

Queens Parade, North Road, Lancing, BN15 9BA

08th November 2024

ISSUE 01



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Author	Date	Checked	Date	Description
L. Jennings Tec. IOA	08/11/2024	M. Austin I. Eng. MIOA	09/11/2024	Information.
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1.0 INTRODUCTION

DAA Group has been appointed to carry out a Noise Impact Assessment at Queens Parade, North Road, Lancing, BN15 9BA to support a Planning Application for a new residential development.

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Using results of the noise survey, the sound insulation performance for the whole building envelope including glazing (windows) is assessed, and a scheme of noise mitigation measures is established and included in the report verified by BS8233:2014 rigorous method building envelope sound insulation calculations.

A scheme of noise mitigation measures in the report provides specification details as appropriate for sound insulation upgrade treatment to the separating walls and separating floors.

The technical content of this assessment has been provided by a Tech member of the Institute of Acoustics.

The Institute of Acoustics is the UK's professional body for those working in acoustics, noise and vibration.

2.0 NOISE CRITERIA

2.1 NATIONAL PLANNING POLICY FRAMEWORK (NPPF)

The Department for Communities and Local Government introduced the National Planning Policy Framework (NPPF) in March 2012. The latest revision of the NPPF is dated December 2024.

The NPPF sets out the Government's planning policies for England and how these are expected to be applied. It provides a framework where local Councils can produce their own local and neighbourhood plans which reflect the needs of their communities.

In conserving and enhancing the natural environment, the planning system should prevent both new and existing development from contributing to, or being put at, unacceptable risk from environmental factors including noise.

Planning policies and decisions should aim to avoid noise giving rise to significant adverse impacts on health and quality of life as a result of new development. Conditions may be used to mitigate and reduce noise to a minimum so that adverse impacts on health and quality of life are minimised. It must be recognised that development will often create some noise and existing businesses wanting to develop in continuance of their business should not have unreasonable restrictions put on them.



2.2 NOISE POLICY STATEMENT FOR ENGLAND (NPSE)

The long-term vision of the NPSE is stated within the documents scope, to 'promote good health and a good quality of life through the effective management of noise within the context of Government policy on sustainable development'. The policy aims are stated to:

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

The application of NPSE should mean that noise is properly considered at the appropriate time (for example in planning applications or appeals) where it must be considered alongside other relevant issues. The guiding principles of Government policy on sustainable development should be used to assist in the implementation of the NPSE.

The NPSE should apply to all types of noise apart from occupational noise in the workplace. The types of noises defined in the NPSE includes:

- Environmental noise from transportation sources.
- Neighbourhood noise which includes noise arising from within the community, industrial premises, trade and business premises, construction sites and noise in the street

The Noise Policy Statement England (NPSE) outlines observed effect levels relating to the above, as follows:

- **NOEL – No Observed Effect Level**

- o This is the level below which no effect can be detected. In simple terms, below this level, there is no detectable effect on health and quality of life due to the noise.

- **LOAEL – Lowest Observed Adverse Effect Level**

- o This is the level above which adverse effects on health and quality of life can be detected.

- **SOAEL – Significant Observed Adverse Effect Level**

- o This is the level above which significant adverse effects on health and quality of life occur.

As stated in The Noise Policy Statement England (NPSE), it is not currently possible to have a single objective-based measure that defines SOAEL that is applicable to all sources of noise in all situations. Specific noise levels are not stated within the guidance for this reason and allow flexibility in the policy until further guidance is available.

2.3 ProPG: PLANNING AND NOISE

As outlined above, the National Planning Policy Framework encourages improved standards of design, although it provides no specific noise levels which should be achieved on site for varying standards of acoustic acceptability, or a prescriptive method for the assessment of noise.

ProPG: Planning and Noise was published in May 2017 in order to encourage better acoustic design for new residential schemes in order to protect future residents from the harmful effects of noise. This guidance can be seen as the missing link between the current NPPF and its predecessor, PPG24 (Planning Policy Guidance 24: Planning and Noise), which provided a prescriptive method for assessing sites for residential development, but without the nuance of 'good acoustic design' as outlined in ProPG.

ProPG allows the assessor to take a holistic approach to consider the site's suitability, taking into consideration numerous design factors which previously may not have been considered alongside the noise level measured on site, for example the orientation of the building in relation to the main source of noise incident upon it.

It should be noted this document is not an official government code of practice, and neither replaces nor provides an authoritative interpretation of the law or government policy, and therefore, should be seen as a good practice document only.

2.4 ACOUSTICS VENTILATION AND OVERHEATING

The AVO Guide includes:

- * an explanation of ventilation requirements under the building regulations and as described in Approved Document F, along with typical ventilation strategies and associated noise considerations.
- * an explanation of the overheating assessment methodology described in CIBSE TM59, potential acoustic criteria and guidance relating to different ventilation and overheating conditions, for both environmental noise ingress and building services noise.
- * and a worked example of the application of the AVO Guide including indicative design solutions.

The AVO Guide is intended for the consideration of new residential development that will be exposed predominantly to airborne sound from transport sources, and to sound from mechanical services that are serving the dwellings in question. Although the policy coverage is limited to England, the approach may be applicable in other parts of the UK.

The AVO Guide is intended to contribute to the practice of good acoustic design, as emphasised in the Professional Practice Guidance on Planning and Noise (ProPG). In particular

2.5 BRITISH STANDARD BS 8233:2014

British Standard Code of Practice BS8233:2014 ‘Sound insulation and noise reduction for buildings’ provides recommended guideline value for internal noise levels within dwellings which are similar in scope to guideline values contained within the World Health Organisation Guidelines for Community Noise 1999 (WHO).

Activity	Location	07:00 to 23:00	23:00 to 07:00
Resting	Living room	35 dB LAeq, 16hour	
Dining	Dining room/area	40 dB LAeq, 16hour	
Sleeping (daytime resting)	Bedroom	35 dB LAeq, 16hour	30 dB LAeq, 8hour

2.5 Indoor ambient noise levels for dwellings

The WHO guideline noise criteria set an internal sleep disturbance noise limit of 45dB LAmax,F which should not be exceeded on a regular basis.

2.6 BRITISH STANDARD BS 4142:2014+A1:2019

British Standard 4142: 2014 ‘Methods for rating and assessing industrial and commercial sound’ [BS 4142] is typically used when a new noise generating development is introduced close to noise sensitive receptors. Guidance is given for new noise sensitive developments close to existing noise generating activities is Section 8.5 of BS4142:2014 as follows: “Introduction of a new noise-sensitive receptor Measure the background sound at the intended location of any new noise-sensitive receptor(s) in the absence of any specific sound.

Where a new noise-sensitive receptor is introduced and there is existing industrial and/or commercial sound, it ought to be recognized that the industrial and/or commercial sound forms a component of the acoustic environment. In such circumstances other guidance and criteria in addition to or alternative to this standard can also inform the appropriateness of both introducing a new noise-sensitive receptor and the extent of required noise mitigation.” Based on the above guidance and the nature of existing noise levels, we would recommend that an appropriate internal environment can be achieved through compliance with the Local Authority condition (with the noted legal exceptions), and the specifications given according to British Standard 8233:2014 in Section 2.5.

