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ACOUSTICS PLUS

New Residential Development

Ransoms, Swan Corner, Station Road, Pulborough, West Sussex, RH20 1AH

Environmental Noise Assessment

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Doc Ref: 104476A.ad.Issue1

Company Registration Number: 4304440
VAT Registration Number: 788 2610 94

New Residential Development	
Project Address:	Ransoms Swan Corner Station Road Pulborough West Sussex RH20 1AH
Project Reference:	104476A

Issue/Revision Record			
Issue:	**Date:**	**Remarks:**	**Author:**
1	27/04/2023	First Issue	Andy Dodd

	Signature:	Print:	Title:	Date:
Author:	[redacted]	**Andy Dodd**	**Senior Consultant**	**27/04/2023**
Reviewer:		**Phil Huffer**	**Principal Consultant**	**27/04/2023**

1. INTRODUCTION

1.1 Acoustics Plus Ltd (APL) is an independent firm of multi-disciplinary acoustic engineers. APL is engaged by both private and public sector clients. APL is a registered member of The Association of Noise Consultants (ANC) and the author is a corporate member of The Institute of Acoustics (IOA).

1.2 APL has been instructed by Purple Pepper Partnership Ltd to consider and advise upon the noise implications of the proposed new residential development.

1.3 It is understood that the Local Planning Authority (LPA) will require more information, specifically in regard of noise. It is further understood that the noise matters are in connection with the proposed developments proximity to nearby highways.

1.4 The object of this report is to determine environmental noise levels at the site in accordance with Government planning policy. Outline comments regarding any noise control measures will also be provided to demonstrate that the ingress of noise may be properly controlled.

1.5 The report will give due regard to the following documents:

(a) National Planning Policy Framework July 2021 – Ministry of Housing Communities & Local Government.
(b) Noise Policy Statement for England (NPSE) March 2010 – Department for Environment, Food and Rural Affairs.
(c) ProPG: Planning and Noise May 2017 Professional Practice Guidance on Planning and Noise.
(d) BS8233:2014 “Sound insulation and noise reduction for buildings – Code of Practice”.
(e) Comments received from Horsham District Council.

1.6 This report has been prepared by Acoustics Plus Limited (APL) with all reasonable skill, care, and diligence in accordance with generally accepted acoustic consultancy principles and taking account the services and terms agreed between APL and our client.

1.7 Any information provided by third-parties and referred to herein may not have been checked or verified by APL unless expressly stated otherwise. Certain statements made in the report are predictions based on reasonable assumptions and good industry practice.

1.8 Such statements involve risk and uncertainty which could cause measured and predicted results to differ materially. APL does therefore not guarantee or warrant any prediction contained in this report.

2. BASELINE SITUATION

2.1 The Application Site (the "site") is located at Ransoms, Swan Corner, Station Road, Pulborough, West Sussex, RH20 1AH. The site location plan is shown in Diagram 1.

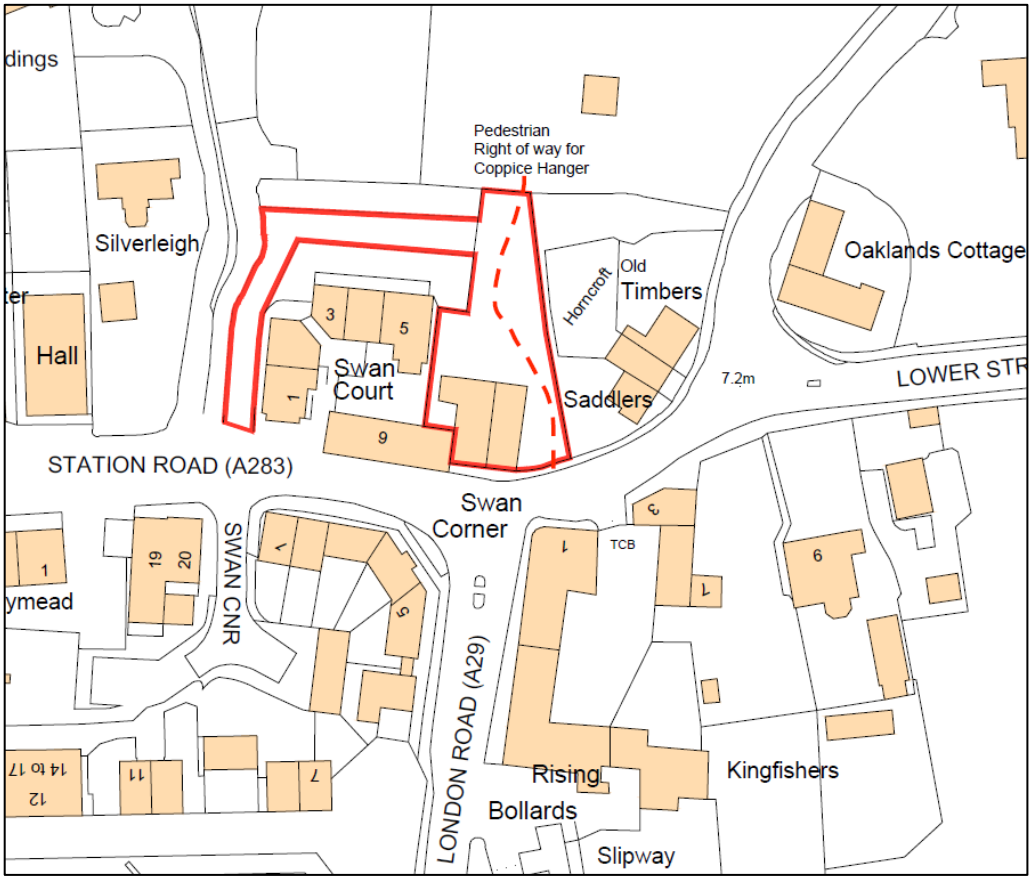


Diagram 1

2.2 The development proposals will comprise the following-

"Demolition of existing mixed use building and erection of a three storey building to provide 8no flats with associated access, parking, bin store and cycle store".

2.3 The proposal would result in the creation of 8no. self-contained residential dwellings located adjacent to office uses at Swan Court and a neighbouring residential properties located east of the site.

3. NOISE CRITERIA

NEW RESIDENTIAL ACCOMMODATION

3.1 The National Planning Policy Framework (NPPF) was revised in July 2021 and has replaced planning policy guidance which previously covered planning and pollution control and new development in England. The purpose of the planning system is to contribute to the achievement of sustainable development. There are three dimensions to sustainable development: economic, social and environmental. The environmental role is to contribute to protecting and enhancing our natural, built and historic environment; including making effective use of land, helping to improve biodiversity, using natural resources prudently, minimising waste and pollution, and mitigating and adapting to climate change, including moving to a low carbon economy.

3.2 One of the core planning principles is to contribute to conserving and enhancing the natural environment and reducing pollution. Planning policies and decisions should contribute to and enhance the natural and local environment by:

(a) protecting and enhancing valued landscapes, sites of biodiversity or geological value and soils (in a manner commensurate with their statutory status or identified quality in the development plan);
(b) recognising the intrinsic character and beauty of the countryside, and the wider benefits from natural capital and ecosystem services – including the economic and other benefits of the best and most versatile agricultural land, and of trees and woodland.
(c) maintaining the character of the undeveloped coast, while improving public access to it where appropriate.
(d) minimising impacts on and providing net gains for biodiversity, including by establishing coherent ecological networks that are more resilient to current and future pressures.
(e) preventing new and existing development from contributing to, being put at unacceptable risk from, or being adversely affected by, unacceptable levels of soil, air, water or noise pollution or land instability. Development should, wherever possible, help to improve local environmental conditions such as air and water quality, taking into account relevant information such as river basin management plans; and
(f) *remediating and mitigating despoiled, degraded, derelict, contaminated and unstable land, where appropriate.*

3.3 Paragraph 174 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"

3.4 Paragraph 185 of the NPPF also refers 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.

3.5 In doing so they should:

a) mitigate and reduce to a minimum potential adverse impacts resulting from noise from new development – and avoid noise giving rise to significant adverse impacts on health and the quality of life
b) identify and protect tranquil areas which have remained relatively undisturbed by noise and are prized for their recreational and amenity value for this reason; and
c) limit the impact of light pollution from artificial light on local amenity, intrinsically dark landscapes and nature conservation.

