

Hanslink Ltd

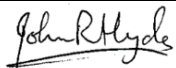
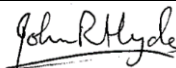
**Library Parade
Crockhamwell Road
Woodley RG5 3LX**

**Noise Assessment
Report for Condition
13 of Approval
230743, Wokingham
Borough Council**

October 2024

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Prepared and Authorised by	John Hyde	John Hyde	John Hyde	
Signature				
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1. INTRODUCTION

At the request of Hardeep Hans of Hanslink Ltd and as instructed by Paul Butt Planning Ltd, a noise impact assessment has been carried out for the approved development at Library Parade, Crockhamwell Road, Woodley RG5 3LX. This is required for the discharge of Planning Condition 13 relating to compliance with the internal and external noise guidelines recommended in BS8233:2014. A survey of day and night time noise levels has been undertaken on the front and rear facades of the building. This report is an update to the March 2024 report following minor revisions to the plans which have not affected the assessment.

The measurements and assessment have been carried out by John Hyde, a Chartered Physicist and Member of the Institute of Acoustics who has over 30 years' experience as a noise and acoustics consultant.

Planning Condition 13 states:

Noise Insulation - The residential flats shall be designed and/or insulated so as to provide attenuation against externally generated noise in accordance with a mitigation scheme to be submitted to and approved in writing by the Local Planning Authority before commencement of development. The scheme shall ensure that all noise implications are mitigated so that internal ambient noise levels for dwellings shall not exceed 35 dB LAeq (16 hour) 07:00- 23:00 during the daytime and 30 dB LAeq (8 hour) 23:00-07:00 during the night assuming full road traffic flows at the outset. The design and/or insulation measures identified in the scheme shall ensure that ambient internal noise levels and the noise levels within external spaces for the dwellings meet the BS8233/1999.

The 1999 version of BS8233 has been replaced by the 2014 version but the criteria required by the Condition are the same for both versions.

2. TERMINOLOGY

It has become practice to measure sound levels in decibels (dB). The decibel scale is logarithmic rather than linear. It is helpful to remember that a noise level change of 3dB on a sound meter reading would be just perceptible, and that an increase of 10 dB is perceived, subjectively, as a doubling of loudness. The human ear responds differently to sounds of different frequencies. The ear "hears" high frequency sound of a given level more loudly than low frequency sound of the same level. The A-weighted sound level, dB(A), takes this response into consideration and is commonly used for measurement of environmental noise in UK. It indicates the subjective human response to sound.

Environmental noise levels vary continuously from second to second. It is clearly

impractical to specify the sound level for each second thus time averaging is required. In practice human response has been related to various units which include allowance for the fluctuating nature of sound with time. For the purpose of this report these include:

$L_{Aeq,T}$: the equivalent A-weighted continuous sound level over period T. This unit relates to the equivalent level of continuous sound for a specific time period T, for example 16 hr for daytime noise. It contains all the sound energy of the varying sound levels over the same time period, and expresses it as a continuous sound level over that period. The unit is used for assessing traffic, transportation and industrial noise for planning purposes.

$L_{A90,T}$: the A-weighted level of sound exceeded for 90% of the time period T. This latter unit is commonly used to represent the background noise, and is used in assessing the effects of industrial noise in UK.

L_{Amax} : the maximum A-weighted sound level over a period of measurement.

3 NOISE GUIDELINES

The requirements of BS8233:2014 are summarised as follows:

<i>Criterion</i>	<i>Situation</i>	<i>$L_{Aeq,T}$</i>
Reasonable resting or sleeping conditions	Living Rooms	35dB Day (16hrs)
	Bedrooms	30dB Night (8hrs)

In addition to internal average noise level criteria, BS8233 recommends that a limit should be placed on maximum internal noise levels at night due to individual external events, such as a passing vehicle, although a specific guideline is not proposed. However, WHO Noise Guidelines recommend that internal maximum noise levels due to individual events at night, should not regularly exceed 45dB(A) on no more than 10-15 occasions. It is also recommended that ambient noise in external amenity spaces should not exceed a free-field $L_{Aeq,16hr}$ 55dB

4 NOISE MEASUREMENTS

Noise measurements were carried out from 19th to 21st February 2024 on the rear façade of the building and from 21st to 24th February on the front façade of the building. Microphones were located at a façade position at first floor level, one overlooking Library Parade and another overlooking the parking and service area at the rear of the building. Both were protected by an outdoor weatherproof system.

Weather conditions were taken from hourly data at 'TimeAndDate.com' for the nearest weather station at Farnborough Airfield. Two periods of data measured at the rear of the building were disregarded in the assessment due to high wind speed and heavy rain, similarly, three periods of data measured at the front of the building were disregarded in the assessment for the same reason. The periods of adverse weather are indicated in the results shown in Appendix 1. Light wind and rain occurred during the measurements from time to time but this was within the parameters recommended in BS7445-1:1991 'Description and measurement of environmental noise'.

The noise measurements were carried out using the following equipment:

SVAN 955 Sound Level Meter	S/N 27330
SVAN 977 Sound Level Meter	S/N 36438
Rion NC-74 Calibrator	S/N 34167512

The above equipment fulfils IEC 61672 Class 1 and is traceable to calibration under BS7580: Part 1:1997. The meters were calibrated before and after the measurement and no significant drifting of the calibration signal was observed.

Measurements were undertaken for a two-day period at the rear of the building and for a three-day period at the front of the building. Levels were measured at 15-minute intervals and the following parameters were recorded:

L _{Aeq}	The equivalent continuous noise level over 15-minute periods
L _{Amax}	The maximum noise level during each period
L _{A90}	The level exceeded for 90% of the time, the background level

Based on limited observation, there was little activity in the parking area other than car movements and occasional deliveries by small vans. This was confirmed by the low daytime average noise level at the rear façade, of L_{Aeq,16hr} 54dB. At the front of the building the dominant noise source was people movement with occasional vehicle movements accessing the parking areas on Library Parade.

The results are summarised in Table 1.

Table 1: Summary of noise measurement results

Date	Period	LAeq,T	LAmax
		[dB]	[dB]
Rear Façade			
19-Feb	Day	53.7	-
	Night	44.8	67.4
20-Feb	Day	54.5	-
	Night	46.5	68.7
21-Feb	Day	54.5	-
Front Façade			
21-Feb	Day	58.7	-
	Night	47.1	65.8
22-Feb	Day	58.5	-
	Night	44.8	69.3
23-Feb	Day	55.2	-
	Night	46.8	67.4
24-Feb	Day	56.9	-

The results were aggregated over the day and night time periods and the following values were used for the calculation of internal noise levels.

	Rear Façade	Front Façade
LAeq,16hr	54.2dB	57.3dB
LAeq,8hr	45.7dB	46.4dB
LAmx	68.7dB	69.3dB

5 ASSESSMENT

Noise Insulation

The facade noise levels have been used to determine internal noise levels by selecting appropriate glazing and ventilation mitigation measures, using the BS8233:2014 Annex G2 methodology. The spectrum of external noise was taken from the measured data. The G2 method takes account of the room dimensions, acoustic absorption, the façade area and the window area meaning that a particular form of glazing will result in varying internal noise levels depending on the room characteristics. A room façade with a high percentage area of glazing will have a lower sound insulation than a room façade with a low percentage area of glazing. Room façade and glazing dimensions have been taken from the floor layouts of the Units, as shown in Figures 1-3.

