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Architectural & Environmental Consultants

Noise | Vibration | Air Quality

Acoustics Design Assessment

29 Broadwater Road, Welwyn Garden City

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Acoustics Design Assessment

Project: 29 BROADWATER ROAD, WELWYN GARDEN CITY

Report reference: RP01-24112-R1

Client:
HILL PARTNERSHIPS LTD
THE POWER HOUSE, GUNPOWDER MILL
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Document control:

REVISION	ISSUE DATE	REPORT BY	CHECKED BY	NOTES
0	24 June 2024	Sebastian Sloan, BSc, Acoustics Consultant	Adam Bamford, BSc MIOA DipIOA, Principal Acoustics Consultant	Initial issue
1	18 July 2024	Adam Bamford, BSc MIOA DipIOA, Principal Acoustics Consultant		Updated external wall construction

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1. EXECUTIVE SUMMARY

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1.2 The assessment was carried out in accordance with relevant local and national planning guidance and acoustics standards.

1.3 Noise levels at the site are dictated by road traffic noise emissions from Broadwater Road and to a less extent by Broad Court. Industrial/Commercial noise levels were assessed by AIRO at the planning submission stage and were found to be generally insignificant compared to traffic noise and would result in low impact when assessed in accordance with BS4142.

1.4 A 3D noise model of the development was constructed based on the results of a site noise survey. The noise model was used to calculate road traffic noise levels at all facades of the development.

1.5 Planning complaint internal noise levels can be achieved with the adoption of acoustically upgraded glazing and installation of MVHR ventilation systems. The project team have confirmed that the specification provided within Table 3 and Appendix 5 of this report will be installed.

1.6 Balconies and the ground floor communal external amenity area are shielded from the traffic noise by the development building itself and achieve the World Health Organisation limit of 55 dBA required by Planning Condition 10.

1.7 Compliance with noise criteria in Building Regulations Part O has also been assessed. Bedrooms facing Broadwater Road and Broad Court need to be designed so that windows can remain closed at night without the rooms overheating. Appendix 6 within this report shows a marked up plan where openable/ closed windows will be required for overheating with respect to noise. Further detail is given in the Cass Allen overheating report (reference RP02-24112).

1.8 It is our view that this report contains the information required to discharge Planning Condition 10 of the development consent.

2. INTRODUCTION

2.1 Cass Allen has been instructed by Hill Partnerships Ltd to assess the acoustic design of a new development at 29 Broadwater Road, Welwyn Garden City.

2.2 The assessment has been carried out in accordance with the requirements of Planning Condition 10 of the development consent (reference: 6/2019/3024/MAJ) which states:

> *10. Prior to any above ground development a scheme of noise protection measures to protect the proposed occupiers of the development from noise due to traffic and the existing and proposed commercial/industrial businesses in the vicinity, shall be submitted to the Local Planning Authority for its written approval. The approved Noise protection measures scheme shall be implemented before any part of the accommodation hereby approved is occupied.*
>
> *For traffic noise the scheme shall ensure that indoor ambient noise levels in living rooms and bedrooms meet the standards within BS8233:2014. For commercial/industrial noise the scheme shall ensure the indoor ambient noise levels in living rooms and bedrooms are 10dB below the standards within BS 8233:2014 and LAmax levels are not to exceed 40dB internally with windows closed.*
>
> *If opening windows raises the noise levels above those listed above, then mechanical ventilation will need to be installed, with ventilation rates required to meet those found within The Noise Insulation Regulations 1975.*
>
> *Alternative methods and rates can be considered, however, evidence that overheating will not occur will need to be provided in the form of a SAP assessment conducted with windows closed and the ventilation rate for the system being substituted for those within Appendix P.*
>
> *Outdoor amenity areas will need to meet the 55dB WHO Community Noise Guideline Level.*
>
> *REASON: To protect the occupants of nearby residential properties from noise disturbance in accordance with the requirements of Policies D1 and R19 of the Welwyn Hatfield District Plan 2005.*

2.3 This report contains technical terminology; a glossary of terms can be found at www.cassallen.co.uk/glossary.

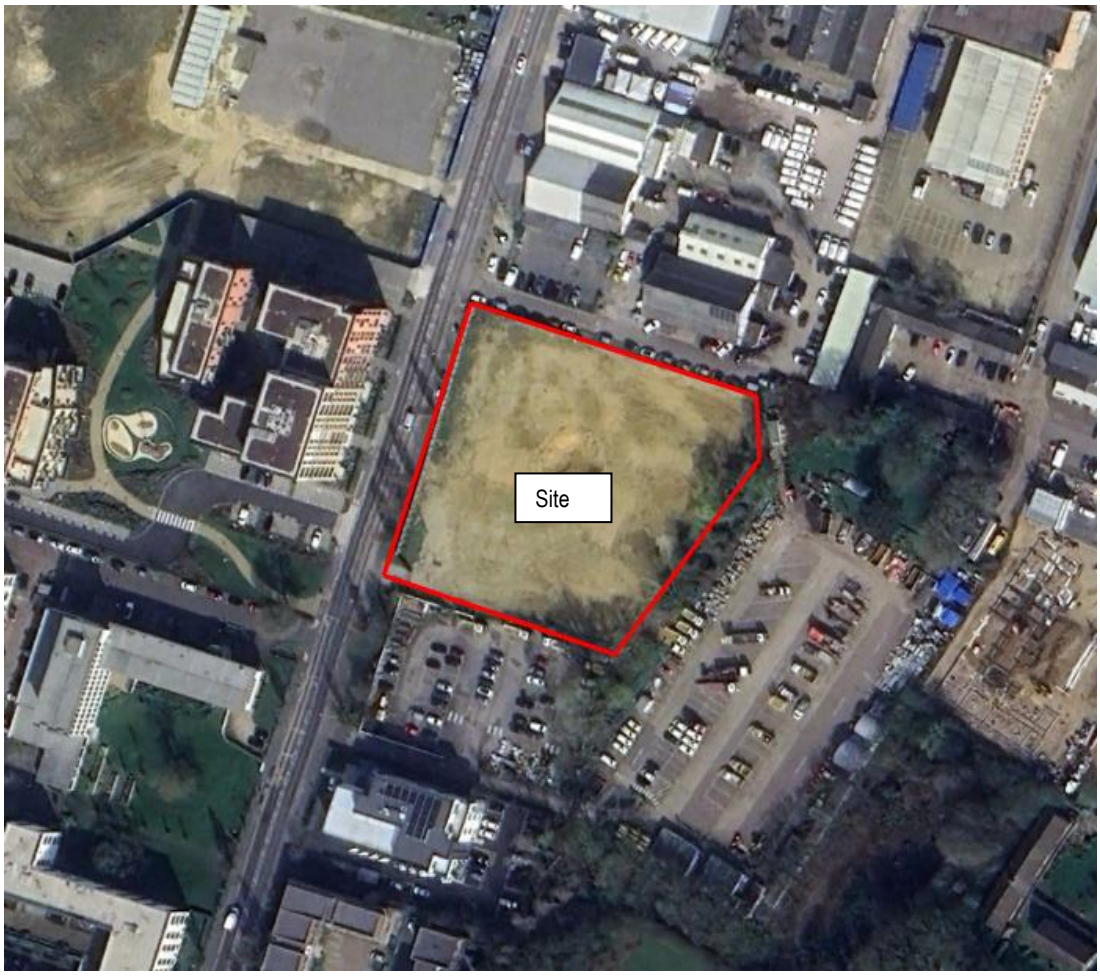
3. DEVELOPMENT DESCRIPTION

3.1 The development comprises residential properties. A current drawing of the development layout is shown in Appendix 1

3.2 The site is located in a mixed-use area, bounded to the east by Broadwater Road and to the north Broad Court. To the south of the site is a car park. To the north of the site is an industrial estate.

3.3 The site location and surrounding area is shown in Figure 1 below.

Figure 1 Site Location and Surrounding Area



3.4 To address the requirements of Planning Condition 10, noise affecting the habitable areas of the development and the design of the external facades has been assessed.

4. NOISE AFFECTING THE DEVELOPMENT

4.1 The noise levels that will exist within the habitable areas of the finished development have been predicted based on the existing noise environment at the site and details for the design of the development. The predicted noise levels have then been compared with appropriate design criteria. Suitable mitigation measures have been identified where necessary to achieve acceptable noise levels.

Design criteria – Internal noise levels

4.2 Planning Condition 10 requires that traffic noise is controlled to achieve the noise criteria given in BS8233:2014 '*Guidance on sound insulation and noise reduction for buildings*' which is reproduced in Table 1 below.

Table 1 BS8233:2014 Internal Noise Criteria

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

4.3 Planning Condition 10 also requires that any facade affected by commercial/industrial noise must achieve internal noise levels 10 dB below the BS8233 requirements i.e. 25 dB LAeq, 16hour for living rooms and 20 dB LAeq, 8hr for bedrooms. Additionally, the planning condition states that LAmax levels cannot exceed 40 dB internally with windows closed at the facades.

Existing site noise levels

4.4 A noise survey was carried out at the site between 30 May and 7 June 2024 to assess existing noise levels in the area. The full methodology and results of the noise survey are provided in Appendix 2.

4.5 Average noise levels (LAeq), maximum noise levels (LAmax), and background noise levels (LA90) across the site were generally dictated by road traffic on Broadwater Road. The LA90 levels were also dictated by traffic movements on surrounding roads.

4.6 Based on the results of the site noise survey, a 3D computer noise model was developed to predict and assess the noise levels that will exist across the entire development.

4.7 The 3D noise model was developed using Cadna/A 2023 environmental noise modelling software. Cadna/A incorporates the calculation methodology outlined in the Department of Transport Welsh Office - Calculation of Road Traffic Noise (CRTN) for the assessment of road traffic noise propagation.

4.8 The layout of the development and surrounding area was input into the model. To calculate the spread of noise levels around the site, daytime average, night-time average, and night-time max noise levels were input for the surrounding roads and calibrated to the results of the on-site noise measurements. The methodology and results of the noise modelling are provided in Appendix 3.

4.9 Areas of the development at the western of the site will be subject to the highest noise levels. The predicted noise levels at the facade can be calculated from the noise survey results. These are:

- Average noise levels during the daytime - 66 dB LAeq,0700-2300hrs
- Average noise levels during the night-time - 59 dB LAeq,2300-0700hrs
- Typical maximum noise levels during the night-time - 75 dB LAmax

Internal noise levels in noise-sensitive rooms

4.10 The external walls of the development will be constructed using a masonry construction (e.g. 102mm brick, 175mm insulated cavity,12mm cementitious board, 100mm SFS with insulation and 2x 15mm Wallboard). Consequently, internal noise levels will be dictated by external noise ingress via glazing.

4.11 Background ventilation for the development will be provided by mechanical ventilation with heat recovery (MVHR) systems with no direct penetrations in the facade for ventilation into habitable rooms

4.12 Calculations were carried out using facade modelling software in accordance with the “more rigorous” methodology given in BS8233:2014 to establish the sound insulation performance required of the glazing and ventilation to achieve the nominated internal noise criteria in all habitable rooms across the development.

4.13 The calculations were carried out based on the dimensions/details for facade elements taken from project drawings.

4.14 The results of the calculations are shown in Appendix 4 and are summarised in Table 2 below. This includes the impact of commercial/industrial noise which is less significant than traffic noise and doesn’t require any additional mitigation measures than those set out for the traffic noise.

Table 2 Acoustic Requirements for All Habitable Rooms

Habitable Rooms	Glazing Performance Requirements (inc. Frames)
GVS01	30 dB Rw+Ctr
GVS02	27 dB Rw+Ctr

4.15 Based on the results of the calculations summarised in Table 2 and the measured noise levels at the site (considering both the day and night-time average and maximum noise levels), a specification has been developed showing the sound insulation performance requirements for all facades of the development. The facade specification is shown in Appendix 6.

4.16

4.17 The required sound insulation performance values in Table 2 could typically be achieved by the glazing types shown in Table 3.

Table 3 Typical Glazing Acoustic Performances

Glazing (in Good Quality Sealed Frames)	Typical Weighted Sound Reduction (Rw + Ctr)
4/16/4mm standard thermal double glazing	27
6/16/6.4mm thermal double glazing	30

Note The acoustic performance of the glazing systems (including frames) should always be confirmed with the manufacturer before selection for installation on site.

4.18 It can be seen from the above that compliance with Planning Condition 10 is predicted to be achieved via the selection of glazing to achieve the specification given in Appendix 5.

Part O Compliance (noise and overheating)

4.19 The above assessment is based on internal noise levels with windows closed (assumed to be "normal" circumstances). However, it is anticipated that residents will open their windows at times for thermal comfort (e.g. to prevent overheating in warmer months). Noise levels in the rooms will increase under these circumstances.

4.20 Specific requirements relating to noise and overheating are given in Part O of the Building Regulations (Approved Document O), which came into effect on 15 June 2022 and states:

> *In locations where external noise may be an issue (for example, where the local planning authority considered external noise to be an issue at the planning stage), the overheating mitigation strategy should take account of the likelihood that windows will be closed during sleeping hours (11pm to 7am).*
>
> *Windows are likely to be closed during sleeping hours if noise within bedrooms exceeds the following limits.*
>
> *a. 40dB LAeq,T, averaged over 8 hours (between 11pm and 7am).*
>
> *b. 55dB LAFmax, more than 10 times a night (between 11pm and 7am).*

4.21 It is important to note that the Part O requirements only apply to bedrooms at night. There are no requirements for other habitable rooms (living rooms, dining rooms, etc).

4.22 The noise levels in bedrooms at night with the windows open will vary based on the external night-time noise levels and the size and extent of window opening required to control overheating. The wider the window needs to be open, the lower the sound insulation performance. The following

indicative "outside to inside" reduction values have been adopted for the assessment based on current industry guidance[1]:

- ~4 dB when the window is fully open
- ~9 dB when the window is open to around ~0.4m^2
- 13 dB when the window is partially open to ~0.2m^2.

4.23 It is therefore possible to rely on a larger window opening to control overheating on quieter facades. The relationship between external noise levels and window openings for compliance with Part O is summarised in Table 4

Table 4 External Part O Noise Criteria and Allowable Window Opening for Overheating

External Noise Levels outside Bedrooms at Night		Allowable night-time window opening to control overheating
Average Noise Levels (LAeq,8hrs)	**Maximum Noise Levels (LAmax) – see Note 1**	
≤44 dB	≤59 dB	Fully open (to achieve 13% of the floor area which is typically ~1.3m^2). Ventilators fully open.
≤49 dB	≤64 dB	Open (~4% of floor area e.g. ~0.4m^2) – see Note 2. Ventilators fully open.
≤53 dB	≤68 dB	Partially open (~2% of floor area e.g. ~0.2m^2). Ventilators fully open.
≥54 dB	≥69 dB	Windows to be assumed to be fully closed during the night for the purposes of Part O compliance. Ventilators fully open.

Note 1 Not exceeded more than 10 times per night (between 11pm and 7am)

Note 2 An opening of 4% of the floor area would comply with the 'simplified method' for Part O compliance, if targeted, as the site is in a 'medium risk' area.

4.24 The criteria in Table 4 above have been applied to the predicted night-time noise levels from the model to show where open windows can be relied upon for the control of overheating and Part O compliance. The results are shown in Appendix 6.

4.25 It can be seen from Appendix 6 that windows to bedrooms facing Broadwater Road, and some bedrooms facing Broad Court, will need to be assumed to be closed during the night-time for the purposes of the overheating assessment due to the higher external noise levels. Open windows can be used to help address overheating in all other bedrooms across the rest of the site.

[1] These values are taken from guidance published in the draft document *"Guide to Demonstrating Compliance with the Noise Requirements of Approved Document O"* Version 1.0 July 2022, by the Association of Noise Consultants. The values are based on a floor area of 10m^2 and a room height of 2.4m.

4.26 The information in Appendix 6 has been used to inform the overheating assessment and demonstrate compliance with Part O. This is described in further detail in Cass Allen report RP01-24112-R0.

Noise levels in external amenity areas

4.27 The design of the development has also been reviewed in relation to the Planning Condition 10 requirement to not exceed the 55 dBA upper guideline limit given in the World Health Organization *Guidelines for Community Noise* Document.

4.28 The noise modelling results indicate that noise levels in external amenity areas (i.e. balconies) and the ground floor communal amenity area are predicted to achieve the 55 dBA WHO guideline limit.

4.29 Consequently, the consented development is therefore also considered to be acceptable based on noise levels in external amenity areas.

5. CONCLUSIONS

5.1 Cass Allen was instructed by Hill Partnerships Ltd to assess the acoustic design of the development as required by Planning Condition 10.

5.2 The assessment was carried out in accordance with relevant local and national planning guidance and acoustics standards.

5.3 Noise levels at the site are dictated by road traffic noise emissions from Broadwater Road and to a less extent by Broad Court. Industrial/Commercial noise levels were assessed by AIRO at the planning submission stage and were found to be generally insignificant compared to traffic noise and would result in low impact when assessed in accordance with BS4142.

