Noise Impact Assessment to a Proposed Residential Development

227 Shepherds Bush Road, London

Client: Pegasus Planning Group Limited

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0. SUMMARY

0.1. The client is preparing an application for the Prior Approval of an upward residential extension of existing commercial space at 227 Shepherds Bush Road, London, to form residential apartments. A separate, coordinated application is being prepared for the conversion of the existing commercial premises to residential.

0.2. An unattended sound level survey at the rear of the site was carried out between the 24th and 25th February 2025.

0.3. ACA Acoustics identified commercial noise sources incident on the rear façade of the development site comprised of mechanical equipment including air conditioning condensers.

0.4. An assessment of noise from third party plant in the vicinity of the site indicates that without mitigation, noise from the equipment is at a level where there is a low likelihood of adverse impact to future occupants. An acoustic specification of façade elements is proposed to mitigate this impact.

0.5. The outline scheme for sound insulation of the building envelope has been developed such that internal sound levels during the daytime do not exceed LAeq 30dB within living rooms and bedrooms, and LAeq 25dB overnight in bedrooms. Industrial and commercial noise sources in the area are understood to operate only during daytime hours. This level is at least 5dB more stringent than the guideline criteria in BS 8233:2014 to provide a good standard of amenity in residential dwellings. This ensures that noise intrusion from industrial and commercial sources will be low and will not be detrimental to the amenity of future occupants.

0.6. In summary, ACA Acoustics considers that allowing for the noise control measures set out in this report, no noise of an industrial or commercial nature will have an adverse impact on future occupants of the dwellings and therefore in accordance with The Town and Country Planning (General Permitted Development) (England) (Amendment) Order it is recommended that the application for Prior Approval is granted.

1. INTRODUCTION

The client is preparing an application to the London Borough of Hammersmith and Fulham Council for the Prior Approval of the upward extension of the commercial space at 227 Shepherds Bush Road, London, with residential apartments.

ACA Acoustics Limited has been commissioned by Pegasus Planning Group Limited to carry out an assessment of potential acoustic impacts to the proposed residential development.

This report presents results of a sound level and subjective observation survey and assessment of results.

2. ACOUSTIC CRITERIA & ASSESSMENT METHODOLOGY

2.1. The Town and Country Planning (General Permitted Development etc.) (England) (Amendment) Order

The application for Prior Approval is being made under Schedule 2, Part 20, Class AA of the Town and Country Planning (General Permitted Development) (England) Order 2015 (as amended) (GPDO 2015). In accordance with the Order,

> "*Where any development under Class AA is proposed, development is permitted subject to the condition that before beginning the development, the developer must apply to the local planning authority for prior approval of the authority as to impacts of noise from any commercial premises on the intended occupiers of the new dwellinghouses.*"

It is important to consider the GPDO specifically refers to noise from commercial premises to the proposed development. Noise from other sources including traffic on nearby routes is not considered under the GPDO.

The Order does not include any assessment methodology nor criteria to be achieved and therefore it is relevant to consider guidance provided in relevant British Standards and other documents.

2.2. National Planning Policy Framework (NPPF) and Noise Policy Statement for England (NPSE)

The National Planning Policy Framework (referred to as NPPF) sets out the Government's planning policies for England and provides guidance on how these are expected to be applied, providing a framework within which Local Authorities can produce their own distinctive local and neighbourhood plans, which reflect the needs and priorities of their communities.

Paragraph 187 of the NPPF states that,

"*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*".

Paragraph 198 also talks specifically about noise and advises,

"*Planning policies and decisions should also ensure that new development is appropriate for its location taking into account the likely effects (including cumulative effects) of pollution on health, living conditions and the natural environment, as well as the potential sensitivity of the site or the wider area to impacts that could arise from the development. In doing so they should:*

- *Mitigate and reduce to a minimum potential adverse impacts resulting from noise from new development – and avoid noise giving rise to significant adverse impacts on health and quality of life.*
- *Identify and protect tranquil areas which have remained relatively undisturbed by noise and are prized for their recreational and amenity value for this reason*."

Paragraph 200 introduces the concept of the 'agent of change'. This requires,

"*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*".

New development must be designed to fully integrate with existing businesses and community uses and the burden on achieving suitable sound levels falls on the new developer.

It is this agent of change principle which forms the backdrop to the requirements of the GPDO. If noise from commercial premises would result in adverse or significant adverse impacts on future occupants of the residential dwellings, the GPDO requires the developer to consider this and design an appropriate mitigation scheme. Incorporating mitigation into the design will protect existing businesses which could otherwise have faced unreasonable burdens due to the development.

The Government's long-term policy aims relating to noise are contained in the Noise Policy Statement for England (referred to as NPSE). Stated aims of the NPSE are:

"*Through the effective management and control of environmental, neighbour and neighbourhood noise within the context of Government policy of sustainable development:*

- *Avoid significant adverse impacts on health and quality of life,*
- *Mitigate and minimise adverse impacts on health and quality of life, and*
- *Where possible, contribute to the improvement of health and quality of life.*"

Paragraphs 2.19 to 2.24 clarify the above aims, referring to established concepts from toxicology; NOEL (No Observed Effect Level) and LOAEL (Lowest Observed Adverse Effect Level). It also introduces a new concept relating to *"significant adverse*" of SOAEL (Significant Observed Adverse Effect Level), however noting,

"*It is not possible to have a single objective noise-based measure that describes 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*".

The first aim of NPPF Paragraph 198 and the second underlying 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 life while also considering the guiding principles of sustainable development, as set out in the NPPF. As neither the NPPF nor NPSE includes any numerical criteria, it is necessary to consider guidance provided in other documents to determine suitable limits that would define the LOAEL on an individual basis.

Finally, it is also of benefit to consider Paragraph 2.7, which advises that,

"*… the application of the NPSE should enable noise to be considered alongside other relevant issues and not to be considered in isolation. In the past, the wider benefits of a particular policy, development or other activity may not have been given adequate weight when assessing the noise implications*".