Figure 1: First floor layout plan

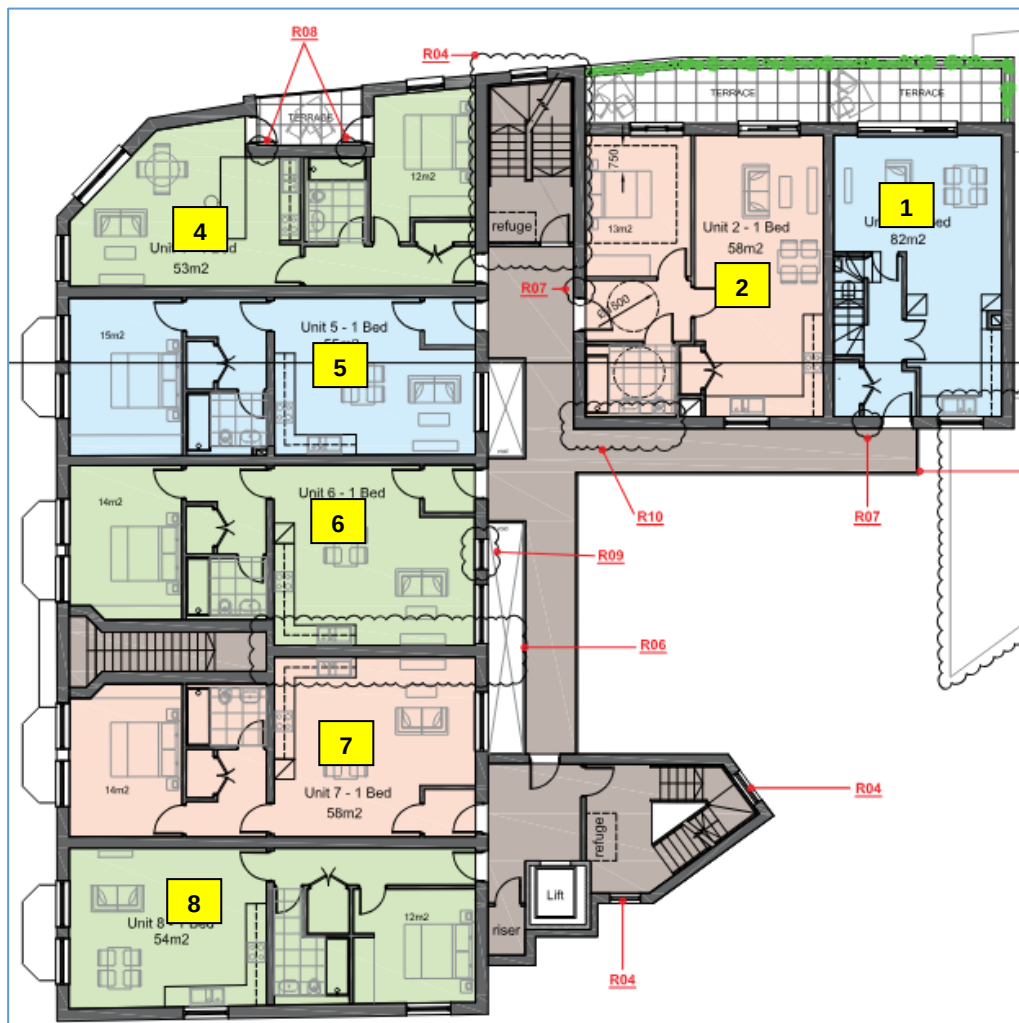


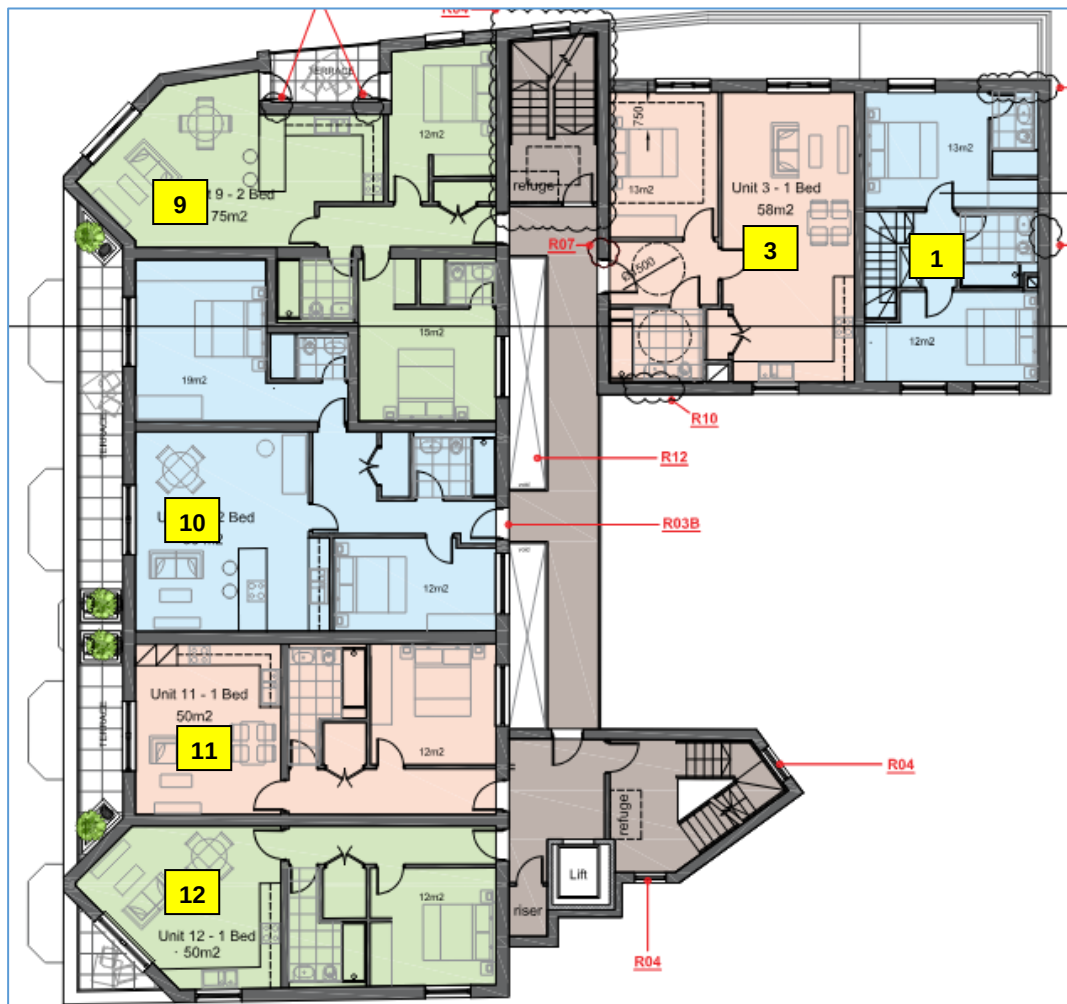
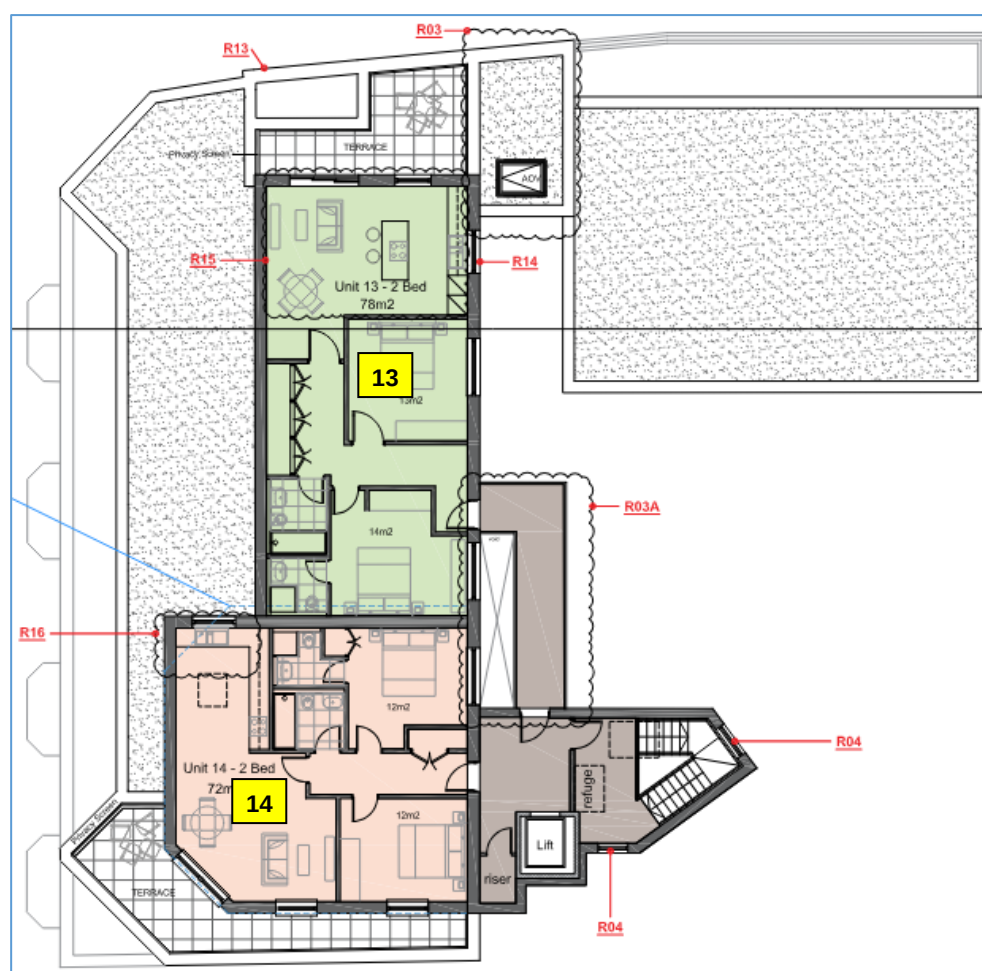
Figure 2: Second floor layout plan

