



Architectural & Environmental Acousticians
Noise & Vibration Engineers

PLANNING CONDITION 42

STATION HILL, PHASE 1, BLOCK E AND F

MIDGARD LTD

RP02-19194

PLANNING CONDITION 42

PROJECT: STATION HILL, PHASE 1, BLOCK E AND F

CLIENT: MIDGARD LTD

CLIENT ADDRESS: 4 ELSTREE WAY
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COMPANY ADDRESS: CASS ALLEN ASSOCIATES LTD
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DOCUMENT CONTROL:

REVISION	ISSUE DATE	REPORT BY	CHECKED BY	NOTES
0	21 February 2020	Ronny Ospina Orozco, MSc TechIOA, Acoustics Consultant	Chris McNeillie, MSc CEng MIOA, Director	Initial issue
1	25 February 2020	Fabio Lassandro, MSc BEng MIOA, Senior Acoustics Consultant	Chris McNeillie, MSc CEng MIOA, Director	Removed Conditions 60- 61. Included proposed glazing performance
2	02 March 2020	Fabio Lassandro, MSc BEng MIOA, Senior Acoustics Consultant	Chris McNeillie, MSc CEng MIOA, Director	Included currently proposed glazing

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1. INTRODUCTION

- 1.1 Cass Allen has been instructed by Midgard Ltd to assess the acoustic design of a new development at Station Hill, Phase 1, Block E and F.
- 1.2 The assessment has been carried out in accordance with the requirements of pre-commencement noise related Planning Condition 42 that have been imposed on the development. The condition states:

Condition 42

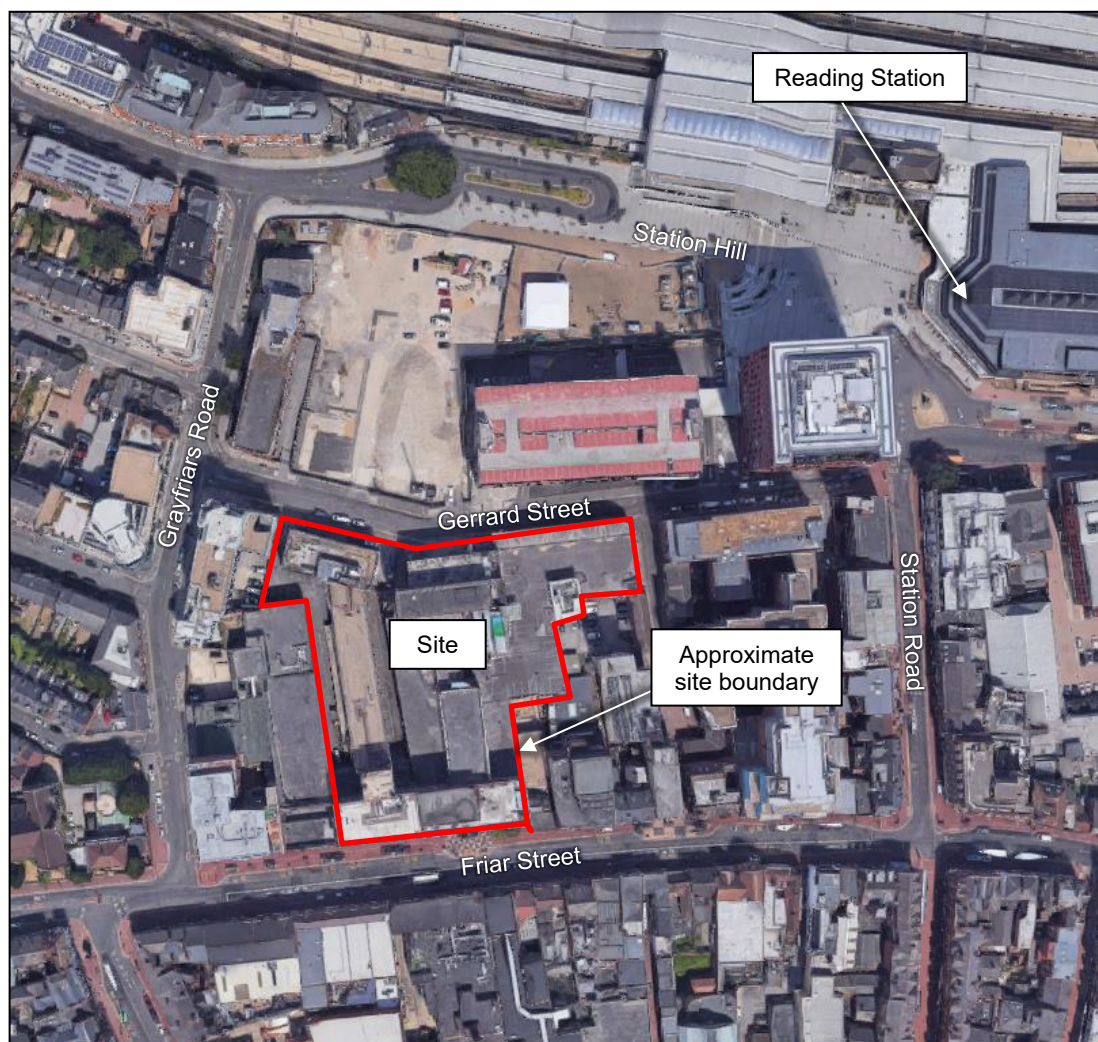
No development shall be commenced (excepting demolition and groundworks) before details of a sound attenuation scheme informed by an assessment of the current noise environment, for protecting the dwellings from the external noise environment of the area has been submitted to and approved in writing by the Local Planning Authority. The scheme itself shall be designed, specified and constructed so that the sound insulation performance of the structure and the layout of the dwellings are such that the indoor ambient noise levels do not exceed the values detailed in Table 4 of BS 8233:2014 and do not exceed 45dB LAmax for bedrooms within any dwelling. Where opening windows will lead to an internal noise level increase of 5 dBA or greater above BS 8233:2014 recommended internal levels, the scheme shall include provision of alternative mechanical ventilation with minimum performance equivalent to a mechanical heat recovery (MVHR) system with cool air bypass as an alternative means of cooling and ventilation. Noise from the system should not result in BS8233 internal levels being exceeded. The development shall not be carried out other than in accordance with the approved scheme which shall be completed before the building to which it relates is first occupied, unless the Local Planning Authority otherwise agrees in writing. The scheme shall be retained as approved at all times thereafter.

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

2. DEVELOPMENT DESCRIPTION

- 2.1 Phase 1 of the Station Hill Development consists of two residential blocks (Block E and F). The residential blocks are up to 12 storeys in height and are connected by a basement. A current drawing of the development layout is shown Appendix 1.
- 2.2 The site is located in a mixed-use area bounded to the north and south by Gerrard Street and Friar Street respectively. To the west of the site is Greyfriars Road and to the east is Station Road. There are also commercial premises along the main roads. Reading Train Station is approximately 140m to the north of the site.
- 2.3 The site and the surrounding area are shown in Figure 1 below.

Figure 1 Site and Surrounding Area



- 2.4 To address the requirements of the noise related planning conditions, noise affecting the habitable areas of the development and facade design (as per Condition 42) has been assessed in this report;

3. PLANNING CONDITION 42

Design criteria – Internal noise levels

- 3.1 Planning Condition 42 makes reference to BS8233:2014 2014 'Guidance on sound insulation and noise reduction for buildings' (BS8233).
- 3.2 The criteria in Planning Condition 42 (in-line with BS8233 as referenced) are summarised in Table 1 below.

Table 1 Planning Condition 42 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
Sleeping (night time)	Bedroom	-	45 dB LAmax

Note 1 Planning Condition 42 states: "Where opening windows will lead to an internal noise level increase of 5 dBA or greater above BS8233:2014 recommended internal levels, the scheme shall include the provision of alternative mechanical ventilation with minimum performance equivalent to mechanical heat recovery system with cool air bypass".

- 3.3 The outside to inside noise reduction of a façade with an open window is approximately 15 dB. Consequently, the following acoustic design criteria have been adopted for the development:
- Average noise levels in living rooms and dining rooms during the day should not exceed 35 dB LAeq,0700-2300hrs and 40 dB LAeq,0700-2300hrs respectively;
 - Living room and dining room façades exposed to external noise levels of 55 dB LAeq,0700-2300hrs and 60 dB LAeq,0700-2300hrs respectively (or greater) will require mechanical ventilation¹ to achieve the required internal noise levels with the 5 dBA tolerance as per Planning Condition 42;
 - Average noise levels in bedrooms should not exceed 35 dB LAeq,0700-2300hrs during the day and 30 dB LAeq,2300-0700hrs during the night;
 - Bedroom façades exposed to external noise levels of 55 dB LAeq,0700-2300hrs during the day and 50 dB LAeq,2300-0700 during the night (or greater) will require mechanical ventilation to achieve the required internal noise levels with the 5 dBA tolerance as per Planning Condition 42.
 - Maximum noise levels in bedrooms should not normally exceed 45 dB LAmax as per Planning Condition 42. This limit is typically recommended for night time periods in order to prevent adverse effect on the quality of sleep for residents. Therefore night time LAmax levels have been assessed.

¹ Assuming 15 dB sound reduction provided by partially open windows, as per Section G.1 of BS8233.

Existing site noise levels

- 3.4 A detailed baseline noise survey was carried out by Hoare Lea (HL) as part of their Stage 4A report ref. 'REP-1010694-5A-TH-20190708' ("the HL report"). The results of the HL's survey and façade levels are included in Appendix 2.
- 3.5 The survey included both short-term attended and long-term noise monitoring over a 14 day period. The survey measured traffic and railway noise emissions from the surrounding roads and railway lines; as well as general background levels at the site. Results are detailed in Section 4 of the HL report.
- 3.6 Additional noise surveys were carried out by Cass Allen on the 22nd August 2019 and on the 7th February 2020 to verify and augment the data from the HL report. Details of the supplementary Cass Allen survey can be seen in Appendix 3. The survey results were in-line with the data from the HL report.
- 3.7 Typical noise levels at the facades of the development have been calculated based on the data from the HL and Cass Allen surveys.
- 3.8 Façades with direct line of sight to the nearby roads will be exposed to the highest noise levels. The noise levels at these locations are summarised as follows:
- Façades on northern edge of the site, facing Gerrard Street:
 - Average noise levels during the daytime – 68 dB LAeq,0700-2300hrs;
 - Average noise levels during the night-time – 59 dB LAeq,2300-0700hrs;
 - Typical maximum noise levels during the night-time – 76 dB L_{Amax}.
 - Façades on southern edge of the site, facing Friar Street:
 - Average noise levels during the daytime – 66 dB LAeq,0700-2300hrs;
 - Average noise levels during the night-time – 66 dB LAeq,2300-0700hrs;
 - Typical maximum noise levels during the night-time – 89 dB L_{Amax}.
- 3.9 The facades facing Friar Street are subject to the highest noise levels. The main noise sources at this location are vehicle movements, and during the evening and night-time; noise breakout from nightclubs directly opposite the site and noise from nightclub patrons on the street.

Internal noise levels in noise-sensitive rooms

- 3.10 The façades of the residential elements of the development will be constructed using the wall details as specified in the project drawings which have been included in Appendix 4. The sound insulation performance of the external wall constructions was predicted using INSUL v9.0 façade modelling software. Results show that the non-glazed elements of the façade build-ups achieve approximately 53 dB *Rw*+Ctr. Consequently, internal noise levels will be dictated by external noise ingress via glazing and ventilators.
- 3.11 The ventilation scheme for the project is Mechanical Ventilation with Heat Recovery (MVHR) i.e. System 4 from Building Regulations Part F with the provision of openable windows for purge ventilation. Therefore, there will be no background ventilators installed in the external façades (e.g. trickle ventilators etc).

- 3.12 It is understood that the MVHR system will be designed to offset overheating during warmer periods of the year keeping the windows close in order to comply with Planning Condition 42.
- 3.13 Calculations were carried out using façade modelling software in accordance with the “more rigorous” methodology given in BS8233:2014 to calculate the sound insulation performance required of the glazing and ventilation to achieve the nominated internal noise criteria (Table 1) in habitable rooms of the development.
- 3.14 The calculations were carried out based on the dimensions/details for facade elements taken from project drawings.
- 3.15 A summary of the minimum glazing specification required to achieve the internal noise criteria (Table 1) are summarised in Table 2 below.