This provides clear guidance that noise must not be considered in isolation but as part of the overall scheme taking into account the overall sustainability and associated impacts of the proposed development; there is no benefit in reducing noise to an excessively low level if this creates or increases some other adverse impact. Similarly, it may be appropriate in some cases for noise to have an adverse impact if this is outweighed by the reduction or removal of some other adverse impact that is of greater significance to the development.

2.3. Planning Practice Guidance – Noise (PPG-N)

Related to the NPSE and the NPPF, The Department for Communities and Local Government has published additional guidance and clarifications within the Planning Practice Guidance – Noise (PPG-N), available at https://www.gov.uk/guidance/noise--2.

Paragraph 003 of the PPG advises,

"Plan-making and decision making need to take account of the acoustic environment and in doing so consider:

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

In line with the Explanatory Note of the Noise Policy Statement for England, this would include identifying whether the overall effect of the noise exposure … is, or would be, above or below the significant observed adverse effect level and the lowest observed adverse effect level for the given situation."

This guidance is like that set out in the NPPF and NPSE, however, Paragraph 005 of the PPG provides outline guidance on the definition of '*significant adverse effect*' and '*adverse effect*'. A copy of the table appended to Paragraph 005 is repeated below.

Response	Examples of outcomes	Increasing effect level	Action
No Observed Effect Level			
Not present	No Effect	No Observed Effect	No specific measures required
No Observed Adverse Effect Level			
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
Lowest Observed Adverse Effect Level			
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 and reduce to a minimum
Significant Observed Adverse Effect Level			
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

Figure 1: Noise exposure hierarchy, taken from Planning Practice Guidance - Noise

Although this table provides descriptive definitions for the NOEL, LOAEL and SOAEL, as with the NPPF and NPSE there are no numerical values provided.

2.4. British Standard 8233:2014+A1:2019

The introduction to BS 8233:2014 *Guidance on sound insulation and noise reduction for buildings* confirms that,

> *"This guide suggests criteria, such as suitable sleeping/resting conditions, and proposes noise levels that normally satisfy these criteria*."

Guidance limits for internal sound levels within living rooms and bedrooms, taken from Table 4 of BS 8233:2014, are shown in Table 1 below:

Activity	**Location**	**07:00 – 23:00**	**23:00 – 07:00**
Resting	Living Room	35dB LAeq, 16hr	-
Dining	Dining Room/Area	40dB LAeq, 16hr	-
Sleeping (daytime resting)	Bedroom	35dB LAeq, 16hr	30dB LAeq, 8hr

Table 1: BS 8233:2014 indoor ambient sound levels for dwellings

2.5. British Standard 4142:2014+A1:2019

The scope of BS 4142:2014+A1:2019 advises,

> "*This British Standard describes methods for rating and assessing sound of an industrial and/or commercial nature … to assess the likely effects of sound on people who might be inside or outside a dwelling or premises used for residential purposes upon which sound is incident*".

The assessment method of BS 4142:2014+A1:2019 corrects the specific sound level from the source under investigation to account for characteristics that could make the sound more obtrusive to obtain a rating level. This rating level is compared against the prevailing background noise outside the noise-sensitive property.

While BS 4142:2014+A1:2019 is routinely used to assess the potential for an adverse impact on residential occupants due to commercial or industrial noise, it is important to consider that the scope of BS 4142:2014+A1:2019 specifically confirms that,

> "*Sound of an industrial and/or commercial nature does not include sound from the passage of vehicles on public roads and railway systems*".

In accordance with the GPDO and BS 4142:2014+A1:2019, commercial noise does not include vehicles travelling in the vicinity.

3. REVIEW OF SITE LOCATION & DEVELOPMENT PROPOSALS

The development site is located at 227 Shepherds Bush Road, London, and is proposed to be extended upwards to include a fourth and fifth floor. These new storeys would comprise 4 residential flats, with bedrooms on the fourth floor and living spaces on the fifth.

To the front (west) of the site is Shepherds Bush Road. This is a consistently busy road with fire and police stations close to the site. As such, road traffic noise is entirely dominant at all times and commercial noise is not considered to impact the front façade. The rear of the site is impacted by commercial noise in the form of third party air conditioning condensers and extract fans, largely serving the premier inn building next door. Surveyed data suggests that this equipment is sporadically active for short periods throughout the day and night.

An aerial photograph (taken from Google Maps) is shown in Figure 2 below.