3.0 SITE SURVEYS

3.1 SITE DESCRIPTION

The application site is located on the corner of North Road and Culver Road. The area is a mix of commercial and residential properties, typical for an urban cityscape environment. The dominant noise source is road noise from the surrounding roads. (See Figure 3.1)



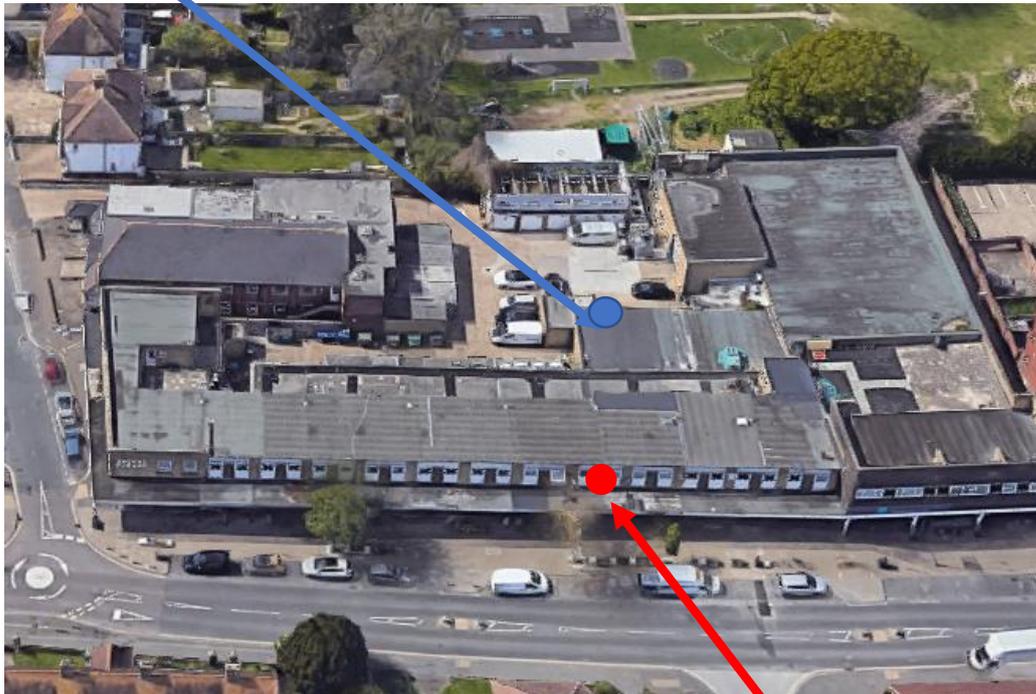
Figure 3.1 – Proposed Site

3.2 ENVIRONMENTAL SITE SURVEY PROCEDURE

In order to characterise the sound profile of the area an environmental sound survey has been carried out from 04/11/2024 to 05/11/2024. The monitoring positions were chosen in order to collect representative data for the potential noise break into the habitable rooms.

Noise Measurements were carried out free field on a flat roof at the rear of the property and 1m outside a first-floor window at the front façade. The external monitoring locations are shown in Figure 3.2.

Measurement Location 2



Measurement Location 1

Figure 3.2 – Measurement Locations

3.3 EQUIPMENT

Instrument manufacturer	Cirrus Research Plc
Model	IEC 61672-3:2013
Serial Number	G302987
Microphone Type	MK:224
Serial Number	214457A
Cirrus CK: 675 Outdoor Kit	
Type 1 Acoustic Calibrator	

Instrument manufacturer	Cirrus
Model	CR:247 Invictus
Serial Number	V069182
Microphone Type	MK: 224
Serial Number	217360D
Calibrator	NC-74
Serial Number	34494274

The calibration of the sound level meters was verified in-situ before any measurements were taken, using the handheld calibrator and reference tone of 114dB at 1kHz. Validation checks at the end of the survey indicated that all instruments had operated within permitted tolerances for drift and measured level.

3.4 METEOROLOGICAL CONDITIONS

As the environmental noise survey was carried out over a long un-manned period no localized records of weather conditions were taken. However, during the set up and collection of the monitoring equipment, the weather conditions have been documented in the following table. All measurements have been compared with met office weather data of the area, specifically the closest weather station, the data from the weather station is outlined in the table below. When reviewing the time history of the noise measurements, any scenarios that were considered potentially to be affected by the local weather conditions have been omitted. The analysis of the noise data includes statistical and percentile analysis and review of minimum and maximum values, which aids in the preclusion of any periods of undesirable weather conditions. The weather conditions were deemed suitable for the measurement of environmental noise in accordance with BS7445 Description and Measurement of Environmental Noise. The table below presents the average temperature, wind speed and rainfall range for each 24-hour period during the entire measurement.

Weather Conditions – London / Gatwick Airport Weather station				
Time Period	Air Temp (°C)	Rainfall mm/h	Prevailing Wind Direction	Wind Speed (m/s)
04/11/2024 – 00:00 – 23:59	8-12	0.0	E	5-7
05/11/2024 – 00:00 – 23:59	9 - 11	0.0	EN	3-4

Table 3.4 – Weather Summary

4.0 NOISE SURVEY

The following free-field sound levels have been derived for assessment of environmental noise break-in.

A maximum value is provided for each night-time measurement period. Based on the World Health Organisation interpretation that for a noise to be regular it needs to occur several (i.e. more than two) times per hour; the L_{AMAX}(f) noise needs to be based upon an average of 10-15 events that are typical in nature. The aim of protecting against maximum noise levels is to ensure protection against typical intermittent noise levels rather than one-off events; whereby an arithmetic average of the 15 typical maximum events across each night period is used to determine values of dB L_{AMAX}(f) reported below. These have been summarised in table 4.1 and 4.2 below.

Measurement Data		Free Field Sound Pressure Level dB	
MP 1			
Time	L _{Aeq,15}	L _{AMAX,15}	L ₉₀
07:00 – 23:00	62dB	78dB	57dB
23:00 – 07:00	48dB	67dB	51dB

Measurement Data		Free Field Sound Pressure Level dB	
MP 2			
Time	L _{Aeq,15}	L _{AMAX,15}	L ₉₀
07:00 – 23:00	52dB	74dB	46dB
23:00 – 07:00	48dB	56dB	41dB

Table 4.1 Measurement Levels

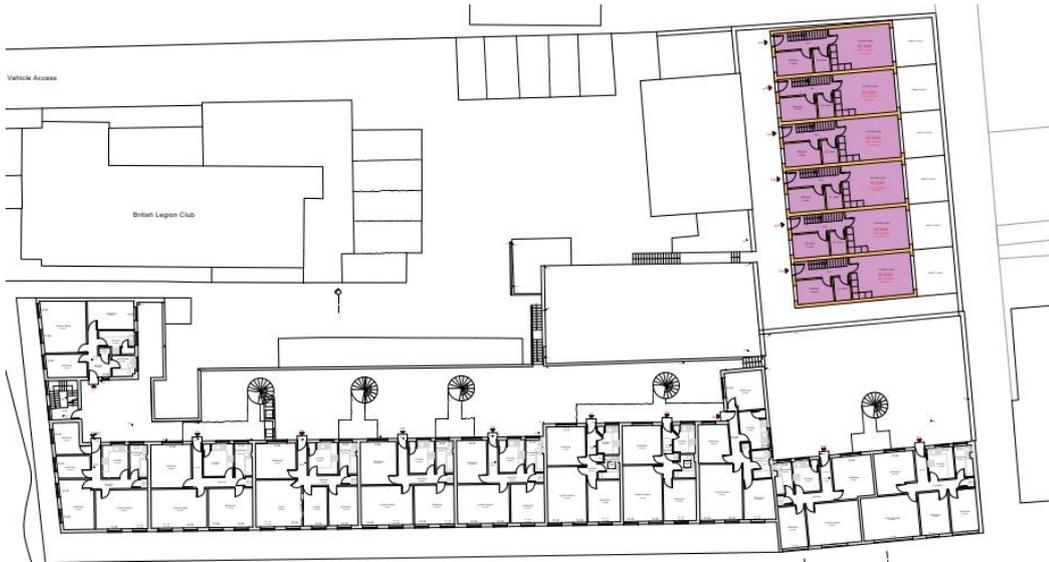
Leq, ff noise levels are taken as the continuous equivalent free-field sound pressure level outside the room elements under consideration.