Table 2 Acoustic Requirements for Glazing

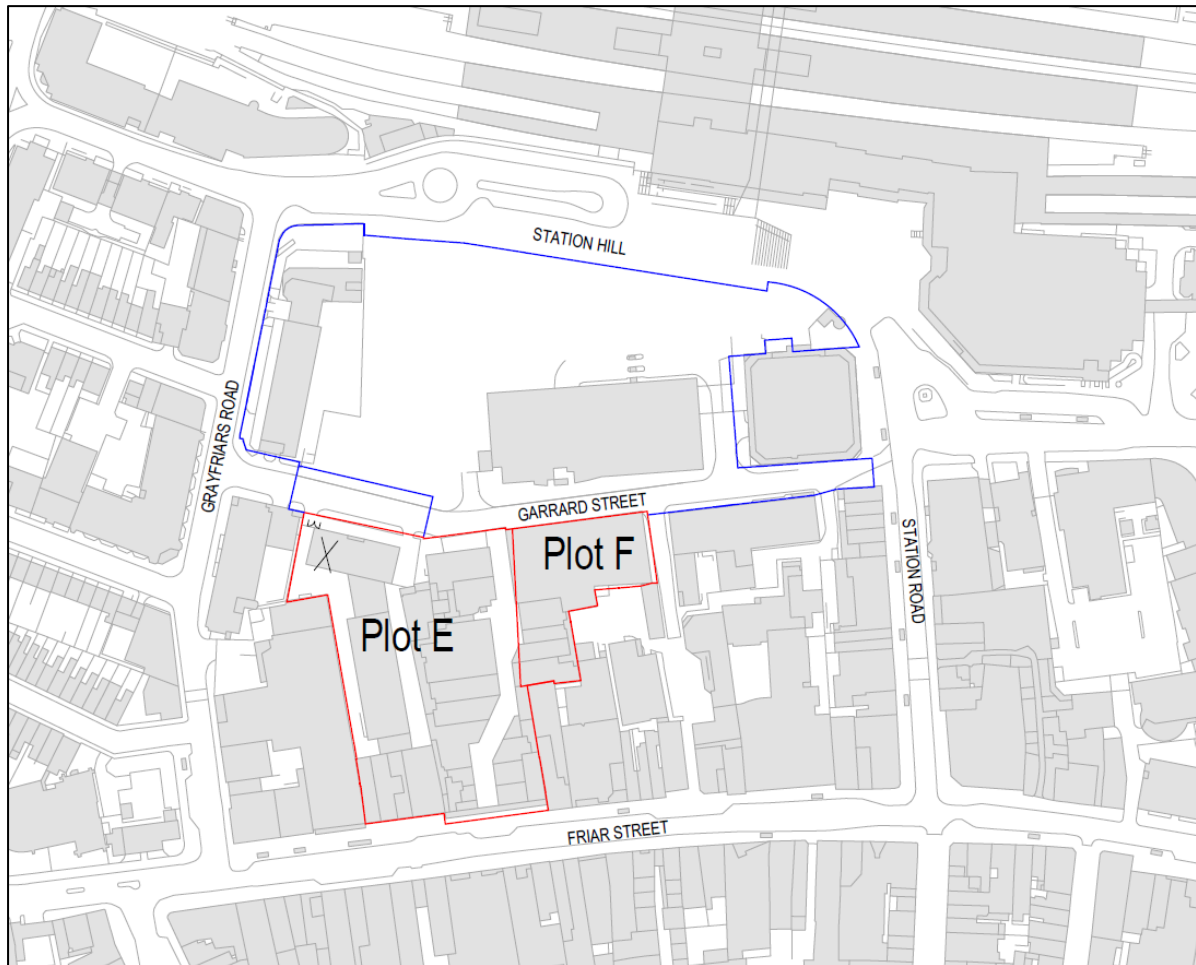
Glazing	Glazing Minimum Performance Requirements (inc. Frames)
GL01 - Lower Specification	29 dB Rw+Ctr
GL02 – Medium Specification	37 dB Rw+Ctr
GL03 – Higher Specification	43 dB Rw+Ctr

- 3.16 The results of the façade calculations are shown in Appendix 5 which shows that the internal noise levels within habitable rooms will be compliant with the criteria in Table 1. The acoustic data of the proposed glazing (excluding frames) are also presented in Appendix 6.
- 3.17 Based on the results of the calculations, a specification has been developed showing the sound insulation performance requirements for all facades of the development. The façade specification is shown in Appendix 7.
- 3.18 In summary, acceptable internal noise levels compliant with Planning Condition 42 will be achieved using the glazing and ventilation specification detailed in this report.

4. CONCLUSIONS

- 4.1 Cass Allen Associates was instructed by Midgard Ltd assess the acoustic design of the proposed development as required by Planning Condition 42.
- 4.2 Internal noise levels in habitable rooms of the development as a result from external noise ingress have been assessed as per the requirements of Planning Condition 42. Compliant noise levels will be achieved in all habitable rooms in the development using the proposed glazing specification given in Table 2 and the ventilation strategy as specified in Section 3.11 and 3.12.
- 4.3 It is our view that this report contains the information required to discharge Planning Condition 42 imposed on the development.