5.4 A 3D noise model of the development was used to calculate road traffic noise levels at all facades of the development.

5.5 Planning complaint internal noise levels can be achieved with the adoption of acoustically upgraded glazing and installation of MVHR ventilation systems. The project team have confirmed that the specification provided within Table 3 and Appendix 5 of this report will be installed.

5.6 Balconies and the ground floor communal external amenity area are shielded from the traffic noise by the development building itself and achieve the World Health Organisation limit of 55 dBA required by Planning Condition 10.

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5.8 It is our view that this report contains the information required to discharge Planning Condition 10 of the development consent.

Appendix 1 Development Layout

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Ground Floor Plan

1 : 200

2 0 2 4 6 8 10

SCALE 1:200 m

P1 Issued for Planning 21.11.19

Revision	Amendment	Date
JP	JD	JD
Drawn by	Reviewed by	Approved by
60193	SEPT 19	1 : 200 @ A1
MCB Number	Date Created	Scale @ A1

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Client
Hightown Housing Association

Project
29 Broadwater Road
Welwyn Garden City

Drawing Title
Ground Floor Plan

ARCHITECTURE

Drawing / Document Reference								Status	
BRW01 -	MCB -	ZZ -	GF -	DR -	A -	0300		D5 -	P1
Project Iden	Originator	Zone	Level	Type	Discipline	Number		Suitability	Revision

Appendix 2 Survey Results

Survey Summary:

The survey comprised short-term operator attended noise measurements and longer-term unattended noise monitoring at the site. Noise levels at the site were generally dictated by road traffic on surrounding roads.

Survey Period:

30/05/2024 to 07/06/2024

Survey Objectives:

- To identify noise sources that contribute to ambient noise levels at the site;
- To measure noise levels around the site over a typical day and night-time period.

Equipment Used:

Type	Manufacturer	Model	Serial Number
Sound level meter[1] (noise logger)	Rion	NL-32	00903343
Sound level meter[1] (noise logger)	Rion	NL-32	00251125
Calibrator	Rion	NC-74	34551703
Sound level meter[1]	Rion	NL-52	00965090

Note 1: All sound level meters were calibrated before and after measurement periods and no significant drift in calibration was found to have occurred. The results of the measurements are therefore considered to be representative.

Weather Conditions:

The observed weather conditions were acceptable for acoustic measurement throughout the attended survey periods (low-medium wind speeds and no rain). Weather records for the area confirmed that weather conditions were also generally acceptable for acoustic measurement during the unattended monitoring.

Measurement Positions:

Position (refer plan below)	Description
N1	Attended noise monitoring position. 1.5m above ground. Free-field. Direct line of sight to nearby roads
L1	Unattended noise logging position. 3m above ground level. Free-field. Direct line of sight to nearby roads
L2	Unattended noise logging position. 3m above ground level. Free-field. Direct line of sight to nearby roads

Site Plan showing Measurement Positions:

Attended Noise Monitoring Results:

Date	Position	Time	Meas. Length	LAeq, dB	LAmax, dB	LA90, dB	Observations
30/05/2024	N1	15:34	30 secs	77	94	61	Car pass on Broadwater road
		15:36	12 secs	72	84	58	
		15:37	15 secs	72	80	63	

Unattended Noise Monitoring Results:

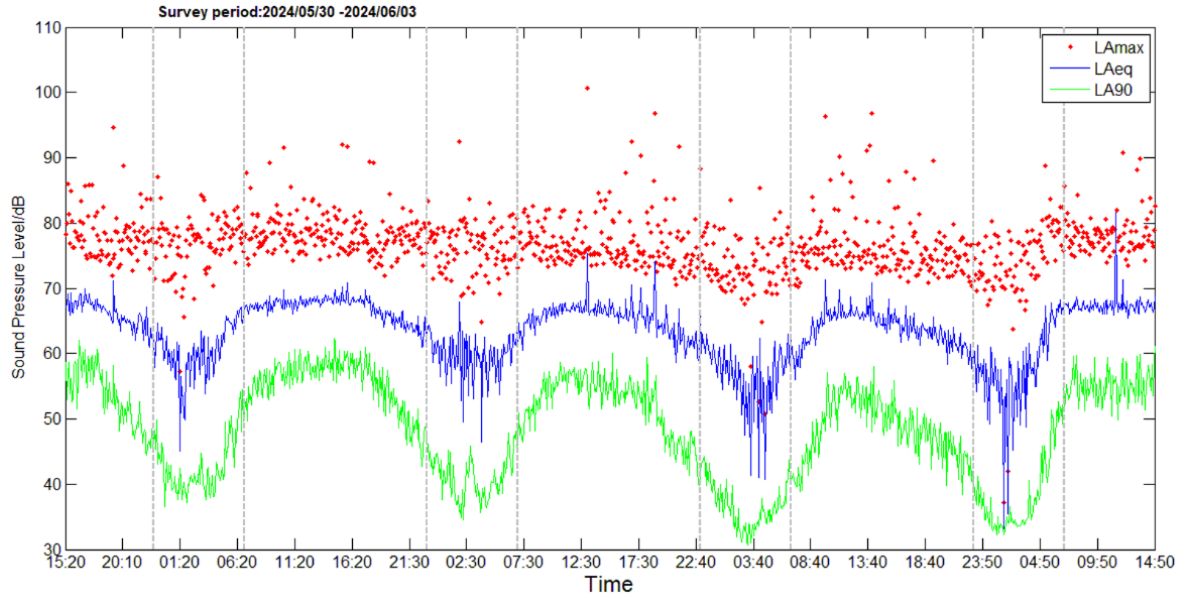
Meas. Period	Position	Daytime (0700-2300hrs)		Night-time (2300-0700hrs)		
		LAeq,16hr, dB	LA90,1hr dB[1]	LAeq,8hr, dB	LA90,5mins, dB[1]	LAmax, dB[2]
30/05/2024 to 03/06/2024	L1	66	48	60	34	79-80
03/06/2024 to 07/06/2024	L2	58	51	52	36	67-68

Note 1: Typical lowest measured during the period shown.

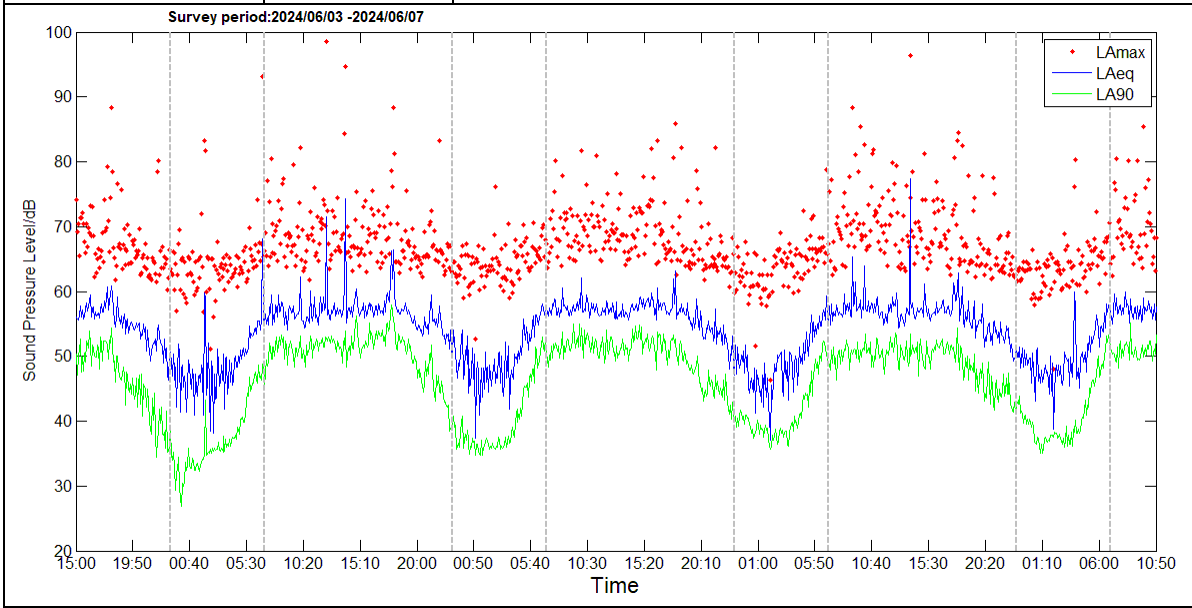
Note 2: Highest typical maximum noise level during the night-time (not exceeded more than 10-15 times per night).

Unattended Noise Monitoring Results:

Meas. Period	Position
30/05/2024 to 03/06/2024	L1



Meas. Period	Position
03/06/2024 to 07/06/2024	L2

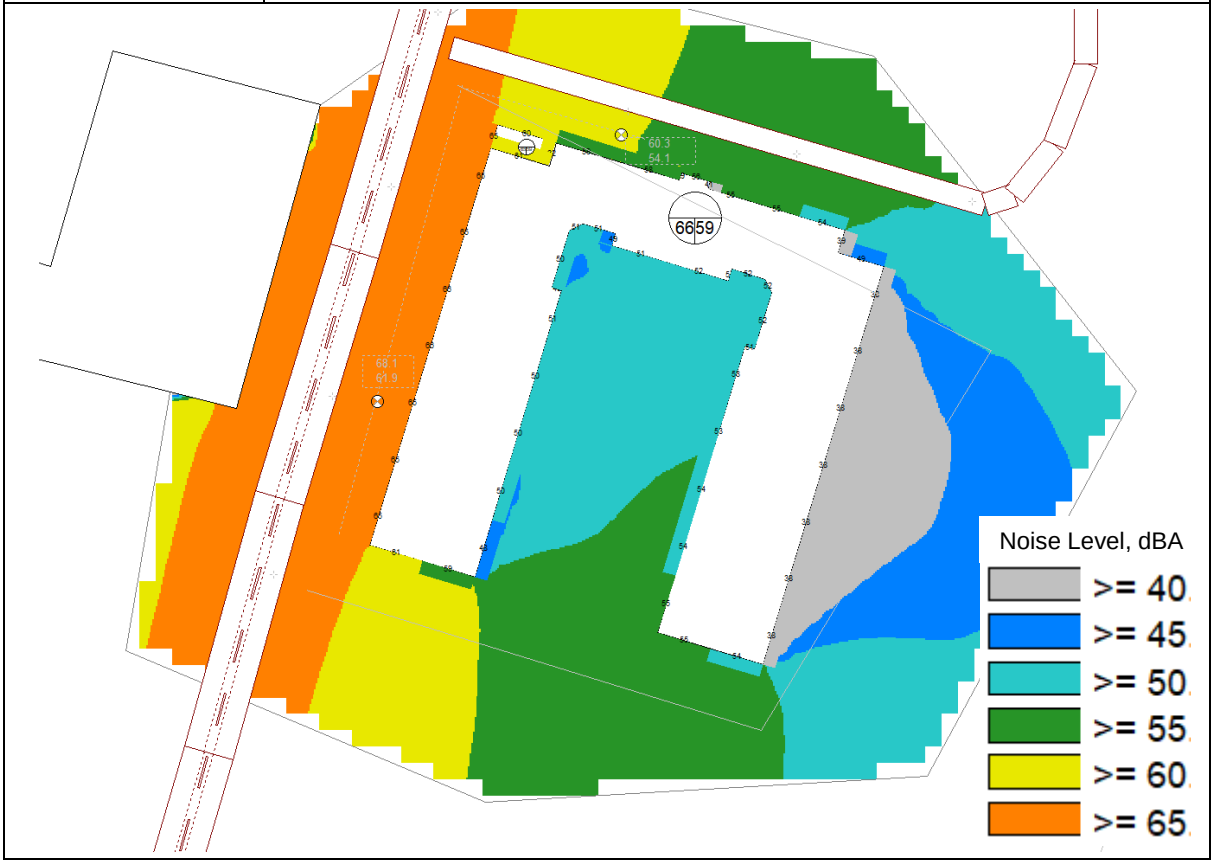


Appendix 3 Modelling Results

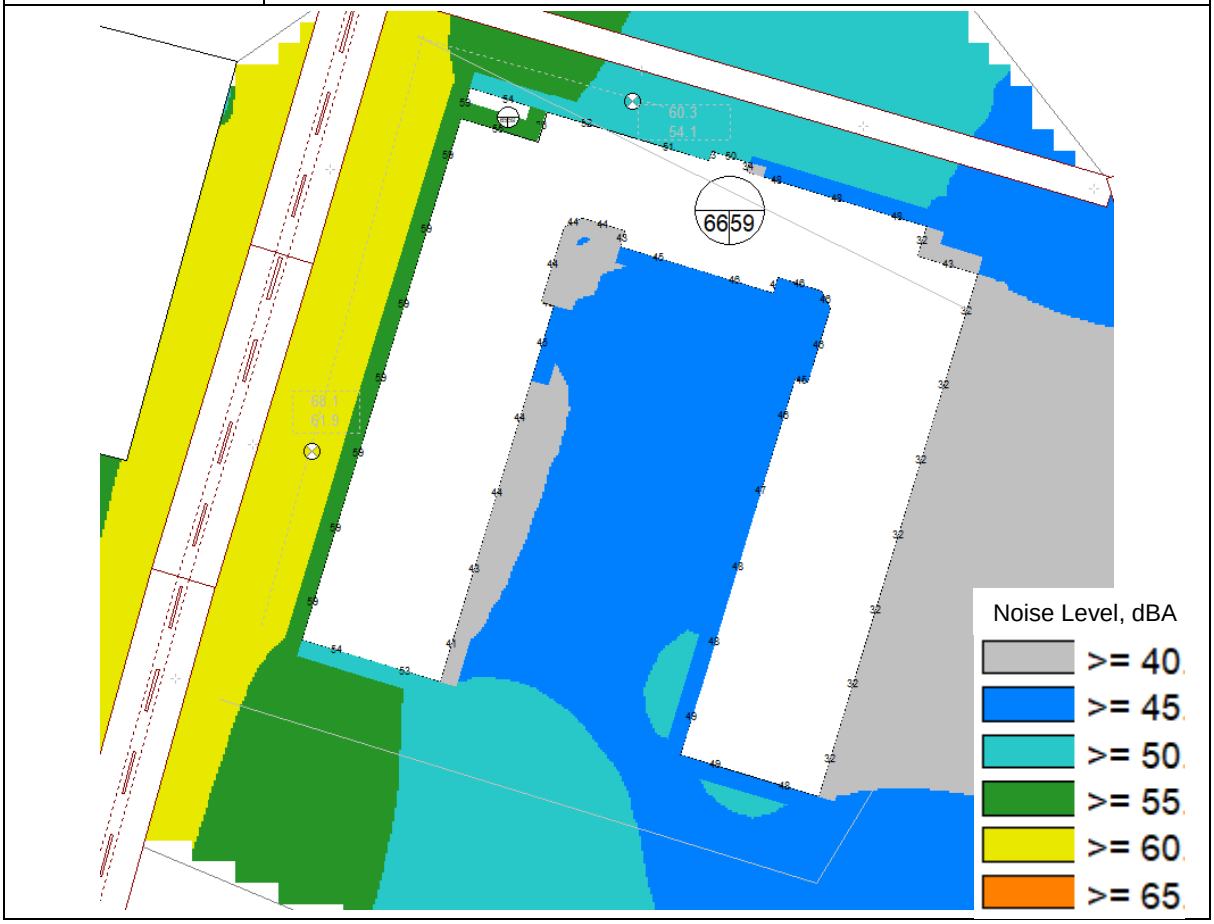
Modelling Software:	CADNA/A Version 2023
Modelled Scenarios:	Day and night-time average and night-time maximum noise levels across the site
Data inputs:	• Noise survey results • Topographical data for the site • Development layout
Calculation Algorithms Used:	• Calculation of Road Traffic Noise 1988 – Department of Transport • ISO 9613-1:1993 Acoustics-Attenuation of sound during propagation outdoors – Part 1: Calculation of the absorption of sound by the atmosphere • ISO 9613-2:1996 Acoustics-Attenuation of sound during propagation outdoors – Part 2: General method of calculation

Modelling Printout:

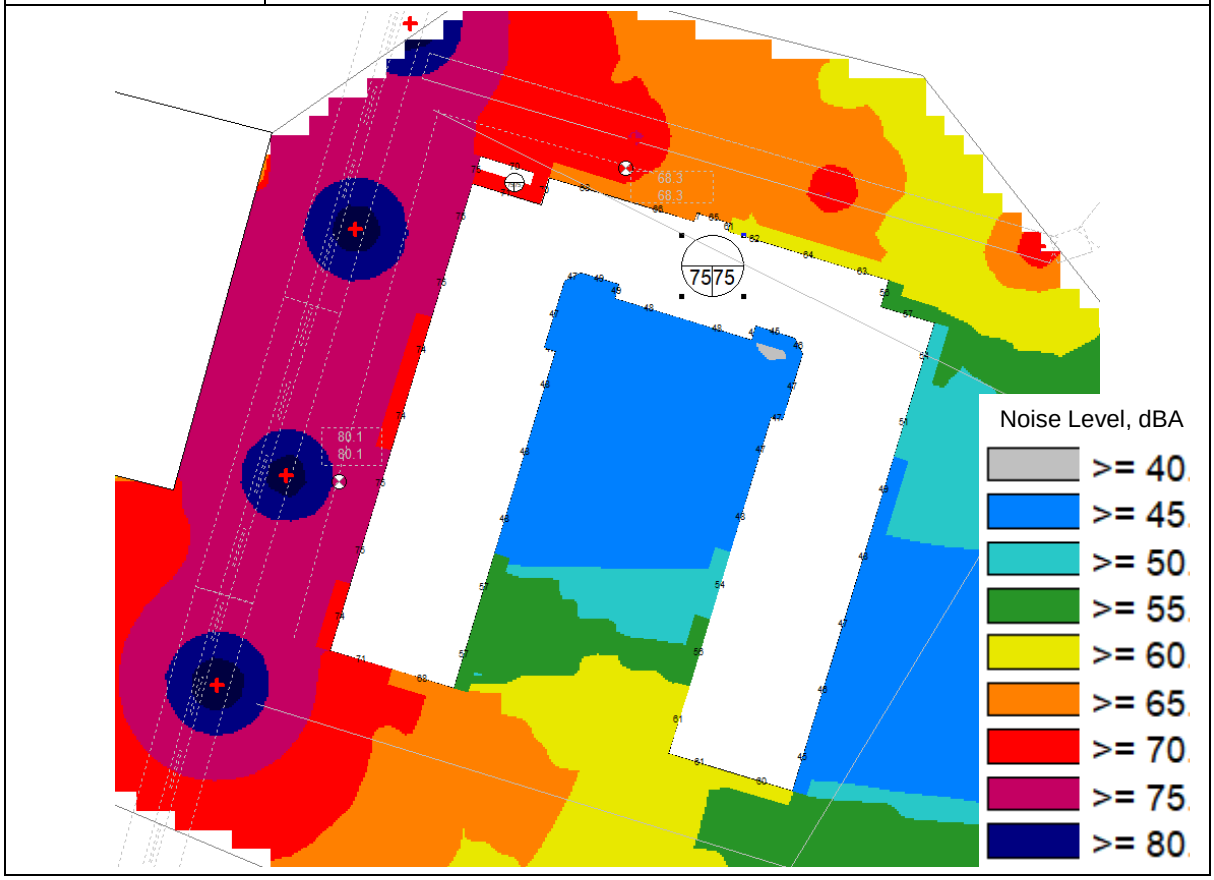
Scenario	Daytime noise levels (LAeq,16hr) across the site (highest level is shown which occurs at ground floor level)



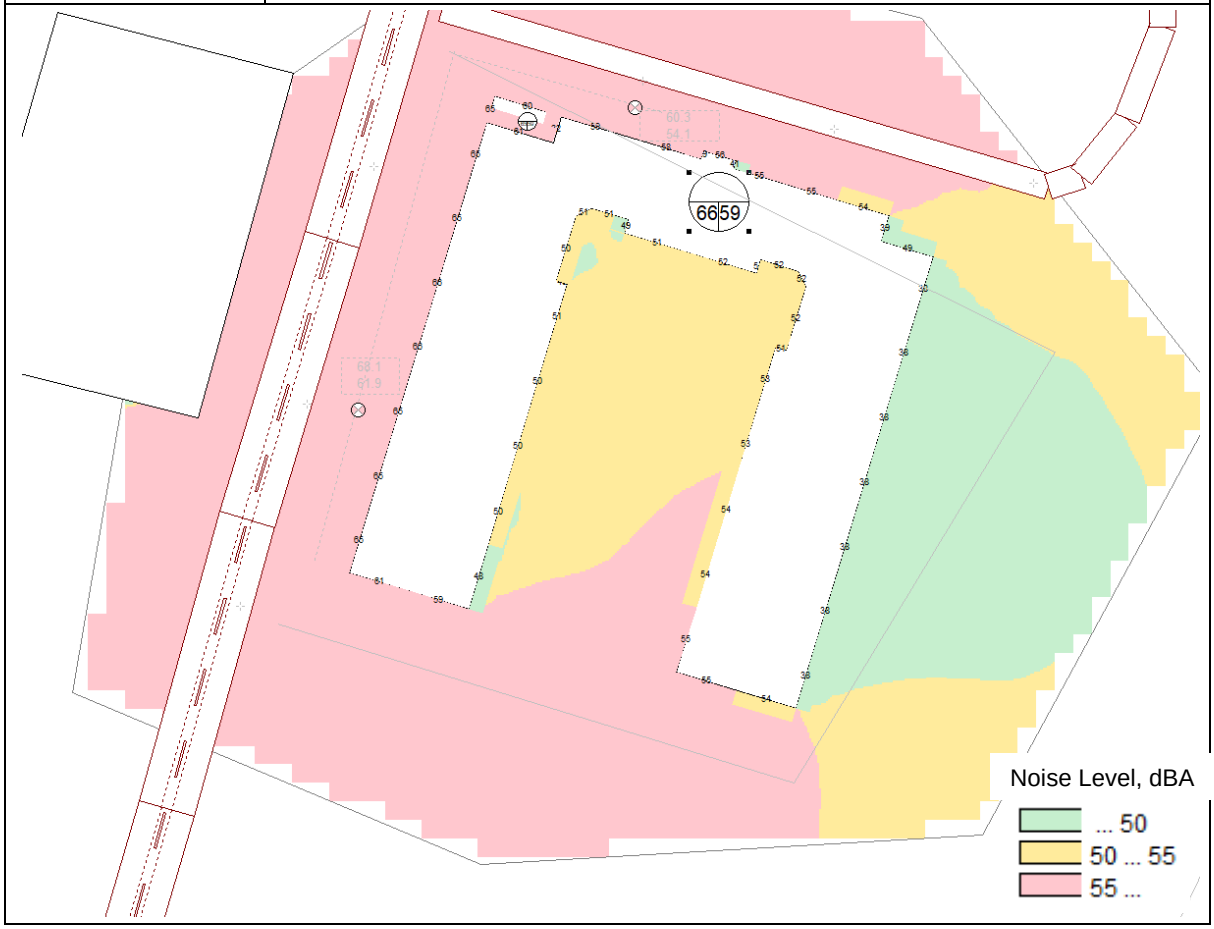
Scenario	Night-time noise levels (LAeq,8hr) at 1.5m above ground level



Scenario	Night-time maximum noise levels (LAmax) at 1.5m above ground level



Scenario	Daytime noise levels (LAeq,16hr) across the site (calculated at 1.2m above ground floor level, representative of the ground floor communal amenity area)



Appendix 4 FacSim Calculations

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FACSIM V2.7.9 - MODELLING OF FACADE ACOUSTIC INSULATION TO BS12354-3 and BS8233

PROJECT:	Broadwater Road, Welwyn
ROOM:	Plot 001 Type B Bedroom
VARIANT:	
NOTES:	

Room Dimensions [m] W 3.0 X L 4.0 X H 2.5

Room Volume = 29.4 m3
Partition Area = 7.4 m2
Ventilation ref area = 10.0 m2
SELECT Free Field or Façade SPL for model input >>>
Free Field SPL K = 3 dB

NOTES:

EXTERNAL SPECTRUM (A weighted)

	dBA	63	125	250	500	1000	2000	4000	
Direct input - Free Field SPL (A weighted octave bands) dB ----->	-								**No data**
Road traffic spectrum (according to BS 8233:1999 section 6)	65.0								
		46.8	50.9	54.4	57.8	61.0	58.2	53.0	**Reference spectrum**

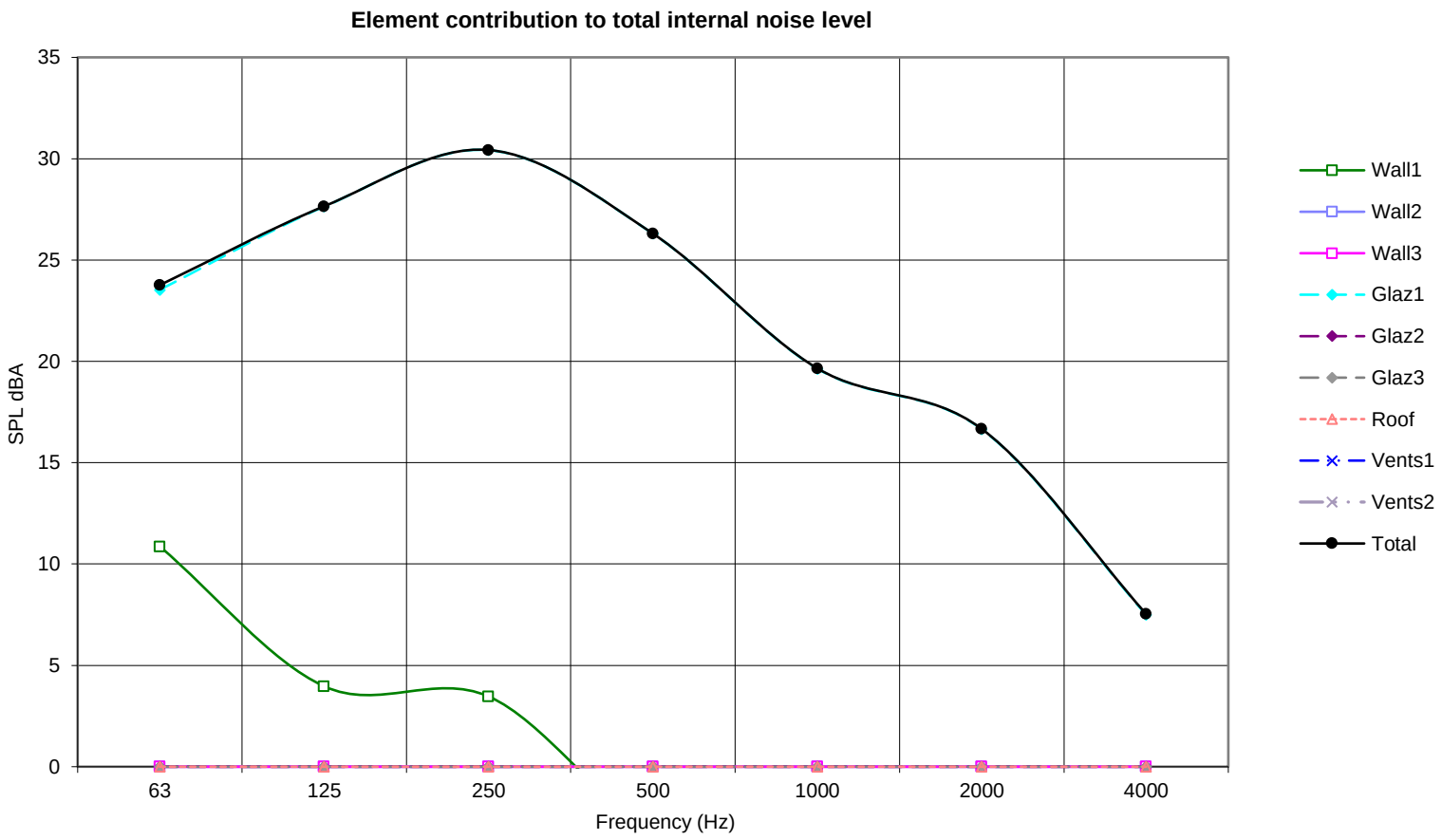
REVERBERATION TIME

DIRECT INPUT ----->									**No data**
EQUAL RT for all bands ----->									
		0.5	0.5	0.5	0.5	0.5	0.5	0.5	**Default - RT set to 0.5s**

Façade Element		Area [m2]	SRI dB to BS EN ISO 140-3:1995								Rw	C	Ctr
Wall 1	EW1	3.8	35	46	50	60	65	65	65	1%	63	-2	-6
	ATTENUATION												
Wall 2	WALLS		0	0	0	0	0	0	0	0%			
	ATTENUATION												
Wall 3	WALLS		0	0	0	0	0	0	0	0%			
	ATTENUATION												
Glazing 1	30 dB Rw + Ctr - Acoustically Upgraded Double Glazing	3.6	22	22	23	30	40	40	44	99%	30 (inc Ctr)	-	-
	ATTENUATION												
Glazing 2	GLAZING		0	0	0	0	0	0	0	0%			
	ATTENUATION												
Glazing 3	GLAZING		0	0	0	0	0	0	0	0%			
	ATTENUATION												
Roof	ROOF / FLOOR		0	0	0	0	0	0	0	0%			
	ATTENUATION												
	Resultant composite Façade SRI		25	25	26	33	43	43	47				
	Resultant SPL inside room excluding ventilators dB	34.0	24	28	30	26	20	17	8	100%			

Ventilator Type		Num	$D_{n,e}$ dB to BS EN 20140-10:1992								Dnew	C	Ctr
Ventilation	VENTS		0	0	0	0	0	0	0	0%			
	ATTENUATION												
Ventilation	VENTS		0	0	0	0	0	0	0	0%			
	ATTENUATION												
	Resultant SPL inside room through ventilators dB	-99.0	-96	-96	-96	-96	-96	-96	-96	0%			

Total SPL inside room	**34.0**	24	28	30	26	20	17	8



FACSIM V2.7.9 - MODELLING OF FACADE ACOUSTIC INSULATION TO BS12354-3 and BS8233

PROJECT:	Broadwater Road, Welwyn
ROOM:	Plot 001 Type B Bedroom
VARIANT:	
NOTES:	

Room Dimensions [m] W 3.0 X L 4.0 X H 2.5

Room Volume = 29.4 m3
Partition Area = 7.4 m2
Ventilation ref area = 10.0 m2
SELECT Free Field or Façade SPL for model input >>>
Free Field SPL K = 3 dB

NOTES:

EXTERNAL SPECTRUM (A weighted)

	dBA	63	125	250	500	1000	2000	4000	
Direct input - Free Field SPL (A weighted octave bands) dB ----->	-								**No data**
Road traffic spectrum (according to BS 8233:1999 section 6)	59.0								
		40.8	44.9	48.4	51.8	55.0	52.2	47.0	**Reference spectrum**

REVERBERATION TIME

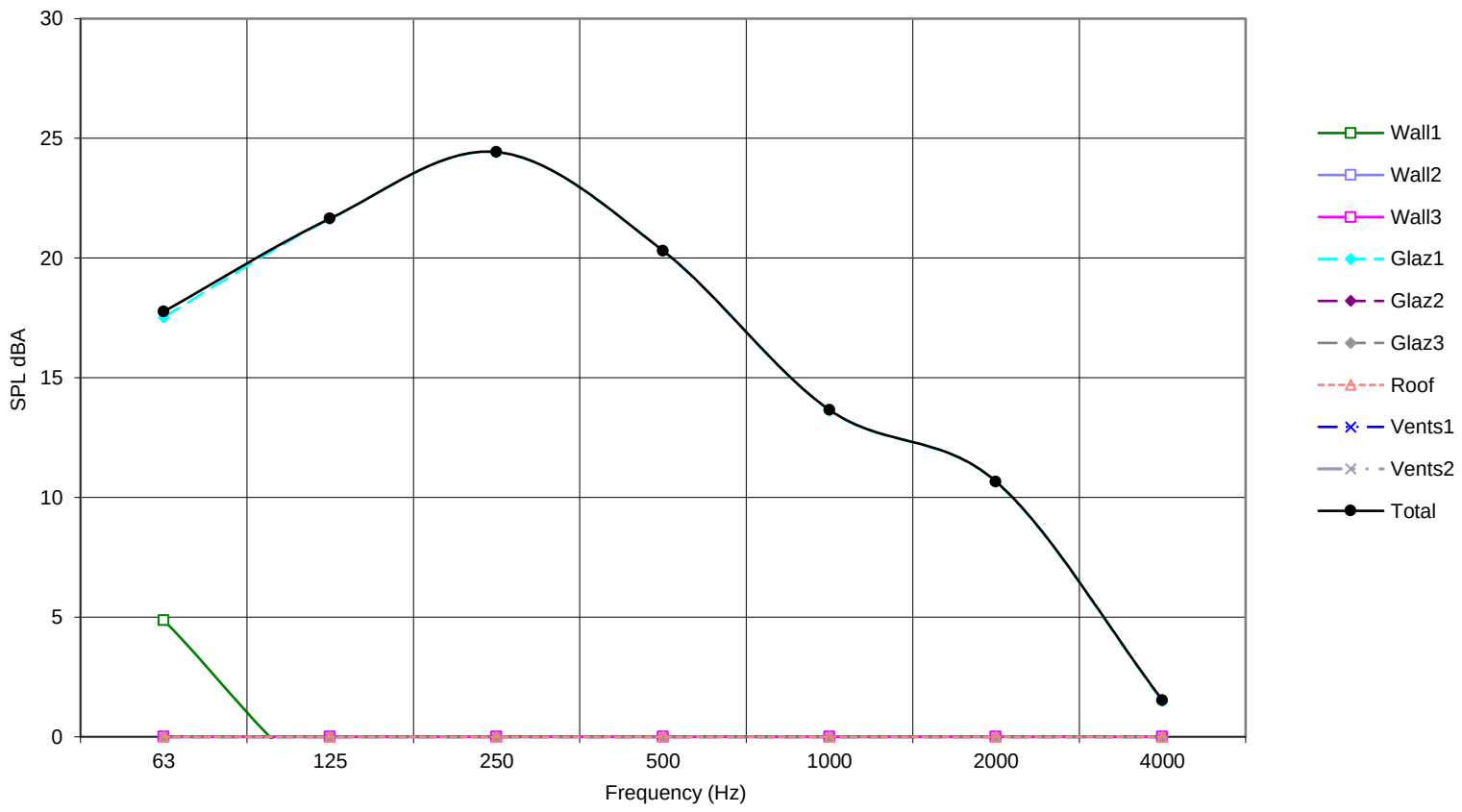
DIRECT INPUT ----->									**No data**
EQUAL RT for all bands ----->									
		0.5	0.5	0.5	0.5	0.5	0.5	0.5	**Default - RT set to 0.5s**