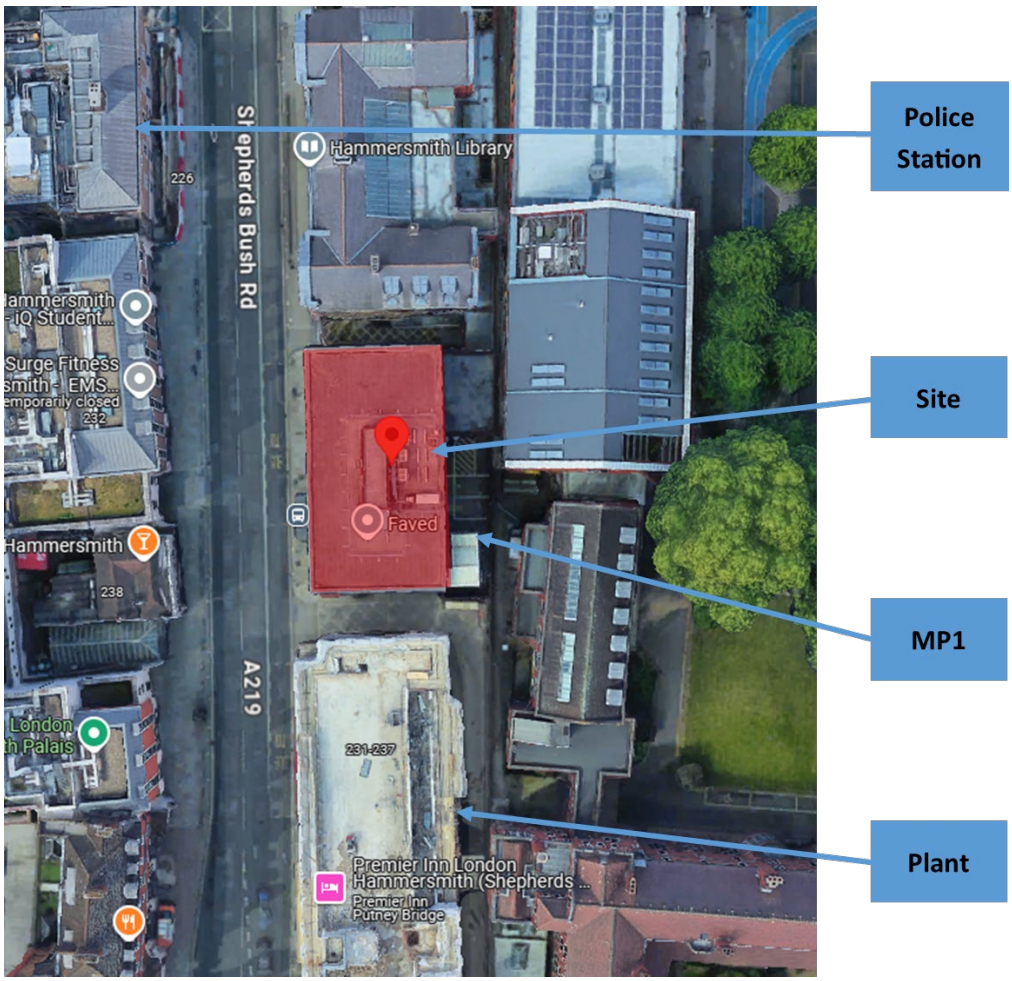


Figure 2: Site location (avalable at www.google.com/maps)

4. SOUND LEVEL SURVEY

To assess the impact of existing noise sources, a sound level survey has been conducted at the development site.

An unattended sound level survey was undertaken between the 24th and 25th February 2025. The survey was conducted by Sam Thorpe of ACA Acoustics Limited.

Details of the survey carried out by ACA Acoustics are provided below.

Sound levels were recorded in consecutive 15-minute samples of overall LAeq, LAfmax, and LA90 values along with other statistical indices and octave band spectra.

During the visit to site, subjective observations of the acoustic climate were gathered. To the front of the site, no commercial noise was subjectively audible. The dominant source of noise in the vicinity was road traffic noise from nearby routes.

To the rear, the noted third party plant was observed running at low level.

Weather conditions at the time of setting up the survey were warm with varied cloud cover, light winds and dry ground conditions. Weather conditions have been reviewed at www.worldweatheronline.com, using the closest available commercial weather station. The extended nature of the survey ensures that a reasonable sample of results have been recorded with appropriate weather conditions and meteorological conditions are not considered to have adversely impacted the outcome of the assessment.

The measurement positions are noted below.

Position Reference	Description
MP1	The microphone was located at the eastern façade of the site, on the rear staircase. This position was screened from traffic on the main road and has line-of-sight to the commercial equipment being assessed.

Table 2: Sound level survey measurement positions

With the microphone being positioned at first floor level and the primary noise source at ground level, it is likely that actual noise levels incident on the fourth and fifth floor rear façade will be lower than the measured levels, making for a more robust assessment.

The following equipment was used during the survey; the sound level meter was calibrated before the survey and checked after with no deviation noted.

Equipment	Serial Number
Rion Class 1 sound level meter type NL-52 complete with weatherproof and lockable outdoor environmental kit	00564867
Svantek calibrator type SV33B. Compliant to IEC 60942-1:2003	122245

Table 3: Equipment used for the sound level survey

Results of the survey in terms of raw data are shown in the graphs below.

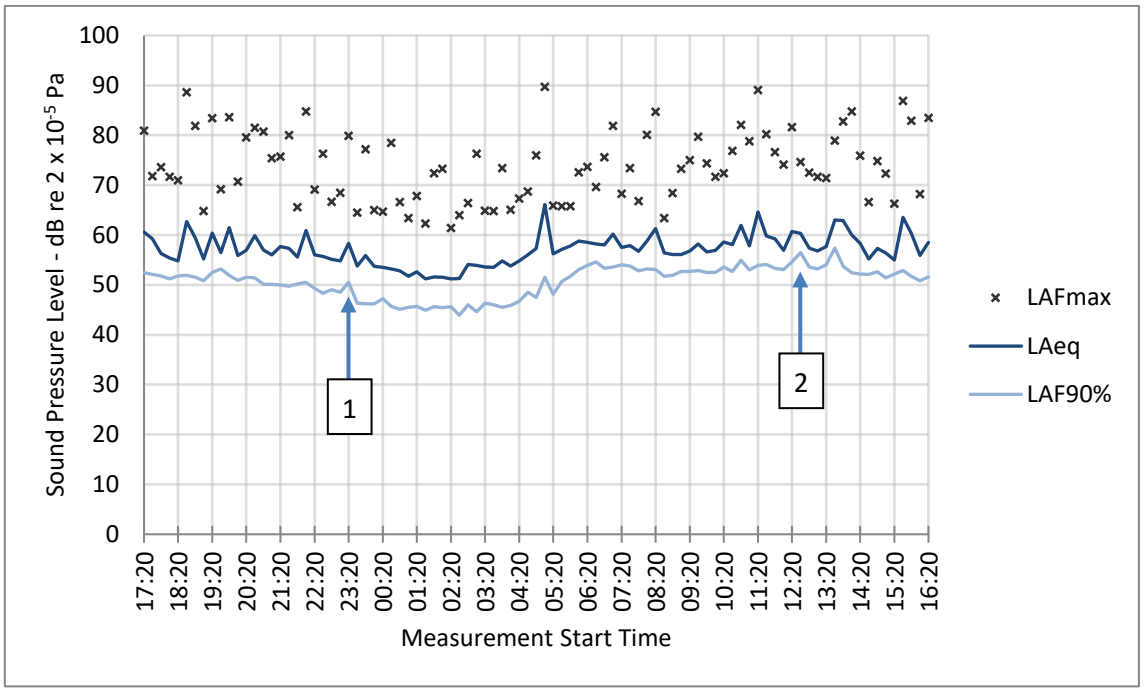


Figure 3: Sound level survey results (MP1) – 24th to 25th February 2025

The frequent peaks in the LAeq data are mirrored by the LA90 measurements. This suggests that the noise source was constant, so this is expected to be showing the impact of mechanical equipment noise as opposed to individual traffic events, which wouldn't typically be reflected in the LA90 data.