Appendix 1 Site Layout



Lower Ground Floor

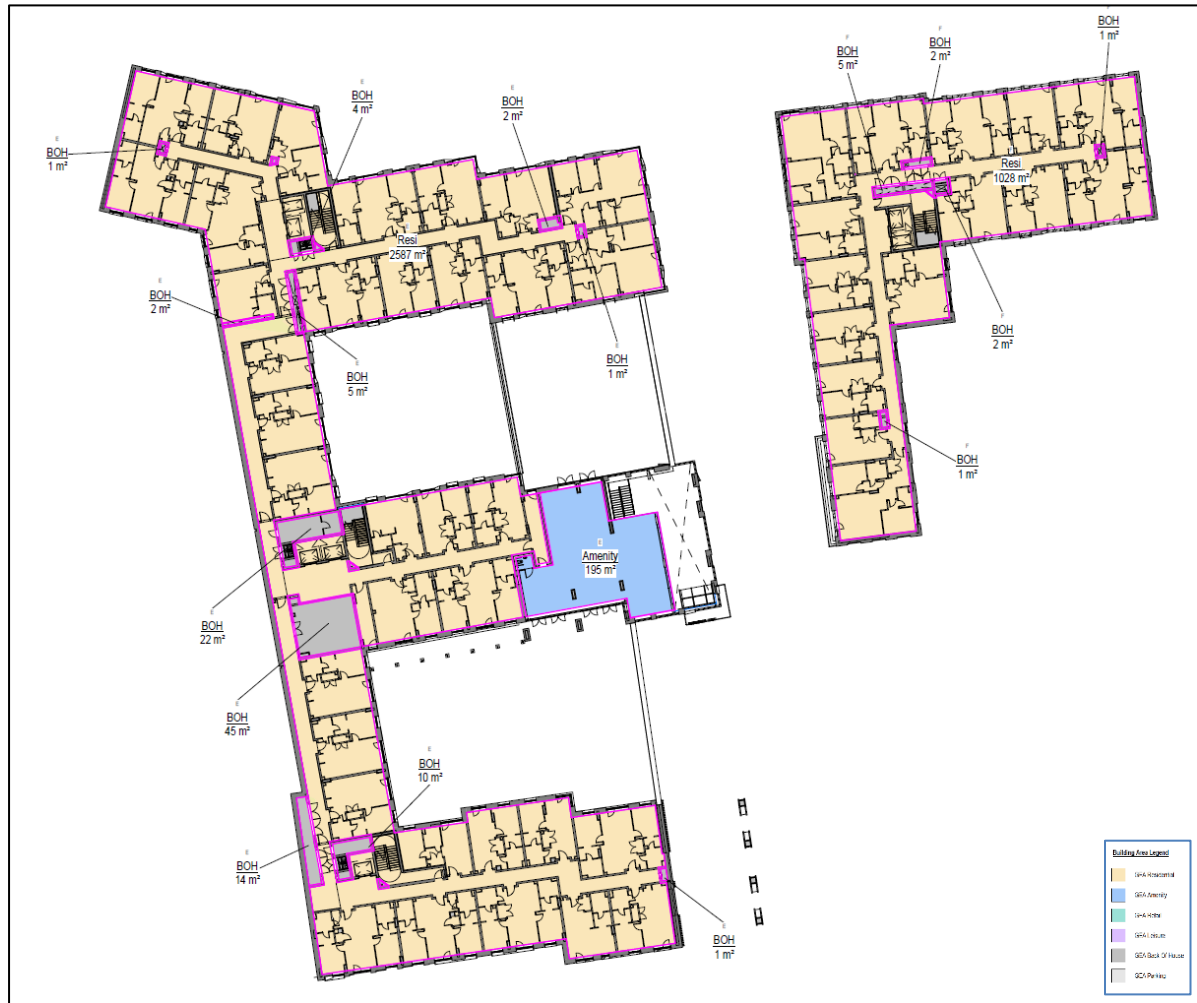




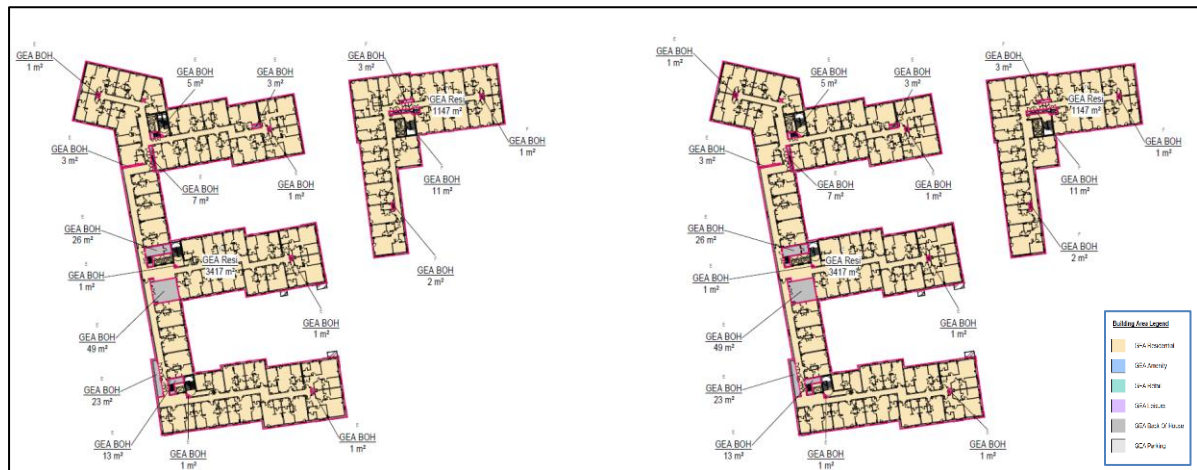
Ground Floor



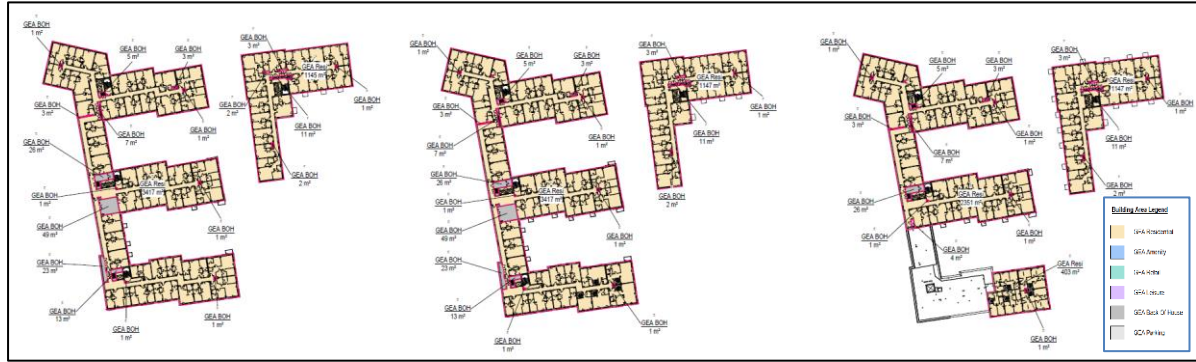
Level 01



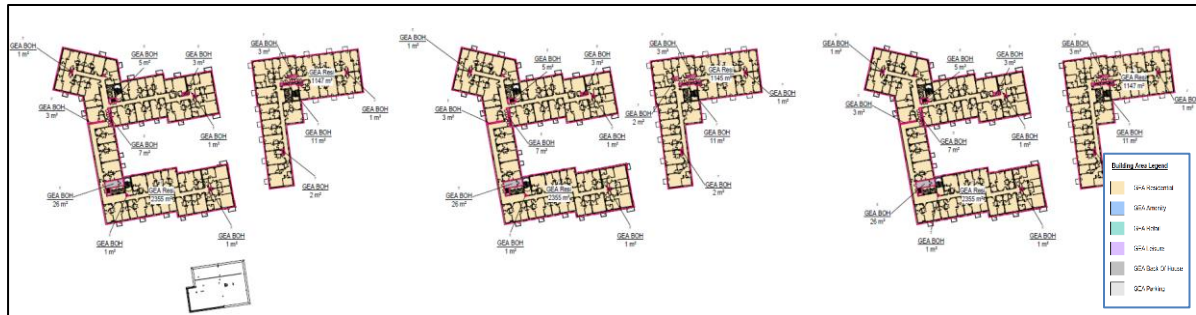
Level 02 and 03



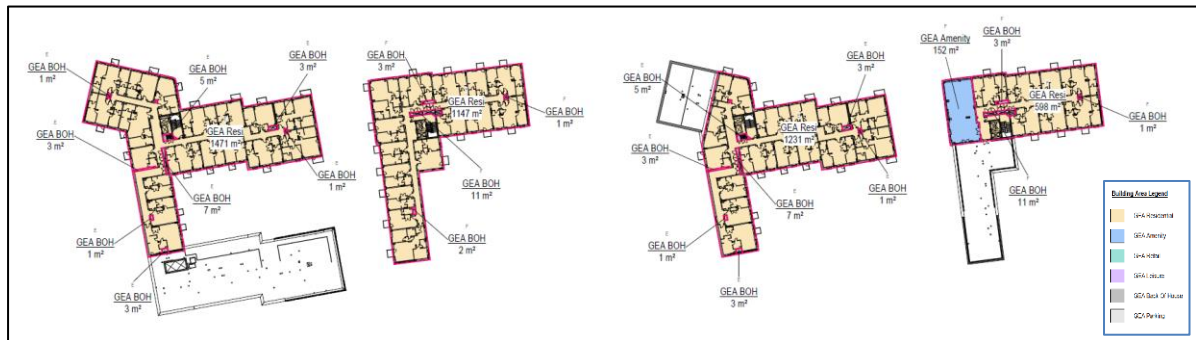
Level 04, 05 and 06



Level 07, 08 and 09



Level 10 and 11



Appendix 2 Hoare Lea Survey Results and Façade Levels

4. Baseline noise & vibration conditions.

This section sets out the acoustic data to be used for the assessment of potential noise impacts in relation to current development proposals. It presents a summary of the environmental noise levels measured at the site and surrounding area for use in assessing and determining the sound insulation requirements of the building envelope, and the control of noise emissions from building services plant and equipment.

4.1 Local noise conditions.

Environmental noise conditions at the site are predominantly formed of road traffic noise from the immediate road network around the Site, in particular buses on Friar Street, but also vehicles (including taxis) using Greyfriars Road, Garrard Street and Station Hill.

Daytime noise activities within the vicinity of the proposed development were observed to include the following:

- Idling buses (with engines running) serving bus stops immediately to the front of the proposed development along Friar Street;
- Idling taxis (with engines running) queuing along Garrard Street as they approach the Reading Station taxi rank on Station Road;
- Trains serving Reading Station to the north of the site. Train movements were observed to be frequent, although slow moving as trains approached / left Reading Station; and
- PA announcements associated with trains serving Reading Station.

Night-time noise activities are predominantly formed of pedestrian activity and noise break-out from the nearby clubs *Popworld* and *Lola Lo*, which are located immediately opposite the site on Friar Street. *Popworld*'s typical opening hours are understood to be 2200 to 0200 on Thursdays, 2100 to 0400 on Fridays and 2000 to 0400 on Saturdays, whilst opening hours at *Lola Lo* are understood to be 2000 to 0300 on Tuesdays and Thursdays and 2100 to 0400 on Fridays and Saturdays.

Night-time noise activities within the vicinity of the proposed development were observed to include the following:

- Buses and taxis travelling along Friar Street;
- Music break-out from *Popworld* and *Lola Lo*;
- Pedestrian activity associated with the neighbouring clubs, including use of the smoking and queuing area located to the front of *Popworld*;
- Taxis were observed to travel a circular route from Friar Street, to Station Hill before returning to Station Road via Garrard Street; and
- Trains serving Reading Station to the north of the site, including PA announcements.

4.2 Baseline noise survey.

An acoustic survey has been carried out at the proposed development site to establish the prevailing noise conditions local to the site. The survey included the installation of three noise monitors across a fourteen-day period, in addition to attended noise measurements during the daytime and night-time.

An indicative site layout identifying the measurement positions is provided in Figure 1 below.

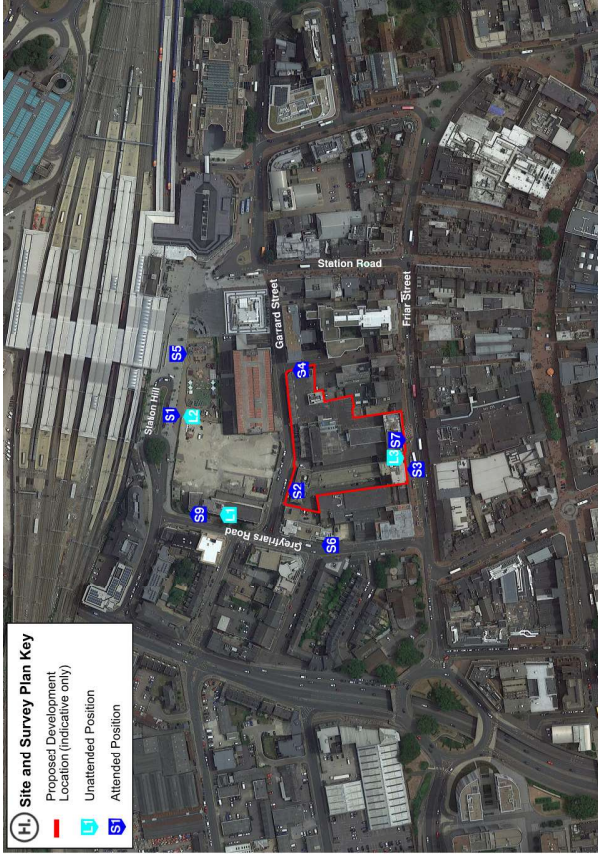


Figure 1: Site layout (indicative only).

4.2.1 Results summary.

A summary of the results from the unattended measurements taken over the fourteen-day period at positions L1, L2 and L3 (see Figure 1) are provided below.

Time period	Ambient $L_{Aeq,T}$ dB	Minimum $L_{A90,T}$ dB	Typical 90 th Percentile L_{AFmax} dB
Position L1			
Daytime (0700 to 2300)	69	44 (see Note 14.1)	85
Night-Time (2300 to 0700)	63	36 (see Note 14.2)	82
Position L2			
Daytime (0700 to 2300)	59	43 (see Note 14.1)	82
Night-Time (2300 to 0700)	56	37 (see Note 14.2)	77
Position L3			
Daytime (0700 to 2300)	67	47 (see Note 14.1)	88
Night-Time (2300 to 0700)	69	43 (see Note 14.2)	91

Table 14: Typical levels at measurement positions.

Note 14.1: Time period during the daytime is 1 hour ($L_{Aeq,1hr}$).

Note 14.2: Time period during the night-time is 15 minutes ($L_{Aeq,15min}$).

A summary of the attended measurements conducted at positions S1, S2, and S3 is provided below in Table 15.

Measurement position	Typical $L_{Aeq,T}$ dB	Ninetieth Percentile $L_{Amax,T}$ dB
Daytime		
S1	58	71
S2	60	76
S3	65	77
S4	62	78
S5	56	74
S6	63	76
Night-time		
S1	58	67
S2	63	81
S7	71	81
S9	65	77

Table 15: Measured noise levels at attended positions.

4.2.2 Nearest noise sensitive receptor.

A noise sensitive area is defined as landscapes or buildings where the occupiers are likely to be sensitive to noise created by new plant installed in the proposed development, including residential areas. Noise sensitive receptors around the Site have been identified and are shown in Figure 2 below.

Of the noise sensitive receptors identified in Figure 2, the nearest noise sensitive receptors to the proposed development have been identified as the proposed development itself, existing residential dwellings along Merchant Place to the east including the Novotel and Ibis Hotel and student residences within Central Studios to the west. In addition, future residential dwellings should be considered as noise sensitive as part of the Phase 2 and 3 proposals for the Station Hill site.

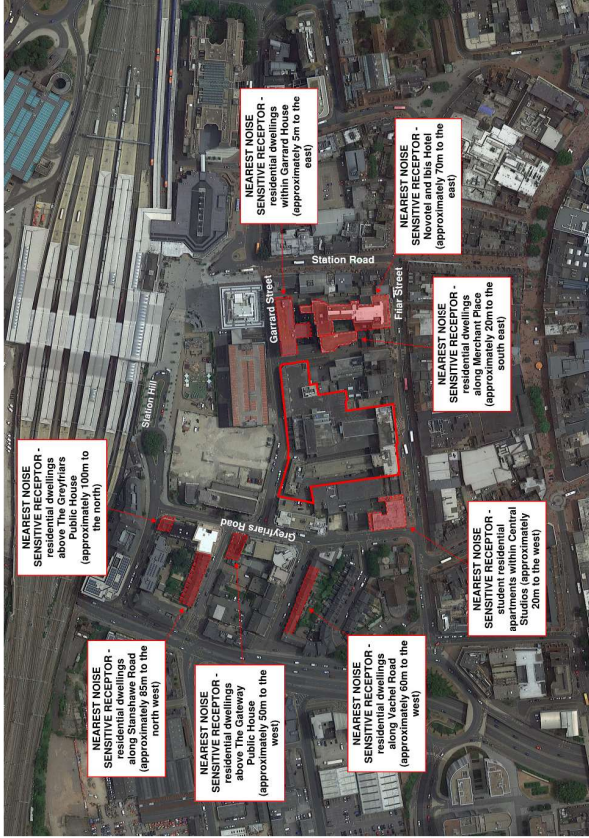


Figure 2: Nearest noise sensitive receptors.

4.2.3 Noise prediction model.

In order to predict the external noise levels present at each facade of the proposed development, a noise map has been created using CADNA environmental noise prediction and mapping software.

A baseline noise map was generated of the existing site using the results of the environmental noise survey and calibrated for daytime equivalent noise levels ($L_{Aeq,16hr}$), night-time equivalent noise levels ($L_{Aeq,8hr}$) and the maximum ninetieth percentile night-time $L_{Amax,T}$. The noise map was calibrated each of the noise sources discussed in Section 4.1.

Subsequently, a noise map was generated of the site with the proposed development in-situ. Figures 3 to 6 below display a three-dimensional representation of the noise map prediction for each of the proposed development façades. It should be noted that the noise mapping exercise takes into consideration all noise reflections that may occur off the proposed development and adjacent buildings.

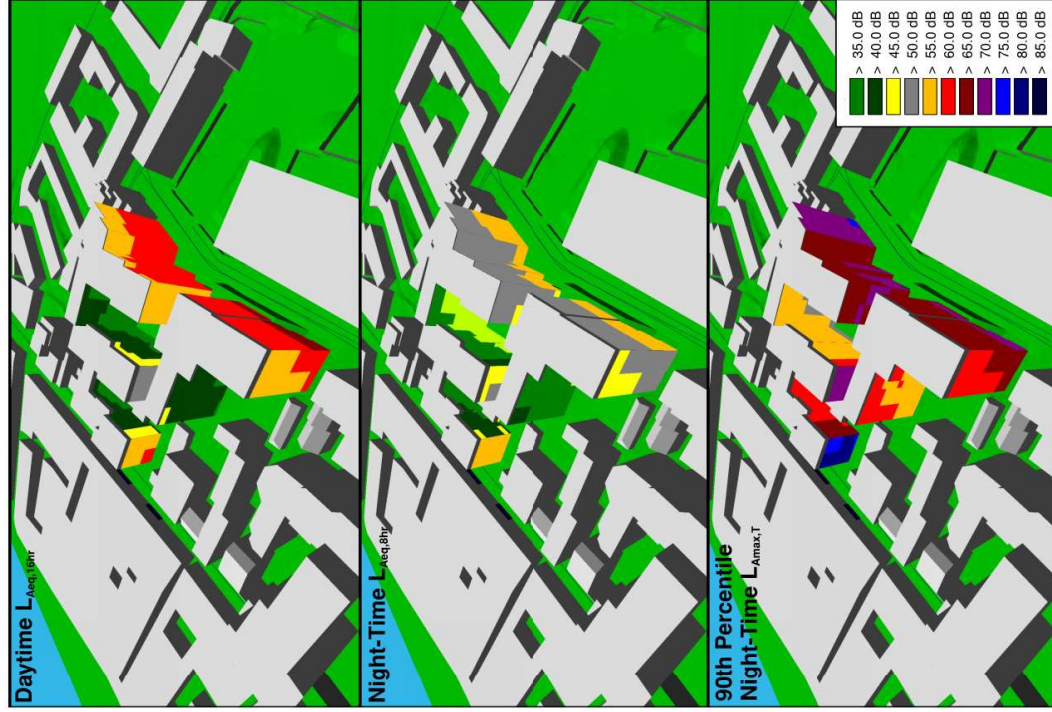


Figure 3: 3D noise map of proposed development from the north east.