3.6 The Governments 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.*"

3.7 The Professional Practice Guidance on Planning and Noise (ProPG) has been produced to provide practitioners with guidance on a recommended approach to the management of noise within the planning system in England. The recommended ProPG internal noise level guidelines are described in the table below. These guidelines reflect and extend current practice contained in BS8233:2014 (Sound Insulation and Noise Reduction for Buildings – Code of Practice). For clarity, blue italic font is used to highlight additions to the guidance contained in Table 4 of BS8233:2014. The dB values provided in the table for different activities are target levels. The table plus supporting notes are referred to as ProPG internal noise level guidelines.

Activity	Location	07:00-23:00hrs	23:00-07:00hrs
Resting	Living room	35dB $L_{Aeq,16hr}$	-
Dining	Dining room/area	40dB $L_{Aeq,16hr}$	-
Sleeping (daytime resting)	Bedroom	35dB $L_{Aeq,16hr}$	30dB $L_{Aeq,8hr}$ 45dB $L_{Amax,F}$

Table 1

NOTE 1 The Table provides recommended internal L_{Aeq} target levels for overall noise in the design of a building. These are the sum total of structure-borne and airborne noise sources. Ground-borne noise is assessed separately and is not included as part of these targets, as human response to ground-borne noise varies with many factors such as level, character, timing, occupant expectation and sensitivity.

NOTE 2 The internal L_{Aeq} target levels shown in the Table are based on the existing guidelines issued by the WHO and assume normal diurnal fluctuations in external noise. In cases where local conditions do not follow a typical diurnal pattern, for example on a road serving a port with high levels of traffic at certain times of the night, an appropriate alternative period, e.g. 1 hour, may be used, but the level should be selected to ensure consistency with the internal L_{Aeq} target levels recommended in the Table.

NOTE 3 These internal L_{Aeq} target levels are based on annual average data and do not have to be achieved in all circumstances. For example, it is normal to exclude occasional events, such as fireworks night or New Year's Eve.

NOTE 4 Regular individual noise events (for example, scheduled aircraft or passing trains) can cause sleep disturbance. A guideline value may be set in terms of SEL or $L_{Amax,F}$, depending on the character and number of events per night. Sporadic noise events could require separate values. In most circumstances in noise sensitive rooms at night (e.g. bedrooms) good acoustic design can be used so that individual noise events do not normally exceed 45dB $L_{Amax,F}$ more than 10 times a night. However, where it is not reasonably practicable to achieve this guideline then the judgement of acceptability will depend not only on the maximum noise levels but also on factors such as the source, number, distribution, predictability and regularity of noise events (see Appendix A).

NOTE 5 Designing the site layout and the dwellings so that the internal target levels can be achieved with open windows in as many properties as possible demonstrates good acoustic design. Where it is not possible to meet internal target levels with windows open, internal noise levels can be assessed with windows closed, however any façade openings used to provide whole dwelling ventilation (e.g. trickle ventilators) should be assessed in the "open" position and, in this scenario, the internal L_{Aeq} target levels should not normally be exceeded, subject to the further advice in Note 7.

NOTE 6 Attention is drawn to the requirements of the Building Regulations.

NOTE 7 Where development is considered necessary or desirable, despite external noise levels above WHO guidelines, the internal L_{Aeq} target levels may be relaxed by up to 5 dB and reasonable internal conditions still achieved. The more often internal L_{Aeq} levels start to exceed the internal L_{Aeq} target levels by more than 5 dB, the more that most people are likely to regard them as "unreasonable". Where such exceedances are predicted, applicants should be required to show how the relevant number of rooms affected has been kept to a minimum. Once internal L_{Aeq} levels exceed the target levels by more than 10 dB, they are highly likely to be regarded as "unacceptable" by most people, particularly if such levels occur more than occasionally. Every effort should be made to avoid relevant rooms experiencing "unacceptable" noise levels at all and where such levels are likely to occur frequently, the development should be prevented in its proposed form (see Section 3.D).

3.8 In addition to the standard national noise criteria given above, Horsham District Council have made the following comment during pre- application consultation:

"No development shall commence until a scheme for sound attenuation against external noise has been submitted to and approved by the Local Planning Authority. The approved sound attenuation works shall be completed before the dwellings are occupied and be retained thereafter."

3.9 The proximity of the proposed new development with the adjacent roads and neighbouring uses is shown in Diagram 2 below:



Diagram 2

4. NOISE OUTLINE

4.1 In order to determine the required building envelope sound insulation, consideration must be given to the noise levels on the site from

- *the presence of traffic noise from Station Road*
- *commercial activities from Swan Court.*

4.2 An environmental noise assessment was undertaken. Noise monitoring equipment was installed at the site and left unattended for a 24hr period. The particulars of the measurement exercise are recorded below:

Date:	17th & 18th April 2023
Start Time:	11:45 hrs.
Location:	Ground floor level at a height of 2m above ground, (see green circle highlighted in Diagram 3 below).

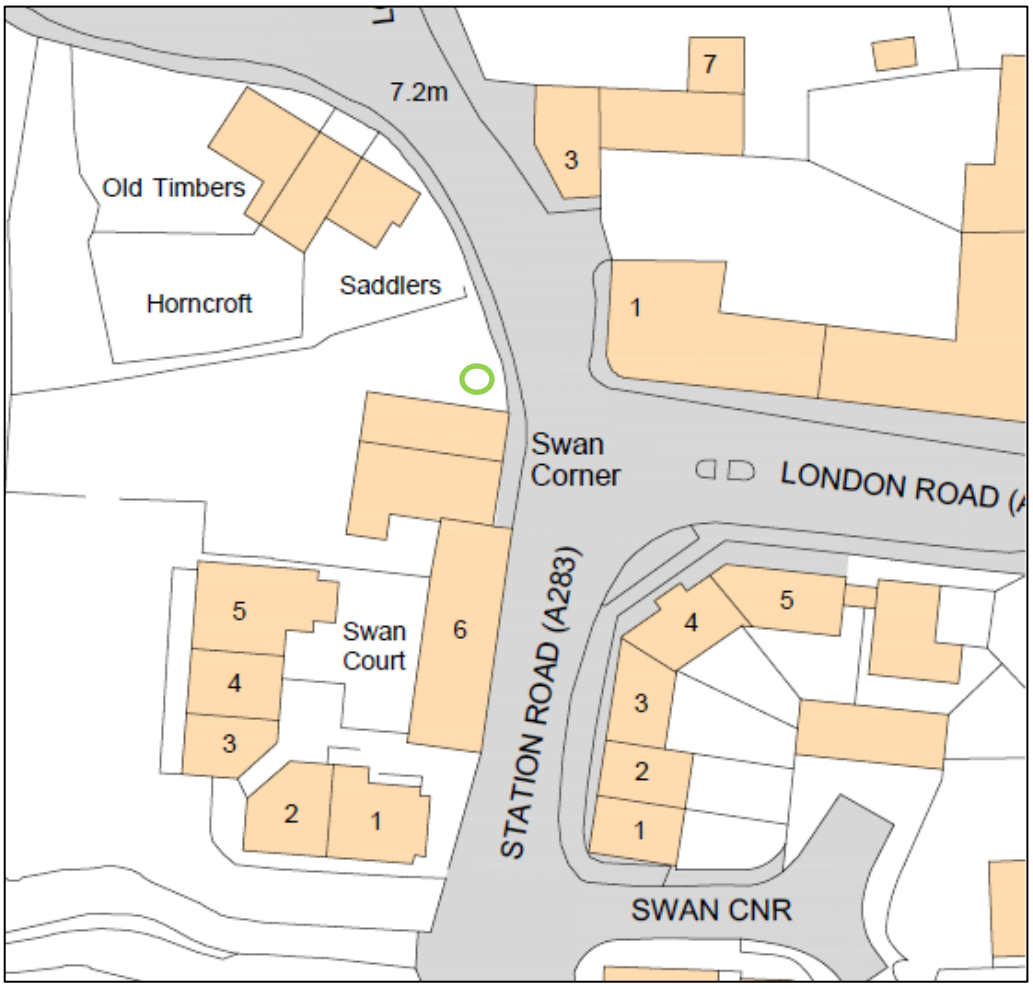


Diagram 3

4.3 The measurements carried out during the exercise are recorded below.

$L_{Aeq, 2mins}$ (dB re 20µPa) - average equivalent sound pressure level
$L_{Amax, 2mins}$ (dB re 20µPa) – maximum sound pressure level.