The numbered labels on the graph show three of the above mentioned incidents that have been used in this assessment. The details and data for these three events are included in Table 4 below.

Event	Position	Time	Description	Measured sound level
1	Rear facade	23:20-23:35	Level used in nighttime façade assessment	58dB
2	Rear facade	12:20-12:35	Level used in daytime façade assessment	61dB

Table 4: Summary sound level survey results

With only commercial noise impact being considered in the criteria for Permitted Development, an average noise level for the whole day (as is typical for residential planning assessments) gives a lower level than will be present for specific incidents of commercial noise. In this case, the average daytime and nighttime levels are LAeq 59dB and LAeq 57dB respectively.

The legislation does not, and reasonably should not, encompass road traffic noise. Moreover, it is not practical to isolate or assess such noise to determine which vehicle or other movements are

specifically linked to commercial premises. In this instance this includes any noise generated from traffic noise and deliveries to the retained commercial unit on the ground floor.

5. BS 4142:2014+A1:2019 ACOUSTIC ASSESSMENT OF MECHANICAL SERVICES EQUIPMENT

Sound levels include contribution from industrial and commercial sources. As a result, a BS 41412:2104+A1:2019 assessment of mechanical noise has been provided in Table 5 below.

Description	Mechanical Services	Relevant Clause	Commentary
Ambient sound level	LAeq 61dB	7.3.6	Measured sound levels during plant noise event between 12:20 and 12:35
Residual sound level	LAeq 57dB	7.3.3	Measured sound levels after plant event between 12:50 and 13:35
Specific sound level	58dB	7.1 7.3.6	Calculated from the measured ambient and residual sound levels
Background sound level	LA90 46dB	8.1.3 8.3	Representative measured background sound level during the assessment period
Acoustic feature correction	Impulsivity +3dB	9.2	Mechanical equipment often emits a characteristic 'clunk' each time it switches on and as such a +3dB rating correction has been applied to account for these impulsive characteristics.
On time correction	0dB		While during the surveyed period, regular, brief mechanical plant events were measured, variations in weather conditions and equipment condition mean that the equipment could plausible operate for more than an hour at a time.
Rating level	LAr 61dB	9.2	

Description	Mechanical Services	Relevant Clause	Commentary
Excess of rating level over background sound level	**+15dB**	**11**	**Assessment indicates likelihood of adverse impact**

Table 5: BS 4142:2014+A1:2019 Assessment

The initial outcome of the BS 4142 assessment of operational noise emissions from the nearby commercial sources is that, without mitigation, there is a likelihood of adverse impact, depending on the context.

The primary context of this assessment is the development of new residential properties to an area of existing commercial use. In the author's experience the likelihood of adverse impact is reduced in this context compared to the reverse situation of bringing a new noise-generating use to an existing residential dwelling; in situations where a new noise source is introduced, residents notice a change in the acoustic climate, potentially causing a reduction of amenity. However, in this instance residents moving into the new residential flats would not be conditioned to any pre-existing lower levels.

Section 11 of BS 4142:2014 discusses potential aspects which may alter the initial assessment result and advises that:

"*Where the initial estimate of the impact needs to be modified due to the context, take all pertinent factors into consideration, including the following … the sensitivity of the receptor and whether dwellings … will incorporate design measures that secure good internal and/or outdoor acoustic conditions, such as:*

i) Façade insulation treatment;
ii) Ventilation and/or cooling that will reduce the need to have windows open so as to provide rapid or purge ventilation", and;
iii) Acoustic screening.

This confirms that designing the sound insulation performance of façade elements to achieve appropriate internal sound levels is required to mitigate the adverse impact.

An appropriate scheme of façade sound insulation has been developed to ensure external noise intrusion to the dwellings is low.

Criteria for the habitable rooms have been set at a level 5dBA below guideline criteria contained in the ProPG/BS8233:2014. This will adequately mitigate the potential adverse impacts from the existing commercial noise sources. Noise from the sources to inside the new dwellings will be low and will not be detrimental to the amenity of future residents.

It is considered that the above alters the outcome of the BS 4142:2014+A1:2019 assessment such that noise from industrial and commercial noise sources will have a low likelihood of adverse impact.

6. ASSESSMENT OF FAÇADE SOUND INSULATION

A scheme for sound insulation is necessary to ensure sound levels inside rooms of the new residential dwellings are reasonable and comply with the requirements of BS 8233:2014 along with an additional 5dB lower criteria to account for the industrial and commercial noise source characteristics.

A computer model has been set up using the measured sound levels incident on the façades of the development along with anticipated façade elements. The computer model is based on the calculation procedures outlined in BS EN ISO 12354-3:2000 and BS 8233:2014.

Due to the commercial noise source being equipment serving a hotel, it is expected – reflected in the survey results - that this could run for potentially 24 hours a day, unlike most commercial sources.

Confirmation of the acoustic performance of the building envelope elements used in the calculation model is provided in Table 6 below.

Description	Location	Rw (dB)	Rw + C'tr (dB)	Typical Construction
External façade walls	Rear façade of development	52	48	Masonry brick-cavity-block construction
Windows	Rear façade of development	37	35	Double glazing such as 10-12-6 Thermal Double Glazing
Roof	Fifth Floor	46	39	Tile-Slate, 25mm plasterboard ceiling c-w insulation

Table 6: Acoustic performance specification for facade elements

Note that the constructions provided are typical and variations on the specification would be acceptable, so long as the installed construction achieved the specified sound insulation performance. It is recommended the glazing supplier submit test data confirming their unit will comply with the specified performance.