Location	T	Time	Free-Field Sound Pressure Level Leq, T dB re.20µPa						
			125Hz	250Hz	500Hz	1kHz	2kHz	4kHz	A
MP1	16h	Day	67	61	60	58	53	45	62
	8h	Night	51	45	46	44	39	31	48
		Max	68	66	65	63	58	50	67

Location	T	Time	Free-Field Sound Pressure Level Leq, T dB re.20µPa						
			125Hz	250Hz	500Hz	1kHz	2kHz	4kHz	A
MP2	16h	Day	57	51	50	48	43	35	52
	8h	Night	51	45	46	44	39	31	48
		Max	57	55	54	62	47	39	56

Table 4.2 Summary of octave -band sound levels for break in assessment

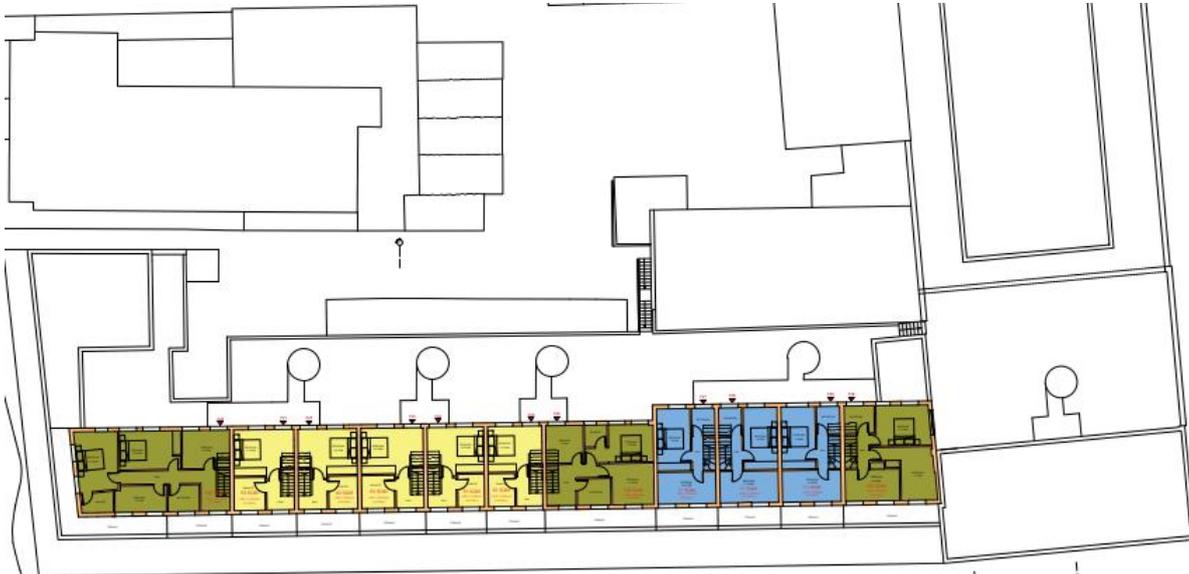
5.0 PROPOSED LAYOUT DESIGN



5.0.1 Proposed Layout Design – First Floor



5.0.2 Proposed Layout Design – Second Floor



5.0.3 Proposed Layout Design - Third Floor

5.1 EXTERNAL SOUND LEVELS

It shall be read from Table 4.2 in Section 4.0 of this report, that the external sound levels taken by means of average equivalent or maximum sound levels are within the World Health Organisation requirements for external noise as described by Community Noise Guidelines (1999) in Section 2.5 of this report.

5.1.1 Pro PG Acoustic Design Statement

The scope of ProPG is restricted to the consideration of new residential development that will be exposed predominantly to airborne noise from transport sources. New apartments, flats and houses are the most common type of new residential development, however the guidance can also be applied to other types of residential developments such as residential institutions, care homes etc. As such it is directly applicable to this development.

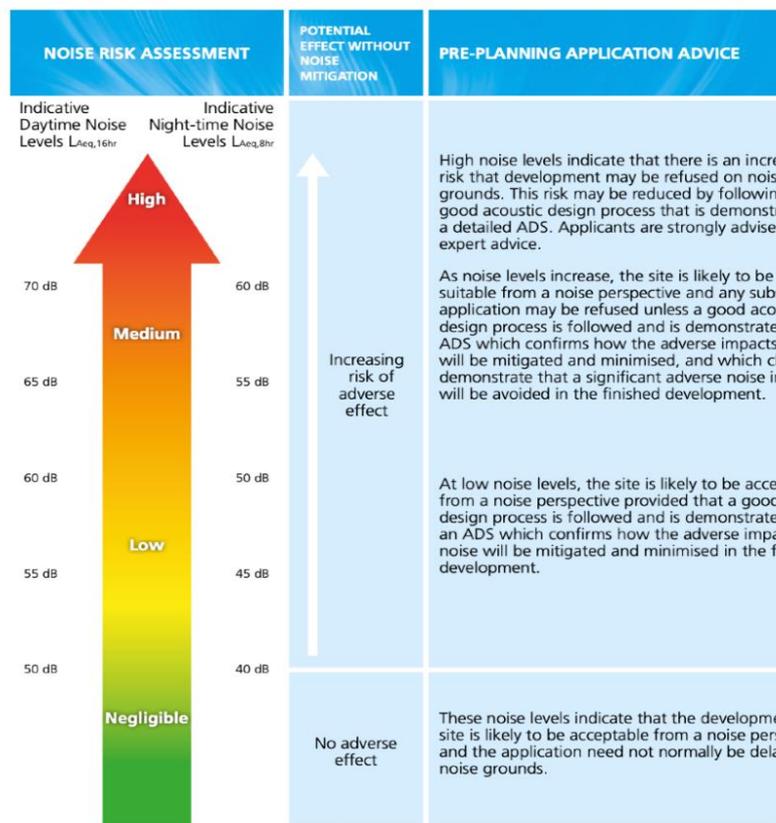


Figure 5.1 - ProPG Noise risk assessment guide

The following table assesses the ProPG noise risk for the measured data. The purpose of this is to provide a view of the noise risk at the site.

MP1	Daytime LAeq, 16hr 07:00 – 23:00	Night-time LAeq, 8hr 23:00 – 07:00
Noise Level	62dB	48dB
ProPG Noise Risk	HIGH	LOW

MP2	Daytime LAeq, 16hr 07:00 – 23:00	Night-time LAeq, 8hr 23:00 – 07:00
Noise Level	52dB	43dB
ProPG Noise Risk	MEDIUM	LOW

Table 5.1.1 : ProPG Stage 1 Assessment table

ProPG states that “Particular care should be taken to ensure that any noise events (as quantified by LAmax,F) have been properly identified and assessed”.

5.1.2 ASSESSMENT OF COMMERCIAL SOURCES

Where a new noise-sensitive receptor is introduced and there is extant industrial and/or commercial sound, it ought to be recognized that the industrial and/or commercial sound forms a component of the acoustic environment. In such circumstances other guidance and criteria in addition to or alternative to BS4142:2014 can also inform the appropriateness of both introducing a new noise-sensitive receptor and the extent of required noise mitigation.” The observed commercial noise sources affect the rear of the site and are as follows:



Figure 5.1.2 – Commercial Noise Sources

	Pizza Nigh Plus (Extraction system) 61dB
	Proposed Site
	20-22 Queens Parade (6 Condenser Units) 58dB
	CO-OP (Chiller) 59dB
	CO-OP Delivery Area
	Lancing Legion Club (3 Condenser Units) 54dB

	Deli Bean (1 Condenser Unit) 50dB
---	-----------------------------------

Located at 14 Queens parade is Pizza Night Plus. The opening hours are:

Sunday – Thursday – 11:00 – 03:00
Friday and Saturday – 11:00 – 02:00.

Manned measurements were taken 1m from the extraction outlet.

Adjacent to the site is Supermarket CO-OP. The noise emissions from the delivery area are presented in MP2 (Measurement location 2).

CO-OP working hours:
Sunday – Friday – 06:00 – 22:00
Saturday – 10:00 – 16:00.

Located approximately 5m away from the rear façade of the site is a large chiller. Measurements were taken 1m away.

Direct contact with the store was made to establish the delivery hours/days but there was no information available.

Manned measurements were taken from the plant nearby the site. On the rear flat roof there is a kitchen extraction system (Pizza Night Plus) and 6 condenser units (20-22 Queens Parade) approximately 5m away from the NSR. On attendance of the site tonality was heard from the units and the correction will be applied to the calculations.

Located at 6 Culver Road is Lancing and Sompting Royal British Legion Club. The noise emissions are presented in MP2 (Measurement Location 2). Located approximately 2m from the west façade of the site is 3 condenser units. Manned measurements were taken 1m away.