Façade Element		Area [m2]	SRI dB to BS EN ISO 140-3:1995								Rw	C	Ctr
Wall 1	EW1	3.8	35	46	50	60	65	65	65	0%	63	-2	-6
	ATTENUATION												
Wall 2	WALLS		0	0	0	0	0	0	0	0%			
	ATTENUATION												
Wall 3	WALLS		0	0	0	0	0	0	0	0%			
	ATTENUATION												
Glazing 1	30 dB Rw + Ctr - Acoustically Upgraded Double Glazing	3.6	22	22	23	30	40	40	44	99%	30 (inc Ctr)	-	-
	ATTENUATION												
Glazing 2	GLAZING		0	0	0	0	0	0	0	0%			
	ATTENUATION												
Glazing 3	GLAZING		0	0	0	0	0	0	0	0%			
	ATTENUATION												
Roof	ROOF / FLOOR		0	0	0	0	0	0	0	0%			
	ATTENUATION												
	Resultant composite Façade SRI		25	25	26	33	43	43	47				
	Resultant SPL inside room excluding ventilators dB	28.0	18	22	24	20	14	11	2	100%			

Ventilator Type		Num	$D_{n,e}$ dB to BS EN 20140-10:1992								Dnew	C	Ctr
Ventilation			0	0	0	0	0	0	0	0%			
	ATTENUATION												
Ventilation	VENTS		0	0	0	0	0	0	0	0%			
	ATTENUATION												
	Resultant SPL inside room through ventilators dB	-99.0	-96	-96	-96	-96	-96	-96	-96	0%			

Total SPL inside room	**28.0**	18	22	24	20	14	11	2

Element contribution to total internal noise level



FACSIM V2.7.9 - MODELLING OF FACADE ACOUSTIC INSULATION TO BS12354-3 and BS8233

			W		L		H
PROJECT:	Broadwater Road, Welwyn	Room Dimensions [m]	3.0	X	4.0	X	2.5
ROOM:	Plot 001 Type B Bedroom						
VARIANT:							
NOTES:							

Room Volume =	29.4	m3
Partition Area =	7.4	m2
Ventilation ref area =	10.0	m2
Free Field SPL K =	3	dB

SELECT Free Field or Façade SPL for model input >>>

NOTES:

EXTERNAL SPECTRUM (A weighted)

	dBA	63	125	250	500	1000	2000	4000	
Direct input - Free Field SPL (A weighted octave bands) dB ----->	75.0	43.5	48.4	53.9	62.3	65.1	73.7	64.6	
Road traffic spectrum (according to BS 8233:1999 section 6)									
		43.5	48.4	53.9	62.3	65.1	73.7	64.6	**Direct input**

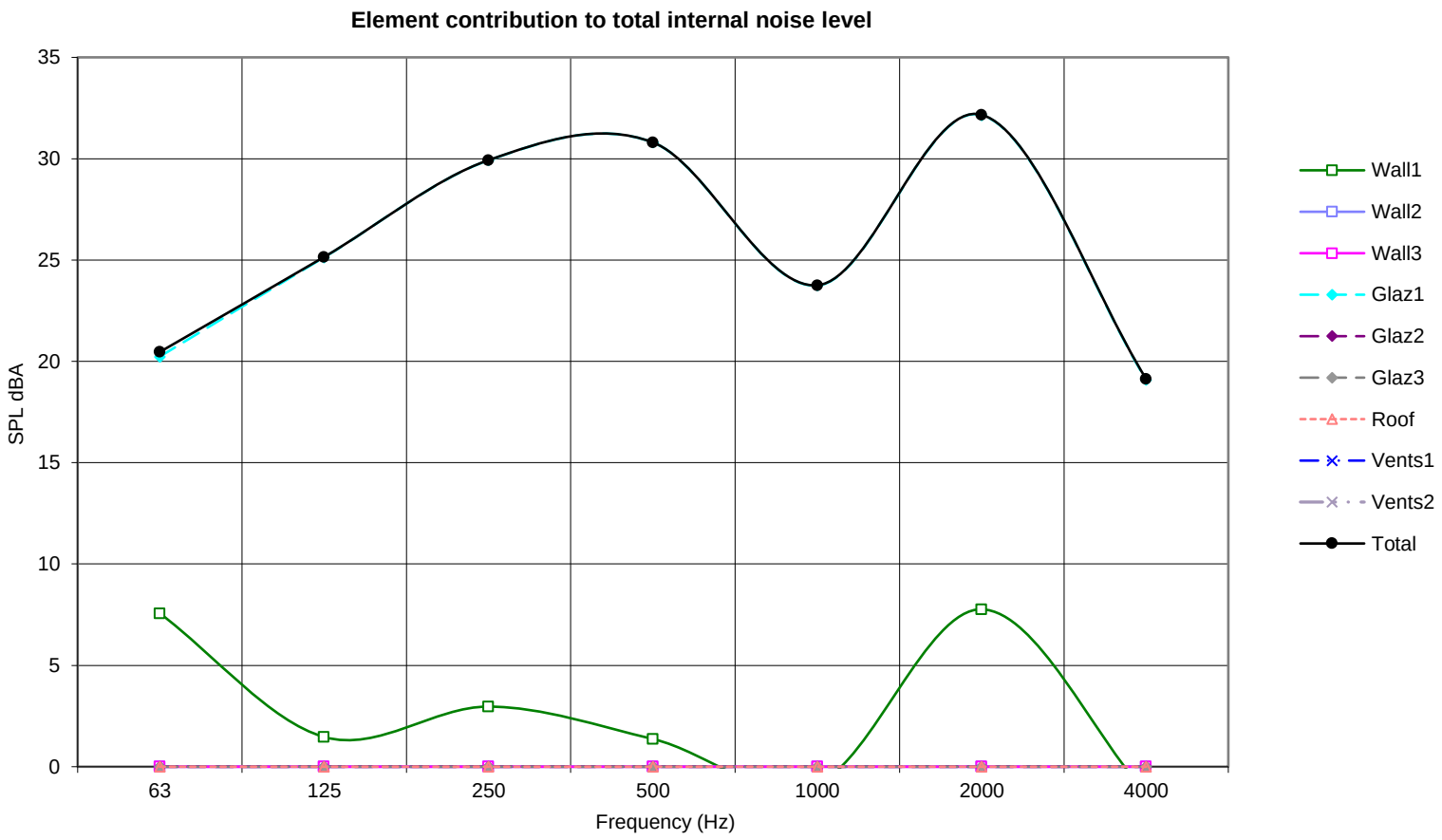
REVERBERATION TIME

DIRECT INPUT ----->									**No data**
EQUAL RT for all bands ----->									
		0.5	0.5	0.5	0.5	0.5	0.5	0.5	**Default - RT set to 0.5s**

Façade Element		Area [m2]	SRI dB to BS EN ISO 140-3:1995								Rw	C	Ctr
Wall 1	EW1	3.8	35	46	50	60	65	65	65	0%	63	-2	-6
	ATTENUATION												
Wall 2	WALLS		0	0	0	0	0	0	0	0%			
	ATTENUATION												
Wall 3	WALLS		0	0	0	0	0	0	0	0%			
	ATTENUATION												
Glazing 1	30 dB Rw + Ctr - Acoustically Upgraded Double Glazing	3.6	22	22	23	30	40	40	44	99%	30 (inc Ctr)	-	-
	ATTENUATION												
Glazing 2	GLAZING		0	0	0	0	0	0	0	0%			
	ATTENUATION												
Glazing 3	GLAZING		0	0	0	0	0	0	0	0%			
	ATTENUATION												
Roof	ROOF / FLOOR		0	0	0	0	0	0	0	0%			
	ATTENUATION												
	Resultant composite Façade SRI		25	25	26	33	43	43	47				
	Resultant SPL inside room excluding ventilators dB	36.6	20	25	30	31	24	32	19	100%			

Ventilator Type		Num	$D_{n,e}$ dB to BS EN 20140-10:1992								Dnew	C	Ctr
Ventilation			0	0	0	0	0	0	0	0%			
	ATTENUATION												
Ventilation	VENTS		0	0	0	0	0	0	0	0%			
	ATTENUATION												
	Resultant SPL inside room through ventilators dB	-99.0	-96	-96	-96	-96	-96	-96	-96	0%			

Total SPL inside room	**36.6**	20	25	30	31	24	32	19



FACSIM V2.7.9 - MODELLING OF FACADE ACOUSTIC INSULATION TO BS12354-3 and BS8233

			W		L		H
PROJECT:	Broadwater Road, Welwyn	Room Dimensions [m]	3.5	X	7.1	X	2.5
ROOM:	Plot 001 Type B Living / Dining Room						
VARIANT:		Room Volume =	63.1	m3			
NOTES:		Partition Area =	26.9	m2			
		Ventilation ref area =	10.0	m2			
	SELECT Free Field or Façade SPL for model input >>>	Free Field SPL K =	3	dB			

NOTES:

EXTERNAL SPECTRUM (A weighted)

	dBA	63	125	250	500	1000	2000	4000	
Direct input - Free Field SPL (A weighted octave bands) dB ----->	-								**No data**
Road traffic spectrum (according to BS 8233:1999 section 6)	65.0								
		46.8	50.9	54.4	57.8	61.0	58.2	53.0	**Reference spectrum**

REVERBERATION TIME

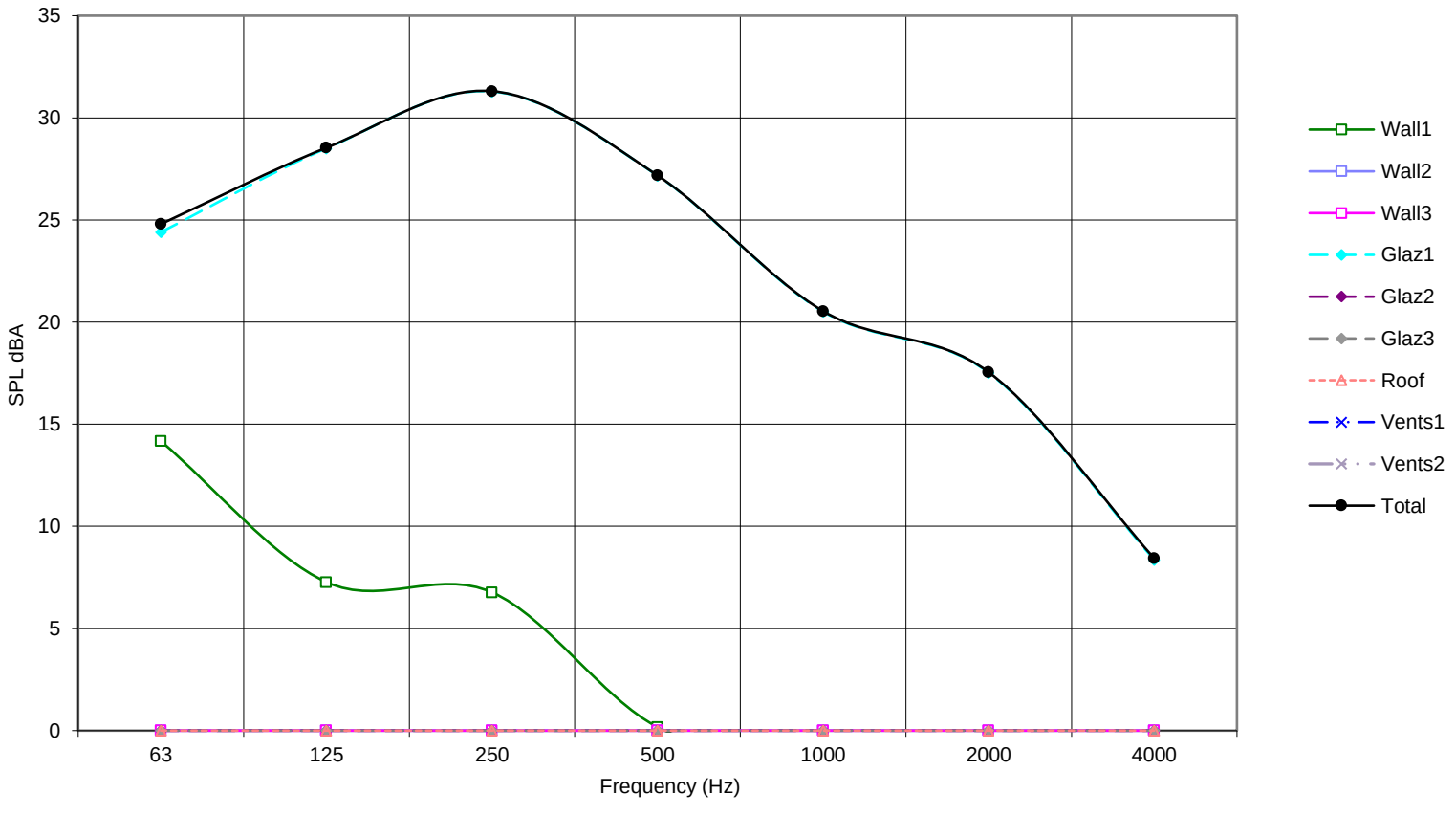
DIRECT INPUT ----->								**No data**
EQUAL RT for all bands ----->								
	0.5	0.5	0.5	0.5	0.5	0.5	0.5	**Default - RT set to 0.5s**

Façade Element		Area [m2]	SRI dB to BS EN ISO 140-3:1995								Rw	C	Ctr
Wall 1	EW1	17.5	35	46	50	60	65	65	65	1%	63	-2	-6
	ATTENUATION												
Wall 2	WALLS		0	0	0	0	0	0	0	0%			
	ATTENUATION												
Wall 3	WALLS		0	0	0	0	0	0	0	0%			
	ATTENUATION												
Glazing 1	30 dB Rw + Ctr - Acoustically Upgraded Double Glazing	9.5	22	22	23	30	40	40	44	99%	30 (inc Ctr)	-	-
	ATTENUATION												
Glazing 2	GLAZING		0	0	0	0	0	0	0	0%			
	ATTENUATION												
Glazing 3	GLAZING		0	0	0	0	0	0	0	0%			
	ATTENUATION												
Roof	ROOF / FLOOR		0	0	0	0	0	0	0	0%			
	ATTENUATION												
	Resultant composite Façade SRI		26	27	27	35	45	45	49				
	Resultant SPL inside room excluding ventilators dB	34.9	25	29	31	27	21	18	8	100%			

Ventilator Type		Num	$D_{n,e}$ dB to BS EN 20140-10:1992								Dnew	C	Ctr
Ventilation	VENTS		0	0	0	0	0	0	0	0%			
	ATTENUATION												
Ventilation	VENTS		0	0	0	0	0	0	0	0%			
	ATTENUATION												
	Resultant SPL inside room through ventilators dB	-99.0	-96	-96	-96	-96	-96	-96	-96	0%			

Total SPL inside room	**34.9**	25	29	31	27	21	18	8

Element contribution to total internal noise level



FACSIM V2.7.9 - MODELLING OF FACADE ACOUSTIC INSULATION TO BS12354-3 and BS8233

PROJECT:	Broadwater Road, Welwyn
ROOM:	Plot 001 Type B Bedroom
VARIANT:	
NOTES:	

Room Dimensions [m] W 3.0 X L 4.0 X H 2.5

Room Volume = 29.4 m3
Partition Area = 7.4 m2
Ventilation ref area = 10.0 m2
SELECT Free Field or Façade SPL for model input >>>
Free Field SPL K = 3 dB

NOTES:

EXTERNAL SPECTRUM (A weighted)

	dBA	63	125	250	500	1000	2000	4000	
Direct input - Free Field SPL (A weighted octave bands) dB ----->	-								**No data**
Road traffic spectrum (according to BS 8233:1999 section 6)	60.0								
		41.8	45.9	49.4	52.8	56.0	53.2	48.0	**Reference spectrum**