6.1. Ventilation Strategy

It is usual to satisfy internal sound level criteria whilst achieving the background ventilation rate defined by Approved Document F of the Building Regulations. It is therefore anticipated that it will be necessary to incorporate an acoustic ventilation scheme into the design such that residents can achieve background ventilation without necessarily needing to open windows.

Values in Table 7 below show a specification schedule of ventilator sound insulation performance for the development, used in the computer model. Note that there are many different passive ventilators including through-wall type and those built into the window frame. If the Dn,e,w performance is not lower than that shown Table 7 then any alternative ventilator may be used. Where a room has windows to two facades it is recommended that ventilators are incorporated into windows/walls on the quieter façade.

Description	Dn,e,w (dB)	Typical Ventilator Type
Acoustic Ventilation	45	Rytons Acoustic Through-Wall AAC125HPCWL or equivalent

Table 7: Specification for ventilator Element Normalized Level Difference – Dn,e,w (dB)

6.2. Calculated Internal Sound Levels

A copy of acoustic calculations for daytime and night-time noise intrusion into sample rooms is provided in Appendix A. Summary results are confirmed Table 8 below and demonstrate that intrusive sound levels within rooms of the proposed residential units will comply with guidance criteria in BS 8233:2014. As discussed above, a criteria 5dBA more stringent than BS 8233:2014 has been used, to ensure that commercial activity is not detrimental to the amenity of future occupants.

Plot / Room	Description	Calculated Internal Sound Level	Criteria
Rear Large Bedrooms	Daytime LAeq	26dB	≤ 30dB
	Nighttime LAeq	23dB	≤ 25dB
Rear Small Bedrooms	Daytime LAeq	27dB	≤ 30dB
	Nighttime LAeq	24dB	≤ 25dB
Living Rooms	Daytime LAeq	29dB	≤ 30dB

Table 8: Summary internal sound levels within sample habitable rooms

7. CONCLUSION

ACA Acoustics have been commissioned to provide a noise impact assessment for a proposed upward extension at 227 Shepherds Bush Road, London. In accordance with the requirements of the GDPO, the assessment is to be submitted in support of an application for permitted development.

ACA Acoustics have undertaken an external sound level survey. An assessment of noise from industrial and commercial sources has been undertaken.

As such, an acoustic specification for façade insulation elements has been developed to ensure internal sound levels within habitable rooms will be at least 5dBA better than recommended guideline criteria within BS 8233:2014+A1:2019.

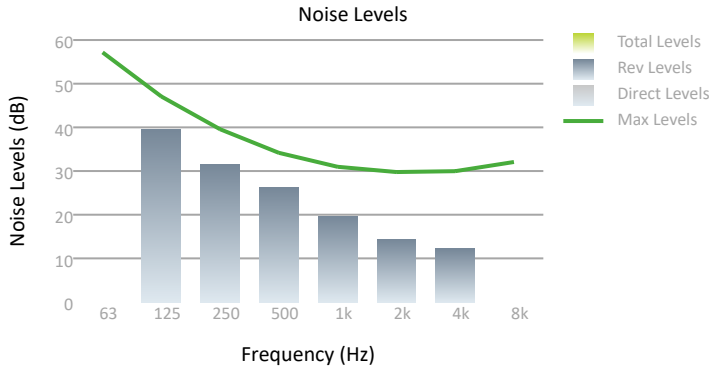
It is the author's opinion that, allowing for an appropriate mitigation strategy as set out in this report, sound intrusion to the proposed residential dwellings should not be detrimental to the amenity of future occupants and the site is suitable for the proposed development and therefore in accordance with the GPDO it is recommended that the application for Prior Approval is granted.

Appendix A

Acoustic Calculations

227 Shepherds Bush Road, London

Reference	Rear Living Rooms
Description	Fifth Floor
Target Sound Level	35dB(A)
Max Sound Level	40dB(A)
Calculated Sound Level	28.8dB(A)
Calculated Tmf T60 (s)	0.5
Volume (m^3)	147.8



Calculated Internal Sound Levels

Reference	Quantity	Noise Levels (dB)							
		63	125	250	500	1k	2k	4k	8k
Leq, ff (Day)	1	-	39.4	31.6	26.2	19.7	14.4	12.2	-

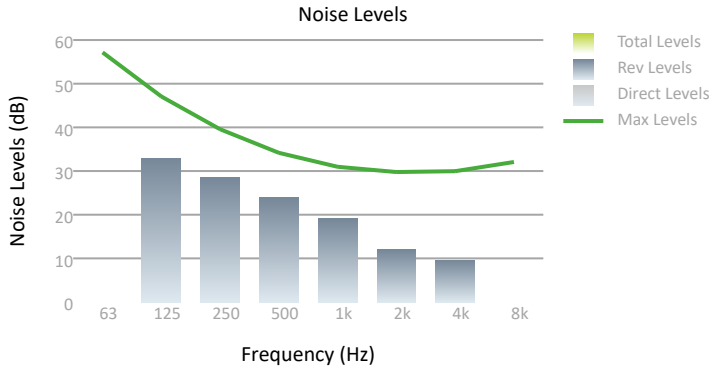
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227 Shepherds Bush Road, London

Reference	Rear Large Bedrooms Day
Description	Fourth Floor
Target Sound Level	35dB(A)
Max Sound Level	40dB(A)
Calculated Sound Level	25.8dB(A)
Calculated Tmf T60 (s)	0.45
Volume (m^3)	38.9



Calculated Internal Sound Levels

Reference	Quantity	Noise Levels (dB)							
		63	125	250	500	1k	2k	4k	8k
Leq, ff (Day)	1	-	32.9	28.6	23.8	19.1	12.0	9.6	-