4.4 A level vs time summary of the noise data obtained at the site is presented in Diagram 4.

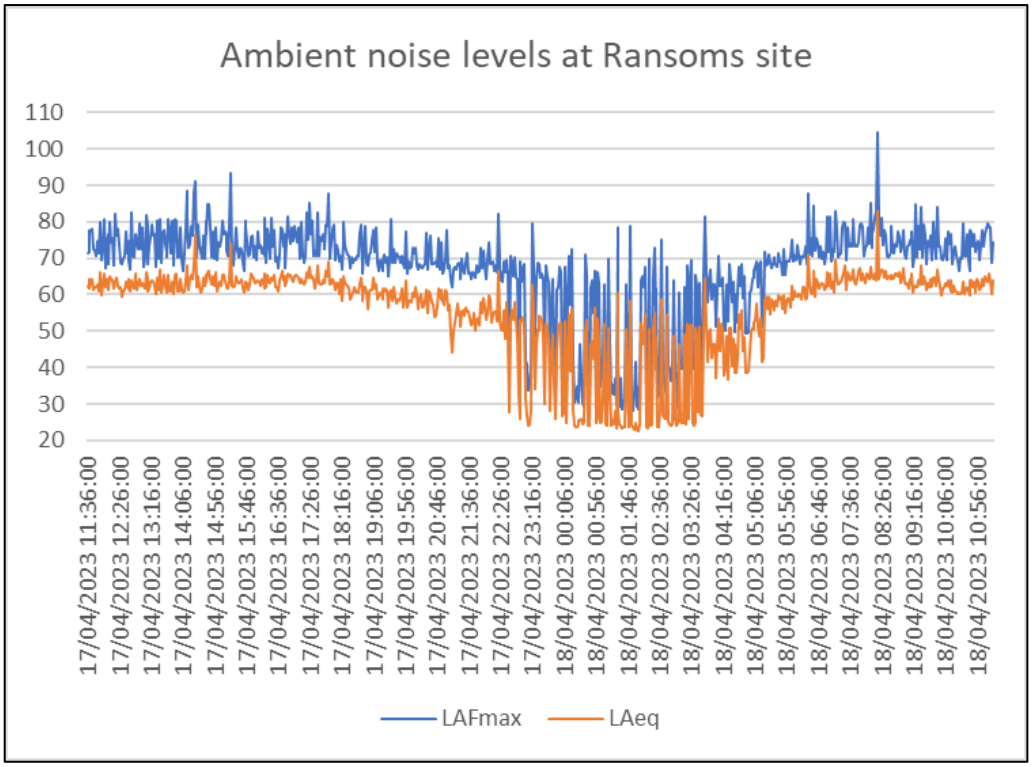


Diagram 4 – level vs time history

4.5 Given the monitoring position and the measurements obtained, it is possible to calculate representative $L_{Aeq, T}$ values experienced during the day and night-time periods.

4.6 For the purposes of this report and in line with the recommendation of BS8233, the following time periods have been calculated.

(a) 07:00 hrs to 23:00 hrs for living rooms.
(b) 23:00 hrs to 07:00 hrs for bedrooms.

4.7 The measurements are based on the day and night time period $L_{Aeq,2min}$ and $L_{Amax,2mins}$ measurements obtained during the assessment period at the front of the site, the results obtained are detailed below.

Location	Daytime 07:00 to 23:00	Night time 23:00 to 07:00	10th highest L_{Amax} dB
Ransoms site	64	56	75[1]

Table 2

5. EQUIPMENT

5.1 All measurements were obtained using the following equipment:

- Svantek Precision Sound Level Meter Type Svan 971, Serial No. 51704
- Rion Calibrator Type NC-74 Class 1, Serial No. 00410215

5.2 The relevant equipment carries full and current traceable calibration.

5.3 The equipment, where necessary, was calibrated prior to and after the measurements were carried out.

[1] *From the data, the 10th highest $L_{Amax,F}$ measurement during the night time period at the façade has been considered, this is taken from WHO Guidelines for Community Noise – which states "For a good sleep, it is believed that indoor sound pressure levels should not exceed approximately 45dB L_{Amax} more than 10-15 times per night" (Vallet and Vernet 1991).*

6. BUILDING ENVELOPE RECOMMENDATIONS

6.1 It is recommended that in order to meet the LPA requirements, acoustic fenestration measures be considered in order to protect the daytime and night-time amenity of future occupiers, it is understood that passive ventilation is to be provided to the new residential dwellings and so passive/trickle ventilation elements will need to be considered within the calculation exercises.

6.2 To reduce daytime and night-time noise exposure in the proposed dwellings, attention should be given to the sound insulation of the façade of the building. The windows will normally be the weakest part of any façade.

6.3 Based on the drawings and outline information supplied, it is anticipated the new cavity walls of the extension will be around R_w 57dB, the pitched roof will be R_w 60dB and the new warm roof type construction will have an insulation value of around R_w 56dB. These performance values were obtained from proprietary prediction software 'Insul' written by Marshall Day, the values predicted have been corrected to account for workmanship and onsite installation. A copy of the prediction output for the construction considered is contained within Appendix A of this report. Given the external noise levels it is recommended that the glazing performances be considered. This will provide the necessary sound insulation values to reduce the internal noise levels to an acceptable level.

6.4 If the considered construction were to be revised, the performance values should be checked prior to the change of use, to ensure the internal noise level requirements of BS8233:2014 are still met.

6.5 From the calculated levels it is possible to predict the internal noise levels within habitable rooms. In order to undertake this, consideration has been given to the following formula:

$$SPL_{in} = SPL_{out} + 10Log_{10}\left(\frac{A_0}{S}10^{\frac{-D_{n,e}}{10}} + \frac{S_{wi}}{S}10^{\frac{-R_{wi}}{10}} + \frac{S_{ew}}{S}10^{\frac{-R_{ew}}{10}} + \frac{S}{A}\right) + 3$$

where:

SPL_{in} =	sound pressure level inside the room
SPL_{out} =	highest sound pressure level outside the room
A_0 =	reference absorption area of $10m^2$
S_{wi} =	area in m^2 of the windows of the room
S_{ew} =	area in m^2 of the external wall of the room
R_{wi} =	weighted sound reduction index of window (R_w+C_{tr})
R_{ew} =	weighted sound reduction index of external wall
S =	area through which sound is transmitted (m^2)
A =	amount of acoustic absorption in room (m^2)
K =	a numerical factor associated with sound incidence

Equation 1

6.6 Room dimensions and the size of windows have been extracted from scaled drawings. For the purposes of the calculation exercises, a typical example of the accommodation proposed at ground floor and second floor level has been assessed.

6.7 Due to the varying methods of quantifying the sound insulation performance of building elements, the following parameters are described:

- *R_w Weighted Sound Reduction Index: Single figure sound insulation value derived from the measured sound reduction index R.*

6.8 To meet the criteria, Equation 1 was rearranged in terms of R_w (the sound reduction index of the window). The window specification required in order to achieve the internal noise levels as set out in BS8233 are shown in Table 3. Details of the elements considered within the calculation exercises are contained within Appendix B of this report.

