

Acoustic South East



Planning Noise Impact Assessment

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Project: J4074

Issue 1

Site: New Salts Farm Barns, Shoreham by Sea

Client : New Salts Farm Barns Limited

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1 Introduction and Executive Summary

Acoustic South East have been appointed to undertake an acoustic assessment to support a planning application for 10 new dwellings.

Standards and guidance referenced for this assessment include:

- BS8233 (Sound insulation and noise reduction for buildings) 2014
- National Planning Policy Framework (NPPF), 2024
- Building Regulations Approved Document O-Overheating
- ProPG2017 - Professional Practice Guidance on Planning & Noise
- Planning Noise Advice Document, November 2023

A sound survey was undertaken from 12th to 19th August with a class 1 sound level meter at the application site. The findings of the assessment were that the daytime sound pressure levels were an average (logarithmic) of 49dB $L_{Aeq,16 \text{ hours}}$ and night time sound pressure levels were 41dB $L_{Aeq,8 \text{ hours}}$. The Sound Reduction Index (SRI) required to protect future occupants is a maximum of 18dB.

The monitoring period deliberately included a weekend and by coincidence, this included the Eastbourne airshow (Airborne). It is therefore argued that the dataset presents a worst-case period when the airport is being used.

Garden areas will comfortably achieve the requirements of BS8233:2014 and ProPG2017 with an upper requirement of 55dB $L_{Aeq, 16 \text{ hour}}$. It is noted that for the days without the airshow impact, the daytime sound pressure levels were 45dB and 47dB $L_{Aeq,16 \text{ hours}}$ respectively.

An initial site risk assessment consistent with the requirements of ProPG2017 identifies a negligible to low risk of developing the site.

An assessment made under Building Regulations Approved Document O (Overheating) identifies that bedroom windows will be capable of being opened during the night time period.

In terms of mitigation measures, rigorous calculations were carried out, consistent with the approach in Annex G.2 of BS8233:2014. Standard thermal double glazing ($R_{\text{traffic}} 25\text{dB(A)}$) and a passive non-acoustic trickle vent of 31dB D_{new} will provide the residents sufficient protection from noise levels.

Based on the above findings, planning permission should not be withheld on noise grounds.

2 Context, Noise Criteria & Noise Assessment Methodology

2.1 Context

The client proposes the introduction of 10 new properties at the site. These are a mix of detached and semi-detached properties. The existing farm barn buildings will be demolished to make way for the development.

Contextually, residential properties already exist to the East and North East of the application site, immediately adjacent New Salts Farm Road.

Through pre-application discussions with Adur and Worthing Council, it was identified that there was a need for an acoustic report to cover both the noise from the railway and the noise generated by Shoreham airport, both of which are located to the North of the site.

The railway located at approximately 300m to the North of the site connects Shoreham and Lancing on the Southern railway line and runs East to West.

The A259 (Brighton Road) also exists to the South of the site with approximately 300m which links Shoreham by Sea and Lancing.

Shoreham Airport is located further North and has both fixed wing small aircraft and helicopters.

The duration of the soundscape monitoring also included the Eastbourne Airshow (Airborne) which ran from Thursday 14 August to Sunday 17th August 2025. This is relevant as a number of the smaller aeroplanes and/or helicopters will have utilised Shoreham Airport.

It should be noted that whilst the railway line will be in 24-hour use, the airport operations are limited to daytime only. The airport hours of operation can be seen here - <https://flybrighton.com/home-page/operating-hours-ooi-indemnity/>

2.2 Site Location

The masterplan layout can be seen in Figure 1 below.



Figure 1. Proposed Site Layout

2.3 Soundscape

The soundscape observed at the site whilst setting up and decommissioning the survey equipment was birdsong, distant intermittent aviation noise and distant road traffic noise.

2.4 Assessment Criteria

2.4.1 BS8233:2014 – Guidance on sound insulation and noise reduction for buildings

Table 4 of BS8233:2014 provides the following guideline values:

Activity	Location	Time period of day	
		07:00-23:00	23:00-07:00
Resting	Living Rooms	35dB $L_{Aeq,16hour}$	-
Dining	Dining Room/Area	40dB $L_{Aeq,16hour}$	-
Sleeping (daytime resting)	Bedroom	35dB $L_{Aeq,16hour}$	30dB $L_{Aeq,8hour}$

Table 1. BS8233:2014 Criteria

It is relevant to note that Table 4 criteria in BS8233:2014 relates to continuous and anonymous sound, typical of that heard at the site.

2.4.2 ProPG2017 – Professional Practice Guidance on Planning & Noise

Planning guidance (ProPG2017) relates to new residential development and airborne transportation noise, which includes exposure to road traffic, railway and aviation noise. Whilst ProPG, 2017 generally mirrors the requirements of BS8233:2014 and the World Health Organisation Guidelines, 1999, it goes further in setting a limit for inside bedrooms for L_{Amax} events and specifically, no more than 10 L_{Amax} events per night time period above 45dB(A).

The internal bedroom L_{Amax} values will be used in accordance with ProPG2017.

An initial site risk assessment consistent with the approach in ProPG2017 has been undertaken and referenced within the report. Whilst an outline consent, the opportunity to be able to implement good acoustic design is more likely at reserved matters when scheme design has been frozen.

2.4.3 National Planning Policy Framework, Dec 2024 (NPPF)

The National Planning Policy Framework (Dec 2024) defines the Government's planning policies for England and how these are expected to be applied. It sets out the Government's requirements for the planning system only to the extent that it is relevant, proportionate and necessary to do so.

The following paragraphs are relevant within NPPF Section 15 (Conserving and enhancing the natural environment) states the following:

Paragraph 187(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, and

Paragraph 198 - Planning policies and decisions should also ensure that new development is appropriate for its location taking into account the likely effects (including cumulative effects) of pollution on health, living conditions and the natural environment, as well as the potential sensitivity of the site or the wider area to impacts that could arise from the development. In doing so they should:

- a) mitigate and reduce to a minimum potential adverse impact 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

Paragraph 200– Planning policies and decisions should ensure that new development can be integrated effectively with existing businesses and community facilities (such as places of worship, pubs, music venues and sports clubs). Existing businesses and facilities should not have unreasonable restrictions placed on them as a result of development permitted after they were established. Where the operation of an existing business or community facility could have a significant adverse effect on new development (including changes of use) in its vicinity, the applicant (or ‘agent of change’) should be required to provide suitable mitigation before the development has been completed.