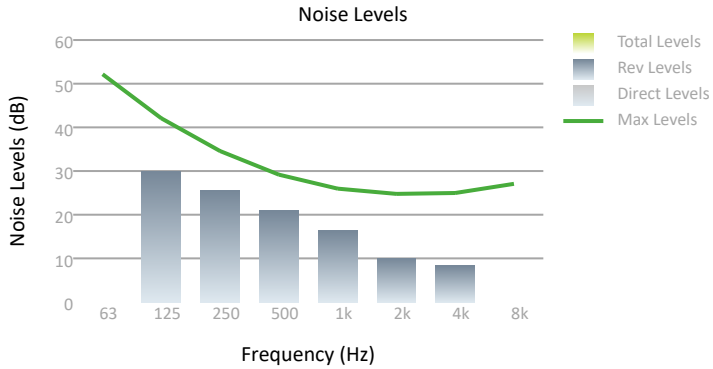
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227 Shepherds Bush Road, London

Reference	Rear Large Bedrooms Night
Description	Fourth Floor
Target Sound Level	30dB(A)
Max Sound Level	35dB(A)
Calculated Sound Level	23dB(A)
Calculated Tmf T60 (s)	0.45
Volume (m^3)	38.9



Calculated Internal Sound Levels

Reference	Quantity	Noise Levels (dB)							
		63	125	250	500	1k	2k	4k	8k
Leq, ff (Night)	1	-	30.0	25.6	20.9	16.3	10.1	8.3	-

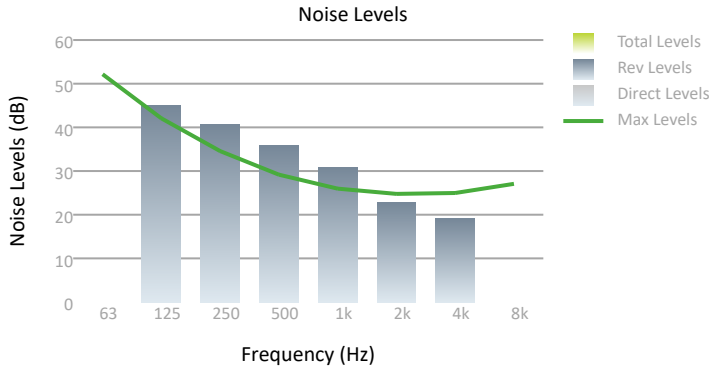
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227 Shepherds Bush Road, London

Reference	Rear Large Bedrooms LAFmax
Description	Fourth Floor
Target Sound Level	30dB(A)
Max Sound Level	35dB(A)
Calculated Sound Level	37.6dB(A)
Calculated Tmf T60 (s)	0.45
Volume (m^3)	38.9



Calculated Internal Sound Levels

Reference	Quantity	Noise Levels (dB)							
		63	125	250	500	1k	2k	4k	8k
Lmax, ff (Night)	1	-	44.9	40.6	35.8	30.8	22.7	19.0	-

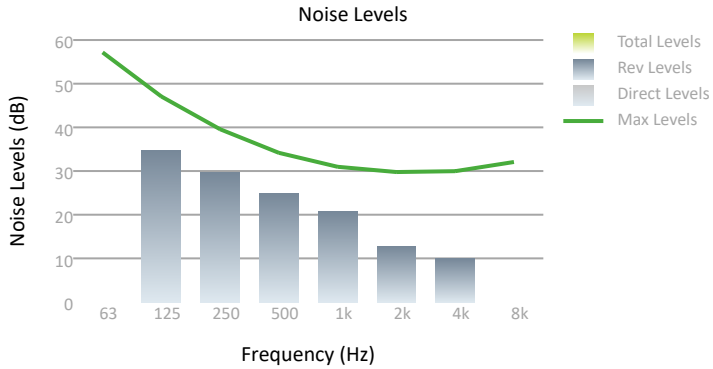
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227 Shepherds Bush Road, London

Reference	Rear Small Bedrooms Day
Description	Fourth Floor
Target Sound Level	35dB(A)
Max Sound Level	40dB(A)
Calculated Sound Level	27.1dB(A)
Calculated Tmf T60 (s)	0.45
Volume (m^3)	22.5



Calculated Internal Sound Levels

Reference	Quantity	Noise Levels (dB)							
		63	125	250	500	1k	2k	4k	8k
Leq, ff (Day)	1	-	34.7	29.8	25.0	20.8	12.8	10.0	-

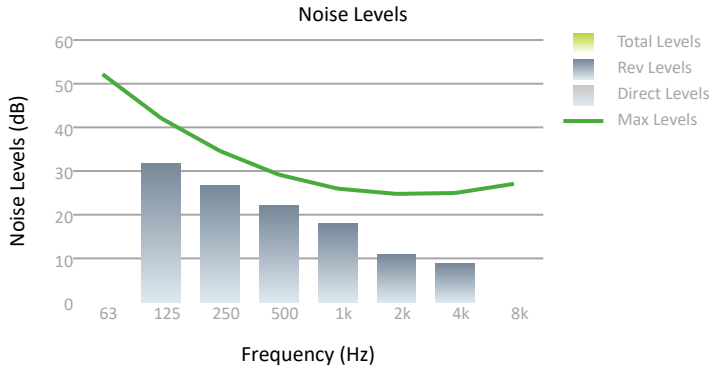
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227 Shepherds Bush Road, London

Reference	Rear Small Bedrooms Night
Description	Fourth Floor
Target Sound Level	30dB(A)
Max Sound Level	35dB(A)
Calculated Sound Level	24.3dB(A)
Calculated Tmf T60 (s)	0.45
Volume (m^3)	22.5



Calculated Internal Sound Levels

Reference	Quantity	Noise Levels (dB)							
		63	125	250	500	1k	2k	4k	8k
Leq, ff (Night)	1	-	31.7	26.8	22.0	18.0	10.9	8.8	-

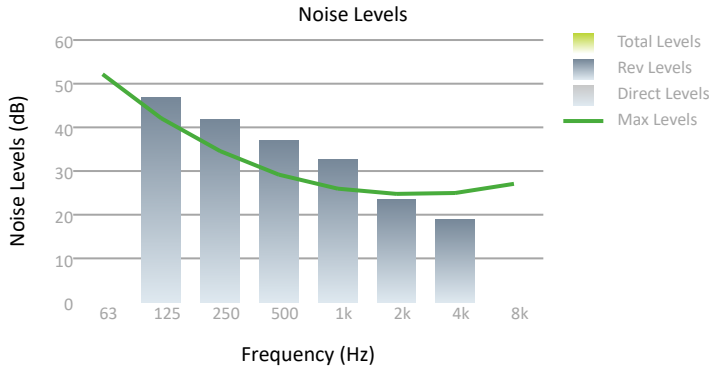
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227 Shepherds Bush Road, London