Accommodation	Sound Reduction Index (R_w)	$D_{n,e,w}$ (dB)
All habitable rooms	34	39

Table 3

6.9 To achieve the values of R_w as specified in Table 3, a number of glazing systems were reviewed.

6.10 The required window performance could be achieved using the following glazing configuration (taken from Guardian Glass):

Required window performance	Glazing configuration (example)
34dB R_w	6mm float glass 10mm cavity 4mm Float glass

Table 4

6.11 To achieve the $D_{n,e,w}$, as specified in Table 3 a Greenwoods AWV39 through wall ventilator ($D_{n,e,w}$ 39dB) was considered. Other wall / frame vents with equal or better performance are available. For the benefit of the calculation exercise 2No. vents were considered for the living space and 1no. vent for the bedroom spaces.

6.12 Suggested window specifications are detailed in Appendix C. This glass has published performance data. The published performance figures for the 'glass only' were obtained from laboratory measurements. The best workmanship practices and installation guidelines should be followed to ensure that the stated performances can be obtained once installed within a frame.

6.13 To be confident that the internal noise levels are achieved, it is recommended that the glazing is over specified (not required where the predicted internal noise level is already 5dB below the requirements of BS8233:2014 to allow a 5dB workmanship tolerance, this is especially important at frequencies 125Hz and 250Hz. Alternatively, a window system (glass and frame) matching or exceeding the octave band performances considered within the calculation exercises (Appendix C) would be acceptable.

VENTILATION

6.14 Ventilation requirements for dwellings (and other buildings) are covered under the Building Regulations 'Approved Document F – Means of Ventilation, 2010 Volume 1:Dwellings (ADF).

6.15 ADF requires that:

"There shall be adequate means of ventilation provided for people in the building".

6.16 Ventilation is required for the following purposes:

(a) Extracts water vapour and indoor pollutants from areas where they are produced in significant quantities.
(b) Supplies a minimum level of outdoor air for occupants' health.
(c) *Rapidly dilutes indoor air pollutants and disperses water vapour when necessary.*

6.17 ADF describes three types of ventilation provision and associated use. The types of ventilation are summarised below:

Type of ventilation	Location	When is this required
Extract Ventilation	Kitchens Utility rooms Bathrooms Sanitary accommodation	Continuous or Intermittent
Whole Dwelling Ventilation	All habitable rooms	Continuously
Purge Ventilation	All habitable rooms	Occasionally

Table 5

6.18 It is currently proposed to install 'passive / extract ventilation' to all residential units.

6.19 In addition to the above ADF also states:

"Purge ventilation should be capable of extracting at least four air changes per hour per room directly to the outside."

6.20 If required to demonstrate compliance with Part O of the Building Regulations, it is likely that higher purge ventilation rates than those given above will be required.

7. CONCLUSION

7.1 Based on the foregoing, it can be concluded that:

- *The specific and maximum noise levels considered to impact upon the new residential accommodation during the day and night-time periods is detailed in Table 3.*
- *A glazing system and passive ventilation provision with the appropriate acoustic performance (Table 4) would provide sufficient attenuation from noise levels generated from the adjacent highways, and office activities to reduce internal noise levels to meet the levels stated within ProPG, BS 8233:2014 and WHO guidelines for Community Noise.*
- *The required level of sound insulation needed to achieve this internal level is based on the building envelope make up and measured external noise levels with the windows closed. Alternative means of ventilation and the prevention of overheating have been proposed (without the need to open windows).*

7.2 This assessment provides a response and addresses the comments raised during pre-application consultation as stated within paragraph 3.8 of this report.

Figures

Ransoms, Swan Corner, Station Road, Pulborough, West Sussex, RH20 1AH


Figure 1


Figure 2


Figure 3


Figure 4


Figure 5


Figure 6


Figure 7

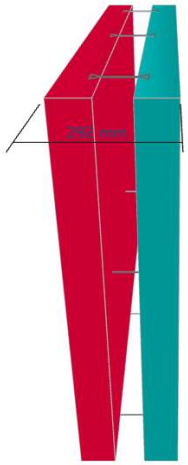

Figure 8

Appendix A

Sound Insulation Prediction (v9.0.24)

Program copyright Marshall Day Acoustics 2017
Margin of error is generally within Rw ±3 dB
- Key No. 2501
Job Name:Ransoms
Job No.:104476A Initials:AD
Date:27/04/2023
File Name:Insul cavity wall Ransoms.ixl

Notes:Blockwork wall



Rw 57 dB
C -1 dB
Ctr -4 dB

Mass-air-mass resonant frequency = =21 Hz

Panel Size = 2.7 m x 4.0 m

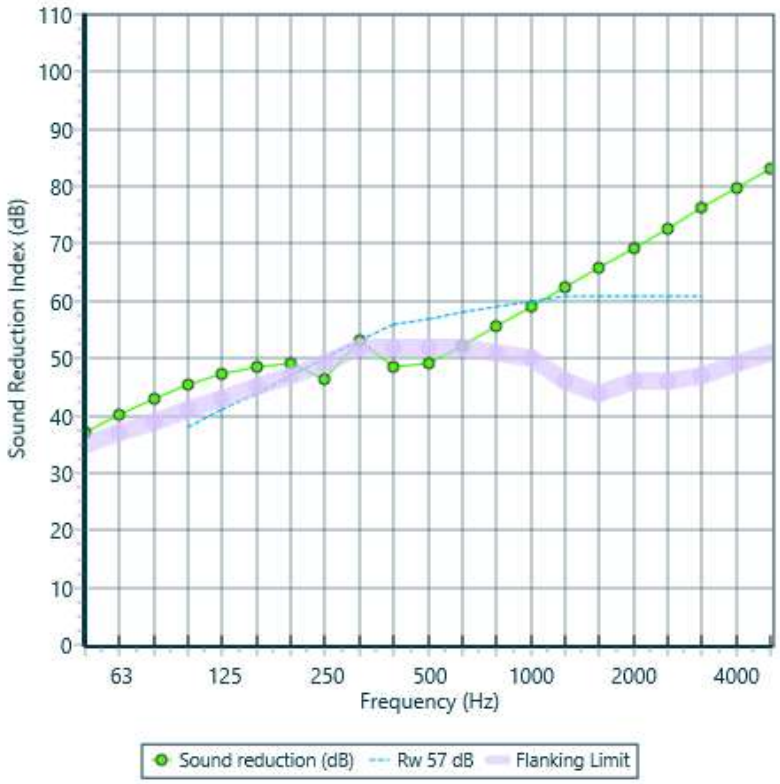
Partition surface mass = 324 kg/m²

System description

Panel 1 : 1 x 102.5 mm Brick

Frame: Butterfly Tie (90 mm x 45 mm), Stud spacing 600 mm ; Cavity Width 90 mm
Panel 2 : 1 x 100 mm Medium density block

freq.(Hz)	R(dB)	R(dB)
50	37	
63	40	39
80	43	
100	45	
125	47	47
160	49	
200	49	
250	46	49
315	53	
400	48	
500	49	50
630	52	
800	56	
1000	59	58
1250	62	
1600	66	
2000	69	68
2500	73	
3150	76	
4000	80	79
5000	83	



Sound Insulation Prediction (v9.0.24)

Program copyright Marshall Day Acoustics 2017
Margin of error is generally within Rw ±3 dB
- Key No. 2501
Job Name:Coppice Hanger
Job No.:104476 Initials:AD
Date:26/04/2023
File Name:Insul warm roof Coppice Hanger.ixl