2.4.4 Building Regulations, Approved Document O

Recently introduced Part O of the building regulation requires an assessment of whether bedroom windows can be opened at night. It is assumed that bedroom windows will be closed if either of the conditions below are met:

- Internal noise level exceeds 40dB $L_{Aeq, 8hour}$
- L_{Amax} events exceed 55dB L_{Amax} more than 10 times a night.

Whilst this is strictly a Building Regulations function, it is relevant to be able to convey to the client whether bedroom windows are likely to be openable during the night time period.

2.4.5 Planning Noise Advice Document Sussex, November 2023

A planning noise advice document which all Sussex local authorities have contributed to and signed up to (including Adur and Worthing District Council) remains relevant. The guidance document has been followed in respect of measurement parameters and report presentation of data.

2.5 Pre-Application Advice

It is relevant to note the client engaged in pre-application discussions with Adur and Worthing Council. The feedback received was that any acoustic report would need to consider the railway and the airport operations.

2.6 Assessment Methodology

A survey has been undertaken to understand the site soundscape over a week period, which happened to coincide with the Eastbourne Airshow.

The measured data has been used to determine with rigorous calculations, what glazing and/or ventilation might be required to protect future occupants with regards to noise levels.

3 Sound Survey

An ambient noise survey was carried out between the 12th to 19th August 2025 to assess the ambient sound pressure levels at the site. The measurement conditions are considered to be freefield. The sound level meter used was field calibrated at the start and finish of the measurement period without any drift observed (94dB at 1000Hz).

As a matter of good practice, the measurement resolution was a 1-minute duration which remains consistent with the Sussex Planning Guidance and is particularly relevant for the assessment of L_{Amax} events overnight.

3.1 Survey Details

Survey(s) carried out by	Scott Castle BSc(Hons) Env Health, MCIEH CEnvH MIOA
Equipment Used	Svantek 971A Class 1 Sound Level Meter
Equipment Used	Castle Acoustic Calibrator – Serial No. 041173
Location	TQ09479/03572 - Pole Mounted at 2.1m WhatThreeWords : woof.closed.jumps
Duration	12-19 th August 2025

Table 2. Survey Details

The location of the sound level meter can be seen in Figure 2 below.



Figure 2. Survey Location

4 Results of the Sound Surveys

4.1 Unattended Measured (Freefield Data)

All sound survey data is reported as freefield values and uses Fast and A weighted filters.

In Figure 3 below, these display the daytime and night time measured sound pressure levels. The 11th highest L_{Amax} events are also presented for 1minute, to allow a consideration for ProPG2017 and the overnight L_{Amax} events inside a bedroom space. The L_{Amax} events are also reported in 2-minute periods for assessing overheating.

New Salts Farm Road									
Day	Date	L_{Aeq} 16/8Hr		11th L_{Amax}		Sound Reduction			
		Day	Night	1 min	2min	Day 16Hr	Night 8 Hr	$L_{Amax,1min}$	$L_{Amax,2min}$
Tue	12/08		37.4	55.6	55.4		7	11	10
Wed	13/08	44.6	39.1	57.6	57.3	10	9	13	12
Thu	14/08	51.3	42.6	61.1	61.1	16	13	16	16
Fri	15/08	50.1	44.0	61.3	58.7	15	14	16	14
Sat	16/08	50.4	40.1	57.6	57.6	15	10	13	13
Sun	17/08	53.1	38.6	57.7	56.9	18	9	13	12
Mon	18/08	47.0	42.6	60.7	60.7	12	13	16	16
AVERAGE:		49	41	59	58	14	11	14	13

Figure 3. Measured Freefield Data (Continuous)

It is understood that the Eastbourne Airshow (Airborne) ran from Thursday 14th through to Sunday 17th August 2025. Shoreham City airport is often used for airplanes and helicopters taking part in the display and this is evident from Figure 3 above, whereby the Thursday through to Sunday measured data is elevated for the daytime periods.

It is noted from Figure 3 that the Sound Reduction Index (SRI), seen from columns 7, 8, 9 and 10 are relatively low.

5 Discussion

5.1 Calculation of the Sound Reduction Index (SRI)

By being aware of how the soundscape impacts the proposed property, the Sound Reduction Index (SRI) can be calculated.

There are three drivers which impact the façade sound reduction index or SRI. These are the daytime continuous noise levels measured over 16 hours in $L_{Aeq,T}$, the night time continuous noise levels over 8 hours, also measured in $L_{Aeq,T}$. Additionally, ProPG2017 requires a consideration of the number of L_{Amax} events which will occur in a bedroom during the night time period. Specifically, ProPG2017 requires no more than ten events exceeding 45dB L_{Amax} measured internally. Whichever of these drivers is highest is applied to ensure that the residents are protected from each criterion.

An assessment has been made below of all rooms at first floor levels.

It is relevant to note that living room and bedroom calculations differ, as whilst living rooms are subject to only the daytime predicted sound pressure levels, bedrooms must consider both daytime and night time continuous sound pressure levels as well as L_{Amax} events during the night to protect sleep.

The daytime SRI is the predicted external freefield sound pressure level minus 35dB as per the Table 4 values in BS8233:2014 and the same for the night time values (albeit minus 30dB).

The L_{Amax} SRI is achieved by using the predicted night time external sound pressure level and comparing this with the measured night time survey noise level. The SRI figure is then adjusted to prevent no more than 10 L_{Amax} events per night inside the bedroom environment above 45dB L_{Amax} . The adjustment process takes account of each of the 7 measured night time periods to ensure that no individual night exceeds 10 events of 45dB L_{Amax} inside the bedroom.

The long-term survey position has been used due to assess night time data and L_{Amax} considerations. The SRI considerations have been considered for all facades.

Kitchen living diners for example will only require the daytime level to be assessed against. However, a bedroom for example will require a more detailed consideration of the continuous day-time sound pressure level, the continuous night time sound pressure level and the overnight L_{Amax} events. Whichever of the SRI is highest is used for the bedroom space to ensure that residents remain protected.

It is seen from Figure 3 above that that the maximum daytime Sound Reduction Index is 18dB, whereas the maximum night time Sound Reduction Index is 14dB. The SRI required for the L_{Amax} events to ensure compliance with ProPG2017 is 16dB. Such SRI values are relatively low.

5.2 Consideration of the Sound Reduction Index vs AVOG,2020

The worst-case SRI to be achieved is 18dB. As per Figure 4 below, this indicates that this is achievable with passive ventilation and the use of typical windows and vents.