The opening hours are:

Monday – 11:00 – 23:00
Tuesday – 11:00 – 21:00
Wednesday – Saturday - 11:00 – 23:00
Sunday – 12:00 – 18:00

Located at 2 Queens Parade is Deli Bean. The noise emissions are presented in MP2 (Measurement Location 2). Located at the rear-west wall of the site is 1 condenser unit. Manned measurements were taken 1m away. The opening hours are:

Monday – Friday – 08:00 – 15:30
Saturday – 09:00 – 14:00
Sunday – Closed

5.1.3 CALCULATION METHOD

For existing plant, the methods described in BS4142:2014 result in the following formula:

$$L_b = 1 - \log [10^{L_m/10} - 10^{L_f/10}]$$

where

L_b = background noise level when plant is removed

L_m = background noise measured with plant running

L_f = Specific noise of the fan

5.1.2 NOISE EMISSION CRITERION

The criteria for plant sound, to be achieved at a point 1m from the closest noise sensitive window, has been set as shown in Table 5.3 in order to comply with the Local Authority requirements.

Time Period	Noise Criterion at 1m outside Residential Receiver
07:00 – 23:00	36
23:00 – 07:00	31

Table 5.3 - Proposed noise emissions criterion

6.0 BS4142:2014+A1:2019 ASSESSMENT – 1m Outside Nearest residential Window

Character corrections should be added to the ‘specific sound level’ if it exhibits any tonality, impulsivity, other specific characteristics and/or intermittency at the assessment location. Based on our site visit and knowledge of such units, corrections to be applied are as follows:

- Tonality – From our measurements the plant was tonal.
- Intermittency – We do not consider plant to have distinguishable intermittency.
- Impulsivity – Plant such as this is not normally impulsive.

BS4142:2014 Assessment		
Source	Mixed Plant	
Operating Period	07:00 – 23:00	23:00 – 07:00
Reference Time Interval (Tr)	15 minutes	
Element	Level (dB)	
Specific Sound Level	57	53
Representative Background Noise Level (LA90)	46	41
Correction	3	0
Rating Level	60	53
Excess of Rating over Background Sound Level	+11	+12

6.1 DISCUSSIONS AND CONTEXT

BS4142 states: “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 or other premises used for residential purposes will already incorporate design measures that secure good internal and/or outdoor acoustic conditions, such as:

- Façade sound insulation treatment
- Ventilation and/or cooling that will reduce the need to have windows open so as to provide rapid or purge ventilation
- Acoustic screening.” With regard to ‘good acoustic conditions’

To mitigate the plant noise emissions, DAA Group recommend installing a Barrier between the NSR’s and the plant.

The screen can be made up of minimum of 15kg M³ closed panel fencing. It should be at least 1m higher and wider than the plant as illustrated below:



We will also be specifying appropriate glazing and mechanical ventilation to negate the need to open windows and the break in noise is to be 10dB below the standard criteria.

BS4142:2014 Assessment with mitigation		
Source Operating Period	Mixed Plant	
	07.00 – 23:00	23:00 – 07:00
Reference Time Interval (Tr) Element	15 minutes	
	Level (dB)	
Specific Sound Level	47	43
Representative Background Noise Level (LA90)	46	41
Correction	3	0
Rating Level	50	43
Excess of Rating over Background Sound Level	+4	+2

Calculations can be found in Appendix D.

7.0 FAÇADE SOUND INSULATION

In accordance with the assessment guidance in Annex G of BS 8233:2014, the sound insulation performance of the building can be estimated by simple calculation from the free-field noise. We will be using the worst-case scenario for MP1 and MP2.

CALCULATION		A	B	(A-B) +5
Location	Period	Free-Field Noise Levels LAeq,T dB	BS8233/WHO Internal Noise Guidance Criteria LAeq, T dB	Typical Insulation Specification dB Rw
1	Day 07:00 – 23:00	62	35	32
	Night 23:00 – 07:00	55	30	23
		67	45	27

2	Day 07:00 – 23:00	60	35	30
	Night 23:00 – 07:00	53	30	28
		56	45	16

Table 7.0 - Sound insulation estimate using the simple calculation method of BS8233

Following the rigorous calculation method of Annex G of BS 8233:2014, it can be shown that a suitable standard of residential amenity can be achieved with façade sound insulation of acoustic double glazing.

7.1 BUILDING FABRIC SPECIFICATION

Sound reduction performance calculations have been undertaken in order to specify the minimum performance required from glazed and non-glazed elements in order to achieve the recommended internal noise levels shown in Table 2.5, taking into account average and maximum noise levels monitored during the environmental noise survey.

Typical sized bedrooms with a high ratio of glazing to masonry have been used for all calculations in order to specify glazing.

As a more robust assessment, L_{Amax} spectrum values of night-time peaks have also been considered and incorporated into the glazing calculation in order to cater for the interior limit of 45 dB L_{Amax} for individual events, as recommended in WHO Guidelines.

7.2 NON-GLAZED ELEMENTS

It is understood that the non glazed element is brickwork cavity walls and would be expected to provide the minimum figures shown above when tested in accordance with BS EN ISO, 140-3:1995.

Element	Octave Band Centre Frequency SRI, dB					
	125	250	500	1K	2K	4K
Non-Glazed Element SRI	41	43	48	50	55	55

Table 7.2 non-glazed elements sound reduction minimum performance

7.3 SPECIFICATION OF GLAZED UNITS

The minimum sound reduction index (SRI) value required for the glazed elements to be installed is shown in Table 7.3 – 7.3.2.

Glazing Configuration – 6mm/ 16mm/ 6mm							
Frequency, Hz/dB					Rw	Rw + C	Rw +Ctr
125	250	500	1K	2K	29	-1	-4
14	19	24	31	41			

Glazing Configuration – 8.38mm Lamiglass/ 14mm/ 10.38mm Lamiglass							
Frequency, Hz/dB					Rw	Rw + C	Rw +Ctr
125	250	500	1K	2K	32	-1	-4
20	21	26	35	42			

Table 7.3 – Required Glazing Performance for Bedrooms at Rear of

site

Glazing Configuration – 10mm Lamiglass/ 20mm/ 6mm Lamiglass							
Frequency, Hz/dB					Rw	Rw + C	Rw +Ctr
125	250	500	1K	2K	38	-2	-4
30	29	33	42	42			

Table 7.3.1 –

Required Glazing Performance for Front of Site

Table 7.3.2 – Required Glazing Performance for Living Area at Rear of Site

The sound reduction performance stated above must be achieved by the glazing system as a whole in its installed condition. The specification therefore applies to both the glazing element and all seals on any openable part of the system. It should be confirmed with any supplier that the full glazing system supplied complies with the requirements stated in Table 7.3 – 7.3.2. Data has been used from Guardian Glass, see Appendix C for details.

Please note that the above guidance only considers acoustic performance. Other disciplines, which consider thermal, safety, durability etc. should be consulted to ensure suitability.

8.0 INTERNAL NOISE CRITERIA

Monitoring Period	Noise Criteria L _{MAX}	No. times exceeded L _{MAX}
07:00 – 23:00	55dB	3
23:00 – 07:00	45dB	0

Table 5.4 – Noise Criteria L_{MAX} - Front façade (MP1)

Monitoring Period	Noise Criteria L _{MAX}	No. times exceeded L _{MAX}
07:00 – 23:00	55dB	7
23:00 – 07:00	45dB	0

Table 5.4.1 - Noise Criteria L_{MAX} - Back façade (MP2)

Monitoring Period	Noise Criteria L _{Aeq}	Internal Noise Level
07:00 – 23:00	35dB	33dB
23:00 – 07:00	30dB	17dB

Table 5.4.3 - Noise Criteria L_{Aeq} - Front façade (MP1)

Monitoring Period	Noise Criteria LAeq	Internal Noise Level
07:00 – 23:00	35dB	20dB
23:00 – 07:00	30dB	16dB

Table 5.4.4 - Noise Criteria LAeq - Back façade (MP2)

9.0 VENTILATION AND OVERHEATING

Guidance on ventilation and associated acoustic considerations is given in Acoustic Ventilation and Overheating – Residential Design Guide [AVO] issued jointly by the Association of Noise Consultants and the Institute of Acoustics. In this guide, the need for ventilation (as falls under the requirements of Approved Document F [ADF] are covered in three main requirements as follows:

- Whole Dwelling Ventilation - General ventilation – continuous ventilation of rooms or spaces at a relatively low rate
- Extract Ventilation - Removal of air from a space or spaces (typically stale air from bathrooms or kitchens) to outside
- Purge Ventilation - Manually controlled removal of air at a high rate to eliminate fumes and odours, e.g. during painting and decorating or from burnt food. May be provided by natural or mechanical means.