Notes:Warm roof construction



Rw 56 dB
C -2 dB
Ctr -8 dB

Mass-air-mass resonant frequency = =32 Hz

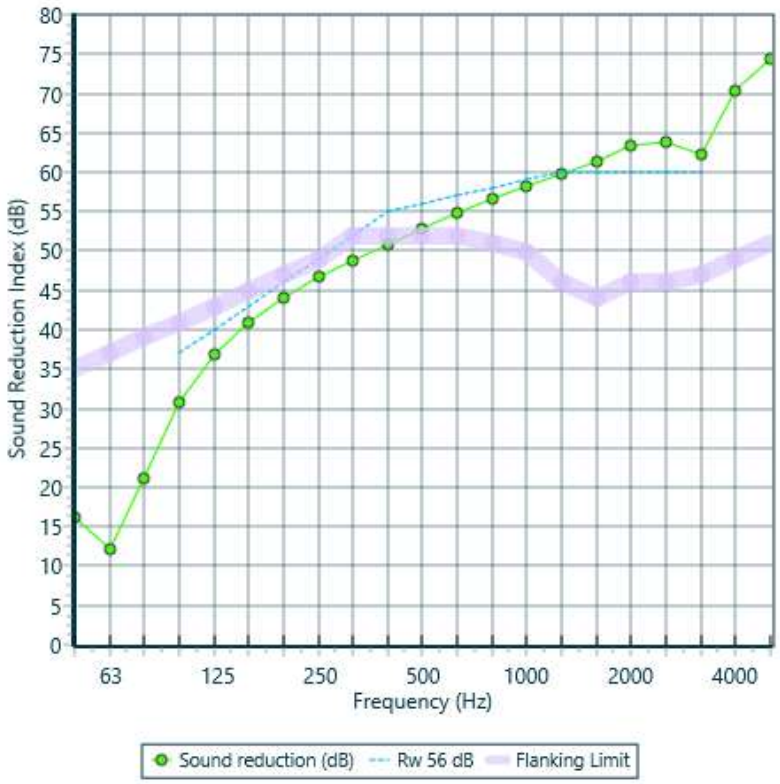
Panel Size = 2.7 m x 4.0 m

Partition surface mass = 63.3 kg/m²

System description

Panel 1 : 1 x 10 mm Nuraply waterproof membrane
+ 1 x 139.9 mm Kingspan KS 1000AWP 120/140mm
+ 1 x 17.5 mm Plywood
+ 1 x 17.5 mm Plywood
Frame: Solid Joist (2.2E2 mm x 45 mm), Stud spacing 600 mm ; Cavity Width 220 mm , 1 x Fibreglass (10kg/m3) Thickness 100 mm
Panel 2 : 2 x 12.5 mm Gyproc Wallboard 12.5mm

freq.(Hz)	R(dB)	R(dB)
50	16	
63	12	15
80	21	
100	31	
125	37	34
160	41	
200	44	
250	47	46
315	49	
400	51	
500	53	53
630	55	
800	57	
1000	58	58
1250	60	
1600	61	
2000	63	63
2500	64	
3150	62	
4000	70	66
5000	74	



Sound Insulation Prediction (v9.0.24)

Program copyright Marshall Day Acoustics 2017
Margin of error is generally within Rw ±3 dB
- Key No. 2501
Job Name:Ransoms
Job No.:104476A Initials:AD
Date:27/04/2023
File Name:Insul warm roof Ransoms.ixl

Notes:Warm roof construction



Rw 56 dB
C -2 dB
Ctr -8 dB

Mass-air-mass resonant frequency = =32 Hz

Panel Size = 2.7 m x 4.0 m

Partition surface mass = 63.3 kg/m²

System description

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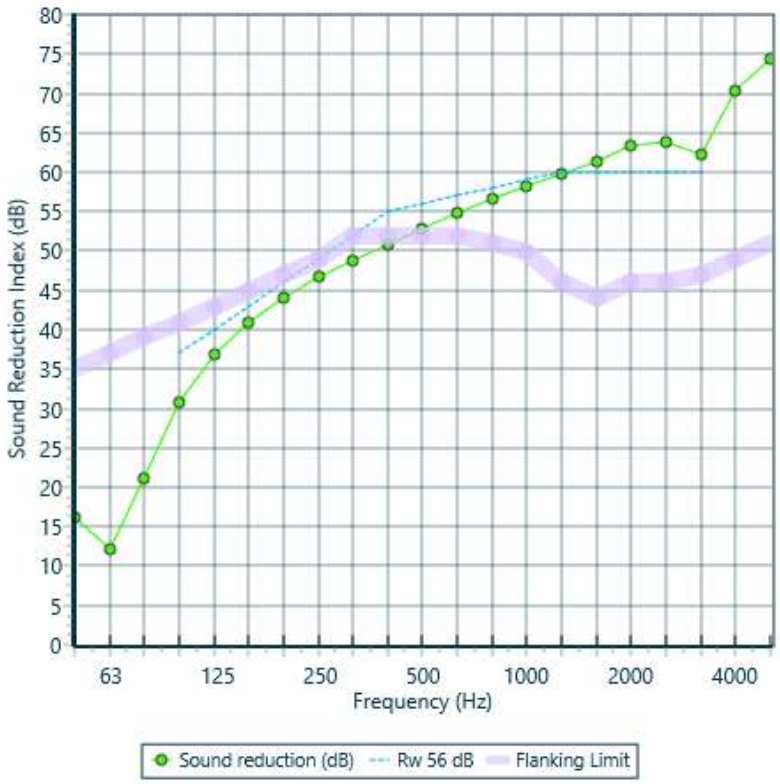
freq.(Hz)	R(dB)	R(dB)
50	16	
63	12	15
80	21	
100	31	
125	37	34
160	41	
200	44	
250	47	46
315	49	
400	51	
500	53	53
630	55	
800	57	
1000	58	58
1250	60	
1600	61	
2000	63	63
2500	64	
3150	62	
4000	70	66
5000	74	



Appendix B

GF F1 Living day

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Description	Term	Weighted rating	Octave Band Centre Frequency (Hz)					
			125	250	500	1000	2000	4000
Freefield External Noise Level	$L_{eq,ff}$	64dBA	64	62	60	60	57	51
Passive vent - 2no AWV39	$D_{ne,w}$	Dne,w 39dB	41	36	36	38	47	59
Glazing 6mm float / 10mm / 4mm float	R_w	Rw 34dB	27	26	28	37	36	36
External wall - cavity masonry	R_{ew}	R_w 57dB	43	45	46	54	64	75
Roof - not applicable	R_{rr}	R_w n/a dB	100	100	100	100	100	100
Total room absorption (based on RT)	RT_{60}	0.75	8	10	12	12	11	11

Derivation	Term	Value
Façade area (including window)	S_f	25
Window area	S_{wi}	6
S_f-S_{wi}	S_{ew}	19
Area of ceiling	S_{rr}	23
S_f+S_{rr}	S	48
Reference absorption area	A_0	10
Room volume	V	57

Description	Term from Equation	Reference letter	Octave Band Centre Frequency (Hz)					
			125	250	500	1000	2000	4000
Freefield External Noise Level	$L_{eq,ff}$	A	64	62	60	60	57	51
Passive vent - 2no AWV39	$D_{n,e}$		40.76091259	36	36	38	47	59
	$(A_0/S)*10^{(-D_{ne,w}/10)}$	B	0.00002	0.00005	0.00005	0.00003	0.00000	0.00000
Double Glazed Windows	R_{wi}		27	26	28	37	36	36
	$(S_{wi}/S)*10^{(-R_{wi}/10)}$	C	0.00025	0.00031	0.00020	0.00002	0.00003	0.00003
External Wall Construction	R_{ew}		43	45	46	54	64	75
	$(S_{ew}/S)*10^{(-R_{ew}/10)}$	D	0.00002	0.00001	0.00001	0.00000	0.00000	0.00000
Roof Construction	R_{rr}		100	100	100	100	100	100
	$(S_{rr}/S)*10^{(-R_{rr}/10)}$	E	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000
Total Sound Insulation Performance	10Log(B+C+D+E)	F	-35	-34	-36	-42	-45	-45
Total Absorption Area of Receiver Room	A (furnished)		8	10	12	12	11	11
	10Log(S/A)	G	7.6	6.7	5.9	5.9	6.3	6.3
Total Internal Sound Pressure Level, Leq	Leq,2	A+F+G+3	38.7	37.3	32.8	26.7	21.7	14.8