Reference	Rear Small Bedrooms LAFmax
Description	Fourth Floor
Target Sound Level	30dB(A)
Max Sound Level	35dB(A)
Calculated Sound Level	38.9dB(A)
Calculated Tmf T60 (s)	0.45
Volume (m^3)	22.5



Calculated Internal Sound Levels

Reference	Quantity	Noise Levels (dB)							
		63	125	250	500	1k	2k	4k	8k
Lmax, ff (Night)	1	-	46.7	41.7	36.9	32.6	23.5	19.0	-

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Calculation Sheet

Room Reference - Daytime Leq

		Octave Band Centre Frequency (Hz)								
		63	125	250	500	1k	2k	4k	8k	
Sound Level at Facade (Daytime Leq)										
Source dBA	**61.0**									
Octave Band Frequencies										
Leq,ff		**65.0**	**63.0**	**59.0**	**57.0**	**57.0**	**53.0**	**48.0**	**42.0**	**Row A**
Facade Wall Element										
		-40.4	*-43.4*	*-47.4*	*-47.4*	*-56.4*	*-60.4*	*-62.4*	*-67.4*	
Facade Glazed Element										
		-	*-41.3*	*-37.3*	*-40.3*	*-48.3*	*-48.3*	*-45.3*	*-*	
Ventilators										
		-37.9	*-34.9*	*-36.9*	*-39.9*	*-42.9*	*-49.9*	*-53.9*	*-57.9*	
Cumulative Lp										
Result		**-**	**29.5**	**25.2**	**20.4**	**15.6**	**8.6**	**6.2**	**-**	
ISO 12354-3 Lfs Correction										
		-	*0.0*	*0.0*	*0.0*	*0.0*	*0.0*	*0.0*	*-*	
Room Corrections										
		-	*3.4*	*3.4*	*3.4*	*3.4*	*3.4*	*3.4*	*-*	
Internal Receiver Noise										
Internal Receiver Noise - Rear Large Bedrooms Day **Reverberant Field, LPrev:**		**-**	**32.9**	**28.6**	**23.8**	**19.1**	**12.0**	**9.6**	**-**	

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Calculation Sheet

Room Reference - Leq

		Octave Band Centre Frequency (Hz)								
		63	125	250	500	1k	2k	4k	8k	
Sound Level at Facade (Nighttime Leq)										
Source dBA	**58.0**									
Octave Band Frequencies										
Leq,ff		**62.0**	**60.0**	**56.0**	**54.0**	**54.0**	**50.0**	**45.0**	**39.0**	**Row A**
Facade Wall Element										
		-40.4	*-43.4*	*-47.4*	*-47.4*	*-56.4*	*-60.4*	*-62.4*	*-67.4*	
Facade Glazed Element										
		-	*-41.3*	*-37.3*	*-40.3*	*-48.3*	*-48.3*	*-45.3*	*-*	
Ventilators										
		-37.9	*-34.9*	*-36.9*	*-39.9*	*-42.9*	*-49.9*	*-53.9*	*-57.9*	
Cumulative Lp										
Result		**-**	**26.5**	**22.2**	**17.5**	**12.9**	**6.6**	**4.9**	**-**	
ISO 12354-3 Lfs Correction										
		-	*0.0*	*0.0*	*0.0*	*0.0*	*0.0*	*0.0*	*-*	
Room Corrections										
		-	*3.4*	*3.4*	*3.4*	*3.4*	*3.4*	*3.4*	*-*	
Internal Receiver Noise										
Internal Receiver Noise - Rear Large Bedrooms Night **Reverberant Field, LPrev:**		**-**	**30.0**	**25.6**	**20.9**	**16.3**	**10.1**	**8.3**	**-**	

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Calculation Sheet

Room Reference - Lmax

		Octave Band Centre Frequency (Hz)								
		63	125	250	500	1k	2k	4k	8k	
Sound Level at Facade (Nighttime Lmax)										
Source dBA	**73.0**									
Octave Band Frequencies										
Leq,ff		**77.0**	**75.0**	**71.0**	**69.0**	**69.0**	**65.0**	**60.0**	**54.0**	**Row A**
Facade Wall Element										
		-40.4	*-43.4*	*-47.4*	*-47.4*	*-56.4*	*-60.4*	*-62.4*	*-67.4*	
Facade Glazed Element										
		-	*-41.3*	*-37.3*	*-40.3*	*-48.3*	*-48.3*	*-45.3*	*-*	
Ventilators										
		-37.9	*-34.9*	*-36.9*	*-39.9*	*-42.9*	*-49.9*	*-53.9*	*-57.9*	
Cumulative Lp										
Result		**-**	**41.5**	**37.1**	**32.3**	**27.4**	**19.3**	**15.6**	**-**	
ISO 12354-3 Lfs Correction										
		-	*0.0*	*0.0*	*0.0*	*0.0*	*0.0*	*0.0*	*-*	
Room Corrections										
		-	*3.4*	*3.4*	*3.4*	*3.4*	*3.4*	*3.4*	*-*	
Internal Receiver Noise										
Internal Receiver Noise - Rear Large Bedrooms LAFmax										
Reverberant Field, LPrev:		**-**	**44.9**	**40.6**	**35.8**	**30.8**	**22.7**	**19.0**	**-**	