Four main template systems for providing each of the above ADF ventilation requirements are summarised in the AVO guide as shown in Table 9.0.

Ventilation System	Method Of Whole Dwelling Ventilation	Method of Extract Ventilation	Method of purge Ventilation
System 1 (Background Ventilators and intermittent extract Fans)	Background ventilators (Trickle Vents)	Intermittent extract fans	Typically provided by opening windows
System 2 (Passive Stack)	Background ventilators (Trickle Vents) & Passive Stack	Continuous via passive stack	Typically provided by opening windows
System 3 (Continuous Mechanical Extract (MEV))	Continuous mechanical extract	Continuous mechanical extract	Typically provided by opening windows

	(low rate), trickle vents provide fresh air	(high rate), trickle vents provide fresh air	
System 4 (Continuously mechanical supply and extract with heat recovery (MVHR))	Continuous mechanical supply and extract (low rate)	Continuous mechanical supply and extract (high rate)	Typically provided by opening windows

Table 9.0 – Summary of ADF Ventilation Requirements

Where possible, natural forms of ventilation are typically preferred. However, in high noise areas, it may be necessary to recommend System 4, in order to minimise penetrations through the external building façade, which weaken the overall sound reduction performance.

Ventilation Strategy (according to ADF)	
System 1: Intermittent Extract Fans System 2: Passive Stack Ventilation	✗
System 3: Continuous Mechanical Extract (MEV)	✗
System 4: Continuous Mechanical Supply & Extract with Heat Recovery (MVHR)	✓

We therefore recommend provision of one of the following acoustic ventilation options:

- Acoustically screened wall mounted mechanical (i.e. powered) acoustic ventilators such as Titon ‘Sonair F+’
- Mechanical Ventilation with Heat Recovery (MVHR) would be to provide each flat with whole house supply and extract ventilation. This comprises of mechanical unit/s that provide both supply and extract to each apartment individually; whereby inlet and outlet ducts would need to be run to the façade or in a riser to the roof. This type of system can also be incorporated with heat recovery built in if desired.
- Positive Input Ventilation (PIV) - Positive Input Ventilation (PIV) also sometimes known as positive pressure ventilation work as a whole house ventilation system and create fresh and healthy living environments by supplying fresh, filtered air into a property at a continuous rate throughout, such as the Envirovent Atmos System

Or any other similar performing acoustic ventilators or ventilation system.

To stairwells, no specific acoustic measures would be necessary and standard trickle vents would be appropriate.

Windows should not be sealed, but openable for times when purge ventilation is required (examples given in Approved Document F including purging of fumes from burnt food when cooking, or removal of fumes when painting).

At no time shall the ventilation system cause the ambient internal noise levels to exceed the criterion set out in BS8233:2014 shown in table 2.4.1. If heat recovery is to be used, then a summer override switch is advisable.

10.0 SOUND INSULATION SPECIFICATION

The floor and wall structure may be subject to pre-completion testing in accordance with requirements of The Building Regulations 2010 Approved Document E (2003 Edition & amendments). It should be expected that the proposed dwelling will exceed the minimum performance standards of the Regulations, as stipulated between dwellings in terms of dB DnT,w +Ctr.

10.1 PARTY FLOOR/ CEILING BETWEEN RESIDENTIAL UNITS

The following construction specification is provided:

- Acoustilay 15
- 18mm Plywood Deck
- Minimum 200mm Joists with 100mm Mineral Wool Insulation (density $\geq 45\text{Kg/m}^3$)
- 16mm Resilient Bars
- 2 x 15mm Fireline or Sound Bloc Plasterboard.

The acoustic modelling indicates that the expected performance of the proposed structure will be as follows:

Projected Airborne Sound Performance:
59 DnTw + Ctr dB.

Projected Impact Sound Performance:
54 L'nTw dB.

10.2 PROPOSED SEPARATING WALL CONSTRUCTION

It is understood that new build separating walls between flats is based on a twin timber stud construction and existing walls to be retained are formed from 100mm solid masonry. To meet the acoustic performance targets for separating walls the following wall specifications are provided:

Timber Stud Party Wall

- 1 x 12.5mm Gyproc Fire Line
- 1 x 15mm Gyproc Sound Bloc
- 2 x 75mm Studs
- Minimum 200mm Cavity between inner boards
- 100mm Mineral Wool Insulation, density $\geq 45\text{Kg/m}^3$
- 1 x 15mm Sound Bloc
- 1 x 12.5mm Fire Line

Acoustic Rating - 57 dB Rw + Ctr

Masonry Party Wall

- 100mm Brick/Block
- 50mm Timber Stud – Not fixed to wall
- 25mm Mineral Wool Insulation, density $\geq 45\text{Kg/m}^3$
- 1 x 12.5mm Fire Line

Acoustic Rating - 56 dB Rw + Ctr

Typical Party Wall Detail between Flats and Communal areas

It is understood that the proposed wall construction to be used between residences and communal areas (in area of column only) is as follows:

- 3mm plaster skim finish
 - 2x12.5mm SoundBloc plasterboard
 - Gypframe 'I' Stud (70 'I' 70) framework with 50mm Isover Steel
 - Frame Infill Batts between studs
 - 200mm RC concrete shear wall (fairfaced on staircase side) to SE design and spec
- The above construction is predicted to achieve a laboratory rated performance of 64dB Rw which approximates to an on-site performance of 52 dB Dn,Tw + Ctr,

10.3 DOOR REQUIREMENTS

Where a degree of sound insulation is deemed necessary, doors with rated acoustic performance would be required. Recommendations with regards to the necessary sound insulation performance of the door units to be installed are shown in Table 9.3.

Rw (dB)	Typical Door Construction
Entrance Doors	Solid Core timber door with drop seals and gaskets, or high quality acoustic perimeter and threshold seals
Internal Doors	Solid core timber door, no seals around the perimeter Solid core timber door, foam tape seals around the perimeter

Table 10.3 – Acoustic Specification of Door Systems

Some general points that should be followed regarding the acoustic performance of doors are as follows.

- Non-hardening caulk should be used to seal joints airtight
- If hollow metal frames are used, they should be fibre- or grout-filled
- Doors should be gasketed around the entire perimeter to be airtight when closed
- Seals should be adjustable to compensate for wear, thermal movement, settlement of building structure and other factors that cause misalignment of the doors
- Good quality hydraulic closers should be fitted on all doors likely to be subjected to heavy use

10.4 LIGHTWEIGHT WALL DETAILING

Socket backs in lightweight partitions should be boxed in using two layers of plasterboard of the same mass as the partition wall and should be staggered by at least 300mm. Party walls should ‘break’ any lightweight flanking constructions to ensure acoustic discontinuity between the leaves of the partition.

10.5 DOWNLIGHTERS

Downlighters should be installed in accordance with the manufacturer’s guidelines at a density of no more than 1 light per 2m² of ceiling and at centres not less than 0.75m. Openings should be no larger than 100mm diameter, or 10mm x 100mm.

10.6 WALL JUNCTIONS

Where party walls meet other constructions, the party wall construction must ‘break’ the flanking construction, such as the plasterboard lining of external walls. Blockwork for internal leaves of external and flanking walls should have a minimum density of 1850kg/m³. With these proposed works implemented the flanking construction is expected to achieve the uprated performance requirements. Cavity stops should be used at all junctions between walls and floors in the external cavity

10.7 PARTY FLOOR/ CEILING BETWEEN COMMERCIAL AND RESIDENTIAL



- Acoustilay 15
- 18mm Plywood Deck
- Minimum 200mm Joists with 100mm Mineral Wool Insulation (density $\geq 65\text{Kg/m}^3$)
- 16mm Resilient Bars
- 2 x 15mm Fireline or Sound Bloc Plasterboard.