RESULTANT INTERNAL NOISE LEVEL	**34**

GF F1 Bedroom day

ACOUSTICS PLUS

Description	Term	Weighted rating	Octave Band Centre Frequency (Hz)					
			125	250	500	1000	2000	4000
Freefield External Noise Level	$L_{eq,ff}$	64dBA	64	62	60	60	57	51
Greenwoods AWV 39 ventilator	$D_{ne,w}$	Dne,w 39dB	44	41	41	43	52	64
Glazing 6mm float / 10mm / 4mm float	R_w	Rw 34dB	27	26	28	37	36	36
External wall - cavity masonry	R_{ew}	R_w 57dB	43	45	46	54	64	75
Roof - not applicable	R_{rr}	R_w n/a dB	100	100	100	100	100	100
Total room absorption (based on RT)	RT_{60}	0.5	8	10	12	12	11	11

Derivation	Term	Value
Façade area (including window)	S_f	23
Window area	S_{wi}	7
S_f-S_{wi}	S_{ew}	16
Area of ceiling	S_{rr}	15
S_f+S_{rr}	S	38
Reference absorption area	A_0	10
Room volume	V	37

Description	Term from Equation	Reference letter	Octave Band Centre Frequency (Hz)					
			125	250	500	1000	2000	4000
Freefield External Noise Level	$L_{eq,ff}$	A	64	62	60	60	57	51
Greenwoods AWV 39 ventilator	$D_{n,e}$		43.77121255	40.77121255	40.77121255	42.77121255	51.77121255	63.77121255
	$(A_0/S)*10^{(-D_{ne,w}/10)}$	B	0.00001	0.00002	0.00002	0.00001	0.00000	0.00000
Double Glazed Windows	R_{wi}		27	26	28	37	36	36
	$(S_{wi}/S)*10^{(-R_{wi}/10)}$	C	0.00036	0.00045	0.00029	0.00004	0.00005	0.00005
External Wall Construction	R_{ew}		43	45	46	54	64	75
	$(S_{ew}/S)*10^{(-R_{ew}/10)}$	D	0.00002	0.00001	0.00001	0.00000	0.00000	0.00000
Roof Construction	R_{rr}		100	100	100	100	100	100
	$(S_{rr}/S)*10^{(-R_{rr}/10)}$	E	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000
Total Sound Insulation Performance	10Log(B+C+D+E)	F	-34	-33	-35	-43	-43	-43
Total Absorption Area of Receiver Room	A (furnished)		8	10	12	12	11	11
	10Log(S/A)	G	6.7	5.7	5.0	5.0	5.3	5.3
Total Internal Sound Pressure Level, Leq	Leq,2	A+F+G+3	39.2	37.6	32.8	25.2	22.0	15.5

RESULTANT INTERNAL NOISE LEVEL	**34**

GF F1 Bedroom night

ACOUSTICS PLUS

Description	Term	Weighted rating	Octave Band Centre Frequency (Hz)					
			125	250	500	1000	2000	4000
Freefield External Noise Level	$L_{eq,ff}$	56dBA	55	54	53	52	47	42
Greenwoods AWV 39 ventilator	$D_{ne,w}$	Dne,w 39dB	44	41	41	43	52	64
Glazing 6mm float / 10mm / 4mm float	R_w	Rw 34dB	27	26	28	37	36	36
External wall - cavity masonry	R_{ew}	R_w 57dB	43	45	46	54	64	75
Roof - not applicable	R_{rr}	R_w n/a dB	100	100	100	100	100	100
Total room absorption (based on RT)	RT_{60}	0.5	8	10	12	12	11	11

Derivation	Term	Value
Façade area (including window)	S_f	23
Window area	S_{wi}	7
S_f-S_{wi}	S_{ew}	16
Area of ceiling	S_{rr}	15
S_f+S_{rr}	S	38
Reference absorption area	A_0	10
Room volume	V	37

Description	Term from Equation	Reference letter	Octave Band Centre Frequency (Hz)					
			125	250	500	1000	2000	4000
Freefield External Noise Level	$L_{eq,ff}$	A	55	54	53	52	47	42
Greenwoods AWV 39 ventilator	$D_{n,e}$		43.77121255	40.77121255	40.77121255	42.77121255	51.77121255	63.77121255
	$(A_0/S)*10^{(-D_{ne,w}/10)}$	B	0.00001	0.00002	0.00002	0.00001	0.00000	0.00000
Double Glazed Windows	R_{wi}		27	26	28	37	36	36
	$(S_{wi}/S)*10^{(-R_{wi}/10)}$	C	0.00036	0.00045	0.00029	0.00004	0.00005	0.00005
External Wall Construction	R_{ew}		43	45	46	54	64	75
	$(S_{ew}/S)*10^{(-R_{ew}/10)}$	D	0.00002	0.00001	0.00001	0.00000	0.00000	0.00000
Roof Construction	R_{rr}		100	100	100	100	100	100
	$(S_{rr}/S)*10^{(-R_{rr}/10)}$	E	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000
Total Sound Insulation Performance	10Log(B+C+D+E)	F	-34	-33	-35	-43	-43	-43
Total Absorption Area of Receiver Room	A (furnished)		8	10	12	12	11	11
	10Log(S/A)	G	6.7	5.7	5.0	5.0	5.3	5.3
Total Internal Sound Pressure Level, Leq	Leq,2	A+F+G+3	30.9	29.8	25.6	16.8	12.3	6.6

RESULTANT INTERNAL NOISE LEVEL	**26**

GF F1 Bedroom Lamax

ACOUSTICS PLUS

Description	Term	Weighted rating	Octave Band Centre Frequency (Hz)					
			125	250	500	1000	2000	4000
Freefield External Noise Level	$Lmax_{,ff}$	76dBA	74	71	71	72	70	63
Greenwoods AWV 39 ventilator	$D_{ne,w}$	Dne,w 39dB	44	41	41	43	52	64
Glazing 6mm float / 10mm / 4mm float	R_w	Rw 34dB	27	26	28	37	36	36
External wall - cavity masonry	R_{ew}	R_w 57dB	43	45	46	54	64	75
Roof - not applicable	R_{rr}	R_w n/a dB	100	100	100	100	100	100
Total room absorption (based on RT)	RT_{60}	0.5	8	10	12	12	11	11

Derivation	Term	Value
Façade area (including window)	S_f	23
Window area	S_{wi}	7
S_f -S_{wi}	S_{ew}	16
Area of ceiling	S_{rr}	15
S_f +S_{rr}	S	38
Reference absorption area	A_0	10
Room volume	V	37

Description	Term from Equation	Reference letter	Octave Band Centre Frequency (Hz)					
			125	250	500	1000	2000	4000
Freefield External Noise Level	$L_{eq,ff}$	A	74	71	71	72	70	63
Greenwoods AWV 39 ventilator	$D_{n,e}$		43.77121255	40.77121255	40.77121255	42.77121255	51.77121255	63.77121255
	$(A_0/S)*10^{(-D_{ne,w}/10)}$	B	0.00001	0.00002	0.00002	0.00001	0.00000	0.00000
Double Glazed Windows	R_{wi}		27	26	28	37	36	36
	$(S_{wi}/S)*10^{(-R_{wi}/10)}$	C	0.00036	0.00045	0.00029	0.00004	0.00005	0.00005
External Wall Construction	R_{ew}		43	45	46	54	64	75
	$(S_{ew}/S)*10^{(-R_{ew}/10)}$	D	0.00002	0.00001	0.00001	0.00000	0.00000	0.00000
Roof Construction	R_{rr}		100	100	100	100	100	100
	$(S_{rr}/S)*10^{(-R_{rr}/10)}$	E	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000
Total Sound Insulation Performance	10Log(B+C+D+E)	F	-34	-33	-35	-43	-43	-43
Total Absorption Area of Receiver Room	A (furnished)		8	10	12	12	11	11
	10Log(S/A)	G	6.7	5.7	5.0	5.0	5.3	5.3
Total Internal Sound Pressure Level, Leq	Leq,2	A+F+G+3	50.0	46.6	43.6	37.2	34.8	27.7