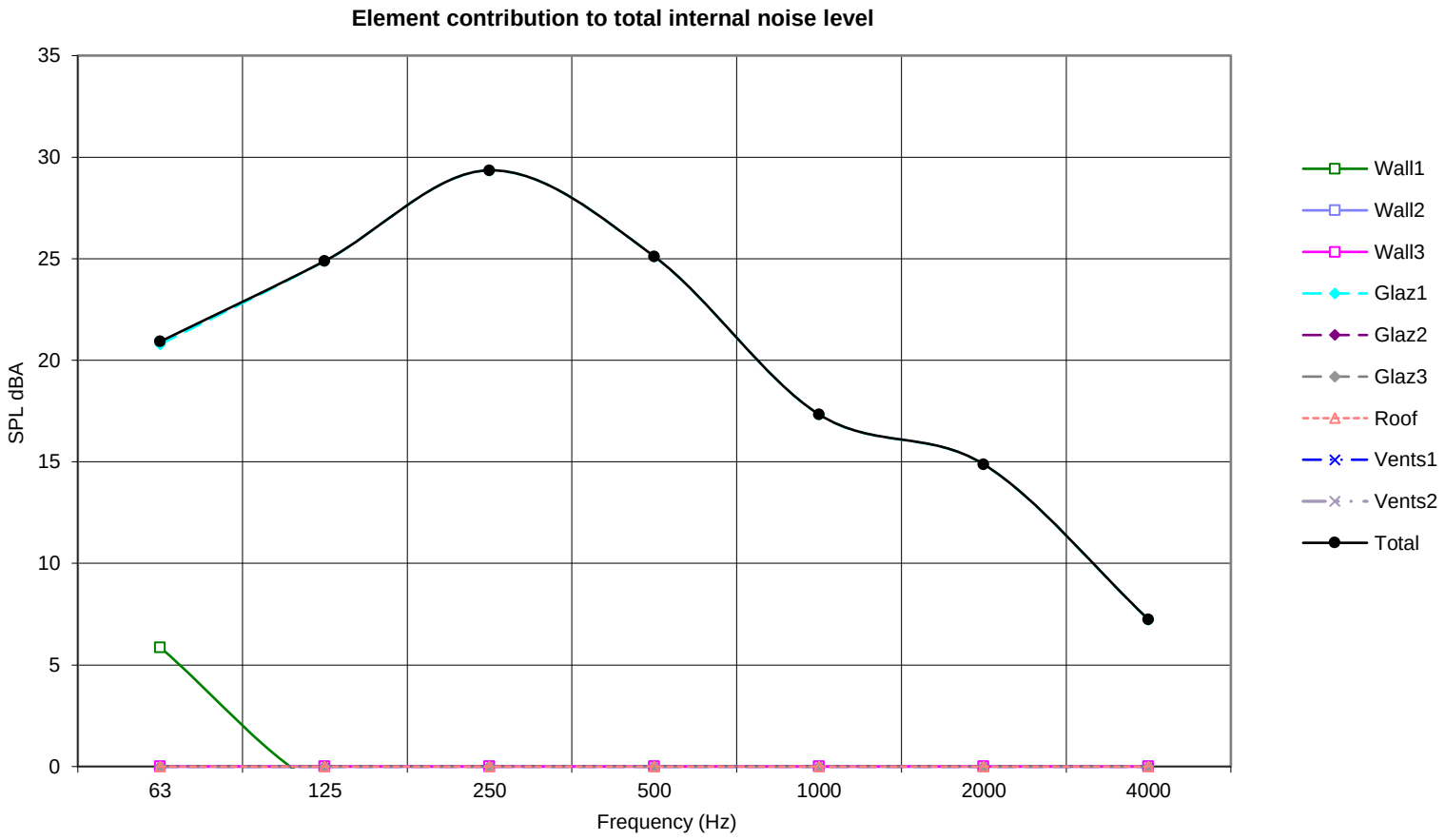
REVERBERATION TIME

DIRECT INPUT ----->									**No data**
EQUAL RT for all bands ----->									
		0.5	0.5	0.5	0.5	0.5	0.5	0.5	**Default - RT set to 0.5s**

Façade Element		Area [m2]	SRI dB to BS EN ISO 140-3:1995								Rw	C	Ctr
Wall 1	EW1	3.8	35	46	50	60	65	65	65	0%	63	-2	-6
	ATTENUATION												
Wall 2	WALLS		0	0	0	0	0	0	0	0%			
	ATTENUATION												
Wall 3	WALLS		0	0	0	0	0	0	0	0%			
	ATTENUATION												
Glazing 1	27 dB Rw + Ctr - Standard Thermal Double Glazing	3.6	20	20	19	27	38	37	40	100%	27 (inc Ctr)	-	-
	ATTENUATION												
Glazing 2	GLAZING		0	0	0	0	0	0	0	0%			
	ATTENUATION												
Glazing 3	GLAZING		0	0	0	0	0	0	0	0%			
	ATTENUATION												
Roof	ROOF / FLOOR		0	0	0	0	0	0	0	0%			
	ATTENUATION												
	Resultant composite Façade SRI		23	23	22	30	41	40	43				
	Resultant SPL inside room excluding ventilators dB	32.3	21	25	29	25	17	15	7	100%			

Ventilator Type		Num	$D_{n,e}$ dB to BS EN 20140-10:1992								Dnew	C	Ctr
Ventilation	VENTS		0	0	0	0	0	0	0	0%			
	ATTENUATION												
Ventilation	VENTS		0	0	0	0	0	0	0	0%			
	ATTENUATION												
	Resultant SPL inside room through ventilators dB	-99.0	-96	-96	-96	-96	-96	-96	-96	0%			

Total SPL inside room	**32.3**	21	25	29	25	17	15	7



FACSIM V2.7.9 - MODELLING OF FACADE ACOUSTIC INSULATION TO BS12354-3 and BS8233

			W		L		H
PROJECT:	Broadwater Road, Welwyn	Room Dimensions [m]	3.0	X	4.0	X	2.5
ROOM:	Plot 001 Type B Bedroom						
VARIANT:							
NOTES:							

Room Volume =	29.4	m3
Partition Area =	7.4	m2
Ventilation ref area =	10.0	m2
Free Field SPL K =	3	dB

SELECT Free Field or Façade SPL for model input >>>

NOTES:

EXTERNAL SPECTRUM (A weighted)

	dBA	63	125	250	500	1000	2000	4000	
Direct input - Free Field SPL (A weighted octave bands) dB ----->	-								**No data**
Road traffic spectrum (according to BS 8233:1999 section 6)	54.0								
		35.8	39.9	43.4	46.8	50.0	47.2	42.0	**Reference spectrum**

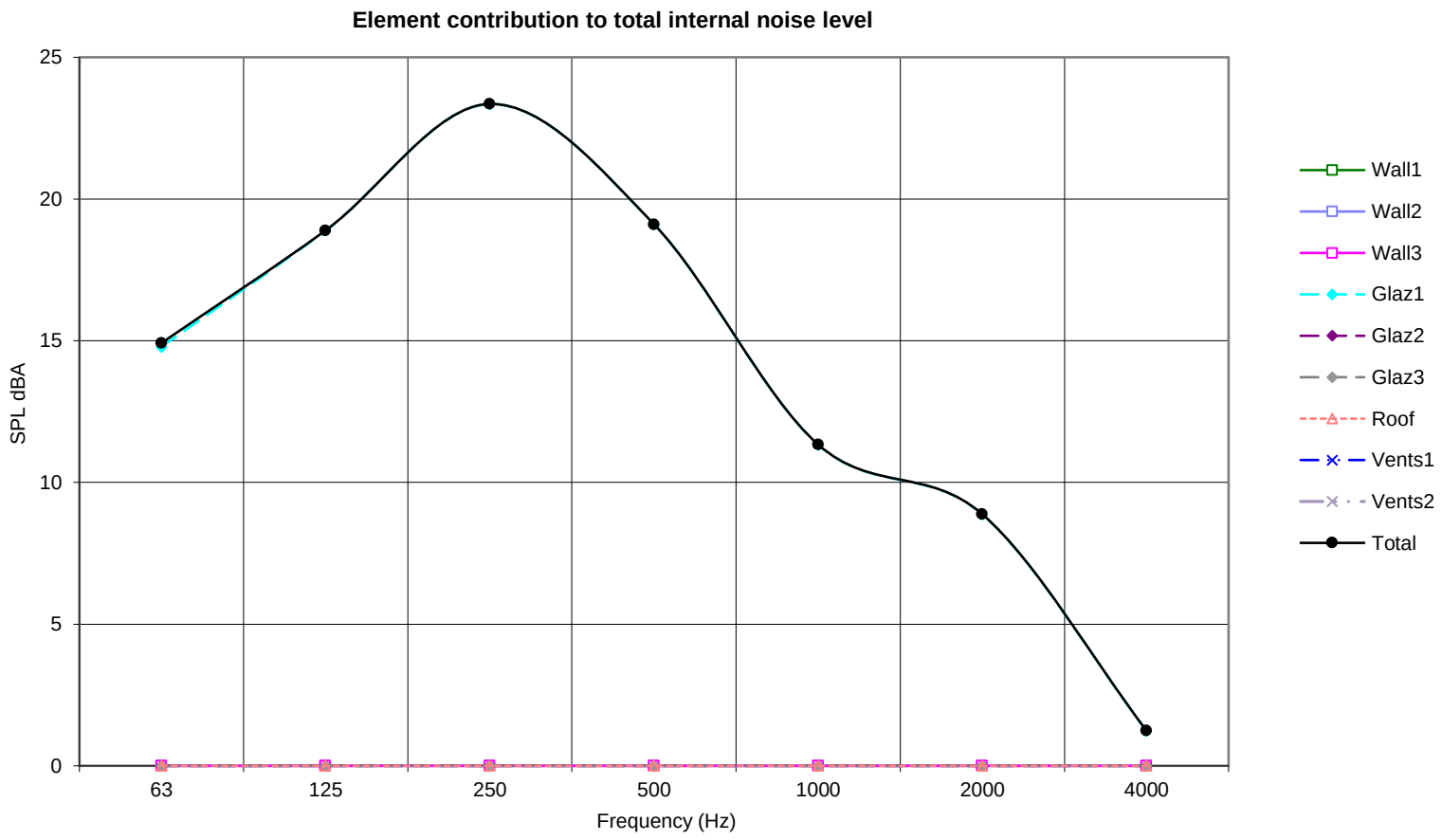
REVERBERATION TIME

DIRECT INPUT ----->									**No data**
EQUAL RT for all bands ----->									
		0.5	0.5	0.5	0.5	0.5	0.5	0.5	**Default - RT set to 0.5s**

Façade Element		Area [m2]	SRI dB to BS EN ISO 140-3:1995								Rw	C	Ctr
Wall 1	EW1	3.8	35	46	50	60	65	65	65	0%	63	-2	-6
	ATTENUATION												
Wall 2	WALLS		0	0	0	0	0	0	0	0%			
	ATTENUATION												
Wall 3	WALLS		0	0	0	0	0	0	0	0%			
	ATTENUATION												
Glazing 1	27 dB Rw + Ctr - Standard Thermal Double Glazing	3.6	20	20	19	27	38	37	40	98%	27 (inc Ctr)	-	-
	ATTENUATION												
Glazing 2	GLAZING		0	0	0	0	0	0	0	0%			
	ATTENUATION												
Glazing 3	GLAZING		0	0	0	0	0	0	0	0%			
	ATTENUATION												
Roof	ROOF / FLOOR		0	0	0	0	0	0	0	0%			
	ATTENUATION												
	Resultant composite Façade SRI		23	23	22	30	41	40	43				
	Resultant SPL inside room excluding ventilators dB	26.3	15	19	23	19	11	9	1	100%			

Ventilator Type		Num	$D_{n,e}$ dB to BS EN 20140-10:1992								Dnew	C	Ctr
Ventilation	VENTS		0	0	0	0	0	0	0	0%			
	ATTENUATION												
Ventilation	VENTS		0	0	0	0	0	0	0	0%			
	ATTENUATION												
	Resultant SPL inside room through ventilators dB	-99.0	-96	-96	-96	-96	-96	-96	-96	0%			

Total SPL inside room	**26.3**	15	19	23	19	11	9	1



FACSIM V2.7.9 - MODELLING OF FACADE ACOUSTIC INSULATION TO BS12354-3 and BS8233

PROJECT:	Broadwater Road, Welwyn
ROOM:	Plot 001 Type B Bedroom
VARIANT:	
NOTES:	

Room Dimensions [m] W 3.0 X L 4.0 X H 2.5

Room Volume = 29.4 m3
Partition Area = 7.4 m2
Ventilation ref area = 10.0 m2
SELECT Free Field or Façade SPL for model input >>>
Free Field SPL K = 3 dB

NOTES:

EXTERNAL SPECTRUM (A weighted)

	dBA	63	125	250	500	1000	2000	4000	
Direct input - Free Field SPL (A weighted octave bands) dB ----->	70.0	38.5	43.4	48.9	57.3	60.1	68.7	59.6	
Road traffic spectrum (according to BS 8233:1999 section 6)									
		38.5	43.4	48.9	57.3	60.1	68.7	59.6	**Direct input**

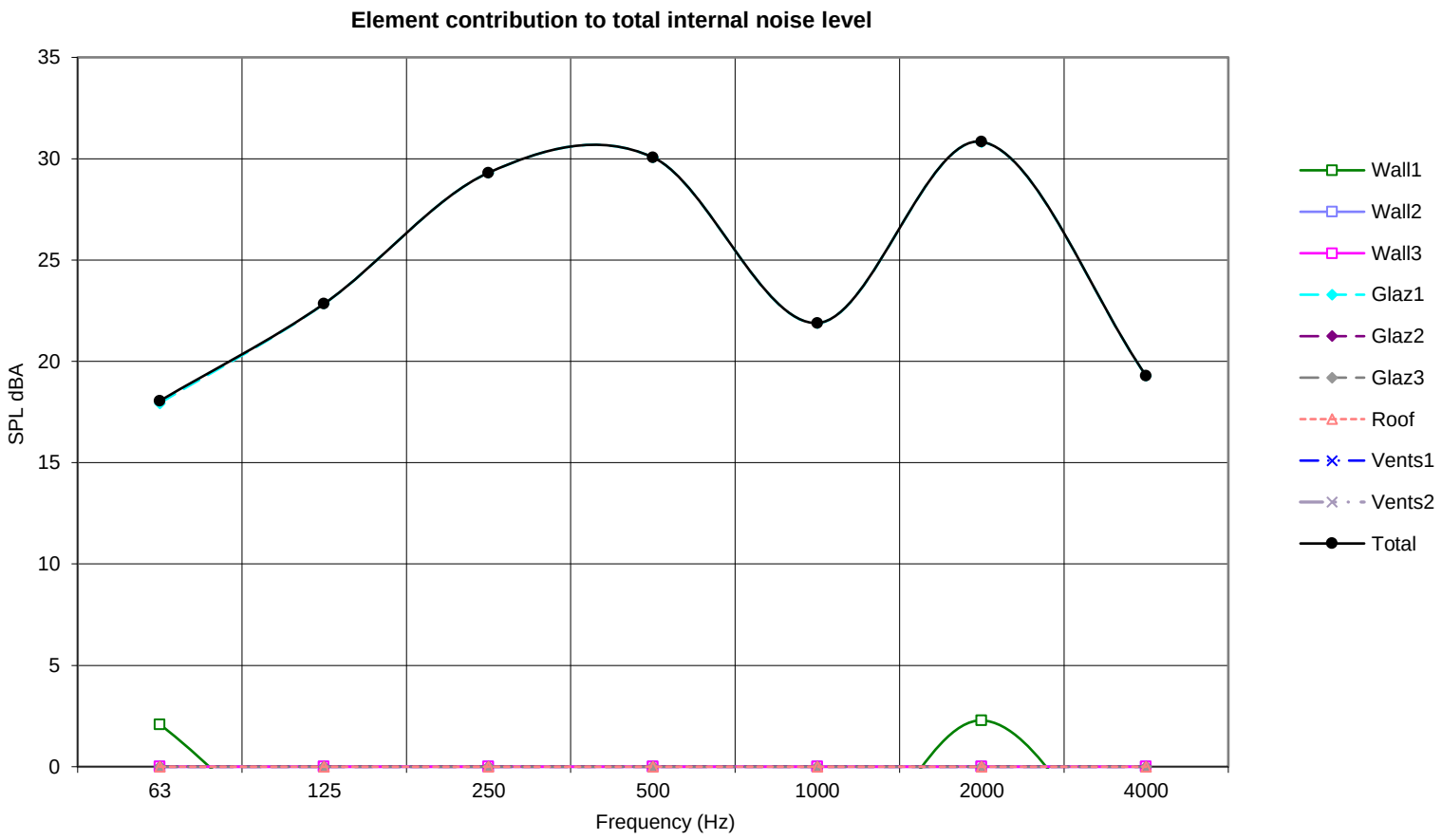
REVERBERATION TIME

DIRECT INPUT ----->									**No data**
EQUAL RT for all bands ----->									
		0.5	0.5	0.5	0.5	0.5	0.5	0.5	**Default - RT set to 0.5s**