Figure 3: Third floor layout plan

Façade attenuation calculations were carried out for all rooms. It was found that the internal noise guidelines of BS8233 could be achieved in all rooms using standard glazing with a minimum weighted sound reduction $R_w + C_{tr}$ 29dB (4-16-4) float glass. The sound attenuation of standard trickle vents was included in the calculations. Sample calculations for one unit on each floor are shown in Appendix 2. Each table shows the assumptions for each room and the resulting internal noise level is shown at the foot of the table.

The sound attenuation needed to meet the guidelines is shown in Table 3 for each room of each unit. The calculated façade attenuation using the proposed glazing is also shown, demonstrating that the guidelines would be met.

Table 2: Calculated façade sound insulation for each Unit

Unit	Room	Façade Level [dB]		Attenuation needed to meet guidelines [dB]			Attenuation Achieved (dB)
		LAeq	LAmaz	Day	Night	LAmaz	
1	Living Room	57	-	22	-	-	25
	Kitchen	54	-	19	-	-	24
	Bedroom 1	46	69	-	16	24	27
	Bedroom 2	45	69	-	15	24	28
2	Living Room	57	-	22	-	-	25
	Kitchen	54	-	19	-	-	24
	Bedroom	46	69	-	16	24	28
3	Living Room	57	-	22	-	-	24
	Kitchen	54	-	19	-	-	24
	Bedroom	46	69	-	16	24	27
4	Living Room	57	-	22	-	-	23
	Bedroom	46	69	-	16	24	26
5,6,7	Living Room	54	-	19	-	-	24
	Bedroom	46	69	-	16	24	26
8	Living Room	57	-	22	-	-	24
	Bedroom	46	69	-	16	24	28
9	Living Room	57	-	22	-	-	23
	Bedroom 1	46	69	-	16	24	26
	Bedroom 2	45	69	-	15	24	27
10	Living Room	57	-	22	-	-	25
	Bedroom 1	46	69	-	16	24	26
	Bedroom 2	45	69	-	15	24	26
11	Living Room	57	-	22	-	-	25
	Bedroom	45	69	-	15	24	27
12	Living Room	57	-	22	-	-	24
	Bedroom	46	69	-	16	24	27
13	Living Room	57	-	22	-	-	23
	Bedroom 1	45	69	-	15	24	27
	Bedroom 2	45	69	-	15	24	27
14	Living Room	57	-	22	-	-	23
	Bedroom 1	45	69	-	15	24	26
	Bedroom 2	47	69	-	17	24	27

The data shows that the windows would need to remain closed to achieve the required internal noise levels. A window slightly opened for ventilation purposes gives an attenuation of only 13dB which would not be sufficient to meet the guidelines. Therefore, provision for background ventilation needs to be made in order to maintain closed windows.

Standard trickle ventilators providing a sound attenuation of $D_{ne,w}$ 30dB have been included in the façade sound attenuation calculations for all rooms. This does not mean that windows need to remain permanently closed. The occupants can open windows whenever they wish, particularly during warm weather, accepting the fact that internal noise levels will increase, that is their choice but the facility is there, to meet the noise guidelines and provide background ventilation by leaving the trickle vents open.

Noise levels in amenity areas

Amenity areas in the form of balconies are provided for nine of the Units, 1, 2, 4 and 9 – 14. These face the front and sides of the building where the measured façade noise level was $L_{Aeq,16hr}$ 57dB which would correspond to a free field noise level of 54dB. Each would have a solid balustrade which would provide partial screening of approximately 5-7dB from the street noise when seated in the balcony area. Thus, the receptor noise level would be below 50dB and meet the BS8233 guideline of less than 55dB.

6 SUMMARY

A noise survey has been carried out at the site of the approved development to establish the external noise levels on the building façades and to assess noise impact according to Planning Condition 13.

The survey results and sound insulation calculations showed that the guidance on internal noise levels, as required by the Planning Condition, can be achieved through appropriate glazing and ventilation measures.

Noise in the balcony amenity areas has been assessed and would meet the external noise guidance recommended in BS8233:2014.

It is therefore considered that the proposed glazing and trickle vent measures would meet the requirements of Planning Condition 13, however, the M&E consultant should advise on any additional measures to ensure that the Part F airflow rates are achieved.

APPENDIX 1 - Results of Ambient Noise Measurements

Data marked in **Yellow** has been excluded from the assessment due to the influence of adverse weather conditions, high windspeed/heavy rain.

Rear Façade

Date & Time	L _{Amax} [dB]	L _{Aeq} [dB]	L _{A90} [dB]
19/02/2024 11:33	78.9	59.6	50.4
19/02/2024 11:48	80.6	59.2	49.4
19/02/2024 12:03	74.4	57.2	48.0
19/02/2024 12:18	75.0	55.1	47.4
19/02/2024 12:33	78.2	57.3	49.4
19/02/2024 12:48	80.5	56.3	48.8
19/02/2024 13:03	76.6	56.3	49.1
19/02/2024 13:18	81.4	57.6	47.6
19/02/2024 13:33	73.2	54.6	47.5
19/02/2024 13:48	81.1	53.8	47.1
19/02/2024 14:03	76.3	53.5	46.0
19/02/2024 14:18	76.8	55.3	46.2
19/02/2024 14:33	76.4	53.5	46.7
19/02/2024 14:48	77.6	55.4	46.3
19/02/2024 15:03	72.6	54.5	47.2
19/02/2024 15:18	73.5	54.5	46.6
19/02/2024 15:33	77.7	55.9	47.9
19/02/2024 15:48	76.9	54.6	47.1
19/02/2024 16:03	75.5	55.6	48.5
19/02/2024 16:18	74.3	52.8	47.0
19/02/2024 16:33	89.9	61.1	48.7
19/02/2024 16:48	72.6	55.4	47.6
19/02/2024 17:03	80.7	57.8	47.3
19/02/2024 17:18	82.1	55.5	46.3
19/02/2024 17:33	84.5	57.6	46.1
19/02/2024 17:48	73.8	52.5	45.5
19/02/2024 18:03	72.7	52.6	45.6
19/02/2024 18:18	70.8	52.1	45.1
19/02/2024 18:33	76.1	51.0	44.5
19/02/2024 18:48	66.2	49.9	44.2
19/02/2024 19:03	73.5	51.5	44.1
19/02/2024 19:18	79.8	52.3	44.2
19/02/2024 19:33	73.3	52.4	44.6
19/02/2024 19:48	74.2	49.0	42.6
19/02/2024 20:03	70.4	50.2	41.4
19/02/2024 20:18	65.8	48.1	43.1
19/02/2024 20:33	66.1	46.4	42.8
19/02/2024 20:48	65.0	47.3	42.3
19/02/2024 21:03	65.4	46.8	42.2
19/02/2024 21:18	62.4	44.6	41.4
19/02/2024 21:33	59.2	45.0	41.3