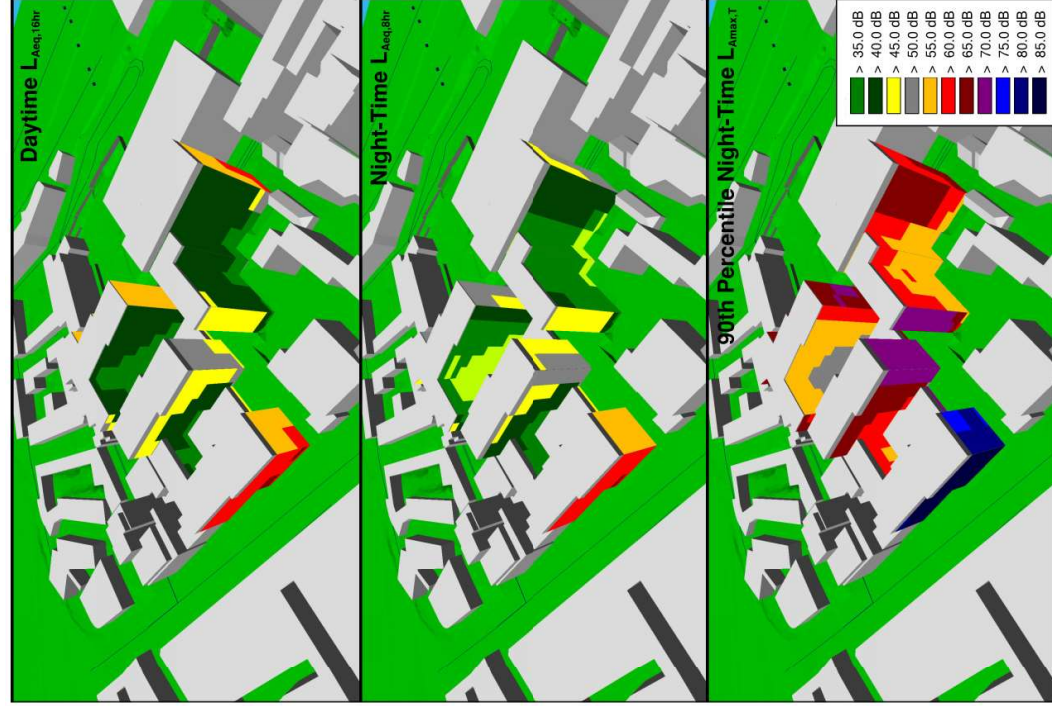


Figure 4: 3D noise map of proposed development from the south east.

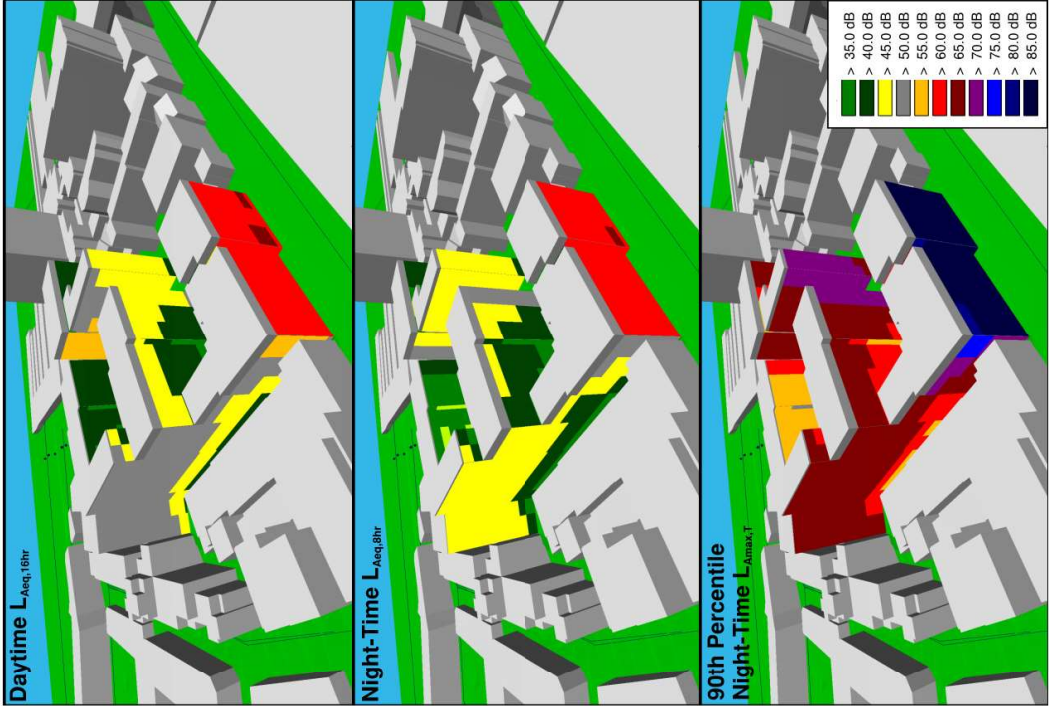


Figure 5: 3D noise map of proposed development from the south west.

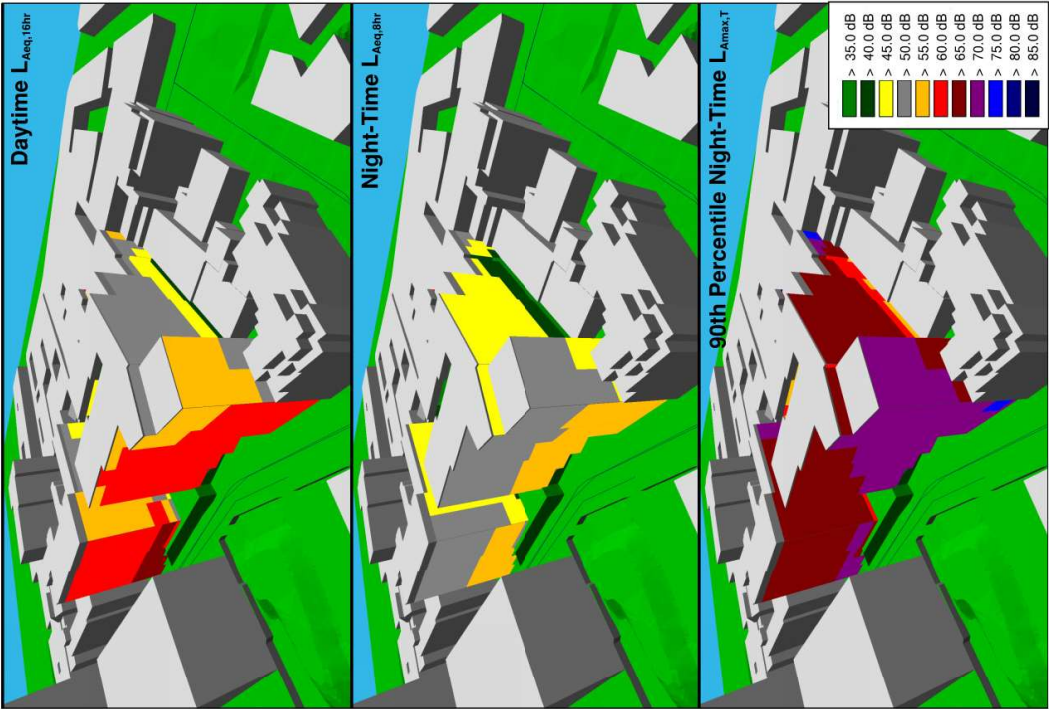


Figure 6: 3D noise map of proposed development from the north west.

Appendix 3 Validation Noise Survey

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 and noise from commercial activities (e.g. Night Clubs) and people on Friar Street.

Survey Period:

22/08/2019 & 07-08/02/2020

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 (Appendix 3, Table 1):

Type	Manufacturer	Model	Serial Number
Sound Level Meter	Rion	NL-52 SLM	00965090
Sound Level Meter	Brüel & Kjær	2250	3007539
Preamplifier	Brüel & Kjær	ZC 0032	22456
Microphone	Brüel & Kjær	4189	2978462
Calibrator	01dB	CAL31	83380

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). Any periods of unattended monitoring that may have been adversely affected by weather conditions have been excluded from the data analysis.

Measurement Positions (Appendix 3, Table 2):

Position (refer plan below)	Description
N1	Attended noise monitoring position. 1.5m above ground and directly in front of train station. Direct line of site to Station Hill.
N2	Attended noise monitoring position. Attended noise monitoring position. 1.5m above ground and 1m away from nearby road/ taxi rank. Railway within direct line of site.
N3	Attended noise monitoring position. 1.5m above ground. Free-field. Direct line of sight to construction site, 1m from road side. Direct line of site to Grayfriars Road
N4	Attended noise monitoring position. 1.5m above ground. Free-field. Direct line of sight to Gerrard Street

Measurement Positions (Appendix 3, Table 2):

Position (refer plan below)	Description
N5	Attended noise monitoring position. 1.5m above ground. Free-field. Direct line of sight to Grayfriars Road
N6	Attended noise monitoring position. 1.5m above ground. Free-field. Direct line of sight to Friar Street. 1m from road side.
N7	Attended noise monitoring position. 1.5m above ground. Free-field. Direct line of sight to Friar Street. 1m from road side.
N8	Attended noise monitoring position. 1.5m above ground. Free-field. Direct line of sight to nearby roads.

Site Plan showing Measurement Positions (Appendix 3, Figure 2):



Attended Noise Monitoring Results (Appendix 3, Table 3):

Date	Position	Time	Meas. Length	LAeq, dB	LAmix, dB	LA90, dB	Observations
22/08/2019	1	13:28:35	5mins	65	78	62	Noise levels dictated by pedestrians passing by.
22/08/2019	1	14:34:19	5mins	64	77	60	

Attended Noise Monitoring Results (Appendix 3, Table 3):

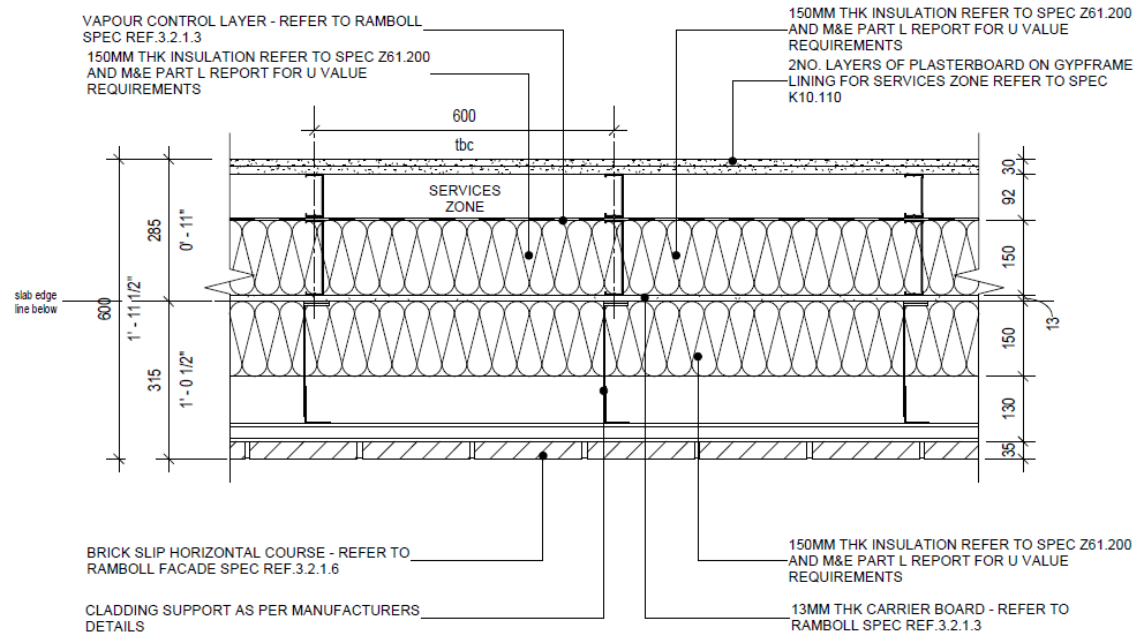
Date	Position	Time	Meas. Length	LAeq, dB	LAmix, dB	LA90, dB	Observations
22/08/2019	2	12:00:44	5mins	62	70	59	Noise levels dictated by pedestrians passing and road traffic noise from the nearby road and trains passing.
22/08/2019	2	13:37:23	5mins	64	73	60	
22/08/2019	3	12:12:39	5mins	69	77	62	Noise levels dictated by construction noise and road traffic along the surrounding roads.
22/08/2019	3	13:44:33	5mins	70	78	62	
22/08/2019	4	12:25:42	5mins	67	92	59	Noise levels dictated by road traffic and noise from the nearby construction site.
22/08/2019	4	13:52:26	5mins	67	78	62	
22/08/2019	5	12:37:40	5mins	63	88	57	Noise levels generally dictated by road traffic. Plane was noted passing by during measurement taken at 12:27.
22/08/2019	5	12:53:05	5mins	63	77	57	
22/08/2019	5	13:59:37	5mins	64	83	58	
22/08/2019	6	13:01:40	5mins	68	77	63	Noise levels generally dictated by road traffic. Vehicles were mainly busses as the measurement position was adjacent to a bus stop.
22/08/2019	6	14:07:14	5mins	70	81	62	
22/08/2019	7	13:09:49	5mins	70	86	64	Noise levels dictated by road traffic and pedestrian flow.
22/08/2019	7	14:16:42	5mins	69	80	62	
22/08/2019	8	13:18:34	5mins	59	70	55	Very quiet side street. Construction site opposite however no notable noise from site. Very little in terms of road traffic. NB close to entrance site of multi-story car park.
22/08/2019	8	14:24:04	5mins	59	70	56	