For context, the Acoustics, Ventilation and Overheating Guidance dated Jan 2020 describes the relationship between the level difference between inside and outside sound pressure levels and how this might be achieved with different ventilation types, with types 1 and 2 being trickle vents, type 3 being mechanical extract ventilation (MEV) and type 4 being Mechanical Ventilation and Heat Recovery.

Theoretically, standard windows and passive vents should be acceptable at the site. This can change depending on the number and size of windows inside habitable rooms.

Table B-2 Potential level differences associated with different ventilation Systems from ADF

Ventilation System from ADF	Cont. equiv. (L_{Aeq}) or events (L_{Amax})	Level Difference, external free field level – internal reverberant level, dB	
		Typical windows and vent	Higher acoustic performance windows and vent
1, 2	L_{Aeq}	21	31
	L_{Amax}	22	35
3 (with trickle vent)	L_{Aeq}	23	33
	L_{Amax}	24	38
4 (no trickle vent)	L_{Aeq}	27	38
	L_{Amax}	31	45

Figure 4. AVOG, 2020 Extract

5.3 Proposed Gardens/External Amenity Areas

Given the measured daytime values, it is apparent that the site will easily achieve below 55dB $L_{Aeq, 16}$ hours as required in BS8233:2014 and ProPG2017. Without the airborne aviation display, the daytime sound pressure levels would likely be below 50dB $L_{Aeq, 16}$ hour.

5.4 ProPG2017 Initial Site Risk Assessment

In line with the approach advocated in ProPG2017, an initial site risk assessment has been carried out for the site based on the survey data.

The outcome of the ProPG2017 initial site risk assessment is that there is a negligible to low risk of developing the site in terms of mitigation measures required for noise.

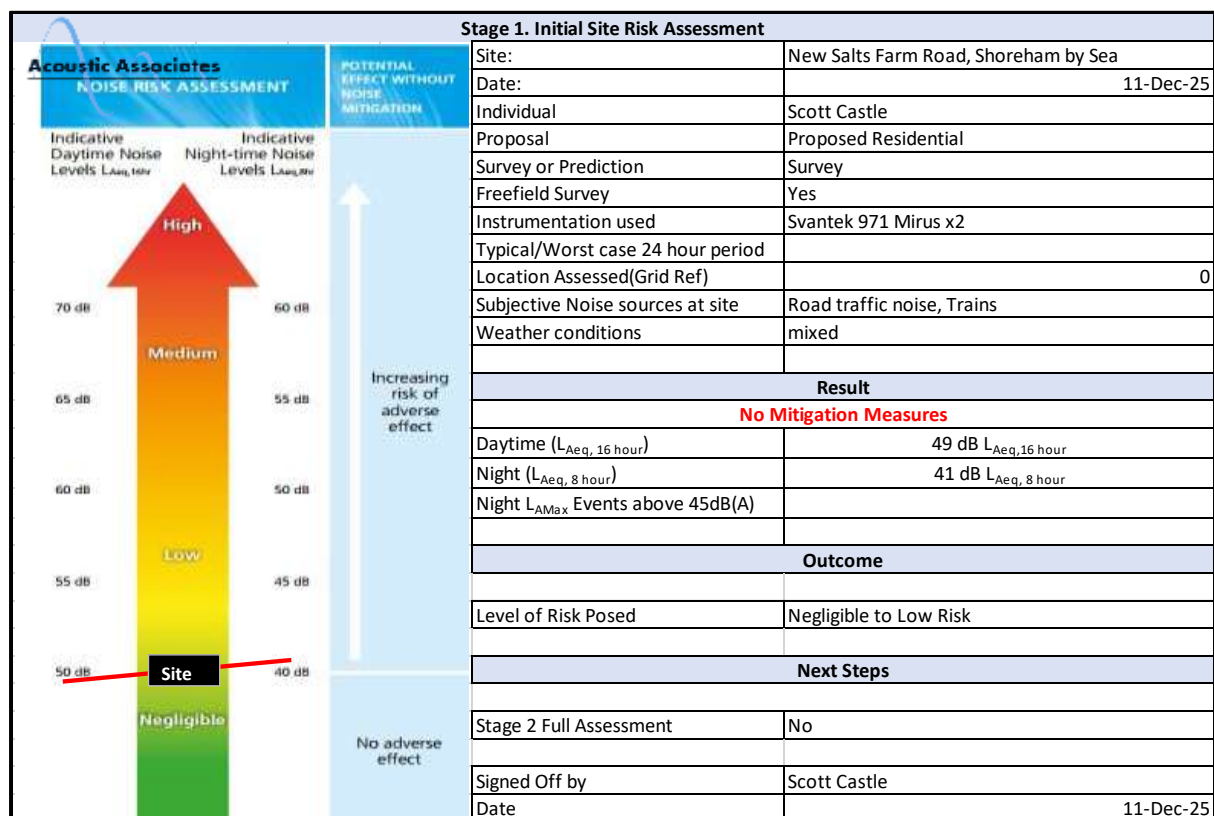


Figure 5. ProPG Initial Site Risk Assessment

5.5 Building Regulations Approved Document O – Overheating

5.5.1 Simplified Assessment (ADO)

As discussed in section 3.4.3 above, the Approvement Document O considers whether bedroom windows may be opened during the night time period, specifically to mitigate thermal overheating. There are two variables to consider and these include both continuous sound and L_{Amax} events. 10dB is taken as loss of sound energy through an open window for overheating.

The internal sound pressure level $L_{Aeq,8\text{ hour}}$ cannot be above 40dB and there must be no more than 10 events per night above 55dB L_{Amax} inside the bedroom space. Both criteria must be satisfied to allow an openable window.

Overheating assessments are not carried out for ground floor windows as these are not openable on safety or security grounds.

The measured survey data averages 41dB $L_{Aeq,8\text{ hour}}$, as seen from Figure 3 above.

Therefore, an open window assessment with a 10dB reduction would mean indoor overnight sound pressure levels are comfortably below 40dB $L_{Aeq,8\text{ hour}}$ for a bedroom. This complies with the L_{Aeq} element of the assessment.

For the L_{Amax} assessment, a 10dB reduction is entered and reviewed to determine how many events there will be overnight, as there should not be more than 10 events above 55dB L_{AFmax} overnight. This is also comfortably achieved with 1 event on average over the seven-night measured period.