Date & Time	L _{Amax} [dB]	L _{Aeq} [dB]	L _{A90} [dB]
19/02/2024 21:48	76.5	51.0	41.9
19/02/2024 22:03	65.8	44.1	41.2
19/02/2024 22:18	69.1	44.3	41.2
19/02/2024 22:33	73.6	44.5	40.7
19/02/2024 22:48	67.5	44.5	39.0
19/02/2024 23:03	64.7	42.1	39.2
19/02/2024 23:18	55.9	41.0	38.9
19/02/2024 23:33	49.4	39.5	38.2
19/02/2024 23:48	64.5	41.3	36.1
20/02/2024 00:03	46.9	40.0	38.6
20/02/2024 00:18	51.0	37.7	34.9
20/02/2024 00:33	43.4	37.5	34.6
20/02/2024 00:48	52.8	40.1	38.0
20/02/2024 01:03	77.0	49.3	38.4
20/02/2024 01:18	49.5	39.4	37.9
20/02/2024 01:33	44.1	37.2	34.5
20/02/2024 01:48	49.5	39.1	38.1
20/02/2024 02:03	54.4	38.9	37.0
20/02/2024 02:18	48.2	37.5	34.5
20/02/2024 02:33	60.8	41.9	37.4
20/02/2024 02:48	61.5	42.4	35.2
20/02/2024 03:03	52.5	41.1	36.3
20/02/2024 03:18	67.4	46.7	38.0
20/02/2024 03:33	56.5	41.9	35.4
20/02/2024 03:48	62.3	44.1	39.0
20/02/2024 04:03	68.5	50.4	38.5
20/02/2024 04:18	56.8	42.1	39.0
20/02/2024 04:33	59.0	45.3	40.1
20/02/2024 04:48	64.5	47.5	43.7
20/02/2024 05:03	66.3	46.3	40.9
20/02/2024 05:18	73.8	52.1	40.4
20/02/2024 05:33	62.6	47.0	41.5
20/02/2024 05:48	62.9	43.7	41.1
20/02/2024 06:03	61.2	43.7	42.1
20/02/2024 06:18	67.1	45.6	42.1
20/02/2024 06:33	57.7	45.3	43.2
20/02/2024 06:48	58.7	46.1	43.3
20/02/2024 07:03	66.3	47.0	43.2
20/02/2024 07:18	60.1	47.7	45.0
20/02/2024 07:33	76.4	55.3	47.0
20/02/2024 07:48	85.1	55.2	46.7

Date & Time	L _{Amax} [dB]	L _{Aeq} [dB]	L _{A90} [dB]
20/02/2024 08:03	65.9	51.0	48.1
20/02/2024 08:18	77.1	53.4	48.3
20/02/2024 08:33	69.8	53.7	48.7
20/02/2024 08:48	77.1	53.7	48.4
20/02/2024 09:03	74.7	55.1	48.5
20/02/2024 09:18	73.3	55.7	47.6
20/02/2024 09:33	74.6	53.8	47.7
20/02/2024 09:48	71.3	52.9	46.6
20/02/2024 10:03	74.6	53.3	47.8
20/02/2024 10:18	71.8	53.9	48.5
20/02/2024 10:33	81.1	54.1	47.9
20/02/2024 10:48	72.5	55.2	49.2
20/02/2024 11:03	75.3	54.5	49.3
20/02/2024 11:18	81.5	56.5	49.0
20/02/2024 11:33	74.7	56.4	48.6
20/02/2024 11:48	81.5	57.2	49.2
20/02/2024 12:03	78.0	57.8	49.4
20/02/2024 12:18	73.5	56.4	50.1
20/02/2024 12:33	75.5	57.7	50.0
20/02/2024 12:48	74.6	55.8	49.7
20/02/2024 13:03	72.0	54.7	48.8
20/02/2024 13:18	76.0	57.0	48.3
20/02/2024 13:33	92.9	58.7	47.1
20/02/2024 13:48	81.9	55.1	48.0
20/02/2024 14:03	78.6	54.0	46.9
20/02/2024 14:18	76.1	54.1	46.9
20/02/2024 14:33	74.1	55.5	47.4
20/02/2024 14:48	79.4	54.0	47.9
20/02/2024 15:03	77.5	54.9	48.1
20/02/2024 15:18	79.6	55.6	48.3
20/02/2024 15:33	79.5	55.4	49.4
20/02/2024 15:48	79.2	55.8	48.4
20/02/2024 16:03	80.6	57.9	48.6
20/02/2024 16:18	86.3	58.1	49.0
20/02/2024 16:33	73.6	55.2	48.9
20/02/2024 16:48	76.8	54.5	48.0
20/02/2024 17:03	78.8	55.1	47.7
20/02/2024 17:18	74.7	55.0	47.5
20/02/2024 17:33	74.9	55.5	47.2
20/02/2024 17:48	74.4	57.3	48.8
20/02/2024 18:03	75.2	55.6	48.2
20/02/2024 18:18	73.8	52.5	46.8
20/02/2024 18:33	75.5	52.3	46.5
20/02/2024 18:48	71.6	52.5	47.2
20/02/2024 19:03	74.2	54.8	46.4
20/02/2024 19:18	74.4	51.6	45.5
20/02/2024 19:33	73.1	54.3	46.1
20/02/2024 19:48	72.5	50.4	45.3

Date & Time	L _{Amax} [dB]	L _{Aeq} [dB]	L _{A90} [dB]
20/02/2024 20:03	70.6	50.8	46.5
20/02/2024 20:18	77.4	51.4	45.6
20/02/2024 20:33	67.9	48.2	44.5
20/02/2024 20:48	68.5	49.5	44.2
20/02/2024 21:03	67.6	49.2	43.5
20/02/2024 21:18	68.1	46.6	43.5
20/02/2024 21:33	73.3	47.5	43.6
20/02/2024 21:48	67.8	47.7	43.1
20/02/2024 22:03	74.2	50.8	43.5
20/02/2024 22:18	73.2	51.3	42.5
20/02/2024 22:33	65.2	46.0	42.0
20/02/2024 22:48	64.0	44.9	42.3
20/02/2024 23:03	57.6	43.1	41.0
20/02/2024 23:18	60.5	42.1	40.0
20/02/2024 23:33	55.1	41.2	40.1
20/02/2024 23:48	52.5	42.1	40.6
21/02/2024 00:03	52.7	41.2	39.4
21/02/2024 00:18	62.4	42.2	39.5
21/02/2024 00:33	67.6	41.5	39.0
21/02/2024 00:48	51.4	39.7	36.7
21/02/2024 01:03	51.9	38.9	36.4
21/02/2024 01:18	53.0	40.5	39.0
21/02/2024 01:33	59.3	43.6	39.0
21/02/2024 01:48	63.7	44.8	38.8
21/02/2024 02:03	60.7	44.5	38.4
21/02/2024 02:18	57.1	41.4	38.3
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21/02/2024 03:03	59.8	45.2	38.1
21/02/2024 03:18	57.9	45.1	41.4
21/02/2024 03:33	62.4	45.6	41.5
21/02/2024 03:48	66.2	45.5	39.1
21/02/2024 04:03	60.6	43.7	40.1
21/02/2024 04:18	71.0	50.1	40.1
21/02/2024 04:33	68.5	47.3	40.8
21/02/2024 04:48	68.5	47.7	40.5
21/02/2024 05:03	61.4	44.5	41.3
21/02/2024 05:18	60.3	45.4	42.3
21/02/2024 05:33	62.9	45.0	42.5
21/02/2024 05:48	72.5	49.1	44.0
21/02/2024 06:03	64.2	47.5	44.7
21/02/2024 06:18	75.3	52.2	45.6
21/02/2024 06:33	68.7	51.9	46.8
21/02/2024 06:48	67.9	54.0	47.8
21/02/2024 07:03	75.1	51.4	48.2
21/02/2024 07:18	76.4	56.3	49.8
21/02/2024 07:33	77.4	61.3	50.2
21/02/2024 07:48	81.2	56.3	50.3