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Calculation Sheet

Room Reference - Daytime Leq

		Octave Band Centre Frequency (Hz)								
		63	125	250	500	1k	2k	4k	8k	
Sound Level at Facade										
Source dBA	**61.0**									
Octave Band Frequencies										
Leq,ff		**65.0**	**63.0**	**59.0**	**57.0**	**57.0**	**53.0**	**48.0**	**42.0**	**Row A**
Facade Wall Element										
		-43.7	*-46.7*	*-50.7*	*-50.7*	*-59.7*	*-63.7*	*-65.7*	*-70.7*	
Facade Glazed Element										
		-	*-38.9*	*-34.9*	*-37.9*	*-45.9*	*-45.9*	*-42.9*	*-*	
Facade Roof Element										
		-26.3	*-30.3*	*-40.3*	*-46.3*	*-51.3*	*-55.3*	*-58.3*	*-*	
Ventilators										
		-43.7	*-40.7*	*-42.7*	*-45.7*	*-48.7*	*-55.7*	*-59.7*	*-63.7*	
Cumulative Lp										
Result		**-**	**33.7**	**25.8**	**20.5**	**14.0**	**8.7**	**6.5**	**-**	
ISO 12354-3 Lfs Correction										
		-	*0.0*	*0.0*	*0.0*	*0.0*	*0.0*	*0.0*	*-*	
Room Corrections										
		-	*5.7*	*5.7*	*5.7*	*5.7*	*5.7*	*5.7*	*-*	
Internal Receiver Noise										
Internal Receiver Noise - Rear Living Rooms										
Reverberant Field, LPrev:		**-**	**39.4**	**31.6**	**26.2**	**19.7**	**14.4**	**12.2**	**-**	

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Calculation Sheet

Room Reference - Daytime Leq

		Octave Band Centre Frequency (Hz)								
		63	125	250	500	1k	2k	4k	8k	
Sound Level at Facade (Daytime Leq)										
Source dBA	**61.0**									
Octave Band Frequencies										
Leq,ff		**65.0**	**63.0**	**59.0**	**57.0**	**57.0**	**53.0**	**48.0**	**42.0**	**Row A**
Facade Wall Element										
		-41.1	*-44.1*	*-48.1*	*-48.1*	*-57.1*	*-61.1*	*-63.1*	*-68.1*	
Facade Glazed Element										
		-	*-42.7*	*-38.7*	*-41.7*	*-49.7*	*-49.7*	*-46.7*	*-*	
Ventilators										
		-36.3	*-33.3*	*-35.3*	*-38.3*	*-41.3*	*-48.3*	*-52.3*	*-56.3*	
Cumulative Lp										
Result		**-**	**30.5**	**25.5**	**20.7**	**16.6**	**8.6**	**5.7**	**-**	
ISO 12354-3 Lfs Correction										
		-	*0.0*	*0.0*	*0.0*	*0.0*	*0.0*	*0.0*	*-*	
Room Corrections										
		-	*4.2*	*4.2*	*4.2*	*4.2*	*4.2*	*4.2*	*-*	
Internal Receiver Noise										
Internal Receiver Noise - Rear Small Bedrooms Day **Reverberant Field, LPrev:**		**-**	**34.7**	**29.8**	**25.0**	**20.8**	**12.8**	**10.0**	**-**	

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Calculation Sheet

Room Reference - Leq

		Octave Band Centre Frequency (Hz)								
		63	125	250	500	1k	2k	4k	8k	
Sound Level at Facade (Nighttime Leq)										
Source dBA	**58.0**									
Octave Band Frequencies										
Leq,ff		**62.0**	**60.0**	**56.0**	**54.0**	**54.0**	**50.0**	**45.0**	**39.0**	**Row A**
Facade Wall Element										
		-41.1	*-44.1*	*-48.1*	*-48.1*	*-57.1*	*-61.1*	*-63.1*	*-68.1*	
Facade Glazed Element										
		-	*-42.7*	*-38.7*	*-41.7*	*-49.7*	*-49.7*	*-46.7*	*-*	
Ventilators										
		-36.3	*-33.3*	*-35.3*	*-38.3*	*-41.3*	*-48.3*	*-52.3*	*-56.3*	
Cumulative Lp										
Result		**-**	**27.5**	**22.6**	**17.8**	**13.8**	**6.7**	**4.6**	**-**	
ISO 12354-3 Lfs Correction										
		-	*0.0*	*0.0*	*0.0*	*0.0*	*0.0*	*0.0*	*-*	
Room Corrections										
		-	*4.2*	*4.2*	*4.2*	*4.2*	*4.2*	*4.2*	*-*	
Internal Receiver Noise										
Internal Receiver Noise - Rear Small Bedrooms Night **Reverberant Field, LPrev:**		**-**	**31.7**	**26.8**	**22.0**	**18.0**	**10.9**	**8.8**	**-**	

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Calculation Sheet

Room Reference - Lmax

		Octave Band Centre Frequency (Hz)								
		63	125	250	500	1k	2k	4k	8k	
Sound Level at Facade (Nighttime Lmax)										
Source dBA	**73.0**									
Octave Band Frequencies										
Leq,ff		**77.0**	**75.0**	**71.0**	**69.0**	**69.0**	**65.0**	**60.0**	**54.0**	**Row A**
Facade Wall Element										
		-41.1	*-44.1*	*-48.1*	*-48.1*	*-57.1*	*-61.1*	*-63.1*	*-68.1*	
Facade Glazed Element										
		-	*-42.7*	*-38.7*	*-41.7*	*-49.7*	*-49.7*	*-46.7*	*-*	
Ventilators										
		-36.3	*-33.3*	*-35.3*	*-38.3*	*-41.3*	*-48.3*	*-52.3*	*-56.3*	
Cumulative Lp										
Result		**-**	**42.5**	**37.5**	**32.7**	**28.4**	**19.3**	**14.7**	**-**	
ISO 12354-3 Lfs Correction										
		-	*0.0*	*0.0*	*0.0*	*0.0*	*0.0*	*0.0*	*-*	
Room Corrections										
		-	*4.2*	*4.2*	*4.2*	*4.2*	*4.2*	*4.2*	*-*	
Internal Receiver Noise										
Internal Receiver Noise - Rear Small Bedrooms LAFmax										
Reverberant Field, LPrev:		**-**	**46.7**	**41.7**	**36.9**	**32.6**	**23.5**	**19.0**	**-**	

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