The acoustic modelling indicates that the expected performance of the proposed structure will be as follows:

Projected Airborne Sound Performance:
63 DnTw + Ctr dB.

Projected Impact Sound Performance:
54 L'nTw dB.

11.0 SUMMARY AND CONCLUSIONS

A baseline noise survey has been undertaken by DAA Group to establish the prevailing noise climate in the locality of Queens Parade, North Road, Lancing, BN15 9BA in support of a Planning Application for a proposed residential development.

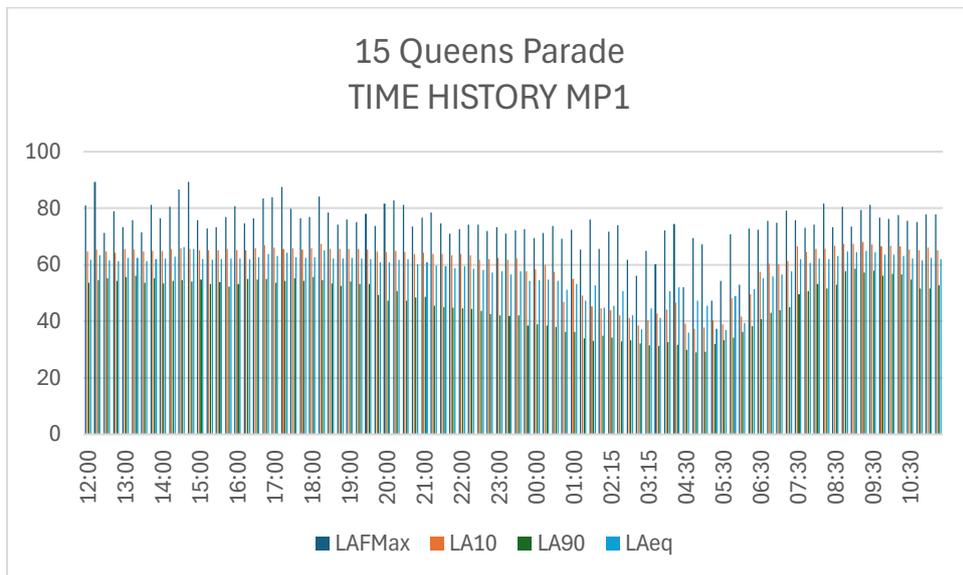
Using results of the noise survey, the sound insulation performance for the whole building envelope including glazing (windows) is assessed, and a scheme of noise mitigation measures is established and included in the report verified by BS8233:2014 rigorous method building envelope sound insulation calculations.

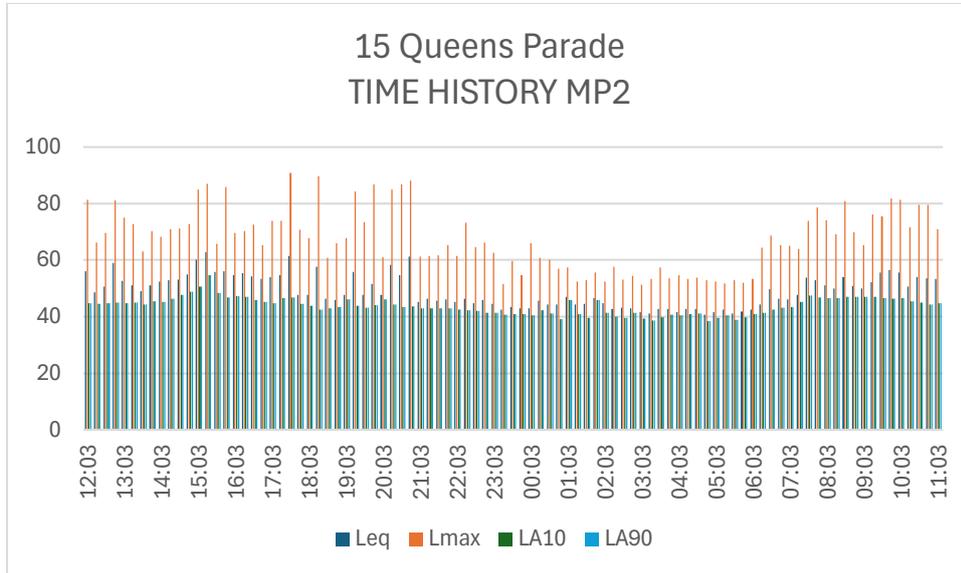
A scheme of noise mitigation measures in the report provides specification details for the internal sound insulation.

A BS4142:2014+A1:2019 Assessment has been carried to assess the noise from the nearby existing commercial plant.

It is concluded that, the impact of noise from commercial premises will not prejudice the amenities of any future occupants provided the above points are taken into consideration.

APPENDIX A – MEASUREMENTS





APPENDIX B - ACOUSTIC TERMINOLOGY

B.1 WEIGHTED DECIBEL, dB(A)

The unit generally used for measuring environmental, traffic or industrial noise is the A-weighted sound pressure level in decibels, denoted dB(A). The weighting is based on the frequency response of the human ear and has been found to correlate well with human subjective reactions to various sounds. An increase or decrease of approximately 10 dB corresponds to a subjective doubling or halving of the loudness of a noise, and a change of 2 to 3 dB is subjectively barely perceptible.

B.2 EQUIVALENT CONTINUOUS SOUND LEVEL, LAeq

Another index for assessment for overall noise exposure is the equivalent continuous sound level, L_{Aeq} . This is a notional steady level which would, over a given period, deliver the same sound energy as the actual time-varying sound over the same period.

B.3 MAXIMUM NOISE LEVEL, L_{max}

The maximum noise level identified during a measurement period. Experimental data has shown that the human ear does not generally register the full loudness of transient sound events of less than 125 ms in duration.

B.4 NOISE RATING, NR

Noise ratings are used as a single figure criterion for specifying services noise in buildings. Each noise rating value has an associated spectrum of defined values in each third or octave frequency band. To determine the noise rating of a room the measured spectrum is compared to a set of noise rating curves. The highest NR curve that crosses any single frequency band of the measurement determines the noise rating for the room. The single figure noise rating is read at the 1 kHz band.

B.5 SOUND LEVEL DIFFERENCE (D)

The sound insulation required between two spaces may be determined by the sound level difference needed between them. A single figure descriptor which characterises a range of frequencies, the weighted sound level difference, D, is sometimes used (BS EN ISO 717-1). This parameter is not adjusted to reference conditions.

The standardized level difference, Dn, T is a measure of the difference in sound level between two rooms, in each frequency band, where the reverberation time in the receiving room has been normalised to 0.5 s. This parameter measures all transmission paths, including flanking paths.

The weighted standardized level difference, DnTw, is a measure of the difference in sound level between two rooms, which characterises a range of frequencies and is normalised to a reference reverberation time

B.6 SOUND REDUCTION INDEX (R)

The sound reduction index (or transmission loss) of a building element is a measure of the loss of sound through the material, i.e. its attenuation properties. It is a property of the component, unlike the sound level difference which is affected by the common area between the rooms and the acoustic of the receiving room. The weighted sound reduction index, Rw, is a single figure description of sound reduction index characterising a range of frequencies, which is defined in BS EN ISO 717-1: 1997. The Rw is calculated from measurements in an acoustic laboratory

B.7 STATISTICAL NOISE LEVELS (L_{A90, (T)} L_{A1, (T)} L_{A10, (T)} etc.)

For levels of noise that vary widely with time, for example road traffic noise, it is necessary to employ an index which allows for this variation. The L_{A10} is the level exceeded for ten per cent of the time under consideration, has historically been

adopted in the UK for the assessment of road traffic noise. The LA90 is the level exceeded for ninety per cent of the time, has been adopted to represent the background noise level. The L_{A1} the level exceeded for one per cent of the time, is representative of the maximum levels recorded during the sample period. A weighted statistical noise levels are denoted LA10, dB LA90, dB. etc. The reference time (T) is normally included, e.g. LA10, (5min), & LA90, (8hr).