5.6 Rigorous Calculations

Rigorous calculations, as per Annex G2 of BS8233:2014 consider the worst-case measured external (freefield levels) sound pressure level, but rather than using a simplistic external to internal sound pressure level subtraction, the Sound Reduction Index (SRI) is achieved using ratios of window sizes, facades, glazing specification as well as the proposed ventilation considerations.

The rigorous calculations have taken account of the following:

- 53dB $L_{Aeq,16\text{ hour}}$ as the relevant daytime sound pressure levels (worst case Sunday)
- All rigorous calculations use freefield data.
- The calculations have assumed a masonry cavity wall system with brick outer, cavity and internal blockwork.
- Where there is glazing on more than one elevation, the glazing has been summed and considered against the noisiest elevation
- Three window frame slot vents (non-acoustic) have been used within the assessment with a D_{new} of 31dB reduction for kitchen/living/diners and bedrooms. These have a 3000mm² equivalent area per single unit.
- Whilst a timber framed roof build up was used, it is noted that there is an additional green roof to be provided on each of the dwellings.

Outcome of Rigorous Calculations							
Plot	Rooms	External SPL	SRI Required	Window	Vent	Internal SPL	SRI Achieved
2	Kitchen/Diner	53	18	4\12\4	3x Velfac Click Vent (Dnew 31dB)	32	21
2	Master Bedroom	53	18	4\12\4	3x Velfac Click Vent (Dnew 31dB)	31	23
6	Kitchen/Diner	53	18	4\12\4	3x Velfac Click Vent (Dnew 31dB)	34	20
6	Master Bedroom	53	18	4\12\4	3x Velfac Click Vent (Dnew 31dB)	31	22
6	Bedroom 3	53	18	4\12\4	3x Velfac Click Vent (Dnew 31dB)	30	23
9	Kitchen/Diner	53	18	4\12\4	3x Velfac Click Vent (Dnew 31dB)	33	20
9	Master Bedroom	53	18	4\12\4	3x Velfac Click Vent (Dnew 31dB)	31	22
9	Bedroom 3	53	18	4\12\4	3x Velfac Click Vent (Dnew 31dB)	31	23

Figure 6. Rigorous Calculation Outcomes Plots 2, 6 and 9

6 Recommendations

6.1 Glazing

The glass used within the calculations was Pilkington 4/12/4 which is considered to be standard thermal double glazing. Should alternative glazing providers be approached, it is critical that only the $R_w + C_{tr}$ metric, sometimes referred to as $R_{traffic}$ is considered.

The $R_{traffic}/R_w + C_{tr}$ value for glazing is 25dB(A).

N.B. This is the required $R_w + C_{tr}$ of the frame and glazing together. If the glazing supplier has test results for the glass on its own an $R_w + C_{tr}$ value 2-3dB higher would be required (glazing tested on its own will outperform glazing that is tested within a window frame). Please note $R_w + C_{tr}$ is also referred to as $R_{traffic}$

6.2 Ventilation

The trickle vents used within the calculations were a Velfac non acoustic click vent with a single equivalent area of 3000mm². Three vents were included in each calculation, therefore 9000mm².

This product has a D_{new} of 31dB, albeit with three vents used in each room, this drops by 6dB.

7 Conclusion

A sound survey was undertaken from 12th to 19th August with a class 1 sound level meter at the application site. The findings of the assessment were that the daytime sound pressure levels were an average (logarithmic) of 49dB $L_{Aeq, 16 \text{ hours}}$ and night time sound pressure levels were 41dB $L_{Aeq, 8 \text{ hours}}$. The Sound Reduction Index (SRI) required to protect future occupants is a maximum of 18dB.

The monitoring period deliberately included a weekend and by coincidence, this included the Eastbourne airshow (Airborne). It is therefore argued that the dataset presents a worst-case period when the airport is being used.

Garden areas will comfortably achieve the requirements of BS8233:2014 and ProPG2017 with an upper requirement of 55dB $L_{Aeq, 16 \text{ hour}}$. It is noted that for the days without the airshow impact, the daytime sound pressure levels were 45dB and 47dB $L_{Aeq, 16 \text{ hours}}$ respectively.

An initial site risk assessment consistent with the requirements of ProPG2017 identifies a negligible to low risk of developing the site.

An assessment made under Building Regulations Approved Document O (Overheating) identifies that bedroom windows will be capable of being opened during the night time period.

In terms of mitigation measures, rigorous calculations were carried out, consistent with the approach in Annex G.2 of BS8233:2014. Standard thermal double glazing ($R_{\text{traffic}} 25\text{dB(A)}$) and a passive non-acoustic trickle vent of 31dB D_{new} will provide the residents sufficient protection from noise levels.

Based on the above findings, planning permission should not be withheld on noise grounds.

8 Appendix A – Rigorous Calculation Outcomes – Plots 2, 6 and 9

Non Frequency Dependent Variables			Key for Table Below	
Term	Derivation	Value	R _{wi}	Sound Reduction of Window (Octave)
A ₀	Given in BS EN 20140-10 = 10 (m ²)	10	R _{ew}	Sound Reduction Index of External Wall (Octave)
S _f	Total Facade Area (m ²)	13.5	R _{rr}	Sound Reduction Index of Roof/Ceiling (Octave)
S _{wi}	Window Area (m ²)	2.34	A	Equivalent Absorption Area of Rx Room
S _{ew}	External Wall Area (m ²)	11.16	D _{n,e}	Insulation of Trickle Vent (BS EN 20140-10)
S _{rr}	Ceiling Area (m ²)	13.1		
S	Total Area sound enters the room (m ²)	26.6		

Frequency Dependent Variables							
Term	Description	Octave Band Centre Frequency					
		125	250	500	1000	2000	4000
Leq,ff	Free-Field External Noise Level	54	53	50	47	47	40
D _{n,e}	Velfac Non Acoustic Click Vent x3	29.4	30.3	28.3	21	24.9	31.3
R _{wi}	4_12_4	24	20	25	35	38	35
R _{ew}	Cavity Masonry (Brick Cavity with Insulation lightweight block)	41	39	44	52	60	65
R _{rr}	Flat timber joist roof, asphalt on boarding, 12mm plasterboard ceiling, thermal insulation	28	34	45	45	45	45
A	Equivalent Absorption Area of Room (Copied from BS8233)	11.00	14.00	16.00	16.00	15.00	15.00