Date & Time	L _{Amax} [dB]	L _{Aeq} [dB]	L _{A90} [dB]
21/02/2024 08:03	77.7	54.8	50.4
21/02/2024 08:18	86.6	57.8	51.3
21/02/2024 08:33	67.6	55.4	51.2
21/02/2024 08:48	72.5	56.4	52.0
21/02/2024 09:03	77.5	57.2	52.1
21/02/2024 09:18	73.1	59.3	54.0
21/02/2024 09:33	72.7	59.2	53.2
21/02/2024 09:48	75.1	55.8	50.5
21/02/2024 10:03	77.6	55.8	50.8
21/02/2024 10:18	81.4	56.5	50.9
21/02/2024 10:33	72.1	55.8	51.3
21/02/2024 10:48	87.9	69.8	51.6
21/02/2024 11:03	82.9	65.8	52.0
21/02/2024 11:18	79.5	58.8	50.9
21/02/2024 11:33	78.1	56.5	51.5
21/02/2024 11:48	79.5	56.8	51.8
21/02/2024 12:03	81.7	59.9	52.1
21/02/2024 12:18	83.4	57.9	51.6
21/02/2024 12:33	81.9	58.7	52.0
21/02/2024 12:48	77.5	58.7	52.3
21/02/2024 13:03	82.5	59.1	52.4
21/02/2024 13:18	80.4	58.7	51.0
21/02/2024 13:33	77.5	56.1	51.1
21/02/2024 13:48	74.7	55.8	50.4
21/02/2024 14:03	78.2	59.0	50.9
21/02/2024 14:18	83.9	57.8	50.9
21/02/2024 14:33	76.9	57.0	50.1

Front Façade

Date & Time	L _{Amax} [dB]	L _{Aeq} [dB]	L _{A90} [dB]
21/02/2024 15:13	78.1	55.8	49.7
21/02/2024 15:28	77.5	55.7	50.5
21/02/2024 15:43	78.1	57.2	49.5
21/02/2024 15:58	77.9	57.0	49.2
21/02/2024 16:13	80.0	56.9	49.4
21/02/2024 16:28	71.7	53.9	48.5
21/02/2024 16:43	79.4	59.1	48.4
21/02/2024 16:58	75.0	54.2	48.3
21/02/2024 17:13	73.1	55.0	48.1
21/02/2024 17:28	72.3	53.6	48.0
21/02/2024 17:43	76.5	53.9	47.9
21/02/2024 17:58	75.2	52.4	47.4
21/02/2024 18:13	71.2	52.6	47.8
21/02/2024 18:28	74.5	53.8	47.7
21/02/2024 18:43	80.1	52.6	46.2
21/02/2024 18:58	80.7	55.4	48.5

Date & Time	L _{Amax} [dB]	L _{Aeq} [dB]	L _{A90} [dB]
21/02/2024 19:13	71.2	54.6	49.5
21/02/2024 19:28	74.1	54.1	48.6
21/02/2024 19:43	75.2	55.6	49.7
21/02/2024 19:58	74.1	56.5	47.2
21/02/2024 20:13	79.0	59.0	43.8
21/02/2024 20:28	64.8	49.3	43.7
21/02/2024 20:43	76.4	53.3	43.1
21/02/2024 20:58	84.3	62.5	47.8
21/02/2024 21:13	64.8	48.7	43.1
21/02/2024 21:28	84.0	56.9	42.5
21/02/2024 21:43	90.7	68.2	50.0
21/02/2024 21:58	69.7	48.9	43.1
21/02/2024 22:13	59.8	48.0	42.9
21/02/2024 22:28	82.3	62.3	45.0
21/02/2024 22:43	69.4	55.3	45.8
21/02/2024 22:58	71.5	56.0	47.1
21/02/2024 23:13	81.1	53.3	40.7
21/02/2024 23:28	59.7	40.9	38.9
21/02/2024 23:43	52.3	40.5	39.0
21/02/2024 23:58	52.9	40.8	39.3
22/02/2024 00:13	59.4	42.6	39.3
22/02/2024 00:28	61.4	41.3	38.8
22/02/2024 00:43	58.6	39.8	36.4
22/02/2024 00:58	48.4	37.4	34.7
22/02/2024 01:13	47.7	39.5	36.7
22/02/2024 01:28	50.6	39.8	38.8
22/02/2024 01:43	49.7	39.5	38.4
22/02/2024 01:58	48.1	39.9	38.6
22/02/2024 02:13	55.9	40.7	38.7
22/02/2024 02:28	56.0	41.3	39.0
22/02/2024 02:43	59.5	43.3	38.5
22/02/2024 02:58	60.0	44.6	39.0
22/02/2024 03:13	60.3	44.0	38.9
22/02/2024 03:28	57.8	43.3	38.6
22/02/2024 03:43	60.0	44.7	39.5
22/02/2024 03:58	59.1	45.0	39.6
22/02/2024 04:13	58.2	44.1	39.7
22/02/2024 04:28	65.8	46.5	37.6
22/02/2024 04:43	74.2	55.4	42.4
22/02/2024 04:58	60.1	44.6	40.4
22/02/2024 05:13	61.9	44.3	40.0
22/02/2024 05:28	62.6	44.5	40.8
22/02/2024 05:43	52.7	44.6	43.2
22/02/2024 05:58	62.3	45.2	43.8
22/02/2024 06:13	64.1	46.0	44.3
22/02/2024 06:28	57.3	46.7	45.0
22/02/2024 06:43	61.1	49.1	47.1
22/02/2024 06:58	63.2	50.8	48.4

Date & Time	L _{Amax} [dB]	L _{Aeq} [dB]	L _{A90} [dB]
22/02/2024 07:13	61.7	50.7	48.8
22/02/2024 07:28	87.1	58.5	52.1
22/02/2024 07:43	97.1	72.3	51.0
22/02/2024 07:58	74.4	52.1	50.0
22/02/2024 08:13	77.5	54.6	50.3
22/02/2024 08:28	73.4	54.6	50.3
22/02/2024 08:43	75.6	55.4	51.3
22/02/2024 08:58	80.1	56.3	51.0
22/02/2024 09:13	70.7	54.2	50.2
22/02/2024 09:28	72.1	53.2	49.4
22/02/2024 09:43	73.0	55.1	48.9
22/02/2024 09:58	85.0	60.3	49.1
22/02/2024 10:13	71.0	54.0	49.3
22/02/2024 10:28	76.7	57.8	48.2
22/02/2024 10:43	83.3	57.4	47.4
22/02/2024 10:58	74.1	56.0	48.0
22/02/2024 11:13	85.8	60.1	50.3
22/02/2024 11:28	84.1	56.4	50.0
22/02/2024 11:43	70.6	54.0	49.3
22/02/2024 11:58	72.3	54.9	51.0
22/02/2024 12:13	72.7	56.5	51.9
22/02/2024 12:28	77.7	54.6	50.1
22/02/2024 12:43	72.8	54.9	48.6
22/02/2024 12:58	71.5	55.5	48.4
22/02/2024 13:13	80.7	58.4	47.3
22/02/2024 13:28	70.4	54.2	48.7
22/02/2024 13:43	75.2	56.8	50.5
22/02/2024 13:58	73.9	57.0	52.6
22/02/2024 14:13	69.6	55.5	51.0
22/02/2024 14:28	66.5	53.2	49.2
22/02/2024 14:43	68.2	54.2	49.7
22/02/2024 14:58	65.8	52.2	49.1
22/02/2024 15:13	75.1	54.6	48.8
22/02/2024 15:28	83.4	61.1	50.3
22/02/2024 15:43	74.7	57.0	52.4
22/02/2024 15:58	99.4	64.1	54.4
22/02/2024 16:13	82.8	58.9	54.2
22/02/2024 16:28	72.9	57.9	54.1
22/02/2024 16:43	77.9	57.3	52.6
22/02/2024 16:58	81.4	58.2	50.6
22/02/2024 17:13	72.2	54.4	48.9
22/02/2024 17:28	83.7	55.0	48.9
22/02/2024 17:43	71.0	55.8	49.6
22/02/2024 17:58	68.9	52.8	48.0
22/02/2024 18:13	71.3	53.4	47.8
22/02/2024 18:28	66.9	51.8	46.9
22/02/2024 18:43	70.1	53.1	47.8
22/02/2024 18:58	72.3	52.5	47.9