Maximum Noise Monitoring Results – Friar Street (Appendix 3, Table 4):

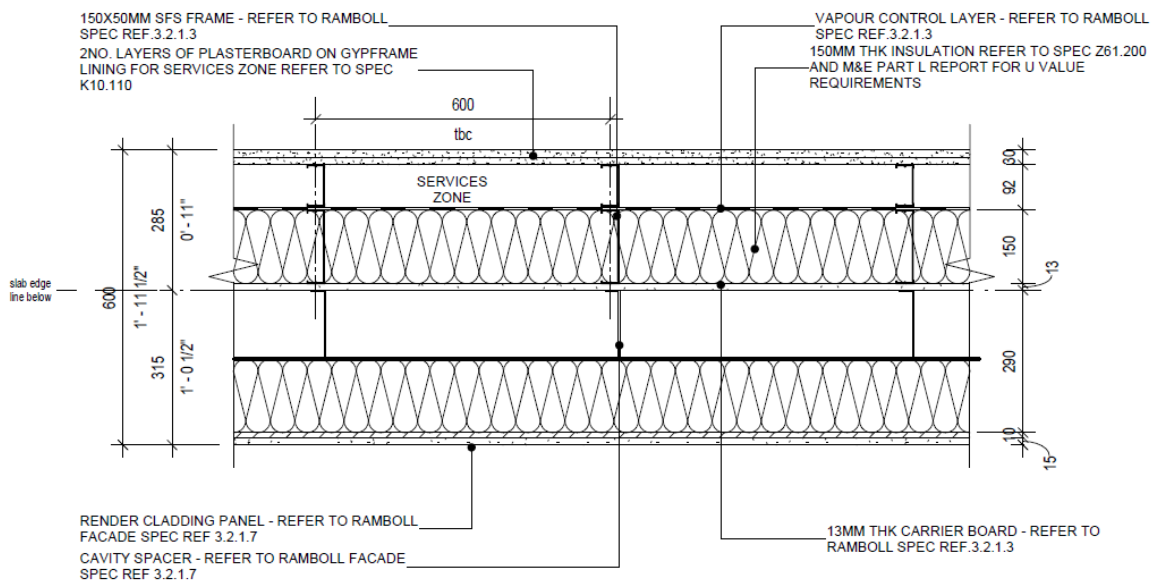
Date	Position	Time	LAmix, dB	Observations
07/02/2020 to 08/02/2020	7	From 19:30 until 06:00	89	Maximum Noise Levels dictated by vehicle movements and activities at the Night Clubs (including people on the street).

Appendix 4 Façade Construction Drawings

EXTERNAL WALL TYPE_EW01a - Brick Slip Facade - Refer to scoping drawings for colours



EXTERNAL WALL TYPE EW02a - Render Facade - Refer to scoping drawings for colours



150X50MM SFS FRAME - REFER TO RAMBOLL SPEC REF.3.2.1.3

2NO. LAYERS OF PLASTERBOARD ON GYPFRAME LINING FOR SERVICES ZONE REFER TO SPEC K10.110

600 tbc

SERVICES ZONE

150MM THK INSULATION REFER TO SPEC Z61.200 AND M&E PART L REPORT FOR U VALUE REQUIREMENTS

150MM THK INSULATION REFER TO SPEC Z61.200 AND M&E PART L REPORT FOR U VALUE REQUIREMENTS

13MM THK CARRIER BOARD - REFER TO RAMBOLL SPEC REF.3.2.1.3

STONE COLOURED METAL CLADDING - REFER TO RAMBOLL FACADE SPEC REF.3.2.1.5

CLADDING SUPPORT AS PER MANUFACTURERS DETAILS

slab edge line below

Dimensions: 600, 285, 0'-11", 1'-11 1/2", 315, 1'-0 1/2", 92, 150, 150, 165, 13

150X50MM SFS FRAME - REFER TO RAMBOLL SPEC REF.3.2.1.3

2NO. LAYERS OF PLASTERBOARD ON GYPFRAME LINING FOR SERVICES ZONE REFER TO SPEC K10.110

600 tbc

SERVICES ZONE

150MM THK INSULATION REFER TO SPEC Z61.200 AND M&E PART L REPORT FOR U VALUE REQUIREMENTS

150MM THK INSULATION REFER TO SPEC Z61.200 AND M&E PART L REPORT FOR U VALUE REQUIREMENTS

13MM THK CARRIER BOARD - REFER TO RAMBOLL SPEC REF.3.2.1.3

STONE COLOURED GRC CLADDING - REFER TO RAMBOLL FACADE SPEC REF.4.5.1

CLADDING SUPPORT AS PER MANUFACTURERS DETAILS

slab edge line below

285 0'-11"

315 1'-0 1/2"

600

92 150 150 165 13

Appendix 5 FACSIM CALCULATIONS

CLIENT:	Midgard	Room Dimensions [m]	W	L	H
PROJECT:	Station Hill		2.9	4.9	2.4
ROOM:	Bedroom				
RUN REF:	Lamax				
VARIANT:	Higher Level Glazing Specification				

Room Volume = 33.9 m³
 Partition Area = 8.6 m²
 Ventilation ref area = 10.0 m²
 Free Field SPL K = 3 dB

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

EXTERNAL SPECTRUM (A weighted)

Direct input - Free Field SPL (A weighted octave bands) dB ---->	89.2	63.4	69.3	75.4	83.6	85.5	82.2	74.9
Road traffic spectrum (according to BS 8233:1999 section 6)								

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

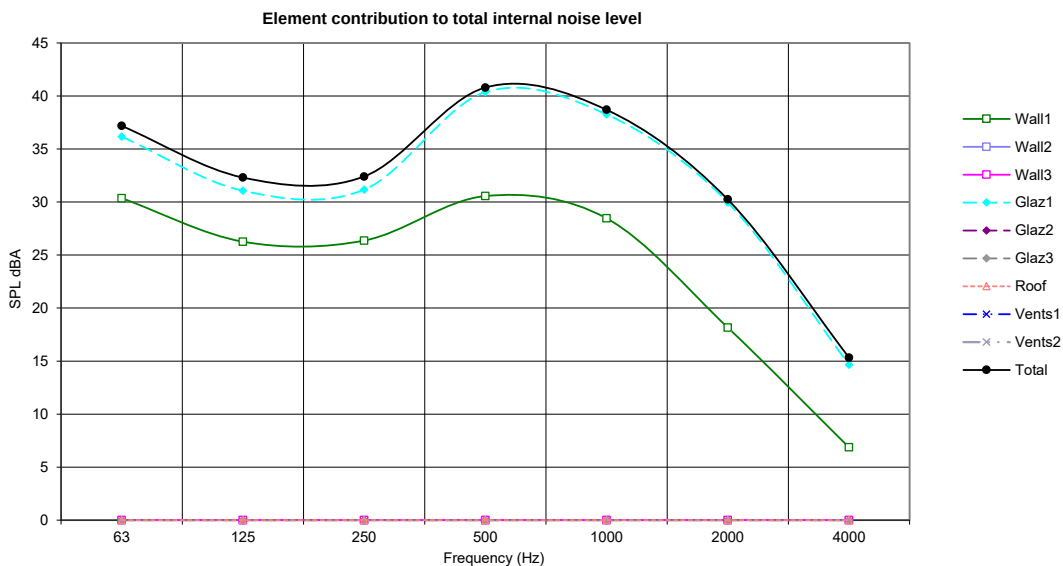
NOTES:

Façade Element		Area [m2]	SRI dB to BS EN ISO 140-3:1995									Rw	C	Ctr
Wall 1	Brick Slip Façade	5.4	33	43	49	53	57	64	68	13%	58	0	-5	
	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	Rw + Ctr 43 - 86.2SIL (24AR) 66.2SIL - With Frame	3.3	25	36	42	41	45	50	58	87%	43dB + Ctr	0	0	
	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			28	39	45	45	49	54	62					
Resultant SPL inside room excluding ventilators dB			44.7	37	32	32	41	39	30	15	100%			

Performance including frames

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



CLIENT:	Midgard	Room Dimensions [m]	W	L	H
PROJECT:	Station Hill		2.9	4.9	2.4
ROOM:	Bedroom				
RUN REF:	L'Aeq	Room Volume =		33.9	m3
VARIANT:	Higher Level Glazing Specification	Partition Area =		8.6	m2
		Ventilation ref area =		10.0	m2
		Free Field SPL K =		3	dB

EXTERNAL SPECTRUM (A weighted)

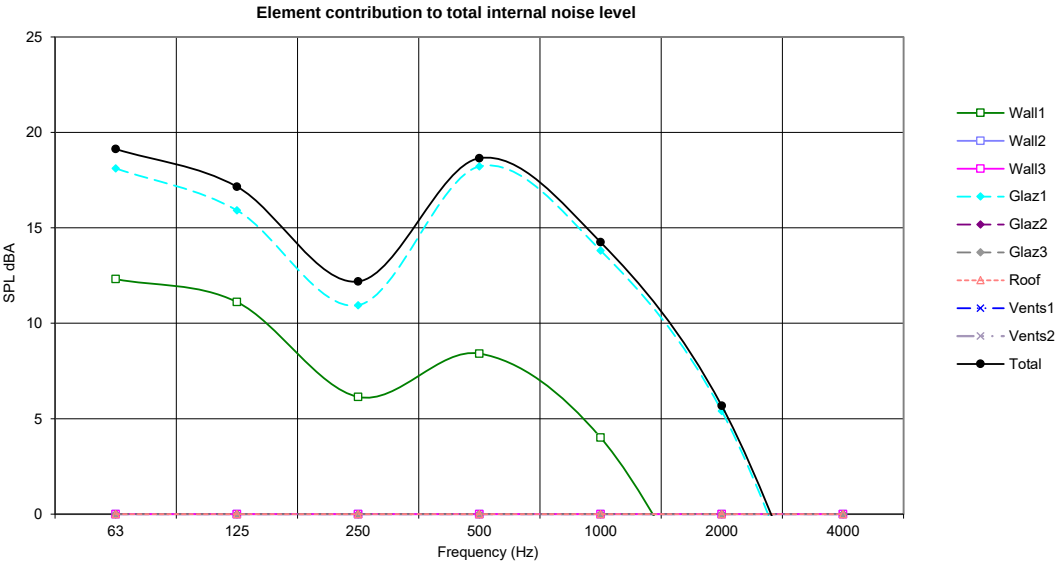
dBA	63	125	250	500	1000	2000	4000
Direct input - Free Field SPL (A weighted octave bands) dB ---->	66.0	45.4	54.2	55.2	61.5	61.1	57.6
Road traffic spectrum (according to BS 8233:1999 section 6)							
	45.4	54.2	55.2	61.5	61.1	57.6	50.2

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	Brick Slip Façade	5.4	33	43	49	53	57	64	68	17%	58	0	-5	
	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	Rw + Ctr 43 - 86.2SIL (24AR) 66.2SIL - With Frame	3.3	25	36	42	41	45	50	58	81%	43dB + Ctr	0	0	
	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			28	39	45	45	49	54	62					
Resultant SPL inside room excluding ventilators dB			24.0	19	17	12	19	14	6	-9	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			24.0	19	17	12	19	14	6	-9				



NOTES:

Performance including frames

CLIENT:	Midgard	Room Dimensions [m]	W	L	H
PROJECT:	Station Hill		7.1	5.4	2.4
ROOM:	Living Room - Kitchen				
RUN REF:	LAeq				
VARIANT:	Higher Level Glazing Specification				

Room Volume = 91.8 m3
Partition Area = 21.6 m2
Ventilation ref area = 10.0 m2
Free Field SPL K = 3 dB

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

EXTERNAL SPECTRUM (A weighted)

Direct input - Free Field SPL (A weighted octave bands) dB ---->	66.0	48.1	51.6	57.2	60.8	60.5	58.4	53.1	
Road traffic spectrum (according to BS 8233:1999 section 6)									
		48.1	51.6	57.2	60.8	60.5	58.4	53.1	Direct input