BS8233 Calculation Details						
Term From Equation Below	Octave Band Centre Frequency					
	125	250	500	1000	2000	4000
Leq,ff	54	53	50	47	47	40
A ₀ /S . 10 [^] (-D _{n,e} /10)	0.000432	0.000351	0.000556	0.002986	0.001217	0.000279
S _{wi} /S . 10 [^] (-R _{wi} /10)	0.00035	0.00088	0.000278	2.78E-05	1.39E-05	2.78E-05
S _{ew} /S . 10 [^] (-R _{ew} /10)	3.33E-05	5.28E-05	1.67E-05	2.65E-06	4.2E-07	1.33E-07
S _{rr} /S . 10 [^] (-R _{rr} /10)	0.000781	0.000196	1.56E-05	1.56E-05	1.56E-05	1.56E-05
10log ₁₀ (S/A)+3	6.83489	5.787536	5.207617	5.207617	5.487904	5.487904
Leq,2	32.86442	30.48847	24.58539	27.02525	23.44466	10.56933
A-Weighting	-16.1	-8.6	-3.2	0	1.2	1
A-Weighted Leq	16.76442	21.88847	21.38539	27.02525	24.64466	11.56933

A-Weighted Level Outside	53
BS8233 Predicted Internal A-Weighted Level	31
Predicted Building Envelope SRI	23

Plot 2 Master Bedroom

BS8233 Calculation can be seen below:

$$L_{eq,2} = L_{eq,ff} + 10 \log_{10} \left(\frac{A_0}{S} 10^{\frac{-D_{n,e}}{10}} + \frac{S_{wi}}{S} 10^{\frac{-R_{wi}}{10}} + \frac{S_{ew}}{S} 10^{\frac{-R_{ew}}{10}} + \frac{S_{rr}}{S} 10^{\frac{-R_{rr}}{10}} \right) + 10 \log_{10} \left(\frac{S}{A} \right) + 3$$

Non Frequency Dependent Variables			Key for Table Below	
Term	Derivation	Value	R _{wi}	Sound Reduction of Window (Octave)
A ₀	Given in BS EN 20140-10 = 10 (m ²)	10	R _{ew}	Sound Reduction Index of External Wall (Octave)
S _f	Total Facade Area (m ²)	47.52	R _{rr}	Sound Reduction Index of Roof/Ceiling (Octave)
S _{wi}	Window Area (m ²)	11.54	A	Equivalent Absorption Area of Rx Room
S _{ew}	External Wall Area (m ²)	35.98	D _{n,e}	Insulation of Trickle Vent (BS EN 20140-10)
S _{rr}	Ceiling Area (m ²)	0.00001		
S	Total Area sound enters the room (m ²)	47.52001		

Frequency Dependent Variables							
Term	Description	Octave Band Centre Frequency					
		125	250	500	1000	2000	4000
Leq,ff	Free-Field External Noise Level	54	53	50	47	47	40
D _{n,e}	Velfac Non Acoustic Click Vent x3	29.4	30.3	28.3	21	24.9	31.3
R _{wi}	4_12_4	24	20	25	35	38	35
R _{ew}	Cavity Masonry (Brick Cavity with Insulation lightweight block)	41	39	44	52	60	65
R _{rr}	Flat timber joist roof, asphalt on boarding, 12mm plasterboard ceiling, thermal insulation	28	34	45	45	45	45
A	Equivalent Absorption Area of Room (Copied from BS8233)	11.00	14.00	16.00	16.00	15.00	15.00

BS8233 Calculation Details						
Term From Equation Below	Octave Band Centre Frequency					
	125	250	500	1000	2000	4000
Leq,ff	54	53	50	47	47	40
A ₀ /S . 10 [^] (-D _{n,e} /10)	0.000242	0.000196	0.000311	0.001672	0.000681	0.000156
S _{wi} /S . 10 [^] (-R _{wi} /10)	0.000967	0.002428	0.000768	7.68E-05	3.85E-05	7.68E-05
S _{ew} /S . 10 [^] (-R _{ew} /10)	6.01E-05	9.53E-05	3.01E-05	4.78E-06	7.57E-07	2.39E-07
S _{rr} /S . 10 [^] (-R _{rr} /10)	3.34E-10	8.38E-11	6.65E-12	6.65E-12	6.65E-12	6.65E-12
10log ₁₀ (S/A)+3	9.354838	8.307485	7.727565	7.727565	8.007853	8.007853
Leq,2	34.38789	35.65343	28.17824	27.16573	23.58243	11.68203
A-Weighting	-16.1	-8.6	-3.2	0	1.2	1
A-Weighted Leq	18.28789	27.05343	24.97824	27.16573	24.78243	12.68203

A-Weighted Level Outside	53
BS8233 Predicted Internal A-Weighted Level	32
Predicted Building Envelope SRI	21

Plot 2 Kitchen/Diner

BS8233 Calculation can be seen below:

$$L_{eq,2} = L_{eq,ff} + 10 \log_{10} \left(\frac{A_0}{S} 10^{\frac{-D_{n,e}}{10}} + \frac{S_{wi}}{S} 10^{\frac{-R_{wi}}{10}} + \frac{S_{ew}}{S} 10^{\frac{-R_{ew}}{10}} + \frac{S_{rr}}{S} 10^{\frac{-R_{rr}}{10}} \right) + 10 \log_{10} \left(\frac{S}{A} \right) + 3$$

Non Frequency Dependent Variables			Key for Table Below	
Term	Derivation	Value	R _{wi}	Sound Reduction of Window (Octave)
A ₀	Given in BS EN 20140-10 = 10 (m ²)	10	R _{ew}	Sound Reduction Index of External Wall (Octave)
S _r	Total Facade Area (m ²)	65.01	R _{rr}	Sound Reduction Index of Roof/Ceiling (Octave)
S _{wi}	Window Area (m ²)	19.65	A	Equivalent Absorption Area of Rx Room
S _{ew}	External Wall Area (m ²)	45.36	D _{n,e}	Insulation of Trickle Vent (BS EN 20140-10)
S _{rr}	Ceiling Area (m ²)	0.00001		
S	Total Area sound enters the room (m ²)	65.01001		

Frequency Dependent Variables							
Term	Description	Octave Band Centre Frequency					
		125	250	500	1000	2000	4000
Leq,ff	Free-Field External Noise Level	54	53	50	47	47	40
D _{n,e}	Velfac Non Acoustic Click Vent x3	29.4	30.3	28.3	21	24.9	31.3
R _{wi}	4_12_4	24	20	25	35	38	35
R _{ew}	Cavity Masonry (Brick Cavity with Insulation lightweight block)	41	39	44	52	60	65
R _{rr}	Flat timber joist roof, asphalt on boarding, 12mm plasterboard ceiling, thermal insulation	28	34	45	45	45	45
A	Equivalent Absorption Area of Room (Copied from BS8233)	11.00	14.00	16.00	16.00	15.00	15.00