Date & Time	L _{Amax} [dB]	L _{Aeq} [dB]	L _{A90} [dB]
22/02/2024 19:13	72.8	51.6	46.6
22/02/2024 19:28	74.2	51.6	46.8
22/02/2024 19:43	66.1	50.5	46.2
22/02/2024 19:58	73.0	51.5	45.6
22/02/2024 20:13	70.2	50.4	44.7
22/02/2024 20:28	63.5	47.6	44.4
22/02/2024 20:43	64.5	48.3	44.3
22/02/2024 20:58	73.1	50.9	44.4
22/02/2024 21:13	71.6	49.1	44.0
22/02/2024 21:28	67.7	49.0	43.9
22/02/2024 21:43	69.3	48.2	43.7
22/02/2024 21:58	66.8	46.9	43.6
22/02/2024 22:13	76.2	49.9	43.5
22/02/2024 22:28	71.5	46.9	43.3
22/02/2024 22:43	59.9	45.6	43.3
22/02/2024 22:58	68.4	45.6	41.7
22/02/2024 23:13	60.9	44.8	41.8
22/02/2024 23:28	64.0	44.9	42.2
22/02/2024 23:43	53.8	42.6	41.1
22/02/2024 23:58	52.1	41.4	39.2
23/02/2024 00:13	51.5	42.2	40.6
23/02/2024 00:28	67.9	44.0	39.4
23/02/2024 00:43	53.6	41.4	38.9
23/02/2024 00:58	46.6	40.7	38.9
23/02/2024 01:13	58.1	41.0	36.1
23/02/2024 01:28	49.2	40.5	38.0
23/02/2024 01:43	47.8	39.5	37.1
23/02/2024 01:58	46.0	40.4	39.4
23/02/2024 02:13	48.3	39.0	36.4
23/02/2024 02:28	63.5	43.8	39.4
23/02/2024 02:43	72.5	45.1	37.9
23/02/2024 02:58	61.2	44.0	38.6
23/02/2024 03:13	57.0	44.7	38.5
23/02/2024 03:28	60.5	45.9	41.8
23/02/2024 03:43	58.7	44.3	39.7
23/02/2024 03:58	70.4	47.6	39.2
23/02/2024 04:13	63.2	44.8	35.8
23/02/2024 04:28	68.6	50.0	39.3
23/02/2024 04:43	58.4	43.3	36.5
23/02/2024 04:58	69.3	44.8	40.1
23/02/2024 05:13	59.5	43.4	38.0
23/02/2024 05:28	59.5	44.8	40.8
23/02/2024 05:43	66.3	45.5	39.9
23/02/2024 05:58	66.9	45.6	41.7
23/02/2024 06:13	69.8	49.8	41.5
23/02/2024 06:28	61.1	46.0	42.8
23/02/2024 06:43	59.2	46.9	43.9
23/02/2024 06:58	65.1	48.2	44.4

Date & Time	L _{Amax} [dB]	L _{Aeq} [dB]	L _{A90} [dB]
23/02/2024 07:13	65.2	49.1	45.4
23/02/2024 07:28	75.4	52.1	45.5
23/02/2024 07:43	73.9	49.6	46.5
23/02/2024 07:58	69.0	51.5	47.6
23/02/2024 08:13	69.8	53.6	48.6
23/02/2024 08:28	73.5	54.5	48.6
23/02/2024 08:43	82.8	57.2	49.5
23/02/2024 08:58	75.2	57.0	50.5
23/02/2024 09:13	70.5	53.8	48.2
23/02/2024 09:28	74.0	52.8	47.2
23/02/2024 09:43	72.4	54.3	46.9
23/02/2024 09:58	84.6	64.1	47.7
23/02/2024 10:13	83.7	55.8	47.5
23/02/2024 10:28	82.6	55.5	47.8
23/02/2024 10:43	77.0	56.8	47.7
23/02/2024 10:58	76.1	54.9	48.5
23/02/2024 11:13	78.0	55.1	47.5
23/02/2024 11:28	80.8	57.4	47.8
23/02/2024 11:43	77.0	57.7	48.9
23/02/2024 11:58	81.7	56.5	48.9
23/02/2024 12:13	74.5	56.0	49.7
23/02/2024 12:28	82.8	57.9	49.1
23/02/2024 12:43	75.3	54.7	48.3
23/02/2024 12:58	86.5	59.7	48.7
23/02/2024 13:13	73.5	53.2	47.9
23/02/2024 13:28	73.5	55.4	48.1
23/02/2024 13:43	73.5	54.3	47.2
23/02/2024 13:58	76.0	54.8	47.8
23/02/2024 14:13	78.2	57.8	47.7
23/02/2024 14:28	76.7	55.9	47.5
23/02/2024 14:43	75.8	53.9	47.7
23/02/2024 14:58	82.7	57.0	47.4
23/02/2024 15:13	75.4	55.9	48.9
23/02/2024 15:28	77.8	56.0	49.3
23/02/2024 15:43	79.1	58.1	50.1
23/02/2024 15:58	76.2	55.9	48.4
23/02/2024 16:13	74.3	57.5	51.8
23/02/2024 16:28	78.4	57.6	48.9
23/02/2024 16:43	77.5	55.6	48.2
23/02/2024 16:58	86.1	56.6	48.5
23/02/2024 17:13	75.3	55.4	48.8
23/02/2024 17:28	71.7	53.2	47.8
23/02/2024 17:43	74.0	54.0	47.7
23/02/2024 17:58	72.3	54.9	47.7
23/02/2024 18:13	83.3	55.3	48.1
23/02/2024 18:28	79.4	57.7	48.3
23/02/2024 18:43	71.0	54.6	47.1
23/02/2024 18:58	74.1	52.9	48.1