Façade Element		Area [m2]	SRI dB to BS EN ISO 140-3:1995								Rw	C	Ctr
Wall 1	EW1	3.4	35	46	50	60	65	65	65	0%	63	-2	-6
	ATTENUATION												
Wall 2	WALLS		0	0	0	0	0	0	0	0%			
	ATTENUATION												
Wall 3	WALLS		0	0	0	0	0	0	0	0%			
	ATTENUATION												
Glazing 1	27 dB Rw + Ctr - Standard Thermal Double Glazing	4.0	20	20	19	27	38	37	40	100%	27 (inc Ctr)	-	-
	ATTENUATION												
Glazing 2	GLAZING		0	0	0	0	0	0	0	0%			
	ATTENUATION												
Glazing 3	GLAZING		0	0	0	0	0	0	0	0%			
	ATTENUATION												
Roof	ROOF / FLOOR		0	0	0	0	0	0	0	0%			
	ATTENUATION												
	Resultant composite Façade SRI		22	23	22	29	40	40	42				
	Resultant SPL inside room excluding ventilators dB	35.5	18	23	29	30	22	31	19	100%			

Ventilator Type		Num	$D_{n,e}$ dB to BS EN 20140-10:1992								Dnew	C	Ctr
Ventilation	VENTS		0	0	0	0	0	0	0	0%			
	ATTENUATION												
Ventilation	VENTS		0	0	0	0	0	0	0	0%			
	ATTENUATION												
	Resultant SPL inside room through ventilators dB	-99.0	-96	-96	-96	-96	-96	-96	-96	0%			

Total SPL inside room	**35.5**	18	23	29	30	22	31	19	



FACSIM V2.7.9 - MODELLING OF FACADE ACOUSTIC INSULATION TO BS12354-3 and BS8233

			W		L		H
PROJECT:	Broadwater Road, Welwyn	Room Dimensions [m]	3.5	X	7.1	X	2.5
ROOM:	Plot 001 Type B Living / Dining Room						
VARIANT:							
NOTES:							

Room Volume =	63.1	m3
Partition Area =	26.9	m2
Ventilation ref area =	10.0	m2
Free Field SPL K =	3	dB

SELECT Free Field or Façade SPL for model input >>>

NOTES:

EXTERNAL SPECTRUM (A weighted)

	dBA	63	125	250	500	1000	2000	4000	
Direct input - Free Field SPL (A weighted octave bands) dB ----->	-								**No data**
Road traffic spectrum (according to BS 8233:1999 section 6)	60.0								
		41.8	45.9	49.4	52.8	56.0	53.2	48.0	**Reference spectrum**

REVERBERATION TIME

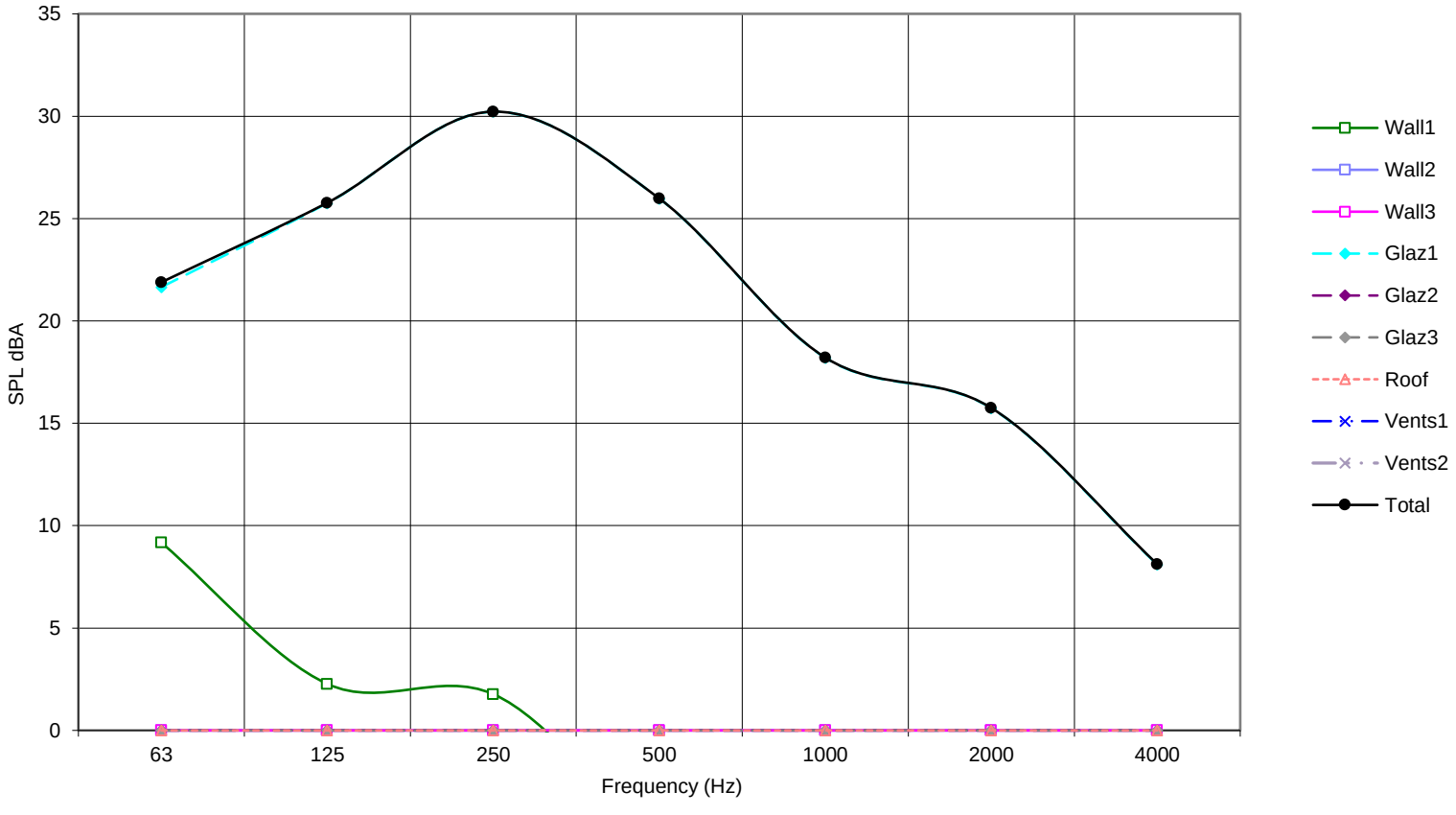
DIRECT INPUT ----->									**No data**
EQUAL RT for all bands ----->									
		0.5	0.5	0.5	0.5	0.5	0.5	0.5	**Default - RT set to 0.5s**

Façade Element		Area [m2]	SRI dB to BS EN ISO 140-3:1995								Rw	C	Ctr
Wall 1	EW1	17.5	35	46	50	60	65	65	65	1%	63	-2	-6
	ATTENUATION												
Wall 2	WALLS		0	0	0	0	0	0	0	0%			
	ATTENUATION												
Wall 3	WALLS		0	0	0	0	0	0	0	0%			
	ATTENUATION												
Glazing 1	27 dB Rw + Ctr - Standard Thermal Double Glazing	9.5	20	20	19	27	38	37	40	99%	27 (inc Ctr)	-	-
	ATTENUATION												
Glazing 2	GLAZING		0	0	0	0	0	0	0	0%			
	ATTENUATION												
Glazing 3	GLAZING		0	0	0	0	0	0	0	0%			
	ATTENUATION												
Roof	ROOF / FLOOR		0	0	0	0	0	0	0	0%			
	ATTENUATION												
	Resultant composite Façade SRI		24	24	23	31	42	42	44				
	Resultant SPL inside room excluding ventilators dB	33.2	22	26	30	26	18	16	8	100%			

Ventilator Type		Num	$D_{n,e}$ dB to BS EN 20140-10:1992								Dnew	C	Ctr
Ventilation	VENTS		0	0	0	0	0	0	0	0%			
	ATTENUATION												
Ventilation	VENTS		0	0	0	0	0	0	0	0%			
	ATTENUATION												
	Resultant SPL inside room through ventilators dB	-99.0	-96	-96	-96	-96	-96	-96	-96	0%			

Total SPL inside room	**33.2**	22	26	30	26	18	16	8

Element contribution to total internal noise level



FACSIM V2.7.9 - MODELLING OF FACADE ACOUSTIC INSULATION TO BS12354-3 and BS8233

			W		L		H
PROJECT:	Broadwater Road, Welwyn	Room Dimensions [m]	3.0	X	4.0	X	2.5
ROOM:	Plot 001 Type B Bedroom						
VARIANT:	Industrial Noise						
NOTES:							

Room Volume =	30.0	m3
Partition Area =	7.5	m2
Ventilation ref area =	10.0	m2
Free Field SPL K =	3	dB

SELECT Free Field or Façade SPL for model input >>>

NOTES:

Rated industrial noise of 52 dBA taken from approaved commerical noise assessment completed by AIRO reference REG/7205/B dated 16 April 2019

EXTERNAL SPECTRUM (A weighted)

	dBA	63	125	250	500	1000	2000	4000	
Direct input - Free Field SPL (A weighted octave bands) dB ----->	-								**No data**
Road traffic spectrum (according to BS 8233:1999 section 6)	52.0								
		33.8	37.9	41.4	44.8	48.0	45.2	40.0	**Reference spectrum**

REVERBERATION TIME

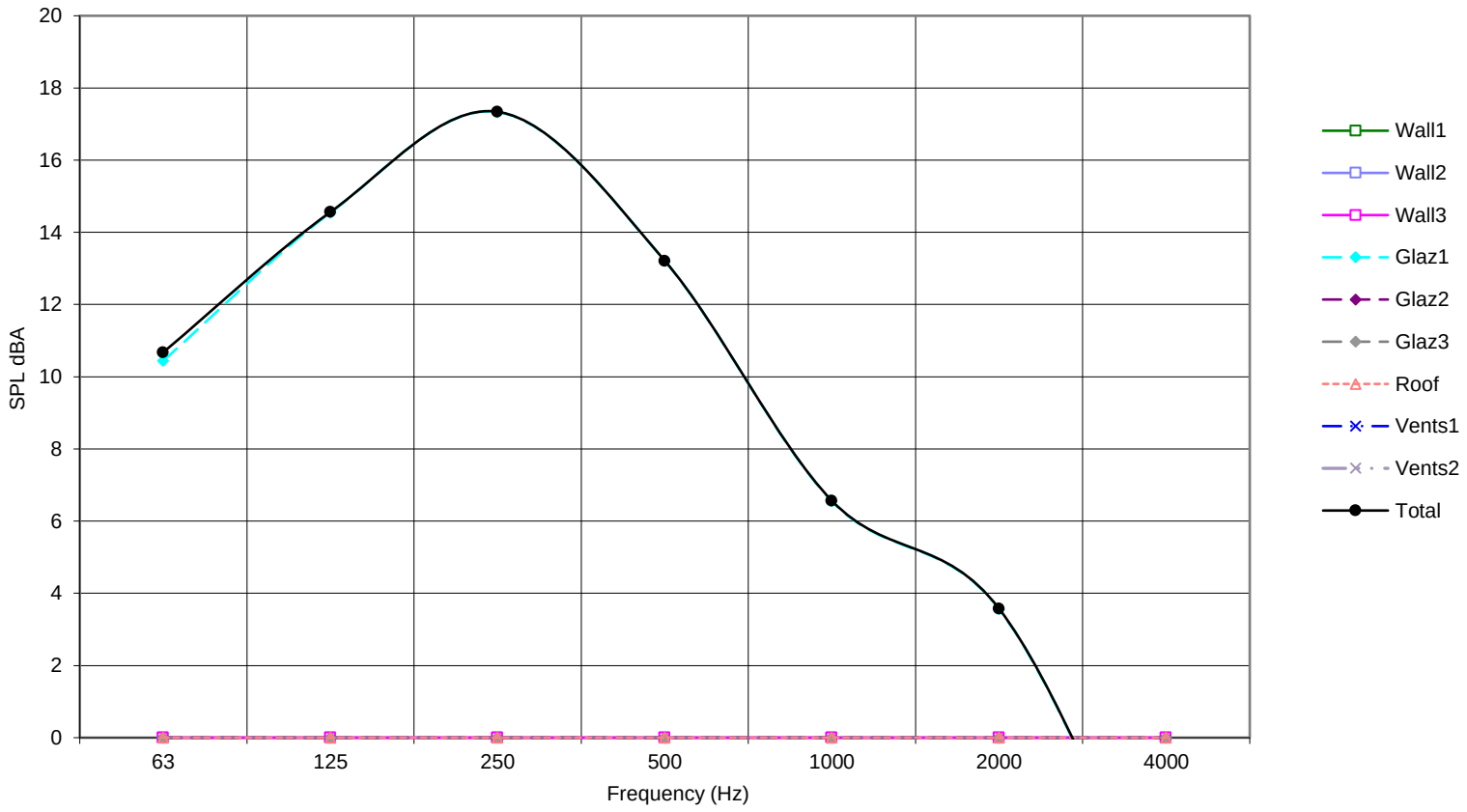
DIRECT INPUT ----->								**No data**
EQUAL RT for all bands ----->								
	0.5	0.5	0.5	0.5	0.5	0.5	0.5	**Default - RT set to 0.5s**

Façade Element		Area [m2]	SRI dB to BS EN ISO 140-3:1995								Rw	C	Ctr
Wall 1	EW1	3.9	35	46	50	60	65	65	65	1%	63	-2	-6
	ATTENUATION												
Wall 2	WALLS		0	0	0	0	0	0	0	0%			
	ATTENUATION												
Wall 3	WALLS		0	0	0	0	0	0	0	0%			
	ATTENUATION												
Glazing 1	30 dB Rw + Ctr - Acoustically Upgraded Double Glazing	3.6	22	22	23	30	40	40	44	95%	30 (inc Ctr)	-	-
	ATTENUATION												
Glazing 2	GLAZING		0	0	0	0	0	0	0	0%			
	ATTENUATION												
Glazing 3	GLAZING		0	0	0	0	0	0	0	0%			
	ATTENUATION												
Roof	ROOF / FLOOR		0	0	0	0	0	0	0	0%			
	ATTENUATION												
	Resultant composite Façade SRI		25	25	26	34	43	44	47				
	Resultant SPL inside room excluding ventilators dB	20.9	11	15	17	13	7	4	-6	100%			

Ventilator Type		Num	$D_{n,e}$ dB to BS EN 20140-10:1992								Dnew	C	Ctr
Ventilation	VENTS		0	0	0	0	0	0	0	0%			
	ATTENUATION												
Ventilation	VENTS		0	0	0	0	0	0	0	0%			
	ATTENUATION												
	Resultant SPL inside room through ventilators dB	-99.0	-96	-96	-96	-96	-96	-96	-96	0%			

Total SPL inside room	**20.9**	11	15	17	13	7	4	-6

Element contribution to total internal noise level



FACSIM V2.7.9 - MODELLING OF FACADE ACOUSTIC INSULATION TO BS12354-3 and BS8233

			W		L		H
PROJECT:	Broadwater Road, Welwyn	Room Dimensions [m]	3.0	X	4.0	X	2.5
ROOM:	Plot 001 Type B Bedroom						
VARIANT:	Industrial Noise						
NOTES:							

Room Volume =	29.4	m3
Partition Area =	7.4	m2
Ventilation ref area =	10.0	m2
Free Field SPL K =	3	dB

SELECT Free Field or Façade SPL for model input >>>

NOTES:

Rated industrial noise of 52 dBA taken from approaved commerical noise assessment completed by AIRO reference REG/7205/B dated 16 April 2019

EXTERNAL SPECTRUM (A weighted)

	dBA	63	125	250	500	1000	2000	4000	
Direct input - Free Field SPL (A weighted octave bands) dB ----->	-								**No data**
Road traffic spectrum (according to BS 8233:1999 section 6)	52.0								
		33.8	37.9	41.4	44.8	48.0	45.2	40.0	**Reference spectrum**