RESULTANT INTERNAL NOISE LEVEL	**45**

SF F7 Living day

ACOUSTICS PLUS

Description	Term	Weighted rating	Octave Band Centre Frequency (Hz)					
			125	250	500	1000	2000	4000
Freefield External Noise Level	$L_{eq,ff}$	64dBA	64	62	60	60	57	51
Passive vent - 2no AWV39	$D_{ne,w}$	Dne,w 39dB	41	36	36	38	47	59
Glazing 6mm float / 10mm / 4mm float	R_w	Rw 34dB	27	26	28	37	36	36
External wall - pitched roof	R_{ew}	R_w 60dB	36	43	49	55	56	56
Roof - Warm type roof	R_{rr}	R_w 56 dB	27	39	46	51	56	59
Total room absorption (based on RT)	RT_{60}	0.75	8	10	12	12	11	11

Derivation	Term	Value
Façade area (including window)	S_f	28
Window area	S_{wi}	2
S_f-S_{wi}	S_{ew}	26
Area of ceiling	S_{rr}	22
S_f+S_{rr}	S	50
Reference absorption area	A_0	10
Room volume	V	56

Description	Term from Equation	Reference letter	Octave Band Centre Frequency (Hz)					
			125	250	500	1000	2000	4000
Freefield External Noise Level	$L_{eq,ff}$	A	64	62	60	60	57	51
Passive vent - 2no AWV39	$D_{n,e}$		40.76091259	36	36	38	47	59
	$(A_0/S)*10^{(-D_{ne,w}/10)}$	B	0.00002	0.00005	0.00005	0.00003	0.00000	0.00000
Double Glazed Windows	R_{wi}		27	26	28	37	36	36
	$(S_{wi}/S)*10^{(-R_{wi}/10)}$	C	0.00008	0.00010	0.00006	0.00001	0.00001	0.00001
External Wall Construction	R_{ew}		36	43	49	55	56	56
	$(S_{ew}/S)*10^{(-R_{ew}/10)}$	D	0.00013	0.00003	0.00001	0.00000	0.00000	0.00000
Roof Construction	R_{rr}		27	39	46	51	56	59
	$(S_{rr}/S)*10^{(-R_{rr}/10)}$	E	0.00090	0.00006	0.00001	0.00000	0.00000	0.00000
Total Sound Insulation Performance	10Log(B+C+D+E)	F	-30	-36	-39	-43	-48	-49
Total Absorption Area of Receiver Room	A (furnished)		8	10	12	12	11	11
	10Log(S/A)	G	7.9	6.9	6.1	6.1	6.5	6.5
Total Internal Sound Pressure Level, Leq	Leq,2	A+F+G+3	45.0	35.5	30.1	25.7	18.6	10.9

RESULTANT INTERNAL NOISE LEVEL	**33**

SF F7 Bedroom day

ACOUSTICS PLUS

Description	Term	Weighted rating	Octave Band Centre Frequency (Hz)					
			125	250	500	1000	2000	4000
Freefield External Noise Level	$L_{eq,ff}$	64dBA	64	62	60	60	57	51
Greenwoods AWV 39 ventilator	$D_{ne,w}$	Dne,w 39dB	44	41	41	43	52	64
Glazing 6mm float / 10mm / 4mm float	R_w	Rw 34dB	27	26	28	37	36	36
External wall - pitched roof	R_{ew}	R_w 60dB	36	43	49	55	56	56
Roof - Warm type roof	R_{rr}	R_w 56 dB	27	39	46	51	56	59
Total room absorption (based on RT)	RT_{60}	0.5	7	9	11	11	10	10

Derivation	Term	Value
Façade area (including window)	S_f	21
Window area	S_{wi}	2
S_f-S_{wi}	S_{ew}	18
Area of ceiling	S_{rr}	14
S_f+S_{rr}	S	34
Reference absorption area	A_0	10
Room volume	V	35

Description	Term from Equation	Reference letter	Octave Band Centre Frequency (Hz)					
			125	250	500	1000	2000	4000
Freefield External Noise Level	$L_{eq,ff}$	A	64	62	60	60	57	51
Greenwoods AWV 39 ventilator	$D_{n,e}$		43.77121255	40.77121255	40.77121255	42.77121255	51.77121255	63.77121255
	$(A_0/S)*10^{(-D_{ne,w}/10)}$	B	0.00001	0.00002	0.00002	0.00002	0.00000	0.00000
Double Glazed Windows	R_{wi}		27	26	28	37	36	36
	$(S_{wi}/S)*10^{(-R_{wi}/10)}$	C	0.00013	0.00017	0.00011	0.00001	0.00002	0.00002
External Wall Construction	R_{ew}		36	43	49	55	56	56
	$(S_{ew}/S)*10^{(-R_{ew}/10)}$	D	0.00013	0.00003	0.00001	0.00000	0.00000	0.00000
Roof Construction	R_{rr}		27	39	46	51	56	59
	$(S_{rr}/S)*10^{(-R_{rr}/10)}$	E	0.00080	0.00005	0.00001	0.00000	0.00000	0.00000
Total Sound Insulation Performance	10Log(B+C+D+E)	F	-30	-36	-38	-45	-47	-47
Total Absorption Area of Receiver Room	A (furnished)		7	9	11	11	10	10
	10Log(S/A)	G	6.8	5.7	4.8	4.8	5.2	5.2
Total Internal Sound Pressure Level, Leq	Leq,2	A+F+G+3	43.7	34.9	29.3	23.2	18.4	11.6

RESULTANT INTERNAL NOISE LEVEL	**32**

SF F7 Bedroom night

ACOUSTICS PLUS

Description	Term	Weighted rating	Octave Band Centre Frequency (Hz)					
			125	250	500	1000	2000	4000
Freefield External Noise Level	$L_{eq,ff}$	56dBA	55	54	53	52	47	42
Greenwoods AWV 39 ventilator	$D_{ne,w}$	Dne,w 39dB	44	41	41	43	52	64
Glazing 6mm float / 10mm / 4mm float	R_w	Rw 34dB	27	26	28	37	36	36
External wall - pitched roof	R_{ew}	R_w 60dB	36	43	49	55	56	56
Roof - Warm type roof	R_{rr}	R_w 56 dB	27	39	46	51	56	59
Total room absorption (based on RT)	RT_{60}	0.5	7	9	11	11	10	10

Derivation	Term	Value
Façade area (including window)	S_f	21
Window area	S_{wi}	2
S_f-S_{wi}	S_{ew}	18
Area of ceiling	S_{rr}	14
S_f+S_{rr}	S	34
Reference absorption area	A_0	10
Room volume	V	35

Description	Term from Equation	Reference letter	Octave Band Centre Frequency (Hz)					
			125	250	500	1000	2000	4000
Freefield External Noise Level	$L_{eq,ff}$	A	55	54	53	52	47	42
Greenwoods AWV 39 ventilator	$D_{n,e}$		43.77121255	40.77121255	40.77121255	42.77121255	51.77121255	63.77121255
	$(A_0/S)*10^{(-D_{ne,w}/10)}$	B	0.00001	0.00002	0.00002	0.00002	0.00000	0.00000
Double Glazed Windows	R_{wi}		27	26	28	37	36	36
	$(S_{wi}/S)*10^{(-R_{wi}/10)}$	C	0.00013	0.00017	0.00011	0.00001	0.00002	0.00002
External Wall Construction	R_{ew}		36	43	49	55	56	56
	$(S_{ew}/S)*10^{(-R_{ew}/10)}$	D	0.00013	0.00003	0.00001	0.00000	0.00000	0.00000
Roof Construction	R_{rr}		27	39	46	51	56	59
	$(S_{rr}/S)*10^{(-R_{rr}/10)}$	E	0.00080	0.00005	0.00001	0.00000	0.00000	0.00000
Total Sound Insulation Performance	10Log(B+C+D+E)	F	-30	-36	-38	-45	-47	-47
Total Absorption Area of Receiver Room	A (furnished)		7	9	11	11	10	10
	10Log(S/A)	G	6.8	5.7	4.8	4.8	5.2	5.2
Total Internal Sound Pressure Level, Leq	Leq,2	A+F+G+3	35.4	27.2	22.1	14.8	8.7	2.7