Date & Time	L _{Amax} [dB]	L _{Aeq} [dB]	L _{A90} [dB]
23/02/2024 19:13	74.0	54.3	47.1
23/02/2024 19:28	73.4	55.1	48.4
23/02/2024 19:43	70.4	52.1	47.9
23/02/2024 19:58	73.0	52.2	45.7
23/02/2024 20:13	68.0	51.4	45.3
23/02/2024 20:28	86.7	57.0	45.7
23/02/2024 20:43	70.6	49.5	45.6
23/02/2024 20:58	66.9	49.9	44.7
23/02/2024 21:13	66.0	48.9	43.8
23/02/2024 21:28	81.7	57.9	44.5
23/02/2024 21:43	68.9	48.4	44.1
23/02/2024 21:58	75.3	50.6	42.8
23/02/2024 22:13	71.7	50.4	43.0
23/02/2024 22:28	63.0	48.6	45.0
23/02/2024 22:43	77.4	55.8	45.1
23/02/2024 22:58	61.4	46.4	42.3
23/02/2024 23:13	61.2	44.1	41.6
23/02/2024 23:28	61.5	44.4	40.3
23/02/2024 23:43	61.7	44.1	40.9
23/02/2024 23:58	65.4	44.5	40.8
24/02/2024 00:13	62.4	44.9	39.5
24/02/2024 00:28	52.3	41.4	38.5
24/02/2024 00:43	49.0	40.8	38.6
24/02/2024 00:58	63.0	40.9	37.2
24/02/2024 01:13	47.3	39.1	36.3
24/02/2024 01:28	52.2	37.8	35.0
24/02/2024 01:43	48.7	39.9	36.8
24/02/2024 01:58	47.6	39.6	38.6
24/02/2024 02:13	55.2	40.8	35.8
24/02/2024 02:28	62.7	43.2	36.6
24/02/2024 02:43	60.7	47.4	40.1
24/02/2024 02:58	61.4	54.7	51.6
24/02/2024 03:13	57.3	44.0	35.8
24/02/2024 03:28	64.8	43.9	37.3
24/02/2024 03:43	54.9	44.0	39.3
24/02/2024 03:58	58.9	41.3	36.0
24/02/2024 04:13	68.0	47.4	38.4
24/02/2024 04:28	71.9	50.2	37.5
24/02/2024 04:43	55.1	42.2	37.3
24/02/2024 04:58	64.5	46.4	40.2
24/02/2024 05:13	66.5	47.5	37.5
24/02/2024 05:28	60.5	48.0	41.6
24/02/2024 05:43	66.0	48.3	39.2
24/02/2024 05:58	69.8	49.1	39.7
24/02/2024 06:13	62.9	45.7	42.9
24/02/2024 06:28	67.4	52.1	45.1
24/02/2024 06:43	93.2	50.6	44.7
24/02/2024 06:58	62.8	47.4	42.8

Date & Time	L _{Amax} [dB]	L _{Aeq} [dB]	L _{A90} [dB]
24/02/2024 07:13	66.5	47.5	42.6
24/02/2024 07:28	63.2	48.6	45.7
24/02/2024 07:43	73.3	50.4	45.3
24/02/2024 07:58	67.8	51.5	46.3
24/02/2024 08:13	71.9	50.8	45.8
24/02/2024 08:28	74.8	52.8	46.1
24/02/2024 08:43	71.5	56.6	47.7
24/02/2024 08:58	73.4	53.9	48.4
24/02/2024 09:13	69.3	51.4	47.8
24/02/2024 09:28	69.3	55.5	50.0
24/02/2024 09:43	80.0	55.4	50.9
24/02/2024 09:58	76.6	59.8	53.8
24/02/2024 10:13	79.6	59.1	53.3
24/02/2024 10:28	75.8	58.2	53.3
24/02/2024 10:43	78.5	58.9	53.9
24/02/2024 10:58	72.1	59.0	54.2
24/02/2024 11:13	72.7	58.3	53.3
24/02/2024 11:28	75.5	58.7	53.8
24/02/2024 11:43	79.0	60.3	53.3
24/02/2024 11:58	77.4	57.5	51.7
24/02/2024 12:13	74.7	58.6	52.3
24/02/2024 12:28	83.5	60.0	51.8
24/02/2024 12:43	78.9	58.1	51.3
24/02/2024 12:58	71.8	56.9	50.7
24/02/2024 13:13	79.2	58.4	50.7
24/02/2024 13:28	75.5	56.6	49.6
24/02/2024 13:43	72.8	56.9	48.8
24/02/2024 13:58	76.5	56.6	49.3
24/02/2024 14:13	73.5	55.0	48.4
24/02/2024 14:28	78.8	58.2	47.0

APPENDIX 2 – Calculation of internal noise levels

First Floor Units 5, 6 & 7

BS8233:2014 Annexe G2 - Rigorous Calculation of Façade Sound Insulation							
Unit 5,6,7 Bedroom							
Wall area		11.5					
Window Area		4.8					
Ceiling/Roof		0.0					
Room Vol.		37.8					
Frequency (Hz)		125	250	500	1000	2000	L _{Aeq}
Measured Façade Leq		57.9	55.1	53.7	53.2	49.6	55.8
Ventilator Dne	Trickle vent	25	25	26	32	35	
Window R	4/16/4	21	17	25	35	37	
Wall	Masonry Cavity	40	44	45	51	56	
Ceiling+Roof R	Std. Roof	28	34	40	45	49	
Absorption		11	14	16	16	15	
Vent		0.002747	0.002747	0.002182	0.000548	0.000275	
		-25.6	-25.6	-26.6	-32.6	-35.6	
Windows		0.003313	0.008321	0.001319	0.000132	0.000083	
		-24.8	-20.8	-28.8	-38.8	-40.8	
Wall		0.000058	0.000023	0.000018	0.000005	0.000001	
		-42.4	-46.4	-47.4	-53.4	-58.4	
Ceiling/roof		0.000001	0.000000	0.000000	0.000000	0.000000	
		-58.6	-64.6	-70.6	-75.6	-79.6	
Composite R		-22.1	-19.5	-24.5	-31.6	-34.4	
Abs. Correction		0.2	-0.9	-1.4	-1.4	-1.2	
Leq (int)		36.0	34.7	27.7	20.2	14.0	
A-Weighting		-16.1	-8.6	-3.2	0	1.2	
L _{Aeq} (internal)		19.9	26.1	24.5	20.2	15.2	29.7
Façade Atten.		26.2	dB				
	External L _{Aeq} ,8hr	46.4	Internal	20.2	Guideline	30	
	External L _{Amax}	69.0	Internal	42.8	Guideline	45	

BS8233:2014 Annexe G2 - Rigorous Calculation of Façade Sound Insulation							
Unit 5/6/7 Living Room							
Wall area		7.5					
Window Area		2.7					
Ceiling/Roof		0.0					
Room Vol.		60					
Frequency (Hz)		125	250	500	1000	2000	L _{Aeq}
Measured Façade Leq		56.6	53.6	51.0	50.0	47.3	53.1
Ventilator Dne	Trickle vent	25	25	26	32	35	
Window R	4/16/4	21	17	25	35	37	
Wall	Masonry Cavity	40	44	45	51	56	
Ceiling+Roof R	Std. Roof	28	34	40	45	49	
Absorption		11	14	16	16	15	
Vent		0.004216	0.004216	0.003349	0.000841	0.000422	
		-23.8	-23.8	-24.8	-30.8	-33.8	
Windows		0.002859	0.007182	0.001138	0.000114	0.000072	
		-25.4	-21.4	-29.4	-39.4	-41.4	
Wall		0.000064	0.000025	0.000020	0.000005	0.000002	
		-41.9	-45.9	-46.9	-52.9	-57.9	
Ceiling/roof		0.000000	0.000000	0.000000	0.000000	0.000000	
		-66.8	-72.8	-78.8	-83.8	-87.8	
Composite R		-21.5	-19.4	-23.5	-30.2	-33.1	
Abs. Correction		-1.7	-2.7	-3.3	-3.3	-3.0	
Leq (int)		36.5	34.5	27.3	19.5	14.3	
A-Weighting		-16.1	-8.6	-3.2	0	1.2	
L _{Aeq} (internal)		20.4	25.9	24.1	19.5	15.5	29.4
Façade Atten.		23.7	dB				
External L _{Aeq} ,16hr	54.0	Internal	30.3	Guideline	35		