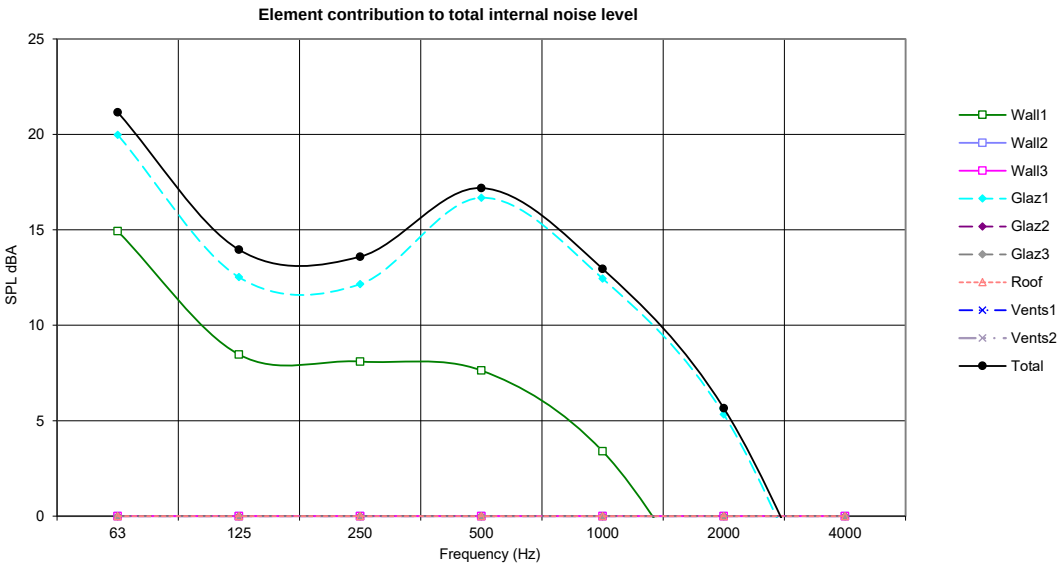
REVERBERATION TIME

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	Brick Slip Façade	▼ 14.3	33	43	49	53	57	64	68	20%	58	0	-5	
	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	Rw + Ctr 43 - 86.2SIL (24AR) 66.2SIL - With Frame	▼ 7.3	25	36	42	41	45	50	58	77%	43dB + Ctr	0	0	
	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			29	39	45	45	49	54	62					
Resultant SPL inside room excluding ventilators dB			24.1	21	14	14	17	13	6	-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



NOTES:

Performance including frames

CLIENT:	Midgard	Room Dimensions [m]	W	L	H
PROJECT:	Station Hill		2.9	4.9	2.4
ROOM:	Bedroom				
RUN REF:	Lamax				
VARIANT:	Medium Level Glazing Specification				

Room Volume = 33.9 m3
Partition Area = 8.6 m2
Ventilation ref area = 10.0 m2
Free Field SPL K = 3 dB

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

EXTERNAL SPECTRUM (A weighted)

dBA	63	125	250	500	1000	2000	4000
Direct input - Free Field SPL (A weighted octave bands) dB ---->	75.9	57.5	63.0	62.4	69.5	67.6	71.4
Road traffic spectrum (according to BS 8233:1999 section 6)							

57.5 63.0 62.4 69.5 67.6 71.4 67.9 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	Brick Slip Façade	5.4	33	43	49	53	57	64	68	10%	58	0	-5			
	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	Rw + Ctr 39 - 44.2 24 66.2 - With frames	3.3	24	29	35	38	42	50	57	90%	39dB + Ctr	0	0			
	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 27 33 39 42 46 54 61
Resultant SPL inside room excluding ventilators dB 36.8 32 32 25 29 24 19 9 100%

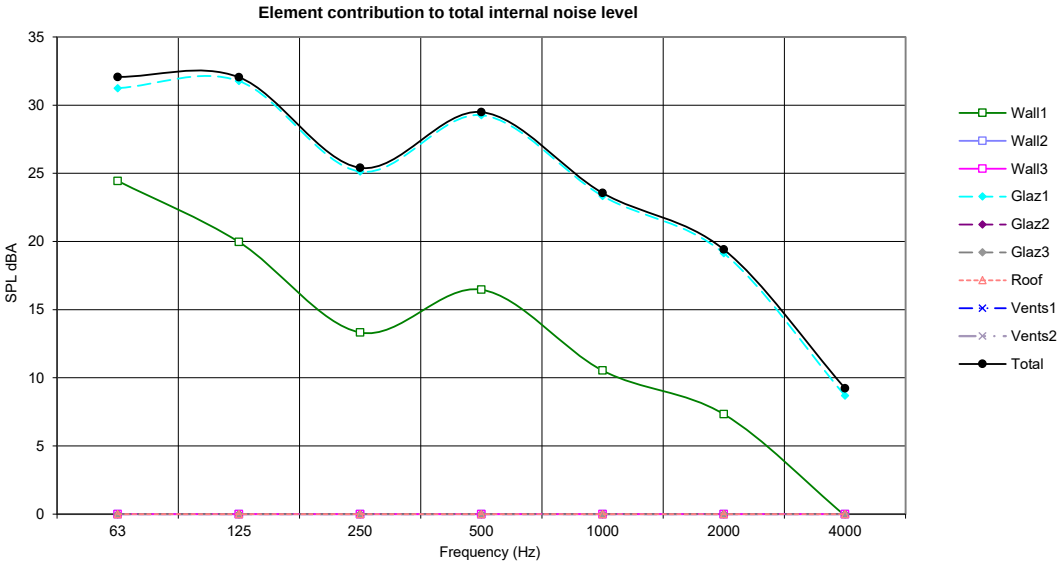
Ventilator Type		Num	D _{n,e} dB to BS EN 20140-10:1992								Dnew	C	Ctr
Ventilation	VENTS		0	0	0	0	0	0	0	0%			
	ATTENUATION												
Ventilation	VENTS		0	0	0	0	0	0	0	0%			
	ATTENUATION												

Resultant SPL inside room through ventilators dB -99.0 -96 -96 -96 -96 -96 -96 -96 0%

Total SPL inside room 36.8 32 32 25 29 24 19 9

NOTES:

Performance including frames



CLIENT:	Midgard	Room Dimensions [m]	W	L	H
PROJECT:	Station Hill		2.9	4.9	2.4
ROOM:	Bedroom				
RUN REF:	L'Aeq	Room Volume =		33.9	m3
VARIANT:	Medium Level Glazing Specification	Partition Area =		8.6	m2
		Ventilation ref area =		10.0	m2
		Free Field SPL K =		3	dB

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

EXTERNAL SPECTRUM (A weighted)

Direct input - Free Field SPL (A weighted octave bands) dB ---->

Road traffic spectrum (according to BS 8233:1999 section 6)

REVERBERATION TIME

DIRECT INPUT ---->

EQUAL RT for all bands ---->

Façade Element		Area [m2]	SRI dB to BS EN ISO 140-3:1995								Rw	C	Ctr
Wall 1	Brick Slip Façade	5.4	33	43	49	53	57	64	68	9%	58	0	-5
	ATTENUATION												
Wall 2	WALLS	0	0	0	0	0	0	0	0	0%			
	ATTENUATION												
Wall 3	WALLS	0	0	0	0	0	0	0	0	0%			
	ATTENUATION												
Glazing 1	Rw + Ctr 39 - 44.2 24 66.2 - With frames	3.3	24	29	35	38	42	50	57	85%	39dB + Ctr	0	0
	ATTENUATION												
Glazing 2	GLAZING	0	0	0	0	0	0	0	0	0%			
	ATTENUATION												
Glazing 3	GLAZING	0	0	0	0	0	0	0	0	0%			
	ATTENUATION												
Roof	ROOF / FLOOR	0	0	0	0	0	0	0	0	0%			
	ATTENUATION												

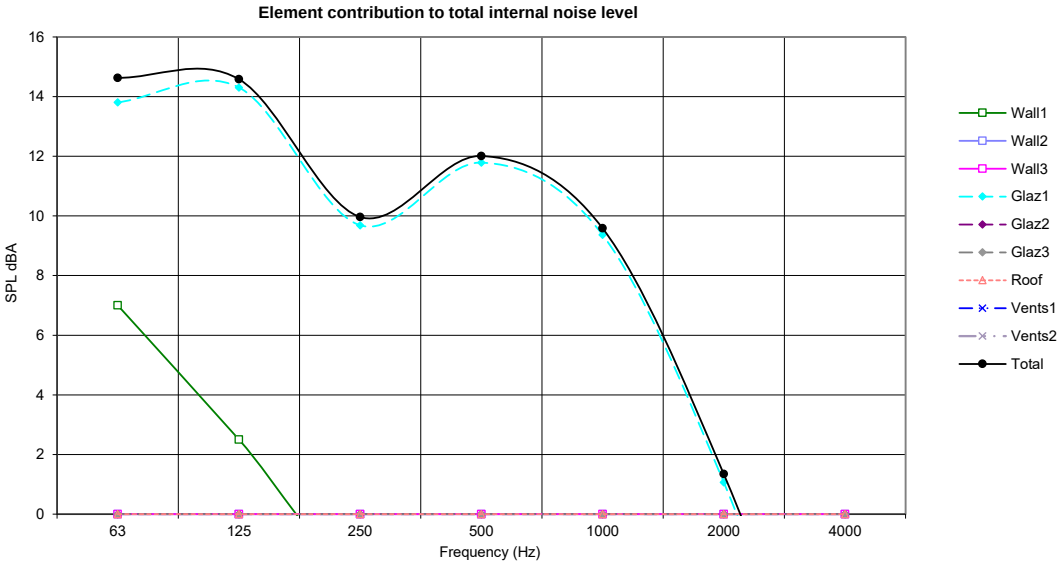
Resultant composite Façade SRI

Resultant SPL inside room excluding ventilators dB

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	0%			
	ATTENUATION												
Ventilation	VENTS	0	0	0	0	0	0	0	0	0%			
	ATTENUATION												

Resultant SPL inside room through ventilators dB

Total SPL inside room



NOTES:

Performance including frames

CLIENT: Midgard
 PROJECT: Station Hill
 ROOM: Living Room - Kitchen
 RUN REF: LAeq
 VARIANT: Medium Level Glazing Specification

Room Dimensions [m] **7.1** X **5.4** X **2.4**

Room Volume = 91.8 m³
 Partition Area = 21.6 m²
 Ventilation ref area = 10.0 m²
 Free Field SPL K = 3 dB

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

EXTERNAL SPECTRUM (A weighted)

dBA	63	125	250	500	1000	2000	4000
Direct input - Free Field SPL (A weighted octave bands) dB ---->	68.0	50.6	53.4	56.7	60.5	63.7	62.0
Road traffic spectrum (according to BS 8233:1999 section 6)							

REVERBERATION TIME

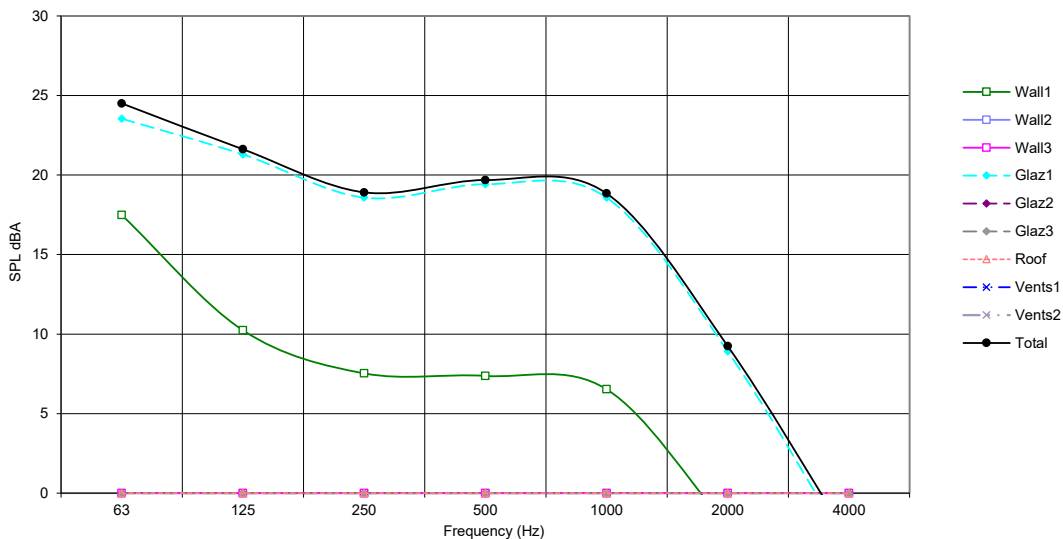
DIRECT INPUT ---->								No data
EQUAL RT for all bands ---->								
	0.5	0.5	0.5	0.5	0.5	0.5	0.5	Default - RT set to 0.5s

NOTES:

Façade Element	Area [m ²]	SRI dB to BS EN ISO 140-3:1995							Rw	C	Ctr
Wall 1 Brick Slip Façade	14.3	33	43	49	53	57	64	68	12%	58	-5
ATTENUATION											
Wall 2 WALLS	0	0	0	0	0	0	0	0	0%		
ATTENUATION											
Wall 3 WALLS	0	0	0	0	0	0	0	0	0%		
ATTENUATION											
Glazing 1 Rw + Ctr 39 - 44.2 24 66.2 - With frames	7.3	24	29	35	38	42	50	57	87%	39dB + Ctr	0
ATTENUATION											
Glazing 2 GLAZING	0	0	0	0	0	0	0	0	0%		
ATTENUATION											
Glazing 3 GLAZING	0	0	0	0	0	0	0	0	0%		
ATTENUATION											
Roof ROOF / FLOOR	0	0	0	0	0	0	0	0	0%		
ATTENUATION											
Resultant composite Façade SRI		28	33	39	42	46	54	61			
Resultant SPL inside room excluding ventilators dB		28.3	25	22	19	20	19	9	-3	100%	

Performance including frames

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	0%		
ATTENUATION											
Ventilation VENTS	0	0	0	0	0	0	0	0	0%		
ATTENUATION											
Resultant SPL inside room through ventilators dB		-99.0	-96	-96	-96	-96	-96	-96	0%		
Total SPL inside room		28.3	25	22	19	20	19	9	-3		

Element contribution to total internal noise level

CLIENT: Midgard
 PROJECT: Station Hill
 ROOM: Bedroom
 RUN REF: Lamax
 VARIANT: Lower Level Glazing Specification

Room Dimensions [m] **2.9** X **4.9** X **2.4**

Room Volume = **33.9** m³
 Partition Area = **8.6** m²
 Ventilation ref area = **10.0** m²
 Free Field SPL K = **3** dB

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

EXTERNAL SPECTRUM (A weighted)

dBA	63	125	250	500	1000	2000	4000
Direct input - Free Field SPL (A weighted octave bands) dB ---->	64.9	46.5	52.0	51.4	58.5	56.6	60.4
Road traffic spectrum (according to BS 8233:1999 section 6)							

46.5 52.0 51.4 58.5 56.6 60.4 56.9 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

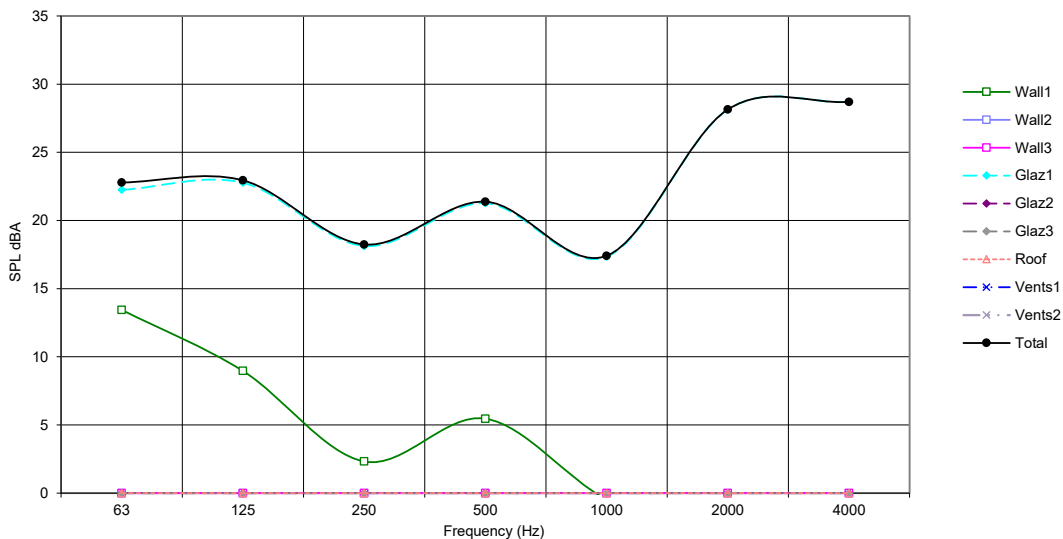
Façade Element	Area [m ²]	SRI dB to BS EN ISO 140-3:1995							Rw	C	Ctr
Wall 1 Brick Slip Façade	5.4	33	43	49	53	57	64	68	2%	58	-5
ATTENUATION											
Wall 2 WALLS		0	0	0	0	0	0	0	0%		
ATTENUATION											
Wall 3 WALLS		0	0	0	0	0	0	0	0%		
ATTENUATION											
Glazing 1 Rw + Ctr 33 - 66 14 33.2 - With frames	3.3	22	27	31	35	37	30	26	98%	33dB + Ctr	0
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	31	35	39	41	34	30			
Resultant SPL inside room excluding ventilators dB		33.1	23	23	18	21	17	28	29	100%	

Performance including frames

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	0%		

Total SPL inside room **33.1 23 23 18 21 17 28 29**

Element contribution to total internal noise level



CLIENT:	Midgard	Room Dimensions [m]	W	L	H
PROJECT:	Station Hill		2.9	4.9	2.4
ROOM:	Bedroom				
RUN REF:	L'Aeq	Room Volume =	33.9 m ³		
VARIANT:	Lower Level Glazing Specification	Partition Area =	8.6 m ²		
		Ventilation ref area =	10.0 m ²		
		Free Field SPL K =	3 dB		

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

EXTERNAL SPECTRUM (A weighted)

dBA	63	125	250	500	1000	2000	4000
Direct input - Free Field SPL (A weighted octave bands) dB ---->	42.9	24.0	29.5	30.9	36.0	37.6	33.3
Road traffic spectrum (according to BS 8233:1999 section 6)							

24.0 29.5 30.9 36.0 37.6 37.3 33.3 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

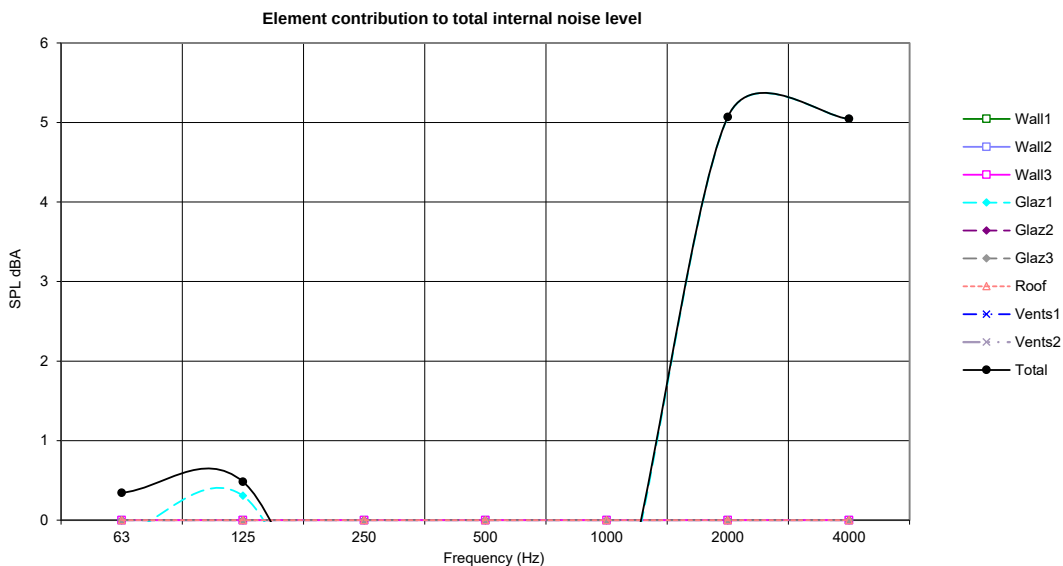
NOTES:

Façade Element	Area [m ²]	SRI dB to BS EN ISO 140-3:1995							Rw	C	Ctr
Wall 1 Brick Slip Façade	5.4	33	43	49	53	57	64	68	6%	58	-5
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 Rw + Ctr 33 - 66 14 33.2 - With frames	3.3	22	27	31	35	37	30	26	60%	33dB + Ctr	0
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	31	35	39	41	34	30			
Resultant SPL inside room excluding ventilators dB		10.3	0	0	-2	-1	-2	5	5	100%	

Performance including frames

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	0%		

Total SPL inside room



CLIENT:	Midgard	Room Dimensions [m]	W	L	H
PROJECT:	Station Hill		7.1	5.4	2.4
ROOM:	Living Room - Kitchen				
RUN REF:	LAeq	Room Volume =	91.8 m ³		
VARIANT:	Lower Level Glazing Specification	Partition Area =	21.6 m ²		
		Ventilation ref area =	10.0 m ²		
		Free Field SPL K =	3 dB		

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

EXTERNAL SPECTRUM (A weighted)

dBA	63	125	250	500	1000	2000	4000
Direct input - Free Field SPL (A weighted octave bands) dB ---->	46.0	28.6	31.4	34.7	38.5	41.7	40.0
Road traffic spectrum (according to BS 8233:1999 section 6)							

28.6 31.4 34.7 38.5 41.7 40.0 34.6 Direct input

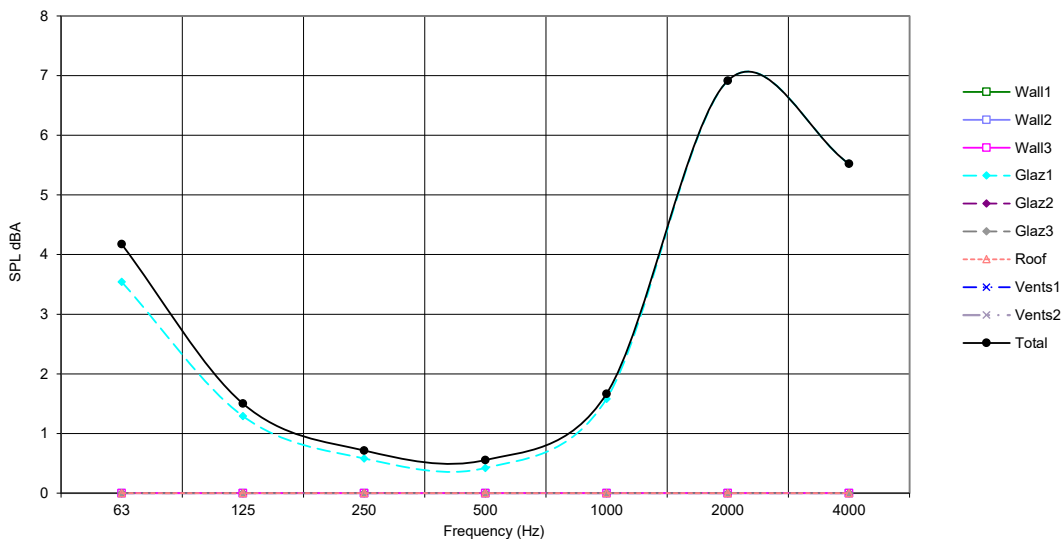
REVERBERATION TIME

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 [m ²]	SRI dB to BS EN ISO 140-3:1995							Rw	C	Ctr
Wall 1 Brick Slip Façade	14.3	33	43	49	53	57	64	68	4%	58	-5
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 Rw + Ctr 33 - 66 14 33.2 - With frames	7.3	22	27	31	35	37	30	26	69%	33dB + Ctr	0
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	32	36	40	42	35	31			
Resultant SPL inside room excluding ventilators dB		12.1	4	2	1	1	2	7	6	100%	

Performance including frames

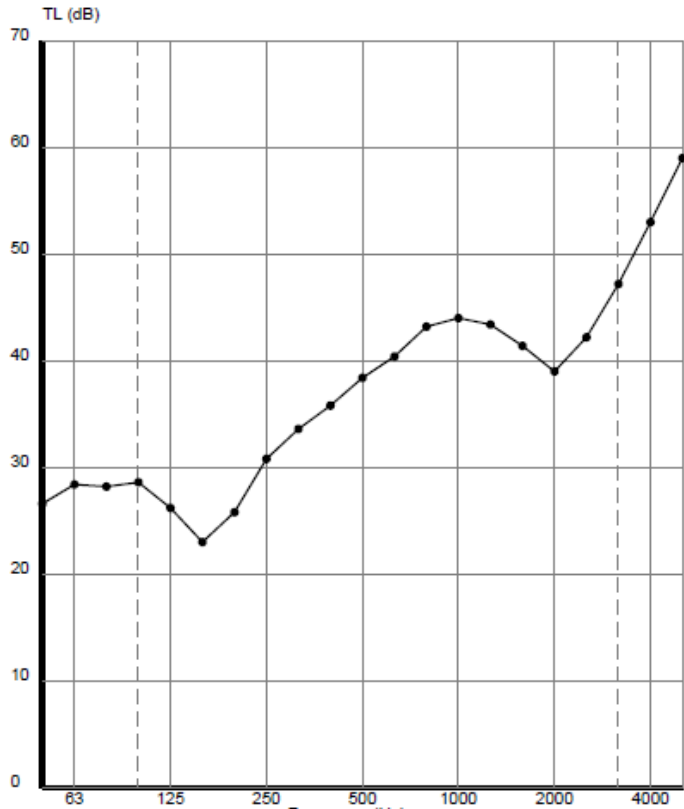
Ventilator Type	Num	D _{n,e} dB to BS EN 20140-10:1992							Dnew	C	Ctr
Ventilation VENTS		0	0	0	0	0	0	0	0%		
ATTENUATION											
Ventilation VENTS		0	0	0	0	0	0	0	0%		
ATTENUATION											
Resultant SPL inside room through ventilators dB		-99.0	-96	-96	-96	-96	-96	-96	0%		
Total SPL inside room		12.1	4	2	1	1	2	7	6		

Element contribution to total internal noise level

Appendix 6 Acoustic Data of Glazing Systems

Test data of the proposed glazing system do not take into account frames.