REVERBERATION TIME

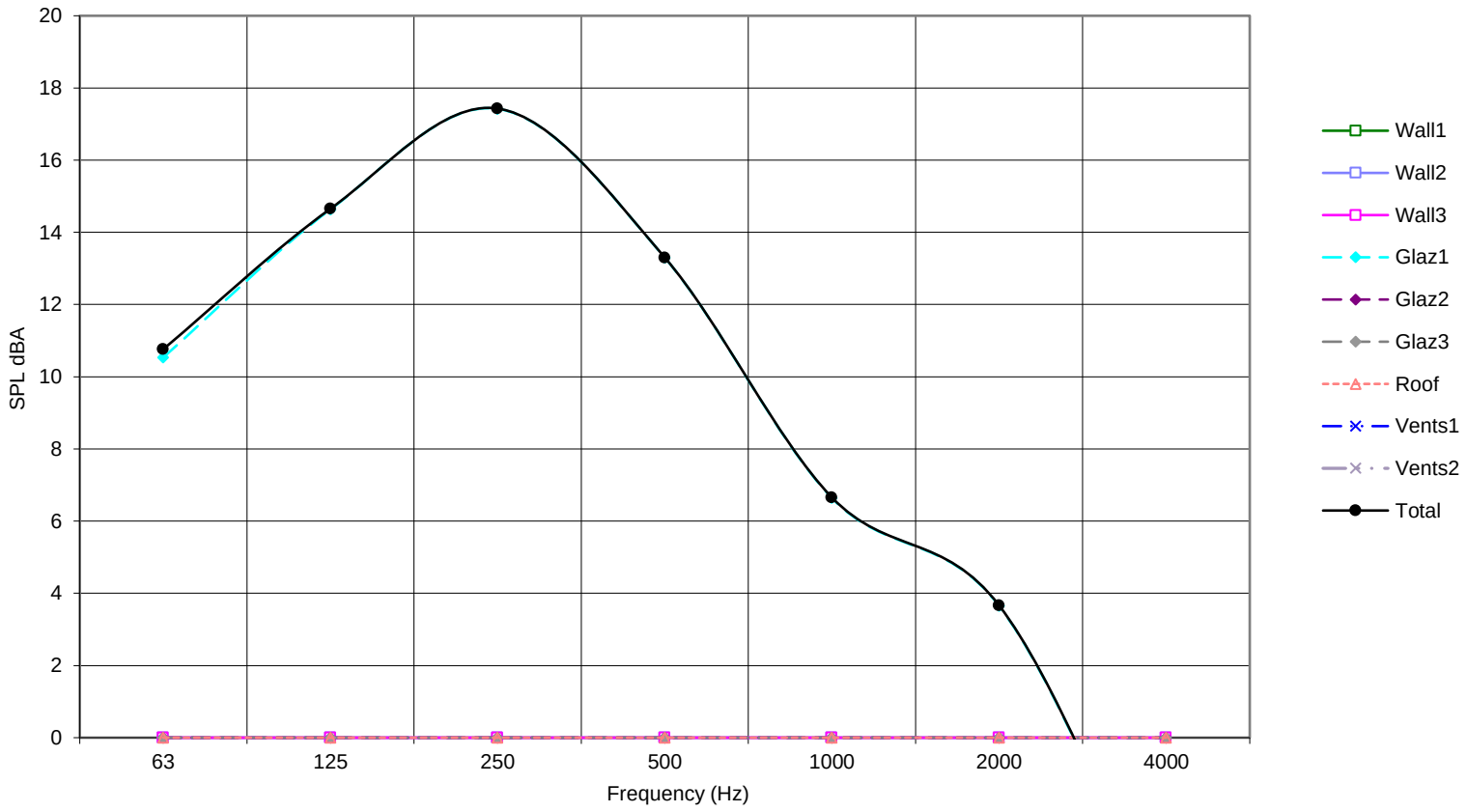
DIRECT INPUT ----->								**No data**
EQUAL RT for all bands ----->								
	0.5	0.5	0.5	0.5	0.5	0.5	0.5	**Default - RT set to 0.5s**

Façade Element		Area [m2]	SRI dB to BS EN ISO 140-3:1995								Rw	C	Ctr
Wall 1	EW1	3.8	35	46	50	60	65	65	65	1%	63	-2	-6
	ATTENUATION												
Wall 2	WALLS		0	0	0	0	0	0	0	0%			
	ATTENUATION												
Wall 3	WALLS		0	0	0	0	0	0	0	0%			
	ATTENUATION												
Glazing 1	30 dB Rw + Ctr - Acoustically Upgraded Double Glazing	3.6	22	22	23	30	40	40	44	95%	30 (inc Ctr)	-	-
	ATTENUATION												
Glazing 2	GLAZING		0	0	0	0	0	0	0	0%			
	ATTENUATION												
Glazing 3	GLAZING		0	0	0	0	0	0	0	0%			
	ATTENUATION												
Roof	ROOF / FLOOR		0	0	0	0	0	0	0	0%			
	ATTENUATION												
	Resultant composite Façade SRI		25	25	26	33	43	43	47				
	Resultant SPL inside room excluding ventilators dB	21.0	11	15	17	13	7	4	-5	100%			

Ventilator Type		Num	$D_{n,e}$ dB to BS EN 20140-10:1992								Dnew	C	Ctr
Ventilation	VENTS		0	0	0	0	0	0	0	0%			
	ATTENUATION												
Ventilation	VENTS		0	0	0	0	0	0	0	0%			
	ATTENUATION												
	Resultant SPL inside room through ventilators dB	-99.0	-96	-96	-96	-96	-96	-96	-96	0%			

Total SPL inside room	**21.0**	11	15	17	13	7	4	-5

Element contribution to total internal noise level



FACSIM V2.7.9 - MODELLING OF FACADE ACOUSTIC INSULATION TO BS12354-3 and BS8233

PROJECT:	Broadwater Road, Welwyn
ROOM:	Plot 001 Type B Bedroom
VARIANT:	Industrial Noise
NOTES:	

Room Dimensions [m] W 3.0 X L 4.0 X H 2.5

Room Volume = 30.0 m3
Partition Area = 7.5 m2
Ventilation ref area = 10.0 m2
SELECT Free Field or Façade SPL for model input >>>
Free Field SPL K = 3 dB

NOTES:

EXTERNAL SPECTRUM (A weighted)

	dBA	63	125	250	500	1000	2000	4000	
Direct input - Free Field SPL (A weighted octave bands) dB ----->	71.0	39.5	44.4	49.9	58.3	61.1	69.7	60.6	
Road traffic spectrum (according to BS 8233:1999 section 6)									
		39.5	44.4	49.9	58.3	61.1	69.7	60.6	**Direct input**

REVERBERATION TIME

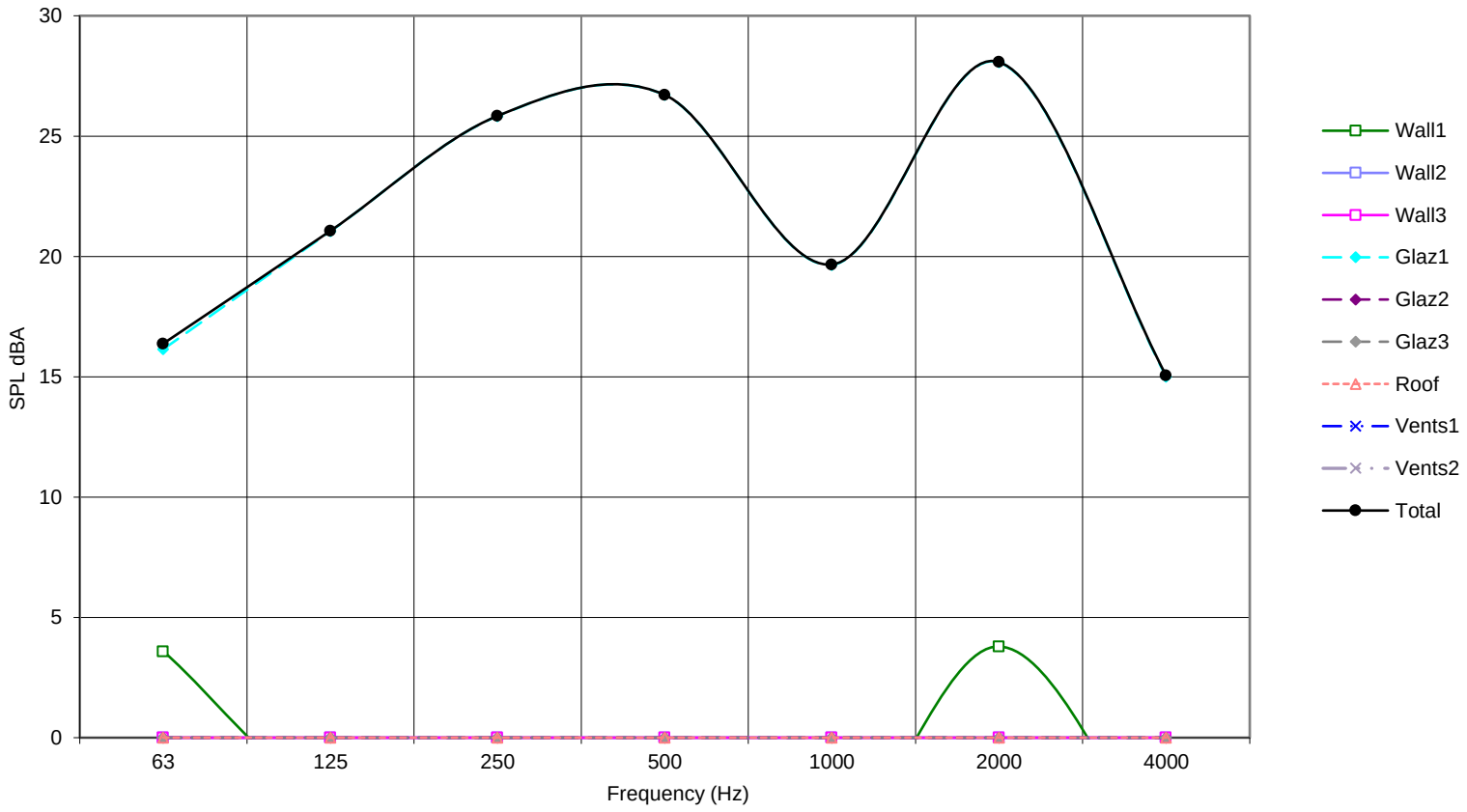
DIRECT INPUT ----->									**No data**
EQUAL RT for all bands ----->									
		0.5	0.5	0.5	0.5	0.5	0.5	0.5	**Default - RT set to 0.5s**

Façade Element		Area [m2]	SRI dB to BS EN ISO 140-3:1995								Rw	C	Ctr
Wall 1	EW1	3.9	35	46	50	60	65	65	65	0%	63	-2	-6
	ATTENUATION												
Wall 2	WALLS		0	0	0	0	0	0	0	0%			
	ATTENUATION												
Wall 3	WALLS		0	0	0	0	0	0	0	0%			
	ATTENUATION												
Glazing 1	30 dB Rw + Ctr - Acoustically Upgraded Double Glazing	3.6	22	22	23	30	40	40	44	100%	30 (inc Ctr)	-	-
	ATTENUATION												
Glazing 2	GLAZING		0	0	0	0	0	0	0	0%			
	ATTENUATION												
Glazing 3	GLAZING		0	0	0	0	0	0	0	0%			
	ATTENUATION												
Roof	ROOF / FLOOR		0	0	0	0	0	0	0	0%			
	ATTENUATION												
	Resultant composite Façade SRI		25	25	26	34	43	44	47				
	Resultant SPL inside room excluding ventilators dB	32.5	16	21	26	27	20	28	15	100%			

Ventilator Type		Num	$D_{n,e}$ dB to BS EN 20140-10:1992								Dnew	C	Ctr
Ventilation	VENTS		0	0	0	0	0	0	0	0%			
	ATTENUATION												
Ventilation	VENTS		0	0	0	0	0	0	0	0%			
	ATTENUATION												
	Resultant SPL inside room through ventilators dB	-99.0	-96	-96	-96	-96	-96	-96	-96	0%			

Total SPL inside room	**32.5**	16	21	26	27	20	28	15

Element contribution to total internal noise level



FACSIM V2.7.9 - MODELLING OF FACADE ACOUSTIC INSULATION TO BS12354-3 and BS8233

			W		L		H
PROJECT:	Broadwater Road, Welwyn	Room Dimensions [m]	3.5	X	7.1	X	2.5
ROOM:	Plot 001 Type B Living / Dining Room						
VARIANT:	Industrial Noise						
NOTES:							

Room Volume =	63.1	m3
Partition Area =	26.9	m2
Ventilation ref area =	10.0	m2
Free Field SPL K =	3	dB

SELECT Free Field or Façade SPL for model input >>>

NOTES:

Rated industrial noise of 52 dBA taken from approaved commerical noise assessment completed by AIRO reference REG/7205/B dated 16 April 2019

EXTERNAL SPECTRUM (A weighted)

	dBA	63	125	250	500	1000	2000	4000	
Direct input - Free Field SPL (A weighted octave bands) dB ----->	-								**No data**
Road traffic spectrum (according to BS 8233:1999 section 6)	52.0								
		33.8	37.9	41.4	44.8	48.0	45.2	40.0	**Reference spectrum**

REVERBERATION TIME

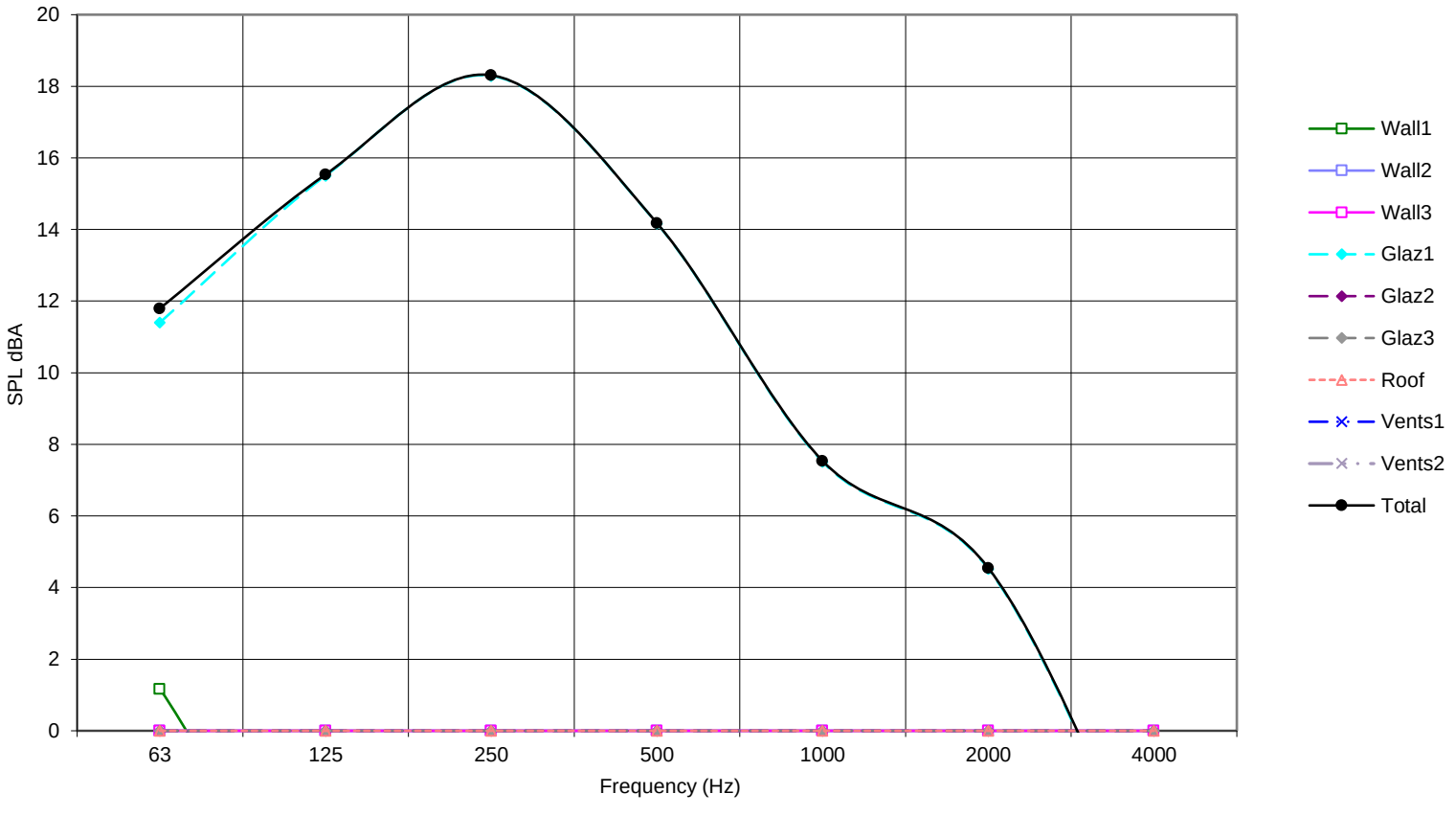
DIRECT INPUT ----->								**No data**
EQUAL RT for all bands ----->								
	0.5	0.5	0.5	0.5	0.5	0.5	0.5	**Default - RT set to 0.5s**