BS8233 Calculation Details							
Term From Equation Below	Octave Band Centre Frequency						
	125	250	500	1000	2000	4000	
Leq,ff	54	53	50	47	47	40	
A ₀ /S . 10 [^] (-D _{n,e} /10)	0.000177	0.000144	0.000228	0.001222	0.000498	0.000114	
S _{wi} /S . 10 [^] (-R _{wi} /10)	0.001203	0.003023	0.000956	9.56E-05	4.79E-05	9.56E-05	
S _{ew} /S . 10 [^] (-R _{ew} /10)	5.54E-05	8.78E-05	2.78E-05	4.4E-06	6.98E-07	2.21E-07	
S _{rr} /S . 10 [^] (-R _{rr} /10)	2.44E-10	6.12E-11	4.86E-12	4.86E-12	4.86E-12	4.86E-12	
10log ₁₀ (S/A)+3	10.71588	9.668522	9.088603	9.088603	9.36889	9.36889	
Leq,2	36.28548	37.79271	29.92051	27.30039	23.7437	12.58765	
A-Weighting	-16.1	-8.6	-3.2	0	1.2	1	
A-Weighted Leq	20.18548	29.19271	26.72051	27.30039	24.9437	13.58765	

A-Weighted Level Outside	53
BS8233 Predicted Internal A-Weighted Level	34
Predicted Building Envelope SRI	20

Plot 6 Kitchen/Diner

BS8233 Calculation can be seen below:

$$L_{eq,2} = L_{eq,ff} + 10 \log_{10} \left(\frac{A_0}{S} 10^{\frac{-D_{n,e}}{10}} + \frac{S_{wi}}{S} 10^{\frac{-R_{wi}}{10}} + \frac{S_{ew}}{S} 10^{\frac{-R_{ew}}{10}} + \frac{S_{rr}}{S} 10^{\frac{-R_{rr}}{10}} \right) + 10 \log_{10} \left(\frac{S}{A} \right) + 3$$

Non Frequency Dependent Variables			Key for Table Below	
Term	Derivation	Value	R _{wi}	Sound Reduction of Window (Octave)
A ₀	Given in BS EN 20140-10 = 10 (m ²)	10	R _{ew}	Sound Reduction Index of External Wall (Octave)
S _r	Total Facade Area (m ²)	23.7	R _{rr}	Sound Reduction Index of Roof/Ceiling (Octave)
S _{wi}	Window Area (m ²)	4.75	A	Equivalent Absorption Area of Rx Room
S _{ew}	External Wall Area (m ²)	18.95	D _{n,e}	Insulation of Trickle Vent (BS EN 20140-10)
S _{rr}	Ceiling Area (m ²)	14.9		
S	Total Area sound enters the room (m ²)	38.6		

Frequency Dependent Variables							
Term	Description	Octave Band Centre Frequency					
		125	250	500	1000	2000	4000
Leq,ff	Free-Field External Noise Level	54	53	50	47	47	40
D _{n,e}	Velfac Non Acoustic Click Vent x3	29.4	30.3	28.3	21	24.9	31.3
R _{wi}	4_12_4	24	20	25	35	38	35
R _{ew}	Cavity Masonry (Brick Cavity with Insulation lightweight block)	41	39	44	52	60	65
R _{rr}	Flat timber joist roof, asphalt on boarding, 12mm plasterboard ceiling, thermal insulation	28	34	45	45	45	45
A	Equivalent Absorption Area of Room (Copied from BS8233)	11.00	14.00	16.00	16.00	15.00	15.00

BS8233 Calculation Details						
Term From Equation Below	Octave Band Centre Frequency					
	125	250	500	1000	2000	4000
Leq,ff	54	53	50	47	47	40
A ₀ /S . 10 [^] (-D _{n,e} /10)	0.000297	0.000242	0.000383	0.002058	0.000838	0.000192
S _{wi} /S . 10 [^] (-R _{wi} /10)	0.00049	0.001231	0.000389	3.89E-05	1.95E-05	3.89E-05
S _{ew} /S . 10 [^] (-R _{ew} /10)	3.9E-05	6.18E-05	1.95E-05	3.1E-06	4.91E-07	1.55E-07
S _{rr} /S . 10 [^] (-R _{rr} /10)	0.000612	0.000154	1.22E-05	1.22E-05	1.22E-05	1.22E-05
10log ₁₀ (S/A)+3	8.451946	7.404593	6.824673	6.824673	7.10496	7.10496
Leq,2	34.02993	32.67786	25.87767	27.07174	23.50278	10.96683
A-Weighting	-16.1	-8.6	-3.2	0	1.2	1
A-Weighted Leq	17.92993	24.07786	22.67767	27.07174	24.70278	11.96683

A-Weighted Level Outside	53
BS8233 Predicted Internal A-Weighted Level	31
Predicted Building Envelope SRI	22

Plot 6 Master Bedroom

BS8233 Calculation can be seen below:

$$L_{eq,2} = L_{eq,ff} + 10 \log_{10} \left(\frac{A_0}{S} 10^{\frac{-D_{n,e}}{10}} + \frac{S_{wi}}{S} 10^{\frac{-R_{wi}}{10}} + \frac{S_{ew}}{S} 10^{\frac{-R_{ew}}{10}} + \frac{S_{rr}}{S} 10^{\frac{-R_{rr}}{10}} \right) + 10 \log_{10} \left(\frac{S}{A} \right) + 3$$

Non Frequency Dependent Variables			Key for Table Below	
Term	Derivation	Value	R _{wi}	Sound Reduction of Window (Octave)
A ₀	Given in BS EN 20140-10 = 10 (m ²)	10	R _{ew}	Sound Reduction Index of External Wall (Octave)
S _r	Total Facade Area (m ²)	12	R _{rr}	Sound Reduction Index of Roof/Ceiling (Octave)
S _{wi}	Window Area (m ²)	1.54	A	Equivalent Absorption Area of Rx Room
S _{ew}	External Wall Area (m ²)	10.46	D _{n,e}	Insulation of Trickle Vent (BS EN 20140-10)
S _{rr}	Ceiling Area (m ²)	11		
S	Total Area sound enters the room (m ²)	23		