GL01 – Lower Specification

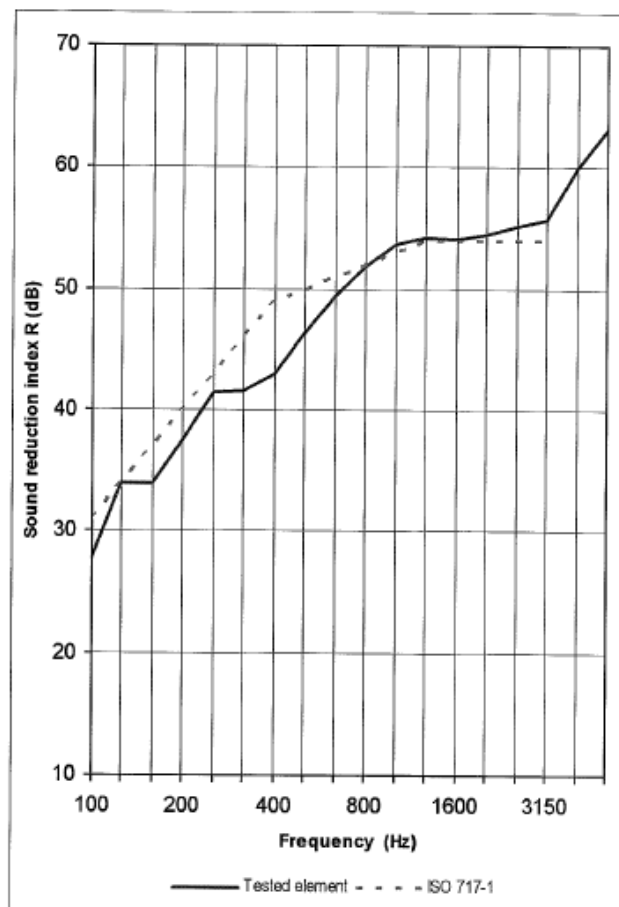
Glazing : 66.2PRO (14AR) 33.2PRO																																													
Ratings: According to ISO 717-1 100Hz - 3150Hz $R_w(C;C_{tr}) = 40(-2;-5) \text{ dB}$ $R_A = 38 \text{ dB}$ $R_{A,tr} = 35 \text{ dB}$																																													
Results: Sound Transmission Loss by third-octave band																																													
	<table> <tr> <th>Frequency (Hz)</th><th>R (dB)</th></tr> <tr><td>50</td><td>26,6</td></tr> <tr><td>63</td><td>28,4</td></tr> <tr><td>80</td><td>28,3</td></tr> <tr><td>100</td><td>28,6</td></tr> <tr><td>125</td><td>26,2</td></tr> <tr><td>160</td><td>23</td></tr> <tr><td>200</td><td>25,8</td></tr> <tr><td>250</td><td>30,8</td></tr> <tr><td>315</td><td>33,6</td></tr> <tr><td>400</td><td>35,7</td></tr> <tr><td>500</td><td>38,4</td></tr> <tr><td>630</td><td>40,5</td></tr> <tr><td>800</td><td>43,3</td></tr> <tr><td>1000</td><td>44</td></tr> <tr><td>1250</td><td>43,3</td></tr> <tr><td>1600</td><td>41,5</td></tr> <tr><td>2000</td><td>38,9</td></tr> <tr><td>2500</td><td>42,1</td></tr> <tr><td>3150</td><td>47,2</td></tr> <tr><td>4000</td><td>52,9</td></tr> <tr><td>5000</td><td>59</td></tr> </table>	Frequency (Hz)	R (dB)	50	26,6	63	28,4	80	28,3	100	28,6	125	26,2	160	23	200	25,8	250	30,8	315	33,6	400	35,7	500	38,4	630	40,5	800	43,3	1000	44	1250	43,3	1600	41,5	2000	38,9	2500	42,1	3150	47,2	4000	52,9	5000	59
Frequency (Hz)	R (dB)																																												
50	26,6																																												
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2500	42,1																																												
3150	47,2																																												
4000	52,9																																												
5000	59																																												
Computation details: Composition No. 19617 calculated the 1607/20/19 - Dimensions: 1480mm x 1230mm - Composition: Glass 1: SGG STADIP PROTECT 66.2 Gaz 1: AR 14 Glass 2: SGG STADIP PROTECT 33.2																																													

GL02 – Medium Specification

Tested element: **SGG STADIP SILENCE 44-2 (24) SGG STADIP SILENCE 66-2**

Sample surface area $S =$ $1,9 \text{ m}^2$
 Volume of receiving room $V =$ 86 m^3
 Volume of source room 98 m^3

FREQ. Hz	R dB
100	27,7
125	33,9
160	33,9
200	37,4
250	41,5
315	41,6
400	42,9
500	46,3
630	49,4
800	51,9
1000	53,7
1250	54,2
1600	54,1
2000	54,5
2500	55,2
3150	55,8
4000	60,0
5000	63,1



Rating according to ISO 717-1 (in the band 100 +3150 Hz) based on laboratory measurements:

$R_w (C; C_{tr}) = 50 (-2 ; -7) \text{ dB}$

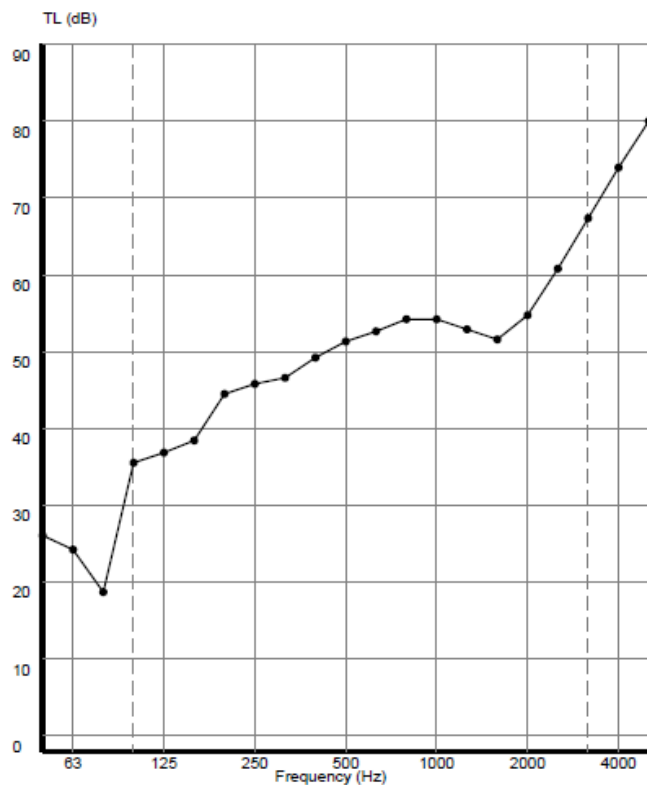
GL03 – Higher Specification

Glazing : 86.2SIL (24AIR) 66.2SIL

Ratings: According to ISO 717-1 100Hz - 3150Hz

$R_w(C;C_{tr}) = 54(-1;-4)$ dB $R_A = 53$ dB $R_{A,tr} = 50$ dB

Results: Sound Transmission Loss by third-octave band



Frequency (Hz)	R (dB)
50	27,4
63	25,6
80	20,4
100	36,9
125	38
160	39,5
200	45,6
250	46,7
315	47,6
400	50
500	52,3
630	53,6
800	55
1000	55,1
1250	53,8
1600	52,4
2000	55,5
2500	61,4
3150	67,8
4000	74,3
5000	80,3

Computation details: Composition No. 1009 calculated the 30/07/2013

- Overall dimensions: 1480m x 1230m

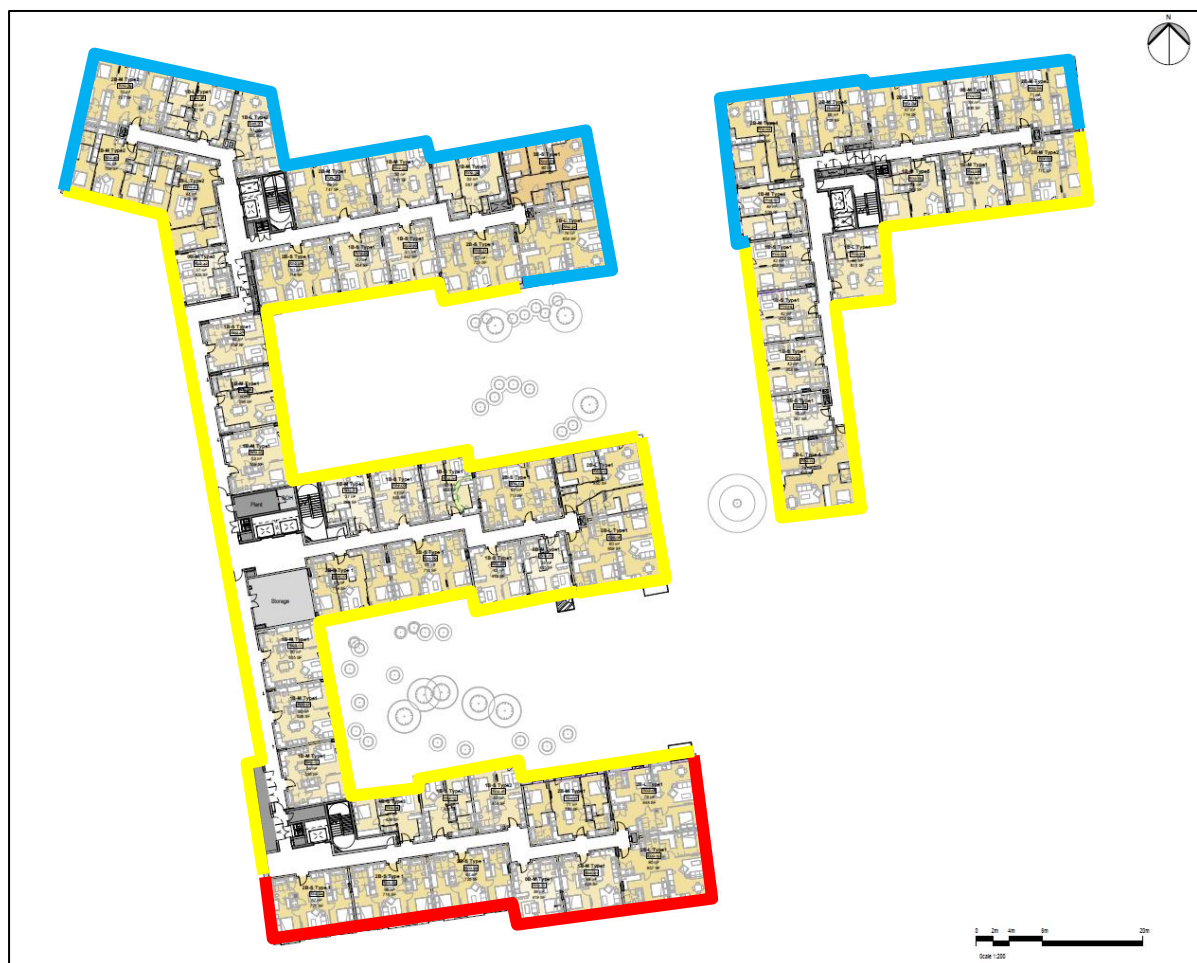
- Composition: Glass 1: SGG STADIP SILENCE 86.2
 Gaz 1: AIR 24
 Glass 2: SGG STADIP SILENCE 66.2

Appendix 7 Acoustic Facade Specification

Reference	Colour	Glazing Minimum Specification (inc. frames)	Ventilator Specification
GL01 – Lower Specification	Yellow	29 dB Rw+Ctr	MVHR
GL02 – Medium Specification	Blue	37 dB Rw+Ctr	MVHR
GL02 – Higher Specification	Red	43 dB Rw+Ctr	MVHR

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).

All floors:





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