Façade Element		Area [m2]	SRI dB to BS EN ISO 140-3:1995								Rw	C	Ctr
Wall 1	EW1	17.5	35	46	50	60	65	65	65	1%	63	-2	-6
	ATTENUATION												
Wall 2	WALLS		0	0	0	0	0	0	0	0%			
	ATTENUATION												
Wall 3	WALLS		0	0	0	0	0	0	0	0%			
	ATTENUATION												
Glazing 1	30 dB Rw + Ctr - Acoustically Upgraded Double Glazing	9.5	22	22	23	30	40	40	44	96%	30 (inc Ctr)	-	-
	ATTENUATION												
Glazing 2	GLAZING		0	0	0	0	0	0	0	0%			
	ATTENUATION												
Glazing 3	GLAZING		0	0	0	0	0	0	0	0%			
	ATTENUATION												
Roof	ROOF / FLOOR		0	0	0	0	0	0	0	0%			
	ATTENUATION												
	Resultant composite Façade SRI		26	27	27	35	45	45	49				
	Resultant SPL inside room excluding ventilators dB	21.9	12	16	18	14	8	5	-5	100%			

Ventilator Type		Num	$D_{n,e}$ dB to BS EN 20140-10:1992								Dnew	C	Ctr
Ventilation	VENTS		0	0	0	0	0	0	0	0%			
	ATTENUATION												
Ventilation	VENTS		0	0	0	0	0	0	0	0%			
	ATTENUATION												
	Resultant SPL inside room through ventilators dB	-99.0	-96	-96	-96	-96	-96	-96	-96	0%			

Total SPL inside room	**21.9**	12	16	18	14	8	5	-5

Element contribution to total internal noise level



Appendix 5 Acoustic Facade Specification

Reference	Colour	Glazing Specification
GVS01		30 dB Rw+Ctr
GVS02	Unmarked	27 dB Rw+Ctr

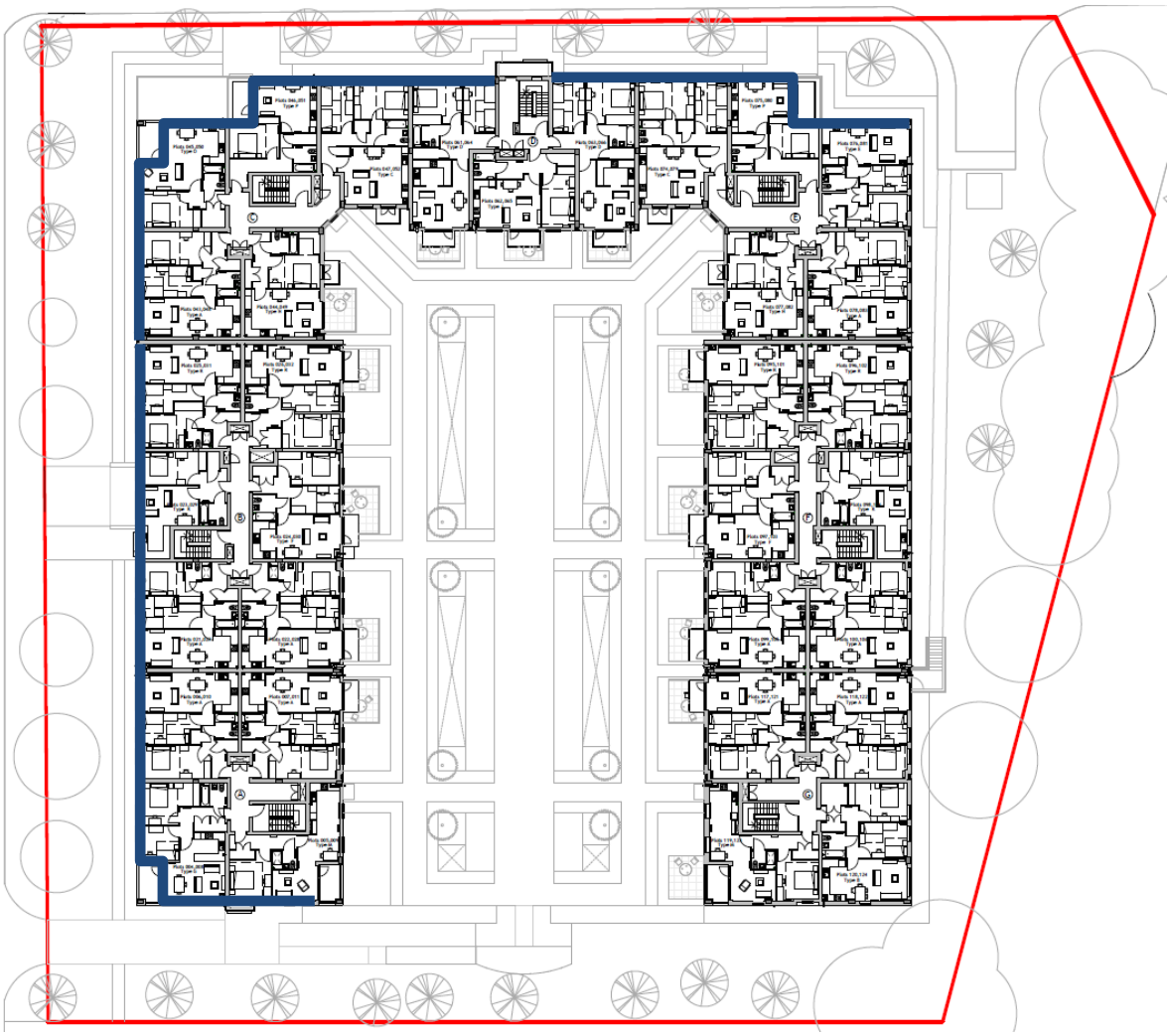
NOTES: Values must include the Ctr correction. Manufacturers or suppliers should provide laboratory test data demonstrating that the proposed systems are capable of achieving the values given. Windows should be tested as complete systems (rather than just the glazing in isolation)

Ground floor

Reference	Colour	Glazing Specification
GVS01		30 dB Rw+Ctr
GVS02	Unmarked	27 dB Rw+Ctr

NOTES: Values must include the Ctr correction. Manufacturers or suppliers should provide laboratory test data demonstrating that the proposed systems are capable of achieving the values given. Windows should be tested as complete systems (rather than just the glazing in isolation)

Upper floors



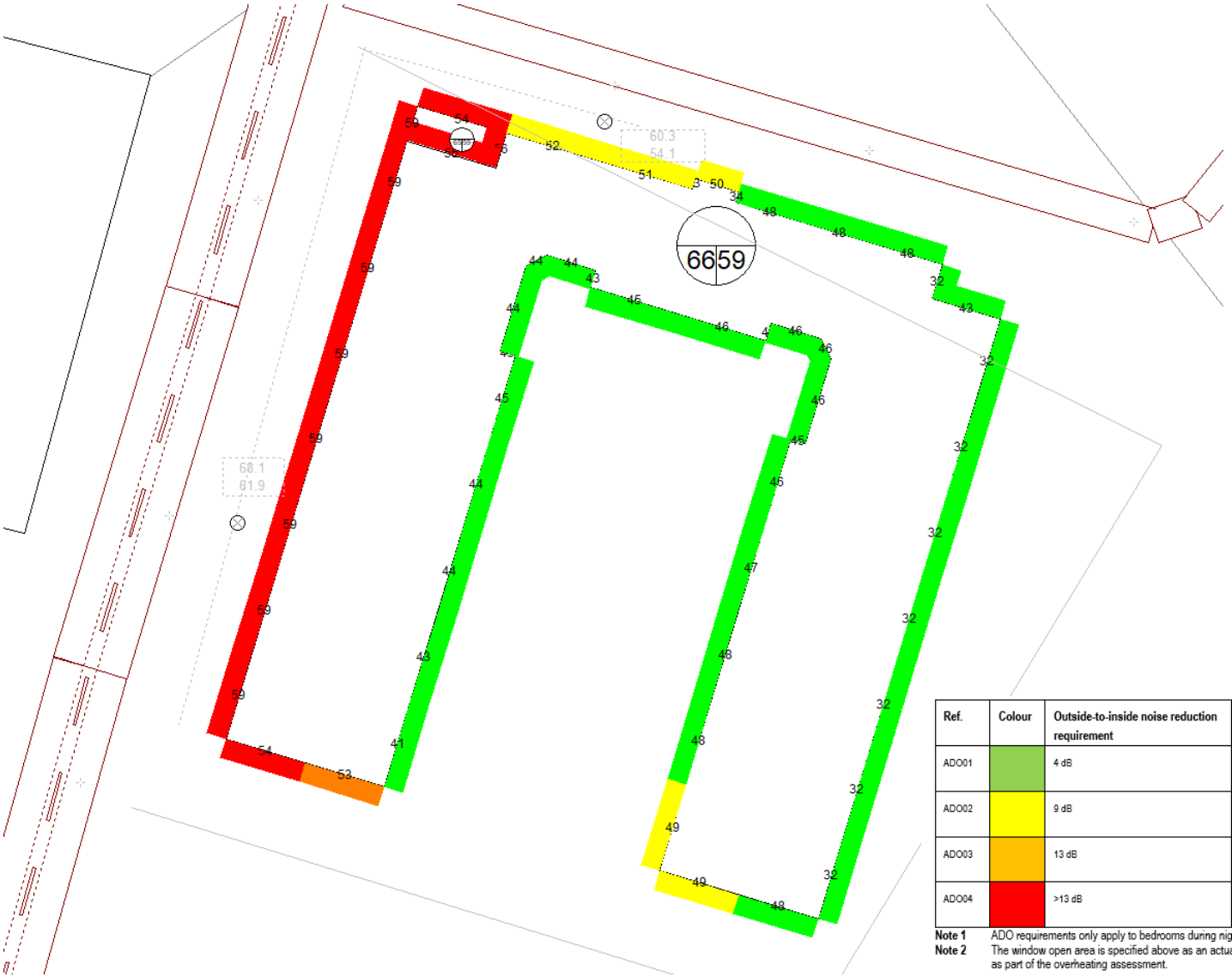
Appendix 6 Part O Acoustic Requirements for Bedrooms at Night

Ref.	Colour	Outside-to-inside noise reduction requirement	Part O Requirement for Bedrooms
ADO01		4 dB	Overheating assessment (e.g. TM59) to show that bedrooms will not overheat at night with windows fully open (e.g. 13% of floor area, which is typically around 1.3m^2) and ventilators fully open.
ADO02		9 dB	Overheating assessment (e.g. TM59) to show that bedrooms will not overheat at night with windows open (e.g. 4% of floor area, which is typically around 0.4m^2) and ventilators fully open.
ADO03		13 dB	Overheating assessment (e.g. TM59) to show that bedrooms will not overheat at night with windows partially open (e.g. ~2% of floor area, which is typically around 0.2m^2) and ventilators fully open.
ADO04		>13 dB	Overheating assessment (e.g. TM59) to show that bedrooms on these facades will not overheat at night with windows fully closed and ventilators fully open.

Note 1 ADO requirements only apply to bedrooms during night-time hours (23:00-07:00)

Note 2 The window open area is specified above as an actual open area, not 'equivalent open area' and the values may therefore need to be converted as part of the overheating assessment.

Night-time Average Noise Levels (LAeq)

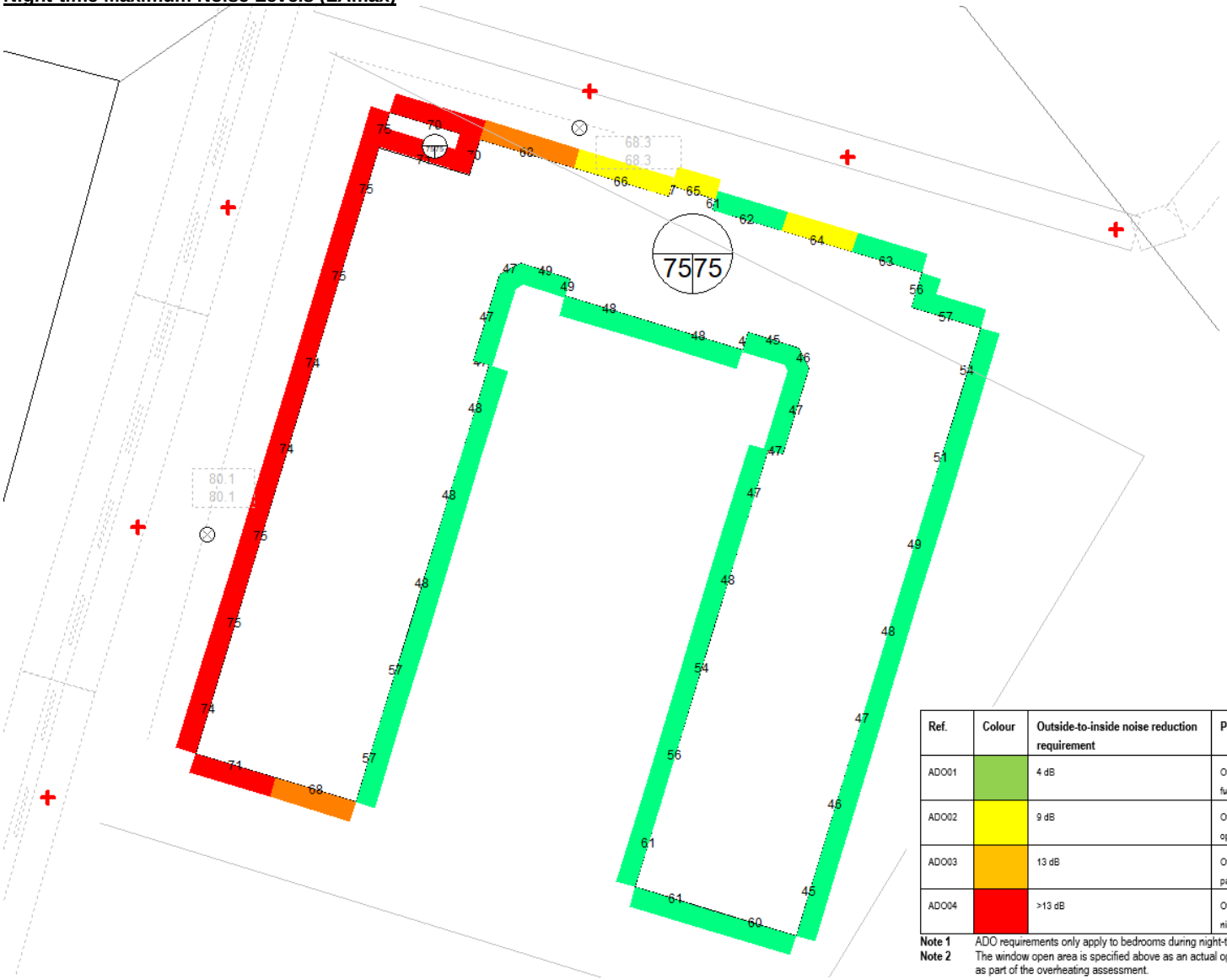


Ref.	Colour	Outside-to-inside noise reduction requirement	Part O Requirement for Bedrooms
ADO01		4 dB	Overheating assessment (e.g. TM59) to show that bedrooms will not overheat at night with windows fully open (e.g. 13% of floor area, which is typically around 1.3m²) and ventilators fully open.
ADO02		9 dB	Overheating assessment (e.g. TM59) to show that bedrooms will not overheat at night with windows open (e.g. 4% of floor area, which is typically around 0.4m²) and ventilators fully open.
ADO03		13 dB	Overheating assessment (e.g. TM59) to show that bedrooms will not overheat at night with windows partially open (e.g. ~2% of floor area, which is typically around 0.2m²) and ventilators fully open.
ADO04		>13 dB	Overheating assessment (e.g. TM59) to show that bedrooms on these facades will not overheat at night with windows fully closed and ventilators fully open.

Note 1 ADO requirements only apply to bedrooms during night-time hours (23:00-07:00)

Note 2 The window open area is specified above as an actual open area, not 'equivalent open area' and the values may therefore need to be converted as part of the overheating assessment.

Night-time Maximum Noise Levels (LAmax)



Ref.	Colour	Outside-to-inside noise reduction requirement	Part O Requirement for Bedrooms
ADO01		4 dB	Overheating assessment (e.g. TM59) to show that bedrooms will not overheat at night with windows fully open (e.g. 13% of floor area, which is typically around 1.3m²) and ventilators fully open.
ADO02		9 dB	Overheating assessment (e.g. TM59) to show that bedrooms will not overheat at night with windows open (e.g. 4% of floor area, which is typically around 0.4m²) and ventilators fully open.
ADO03		13 dB	Overheating assessment (e.g. TM59) to show that bedrooms will not overheat at night with windows partially open (e.g. ~2% of floor area, which is typically around 0.2m²) and ventilators fully open.
ADO04		>13 dB	Overheating assessment (e.g. TM59) to show that bedrooms on these facades will not overheat at night with windows fully closed and ventilators fully open.

Note 1 ADO requirements only apply to bedrooms during night-time hours (23:00-07:00)

Note 2 The window open area is specified above as an actual open area, not 'equivalent open area' and the values may therefore need to be converted as part of the overheating assessment.

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