Frequency Dependent Variables							
Term	Description	Octave Band Centre Frequency					
		125	250	500	1000	2000	4000
Leq,ff	Free-Field External Noise Level	54	53	50	47	47	40
D _{n,e}	Velfac Non Acoustic Click Vent x3	29.4	30.3	28.3	21	24.9	31.3
R _{wi}	4_12_4	24	20	25	35	38	35
R _{ew}	Cavity Masonry (Brick Cavity with Insulation lightweight block)	41	39	44	52	60	65
R _{rr}	Flat timber joist roof, asphalt on boarding, 12mm plasterboard ceiling, thermal insulation	28	34	45	45	45	45
A	Equivalent Absorption Area of Room (Copied from BS8233)	11.00	14.00	16.00	16.00	15.00	15.00

BS8233 Calculation Details						
Term From Equation Below	Octave Band Centre Frequency					
	125	250	500	1000	2000	4000
Leq,ff	54	53	50	47	47	40
A ₀ /S . 10 [^] (-D _{n,e} /10)	0.000499	0.000406	0.000643	0.003454	0.001407	0.000322
S _{wi} /S . 10 [^] (-R _{wi} /10)	0.000267	0.00067	0.000212	2.12E-05	1.06E-05	2.12E-05
S _{ew} /S . 10 [^] (-R _{ew} /10)	3.61E-05	5.73E-05	1.81E-05	2.87E-06	4.55E-07	1.44E-07
S _{rr} /S . 10 [^] (-R _{rr} /10)	0.000758	0.00019	1.51E-05	1.51E-05	1.51E-05	1.51E-05
10log ₁₀ (S/A)+3	6.203352	5.155998	4.576079	4.576079	4.856366	4.856366
Leq,2	32.13424	29.37153	24.06048	27.00778	23.41919	10.40429
A-Weighting	-16.1	-8.6	-3.2	0	1.2	1
A-Weighted Leq	16.03424	20.77153	20.86048	27.00778	24.61919	11.40429

A-Weighted Level Outside	53
BS8233 Predicted Internal A-Weighted Level	30
Predicted Building Envelope SRI	23

Plot 6 Bedroom 3

BS8233 Calculation can be seen below:

$$L_{eq,2} = L_{eq,ff} + 10 \log_{10} \left(\frac{A_0}{S} 10^{\frac{-D_{n,e}}{10}} + \frac{S_{wi}}{S} 10^{\frac{-R_{wi}}{10}} + \frac{S_{ew}}{S} 10^{\frac{-R_{ew}}{10}} + \frac{S_{rr}}{S} 10^{\frac{-R_{rr}}{10}} \right) + 10 \log_{10} \left(\frac{S}{A} \right) + 3$$

Non Frequency Dependent Variables			Key for Table Below	
Term	Derivation	Value	R _{wi}	Sound Reduction of Window (Octave)
A ₀	Given in BS EN 20140-10 = 10 (m ²)	10	R _{ew}	Sound Reduction Index of External Wall (Octave)
S _f	Total Facade Area (m ²)	71.61	R _{rr}	Sound Reduction Index of Roof/Ceiling (Octave)
S _{wi}	Window Area (m ²)	17.71	A	Equivalent Absorption Area of Rx Room
S _{ew}	External Wall Area (m ²)	53.9	D _{n,e}	Insulation of Trickle Vent (BS EN 20140-10)
S _{rr}	Ceiling Area (m ²)	0.00001		
S	Total Area sound enters the room (m ²)	71.61001		

Frequency Dependent Variables							
Term	Description	Octave Band Centre Frequency					
		125	250	500	1000	2000	4000
Leq,ff	Free-Field External Noise Level	54	53	50	47	47	40
D _{n,e}	Velfac Non Acoustic Click Vent x3	29.4	30.3	28.3	21	24.9	31.3
R _{wi}	4_12_4	24	20	25	35	38	35
R _{ew}	Cavity Masonry (Brick Cavity with Insulation lightweight block)	41	39	44	52	60	65
R _{rr}	Flat timber joist roof, asphalt on boarding, 12mm plasterboard ceiling, thermal insulation	28	34	45	45	45	45
A	Equivalent Absorption Area of Room (Copied from BS8233)	11.00	14.00	16.00	16.00	15.00	15.00

BS8233 Calculation Details						
Term From Equation Below	Octave Band Centre Frequency					
	125	250	500	1000	2000	4000
Leq,ff	54	53	50	47	47	40
A ₀ /S . 10 [^] (-D _{n,e} /10)	0.00016	0.00013	0.000207	0.001109	0.000452	0.000104
S _{wi} /S . 10 [^] (-R _{wi} /10)	0.000985	0.002473	0.000782	7.82E-05	3.92E-05	7.82E-05
S _{ew} /S . 10 [^] (-R _{ew} /10)	5.98E-05	9.48E-05	3E-05	4.75E-06	7.53E-07	2.38E-07
S _{rr} /S . 10 [^] (-R _{rr} /10)	2.21E-10	5.56E-11	4.42E-12	4.42E-12	4.42E-12	4.42E-12
10log ₁₀ (S/A)+3	11.13581	10.08846	9.508538	9.508538	9.788825	9.788825
Leq,2	35.94456	37.3992	29.58851	27.27202	23.70699	12.38871
A-Weighting	-16.1	-8.6	-3.2	0	1.2	1
A-Weighted Leq	19.84456	28.7992	26.38851	27.27202	24.90699	13.38871

A-Weighted Level Outside	53
BS8233 Predicted Internal A-Weighted Level	33
Predicted Building Envelope SRI	20

Plot 9 Kitchen Diner

BS8233 Calculation can be seen below:

$$L_{eq,2} = L_{eq,ff} + 10 \log_{10} \left(\frac{A_0}{S} 10^{\frac{-D_{n,e}}{10}} + \frac{S_{wi}}{S} 10^{\frac{-R_{wi}}{10}} + \frac{S_{ew}}{S} 10^{\frac{-R_{ew}}{10}} + \frac{S_{rr}}{S} 10^{\frac{-R_{rr}}{10}} \right) + 10 \log_{10} \left(\frac{S}{A} \right) + 3$$

Non Frequency Dependent Variables			Key for Table Below	
Term	Derivation	Value	R _{wi}	Sound Reduction of Window (Octave)
A ₀	Given in BS EN 20140-10 = 10 (m ²)	10	R _{ew}	Sound Reduction Index of External Wall (Octave)
S _r	Total Facade Area (m ²)	24.3	R _{rr}	Sound Reduction Index of Roof/Ceiling (Octave)
S _{wi}	Window Area (m ²)	5	A	Equivalent Absorption Area of Rx Room
S _{ew}	External Wall Area (m ²)	19.3	D _{n,e}	Insulation of Trickle Vent (BS EN 20140-10)
S _{rr}	Ceiling Area (m ²)	14.3		
S	Total Area sound enters the room (m ²)	38.6		