B.8 TYPICAL NOISE LEVELS

Typical noise levels are given in the following table.

Noise Level dB(A)	Example
130	Threshold of pain
120	Jet aircraft take-offs at 100 m
110	Chain saw at 1 m
100	Inside disco



90	Heavy lorries at 5 m
80	Kerbside of busy street
70	Loud radio (in typical domestic room)
60	Office or restaurant
50	Domestic fan heaters at 1m
40	Living room
30	Ventilation Noise in Theatre
20	Remote countryside on still night
10	Sound insulated test chamber
0	Threshold of hearing.



Acoustic Performance

Glazing Configuration

3mm Float Glass
10mm Cavity
3mm Float Glass

Sound Reduction Indices

Frequency, Hz / dB*						Rw	C	Ctr	OITC	STC
125	250	500	1000	2000	4000	29	-1	-4	23	28
14	19	24	31	41	21					

*The values expressed in the frequency table correspond to the central values of the 1/3 octave band

Disclaimer: The acoustic performance data provided in the reports is based on a test protocol or an estimation and may be used if user actual glazing is identical to input data described herein. Acoustic performance data herein is only applicable for glazing dimensions 1,23 m x 1,48 m (as per testing standard). Estimation of acoustic performance is based on component-similarity assumptions which are derived from measured data and interpolation to expand the database of values from test protocols. Due to inherent variations in acoustic performance when testing in accordance with EN ISO 10140-3/EN ISO 10140-2, some variation in the calculated performance can also be expected. As such, the weighted performance, R_w , and adaptation terms, C and Ctr, should typically be considered to be accurate within ± 2 dB. However, wider deviations can occur. Actual performance may vary according to the glazing dimensions, frame system, noise sources and many other parameters. The acoustic performance data herein should not be used as a substitute for tests of actual glazing. For more information, please consult Assumptions and Terminology section in Guardian Acoustic Assistant. By accessing this calculator, you agree not to alter or modify the generated report data and information, by any means. Any manual alteration will be your own responsibility and will annul all the content of the report.

Thursday, October 31, 2024 | Acoustic database 20221229



Acoustic Performance

Glazing Configuration

3mm Float Glass
12mm Cavity
4mm Float Glass

Sound Reduction Indices

Frequency, Hz / dB*						Rw	C	Ctr	OITC	STC
125	250	500	1000	2000	4000	32	-1	-4	26	30
20	21	26	35	42	23					

*The values expressed in the frequency table correspond to the central values of the 1/3 octave band

Disclaimer: The acoustic performance data provided in the reports is based on a test protocol or an estimation and may be used if user actual glazing is identical to input data described herein. Acoustic performance data herein is only applicable for glazing dimensions 1,23 m x 1,48 m (as per testing standard). Estimation of acoustic performance is based on component-similarity assumptions which are derived from measured data and interpolation to expand the database of values from test protocols. Due to inherent variations in acoustic performance when testing in accordance with EN ISO 10140-3/EN ISO 10140-2, some variation in the calculated performance can also be expected. As such, the weighted performance, R_w , and adaptation terms, C and Ctr, should typically be considered to be accurate within ± 2 dB. However, wider deviations can occur. Actual performance may vary according to the glazing dimensions, frame system, noise sources and many other parameters. The acoustic performance data herein should not be used as a substitute for tests of actual glazing. For more information, please consult Assumptions and Terminology section in Guardian Acoustic Assistant. By accessing this calculator, you agree not to alter or modify the generated report data and information, by any means. Any manual alteration will be your own responsibility and will annul all the content of the report.

Thursday, October 31, 2024 | Acoustic database 20221229



Acoustic Performance

Glazing Configuration

10mm Float Glass

20mm Cavity

6mm Float Glass

Sound Reduction Indices

Frequency, Hz / dB*						Rw	C	Ctr	OITC	STC
125	250	500	1000	2000	4000	38	-2	-4	32	37
30	29	33	42	42	36					

*The values expressed in the frequency table correspond to the central values of the 1/3 octave band

Disclaimer: The acoustic performance data provided in the reports is based on a test protocol or an estimation and may be used if user actual glazing is identical to input data described herein. Acoustic performance data herein is only applicable for glazing dimensions 1,23 m x 1,48 m (as per testing standard). Estimation of acoustic performance is based on component-similarity assumptions which are derived from measured data and interpolation to expand the database of values from test protocols. Due to inherent variations in acoustic performance when testing in accordance with EN ISO 10140-3/EN ISO 10140-2, some variation in the calculated performance can also be expected. As such, the weighted performance, Rw, and adaptation terms, C and Ctr, should typically be considered to be accurate within ± 2 dB. However, wider deviations can occur. Actual performance may vary according to the glazing dimensions, frame system, noise sources and many other parameters. The acoustic performance data herein should not be used as a substitute for tests of actual glazing. For more information, please consult Assumptions and Terminology section in Guardian Acoustic Assistant. By accessing this calculator, you agree not to alter or modify the generated report data and information, by any means. Any manual alteration will be your own responsibility and will annul all the content of the report.

Monday, November 11, 2024 | Acoustic database 20221229 | Protocol No: Extension based on Extension based on 16/12, .

APPENDIX D – CALCULATIONS

NOISE EMISSION CALCULATION														
ITEM	PARAMETER		HZ		63	125	250	500	1K	2K	4K	8K	dBA	
1		Qty												
2	Extract Flue Vent & AC Noise Sources:													
3														
4														
5														
6														
7	Kitchen Extract system		Spl	dB	-	56	56	55	43	41	42	40	38	61
8	Distance to receptor: 5 m:	5		dB	-	3	3	3	3	3	3	3	3	
9	Directivity factor: Axis 120°			dB	-	-4	-4	-6	-12	-15	-15	-15	-15	
10	Spl at receptor		Spl	dB	+	49	49	46	28	23	24	22	20	53
11														
12	Condenser unit 1:													
13	Spl at 1metre: Free Field:	1		dB	+	47	51	56	40	41	40	36	32	58
14														
15	Distance to receptor: 5 m: SPL2=SPL1-20log(R2/R1)dB	5		dB	-	-14	-14	-14	-14	-14	-14	-14	-14	
16	Directivity factor: Reflective wall:			dB	+	3	3	3	3	3	3	3	3	
17	Spl at receptor		Spl	dB	+	36	40	45	29	30	29	25	21	47
18														
19	Condenser unit 2:													
20	Spl at 1metre: Free Field:	1		dB	+	48	52	57	49	41	40	36	32	59
21														
22	Distance to receptor: 5 m: SPL2=SPL1-20log(R2/R1)dB + Barrier -10	5		dB	-	-24	-24	-24	-24	-24	-24	-24	-24	
23	Directivity factor: Reflective wall:			dB	+	3	3	3	3	3	3	3	3	
24	Spl at receptor		Spl	dB	+	27	31	36	28	20	19	15	11	38
25														
26	Condenser unit 3:													
27	Spl at 1metre: Free Field:	1		dB	+	43	47	52	44	41	40	36	32	54
28														
29	Distance to receptor: 2 m: SPL2=SPL1-20log(R2/R1)dB	2		dB	-	-6	-6	-6	-6	-6	-6	-6	-6	
30	Directivity factor: Reflective wall:			dB	+	3	3	3	3	3	3	3	3	
31	Spl at receptor		Spl	dB	+	40	44	49	41	38	37	33	29	51
32														
33	Condenser unit 4:													
34	Spl at 1metre: Free Field:	1		dB	+	44	46	52	44	39	38	34	32	54
35														
36	Distance to receptor: 2 m: SPL2=SPL1-20log(R2/R1)dB	2		dB	-	-6	-6	-6	-6	-6	-6	-6	-6	
37	Directivity factor: Reflective wall:			dB	+	3	3	3	3	3	3	3	3	
38	Spl at receptor		Spl	dB	+	40	42	47	41	36	35	31	29	50
39														
40	Combined Spl at receptor:		Spl	dB	+	50	51	54	44	41	40	37	33	57
41														
42	Daytime Background Level: (07:00 - 23:00)													46
43	Difference: (Assessment level)			dB	-									11
	E&OE													