RESULTANT INTERNAL NOISE LEVEL	**24**

SF F7 Bedroom Lamax

ACOUSTICS PLUS

Description	Term	Weighted rating	Octave Band Centre Frequency (Hz)					
			125	250	500	1000	2000	4000
Freefield External Noise Level	$Lmax_{,ff}$	76dBA	74	71	71	72	70	63
Greenwoods AWV 39 ventilator	$D_{ne,w}$	Dne,w 39dB	44	41	41	43	52	64
Glazing 6mm float / 10mm / 4mm float	R_w	Rw 34dB	27	26	28	37	36	36
External wall - pitched roof	R_{ew}	R_w 60dB	36	43	49	55	56	56
Roof - Warm type roof	R_{rr}	R_w 56 dB	27	39	46	51	56	59
Total room absorption (based on RT)	RT_{60}	0.5	7	9	11	11	10	10

Derivation	Term	Value
Façade area (including window)	S_f	21
Window area	S_{wi}	2
S_f -S_{wi}	S_{ew}	18
Area of ceiling	S_{rr}	14
S_f +S_{rr}	S	34
Reference absorption area	A_0	10
Room volume	V	35

Description	Term from Equation	Reference letter	Octave Band Centre Frequency (Hz)					
			125	250	500	1000	2000	4000
Freefield External Noise Level	$L_{eq,ff}$	A	74	71	71	72	70	63
Greenwoods AWV 39 ventilator	$D_{n,e}$		43.77121255	40.77121255	40.77121255	42.77121255	51.77121255	63.77121255
	$(A_0/S)*10^{(-D_{ne,w}/10)}$	B	0.00001	0.00002	0.00002	0.00002	0.00000	0.00000
Double Glazed Windows	R_{wi}		27	26	28	37	36	36
	$(S_{wi}/S)*10^{(-R_{wi}/10)}$	C	0.00013	0.00017	0.00011	0.00001	0.00002	0.00002
External Wall Construction	R_{ew}		36	43	49	55	56	56
	$(S_{ew}/S)*10^{(-R_{ew}/10)}$	D	0.00013	0.00003	0.00001	0.00000	0.00000	0.00000
Roof Construction	R_{rr}		27	39	46	51	56	59
	$(S_{rr}/S)*10^{(-R_{rr}/10)}$	E	0.00080	0.00005	0.00001	0.00000	0.00000	0.00000
Total Sound Insulation Performance	10Log(B+C+D+E)	F	-30	-36	-38	-45	-47	-47
Total Absorption Area of Receiver Room	A (furnished)		7	9	11	11	10	10
	10Log(S/A)	G	6.8	5.7	4.8	4.8	5.2	5.2
Total Internal Sound Pressure Level, Leq	Leq,2	A+F+G+3	54.5	44.0	40.2	35.3	31.3	23.8

RESULTANT INTERNAL NOISE LEVEL	**43**

Appendix C

Acoustic Performance

Glazing Configuration

6mm Float Glass

10mm Cavity

4mm Float Glass

.

Sound Reduction Indices

Frequency, Hz / dB						Rw	C	Ctr	OITC	STC
125	250	500	1000	2000	4000	34	-1	-3	29	34
27	26	28	37	36	29					

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.

Wednesday, December 1, 2021 | Acoustic database 20210629

UKAS ACCREDITATION — INDEPENDENTLY ACCREDITED TEST INFORMATION

AWV39

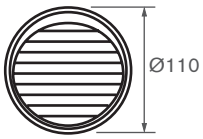
Acoustic wall ventilator

Physical specification

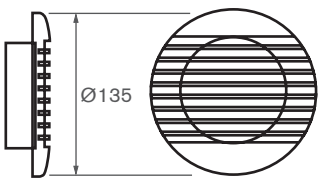
All measurements in millimetres

Weight: 0.7440kg
Materials: PVC

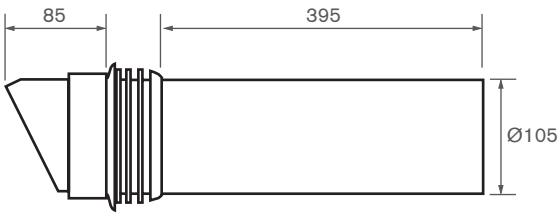




External grille (supplied separately)



Internal



Side

Features and benefits

Designed for use in refurbishment applications.

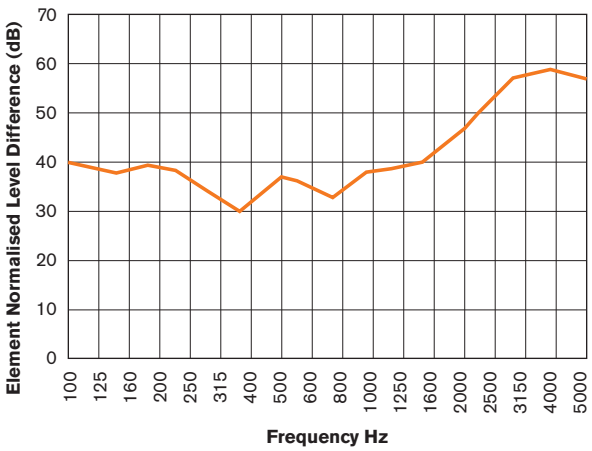
Provides acoustic attenuation to Dn,e,w 39dB.

2500mm² equivalent area performance.

Suitable for wall thicknesses 255–370mm.

Performance

Model	Acoustic performance Dn,e,w (dB)	Equivalent area mm²
AWV39	39	2500



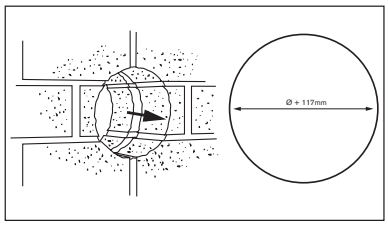
Key

AWV39

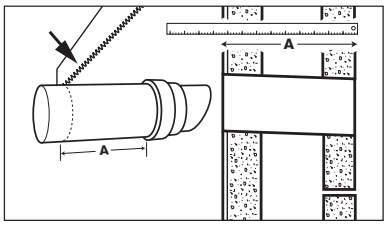
Acoustic performance

Dn,e,w (C;Ctr) = 39(0;-2) dB
Dn,e,w (C) = 39dB
Dn,e,w (Ctr) = 37dB
Dn,e,w: Average weighted performance across frequency range
C: Pink noise
Ctr: Road noise

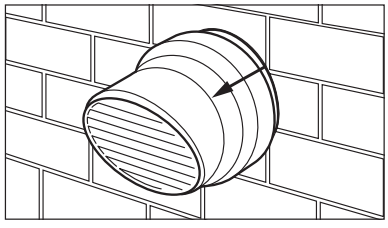
Installation



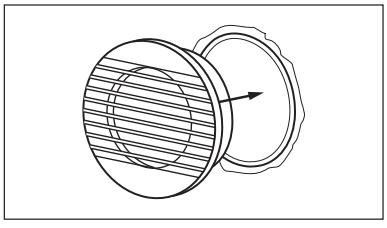
Using a 117mm core drill, cut a hole through wall



Measure wall thickness and cut down plastic sleeve as required



Push the sleeve through the wall. The seal will automatically sit between the sleeve and the external grille, providing a watertight fit



Push fit internal grille