Frequency Dependent Variables							
Term	Description	Octave Band Centre Frequency					
		125	250	500	1000	2000	4000
Leq,ff	Free-Field External Noise Level	54	53	50	47	47	40
D _{n,e}	Velfac Non Acoustic Click Vent x3	29.4	30.3	28.3	21	24.9	31.3
R _{wi}	4_12_4	24	20	25	35	38	35
R _{ew}	Cavity Masonry (Brick Cavity with Insulation lightweight block)	41	39	44	52	60	65
R _{rr}	Flat timber joist roof, asphalt on boarding, 12mm plasterboard ceiling, thermal insulation	28	34	45	45	45	45
A	Equivalent Absorption Area of Room (Copied from BS8233)	11.00	14.00	16.00	16.00	15.00	15.00

BS8233 Calculation Details						
Term From Equation Below	Octave Band Centre Frequency					
	125	250	500	1000	2000	4000
Leq,ff	54	53	50	47	47	40
A ₀ /S . 10 [^] (-D _{n,e} /10)	0.000297	0.000242	0.000383	0.002058	0.000838	0.000192
S _{wi} /S . 10 [^] (-R _{wi} /10)	0.000516	0.001295	0.00041	4.1E-05	2.05E-05	4.1E-05
S _{ew} /S . 10 [^] (-R _{ew} /10)	3.97E-05	6.29E-05	1.99E-05	3.15E-06	5E-07	1.58E-07
S _{rr} /S . 10 [^] (-R _{rr} /10)	0.000587	0.000147	1.17E-05	1.17E-05	1.17E-05	1.17E-05
10log ₁₀ (S/A)+3	8.451946	7.404593	6.824673	6.824673	7.10496	7.10496
Leq,2	34.03556	32.82887	25.98621	27.07506	23.50549	10.99458
A-Weighting	-16.1	-8.6	-3.2	0	1.2	1
A-Weighted Leq	17.93556	24.22887	22.78621	27.07506	24.70549	11.99458

A-Weighted Level Outside	53
BS8233 Predicted Internal A-Weighted Level	31
Predicted Building Envelope SRI	22

Plot 9 Master Bedroom

BS8233 Calculation can be seen below:

$$L_{eq,2} = L_{eq,ff} + 10 \log_{10} \left(\frac{A_0}{S} 10^{\frac{-D_{n,e}}{10}} + \frac{S_{wi}}{S} 10^{\frac{-R_{wi}}{10}} + \frac{S_{ew}}{S} 10^{\frac{-R_{ew}}{10}} + \frac{S_{rr}}{S} 10^{\frac{-R_{rr}}{10}} \right) + 10 \log_{10} \left(\frac{S}{A} \right) + 3$$

Non Frequency Dependent Variables			Key for Table Below	
Term	Derivation	Value	R _{wi}	Sound Reduction of Window (Octave)
A ₀	Given in BS EN 20140-10 = 10 (m ²)	10	R _{ew}	Sound Reduction Index of External Wall (Octave)
S _r	Total Facade Area (m ²)	18.9	R _{rr}	Sound Reduction Index of Roof/Ceiling (Octave)
S _{wi}	Window Area (m ²)	2.25	A	Equivalent Absorption Area of Rx Room
S _{ew}	External Wall Area (m ²)	16.65	D _{n,e}	Insulation of Trickle Vent (BS EN 20140-10)
S _{rr}	Ceiling Area (m ²)	8.91		
S	Total Area sound enters the room (m ²)	27.81		

Frequency Dependent Variables							
Term	Description	Octave Band Centre Frequency					
		125	250	500	1000	2000	4000
Leq,ff	Free-Field External Noise Level	54	53	50	47	47	40
D _{n,e}	Velfac Non Acoustic Click Vent x3	29.4	30.3	28.3	21	24.9	31.3
R _{wi}	4_12_4	24	20	25	35	38	35
R _{ew}	Cavity Masonry (Brick Cavity with Insulation lightweight block)	41	39	44	52	60	65
R _{rr}	Flat timber joist roof, asphalt on boarding, 12mm plasterboard ceiling, thermal insulation	28	34	45	45	45	45
A	Equivalent Absorption Area of Room (Copied from BS8233)	11.00	14.00	16.00	16.00	15.00	15.00

BS8233 Calculation Details						
Term From Equation Below	Octave Band Centre Frequency					
	125	250	500	1000	2000	4000
Leq,ff	54	53	50	47	47	40
A ₀ /S . 10 [^] (-D _{n,e} /10)	0.000413	0.000336	0.000532	0.002856	0.001164	0.000267
S _{wi} /S . 10 [^] (-R _{wi} /10)	0.000322	0.000809	0.000256	2.56E-05	1.28E-05	2.56E-05
S _{ew} /S . 10 [^] (-R _{ew} /10)	4.76E-05	7.54E-05	2.38E-05	3.78E-06	5.99E-07	1.89E-07
S _{rr} /S . 10 [^] (-R _{rr} /10)	0.000508	0.000128	1.01E-05	1.01E-05	1.01E-05	1.01E-05
10log ₁₀ (S/A)+3	7.028083	5.98073	5.40081	5.40081	5.681097	5.681097
Leq,2	32.13495	30.27623	24.54782	27.01844	23.42612	10.48789
A-Weighting	-16.1	-8.6	-3.2	0	1.2	1
A-Weighted Leq	16.03495	21.67623	21.34782	27.01844	24.62612	11.48789

A-Weighted Level Outside	53
BS8233 Predicted Internal A-Weighted Level	31
Predicted Building Envelope SRI	23

Plot 9 Bedroom 3

BS8233 Calculation can be seen below:

$$L_{eq,2} = L_{eq,ff} + 10 \log_{10} \left(\frac{A_0}{S} 10^{\frac{-D_{n,e}}{10}} + \frac{S_{wi}}{S} 10^{\frac{-R_{wi}}{10}} + \frac{S_{ew}}{S} 10^{\frac{-R_{ew}}{10}} + \frac{S_{rr}}{S} 10^{\frac{-R_{rr}}{10}} \right) + 10 \log_{10} \left(\frac{S}{A} \right) + 3$$