Noise Break In Calculations

Calculation Sheet

MP1 - 07:00 - 23:00 to LR

		Octave Band Centre Frequency (Hz)								
		63	125	250	500	1k	2k	4k	8k	
Noise Source										
Noise Source - MP1 - 07:00 - 23:00										
Noise Levels		67.0	67.0	61.0	60.0	58.0	53.0	45.0	45.0	62.4 dBA
Composite SRI										
Facade Width (m)	3.0									
Facade Height (m)	3.0									
Main Element - External Wall										
SRI		-	41.0	43.0	48.0	50.0	55.0	55.0	-	Rw 51
Window Width (m)	1.1									
Window Height (m)	1.0									
No. of Windows (no)	3.0									
Glazed Element - 32Rw										
SRI		-	20.0	21.0	26.0	35.0	42.0	23.0	-	Rw 32
		-	-24.30	-25.31	-30.31	-39.13	-46.00	-27.35	-	
10 log (S/A)										
Internal Receiver - LR										
		-	-2.3	-2.3	-2.3	-2.3	-2.3	-2.3	-	
+3										
		-	3.0	3.0	3.0	3.0	3.0	3.0	-	
Internal Receiver Noise										
Internal Receiver Noise - LR										
Reverberant Field, L_{Prev}		-	43.4	36.3	30.3	19.5	7.7	18.3	-	32.6 dBA



Calculation Sheet

MP1 23:00 - 07:00 to BR

		Octave Band Centre Frequency (Hz)								
		63	125	250	500	1k	2k	4k	8k	
Noise Source										
Noise Source - MP1 23:00 - 07:00										
Noise Levels		51.0	51.0	45.0	46.0	44.0	39.0	31.0	31.0	48.1 dBA
Composite SRI										
Facade Width (m)	4.0									
Facade Height (m)	3.0									
Main Element - External Wall										
SRI		-	41.0	43.0	48.0	50.0	55.0	55.0	-	Rw 51
Window Width (m)	1.1									
Window Height (m)	1.0									
No. of Windows (no)	2.0									
Glazed Element - 32Rw										
SRI		-	20.0	21.0	26.0	35.0	42.0	23.0	-	Rw 32
		-	-27.22	-28.25	-33.25	-41.80	-48.49	-30.36	-	
10 log (S/A)										
Internal Receiver - BR										
		-	0.2	0.2	0.2	0.2	0.2	0.2	-	
+3										
		-	3.0	3.0	3.0	3.0	3.0	3.0	-	
Internal Receiver Noise										
Internal Receiver Noise - BR										
Reverberant Field, LPrev		-	26.9	19.9	15.9	5.4	-6.3	3.8	-	17.1 dBA



Calculation Sheet
MP1 LAMAX to BR

		Octave Band Centre Frequency (Hz)								
		63	125	250	500	1k	2k	4k	8k	
Noise Source										
Noise Source - MP1 LAMAX										
Noise Levels		68.0	68.0	66.0	65.0	63.0	58.0	50.0	50.0	67.2 dBA
Composite SRI										
Facade Width (m)	3.0									
Facade Height (m)	3.0									
Main Element - External Wall										
SRI		-	41.0	43.0	48.0	50.0	55.0	55.0	-	Rw 51
Window Width (m)	1.1									
Window Height (m)	1.0									
No. of Windows (no)	2.0									
Glazed Element - 32Rw										
SRI		-	20.0	21.0	26.0	35.0	42.0	23.0	-	Rw 32
		-	-26.01	-27.03	-32.03	-40.71	-47.49	-29.11	-	
10 log (S/A)										
Internal Receiver - BR										
		-	-1.1	-1.1	-1.1	-1.1	-1.1	-1.1	-	
+3										
		-	3.0	3.0	3.0	3.0	3.0	3.0	-	
Internal Receiver Noise										
Internal Receiver Noise - BR										
Reverberant Field, LPrev		-	43.9	40.9	34.9	24.2	12.4	22.8	-	36.3 dBA



Calculation Sheet

MP2 07:00 - 23:00 to LR

		Octave Band Centre Frequency (Hz)								
		63	125	250	500	1k	2k	4k	8k	
Noise Source										
Noise Source - MP2 07:00 - 23:00										
Noise Levels		38.0	40.0	60.0	40.0	47.0	58.0	36.0	43.0	60.2 dBA
Composite SRI										
Facade Width (m)	3.0									
Facade Height (m)	3.0									
Main Element - External Wall										
SRI		-	41.0	43.0	48.0	50.0	55.0	55.0	-	Rw 51
Window Width (m)	1.1									
Window Height (m)	1.0									
No. of Windows (no)	3.0									
Glazed Element - 38rW										
SRI		30.0	30.0	29.0	33.0	42.0	42.0	36.0	36.0	Rw 39
		-	-33.80	-33.07	-37.13	-45.31	-46.00	-40.26	-	
10 log (S/A)										
Internal Receiver - LR										
		-	-2.3	-2.3	-2.3	-2.3	-2.3	-2.3	-	
+3										
		-	3.0	3.0	3.0	3.0	3.0	3.0	-	
Internal Receiver Noise										
Internal Receiver Noise - LR										
Reverberant Field, LPrev		-	6.9	27.6	3.5	2.3	12.7	-3.6	-	20.3 dBA



Calculation Sheet

MP2 23:00 - 07:00 to BR

		Octave Band Centre Frequency (Hz)								
		63	125	250	500	1k	2k	4k	8k	
Noise Source										
Noise Source - MP2 23:00 - 07:00										
Noise Levels		56.0	22.0	40.0	43.0	43.0	50.0	32.0	30.0	52.2 dBA
Composite SRI										
Facade Width (m)	4.0									
Facade Height (m)	3.0									
Main Element - External Wall										
SRI		-	41.0	43.0	48.0	50.0	55.0	55.0	-	Rw 51
Window Width (m)	1.1									
Window Height (m)	1.0									
No. of Windows (no)	2.0									
Glazed Element - 29Rw										
SRI		-	14.0	19.0	24.0	31.0	41.0	21.0	-	Rw 29
		-	-21.33	-26.29	-31.29	-38.13	-47.66	-28.36	-	
10 log (S/A)										
Internal Receiver - BR										
		-	0.2	0.2	0.2	0.2	0.2	0.2	-	
+3										
		-	3.0	3.0	3.0	3.0	3.0	3.0	-	
Internal Receiver Noise										
Internal Receiver Noise - BR										
Reverberant Field, LPrev		-	3.8	16.9	14.9	8.0	5.5	6.8	-	15.8 dBA



Calculation Sheet
MP2 LAMAX to BR

		Octave Band Centre Frequency (Hz)								
		63	125	250	500	1k	2k	4k	8k	
Noise Source										
Noise Source - MP2 LAMAX										
Noise Levels		57.0	57.0	35.0	54.0	47.0	44.0	51.0	40.0	55.8 dBA
Composite SRI										
Facade Width (m)	3.0									
Facade Height (m)	3.0									
Main Element - External Wall										
SRI		-	41.0	43.0	48.0	50.0	55.0	55.0	-	Rw 51
Window Width (m)	1.1									
Window Height (m)	1.0									
No. of Windows (no)	2.0									
Glazed Element - 29Rw										
SRI		-	14.0	19.0	24.0	31.0	41.0	21.0	-	Rw 29
		-	-20.09	-25.07	-30.07	-36.95	-46.61	-27.11	-	
10 log (S/A)										
Internal Receiver - BR										
		-	-1.1	-1.1	-1.1	-1.1	-1.1	-1.1	-	
+3										
		-	3.0	3.0	3.0	3.0	3.0	3.0	-	
Internal Receiver Noise										
Internal Receiver Noise - BR										
Reverberant Field, LPrev		-	38.8	11.8	25.8	11.9	-0.7	25.8	-	29.4 dBA