Second Floor Unit 10

BS8233:2014 Annexe G2 - Rigorous Calculation of Façade Sound Insulation							
Unit 10 Living Room							
Wall area		16.0					
Window Area		3.6					
Ceiling/Roof		0.0					
Room Vol.		48					
Frequency (Hz)		125	250	500	1000	2000	L _{Aeq}
Measured Façade Leq		57.9	55.1	53.7	53.2	49.6	55.8
Ventilator Dne	Trickle vent	25	25	26	32	35	
Window R	4/16/4	21	17	25	35	37	
Wall	Masonry Cavity	40	44	45	51	56	
Ceiling+Roof R	Std. Roof	28	34	40	45	49	
Absorption		11	14	16	16	15	
Vent		0.001975	0.001975	0.001569	0.000394	0.000198	
		-27.0	-27.0	-28.0	-34.0	-37.0	
Windows		0.001786	0.004487	0.000711	0.000071	0.000045	
		-27.5	-23.5	-31.5	-41.5	-43.5	
Wall		0.000077	0.000031	0.000024	0.000006	0.000002	
		-41.1	-45.1	-46.1	-52.1	-57.1	
Ceiling/roof		0.000001	0.000000	0.000000	0.000000	0.000000	
		-60.0	-66.0	-72.0	-77.0	-81.0	
Composite R		-24.2	-21.9	-26.4	-33.3	-36.1	
Abs. Correction		1.6	0.6	0.0	0.0	0.3	
Leq (int)		38.4	36.8	30.3	23.0	16.8	
A-Weighting		-16.1	-8.6	-3.2	0	1.2	
L _{Aeq} (internal)		22.3	28.2	27.1	23.0	18.0	32.1
Façade Atten.		23.8	dB				
External L _{Aeq} ,16hr	57.3	Internal	33.5	Guideline	35		

BS8233:2014 Annexe G2 - Rigorous Calculation of Façade Sound Insulation							
Unit 10 Bedroom 1							
Wall area		9.0					
Window Area		3.6					
Ceiling/Roof		0.0					
Room Vol.		50					
Frequency (Hz)		125	250	500	1000	2000	L _{Aeq}
Measured Façade Leq		57.9	55.1	53.7	53.2	49.6	55.8
Ventilator Dne	Trickle vent	25	25	26	32	35	
Window R	4/16/4	21	17	25	35	37	
Wall	Masonry Cavity	40	44	45	51	56	
Ceiling+Roof R	Std. Roof	28	34	40	45	49	
Absorption		11	14	16	16	15	
Vent		0.003510	0.003510	0.002788	0.000700	0.000351	
		-24.5	-24.5	-25.5	-31.5	-34.5	
Windows		0.003174	0.007972	0.001264	0.000126	0.000080	
		-25.0	-21.0	-29.0	-39.0	-41.0	
Wall		0.000060	0.000024	0.000019	0.000005	0.000002	
		-42.2	-46.2	-47.2	-53.2	-58.2	
Ceiling/roof		0.000002	0.000000	0.000000	0.000000	0.000000	
		-57.5	-63.5	-69.5	-74.5	-78.5	
Composite R		-21.7	-19.4	-23.9	-30.8	-33.6	
Abs. Correction		-0.9	-1.9	-2.5	-2.5	-2.2	
Leq (int)		35.3	33.8	27.3	19.9	13.8	
A-Weighting		-16.1	-8.6	-3.2	0	1.2	
L _{Aeq} (internal)		19.2	25.2	24.1	19.9	15.0	29.0
Façade Atten.		26.8 dB					
External L _{Aeq} ,8hr	46.4	Internal	19.6	Guideline	30		
External L _{Amax}	69.0	Internal	42.2	Guideline	45		

BS8233:2014 Annexe G2 - Rigorous Calculation of Façade Sound Insulation							
Unit 10 Bedroom 2							
Wall area		9.3					
Window Area		2.7					
Ceiling/Roof		0.0					
Room Vol.		36					
Frequency (Hz)		125	250	500	1000	2000	L _{Aeq}
Measured Façade Leq		56.6	53.6	51.0	50.0	47.3	53.1
Ventilator Dne	Trickle vent	25	25	26	32	35	
Window R	4/16/4	21	17	25	35	37	
Wall	Masonry Cavity	40	44	45	51	56	
Ceiling+Roof R	Std. Roof	28	34	40	45	49	
Absorption		11	14	16	16	15	
Vent		0.003397	0.003397	0.002698	0.000678	0.000340	
		-24.7	-24.7	-25.7	-31.7	-34.7	
Windows		0.002304	0.005786	0.000917	0.000092	0.000058	
		-26.4	-22.4	-30.4	-40.4	-42.4	
Wall		0.000071	0.000028	0.000022	0.000006	0.000002	
		-41.5	-45.5	-46.5	-52.5	-57.5	
Ceiling/roof		0.000002	0.000000	0.000000	0.000000	0.000000	
		-57.7	-63.7	-69.7	-74.7	-78.7	
Composite R		-22.4	-20.4	-24.4	-31.1	-34.0	
Abs. Correction		-0.7	-1.8	-2.4	-2.4	-2.1	
Leq (int)		33.5	31.5	24.3	16.5	11.3	
A-Weighting		-16.1	-8.6	-3.2	0	1.2	
L _{Aeq} (internal)		17.4	22.9	21.1	16.5	12.5	26.4
Façade Atten.		26.6	dB				
External L _{Aeq} ,8hr	45.7	Internal	19.1	Guideline	30		
External L _{Amax}	69.0	Internal	42.4	Guideline	45		

Third Floor Unit 14

BS8233:2014 Annexe G2 - Rigorous Calculation of Façade Sound Insulation							
Unit 14 Living Room							
Wall area		26.8					
Window Area		5.8					
Ceiling/Roof		25.0					
Room Vol.		68					
Frequency (Hz)		125	250	500	1000	2000	L _{Aeq}
Measured Façade Leq		57.9	55.1	53.7	53.2	49.6	55.8
Ventilator Dne	Trickle vent	25	25	26	32	35	
Window R	4/16/4	21	20	26	38	37	
Wall	Masonry Cavity	40	44	45	51	56	
Ceiling+Roof R	Std. Roof	28	34	40	45	49	
Absorption		11	14	16	16	15	
Vent		0.000610	0.000610	0.000485	0.000122	0.000061	
		-32.1	-32.1	-33.1	-39.1	-42.1	
Windows		0.000889	0.001120	0.000281	0.000018	0.000022	
		-30.5	-29.5	-35.5	-47.5	-46.5	
Wall		0.000041	0.000016	0.000013	0.000003	0.000001	
		-43.9	-47.9	-48.9	-54.9	-59.9	
Ceiling/roof		0.000765	0.000192	0.000048	0.000015	0.000006	
		-31.2	-37.2	-43.2	-48.2	-52.2	
Composite R		-26.4	-27.1	-30.8	-38.0	-40.4	
Abs. Correction		6.7	5.7	5.1	5.1	5.4	
Leq (int)		41.3	36.7	30.9	23.3	17.6	
A-Weighting		-16.1	-8.6	-3.2	0	1.2	
L _{Aeq} (internal)		25.2	28.1	27.7	23.3	18.8	32.7
Façade Atten.		23.2 dB					
	External L _{Aeq} ,16hr	57.3	Internal	34.1	Guideline	35	

BS8233:2014 Annex G2 - Rigorous Calculation of Façade Sound Insulation							
Unit 14 Bedroom 1							
Wall area		9.3					
Window Area		2.7					
Ceiling/Roof		13.8					
Room Vol.		36					
Frequency (Hz)		125	250	500	1000	2000	L _{Aeq}
Measured Façade Leq		56.6	53.6	51.0	50.0	47.3	53.1
Ventilator Dne	Trickle vent	25	25	26	32	35	
Window R	4/16/4	21	17	25	35	37	
Wall	Masonry Cavity	40	44	45	51	56	
Ceiling+Roof R	Std. Roof	28	34	40	45	49	
Absorption		11	14	16	16	15	
Vent		0.001369	0.001369	0.001087	0.000273	0.000137	
		-28.6	-28.6	-29.6	-35.6	-38.6	
Windows		0.000928	0.002332	0.000370	0.000037	0.000023	
		-30.3	-26.3	-34.3	-44.3	-46.3	
Wall		0.000029	0.000011	0.000009	0.000002	0.000001	
		-45.4	-49.4	-50.4	-56.4	-61.4	
Ceiling/roof		0.000947	0.000238	0.000060	0.000019	0.000008	
		-30.2	-36.2	-42.2	-47.2	-51.2	
Composite R		-24.9	-24.0	-28.2	-34.8	-37.7	
Abs. Correction		3.2	2.2	1.6	1.6	1.9	
Leq (int)		35.0	31.8	24.5	16.8	11.5	
A-Weighting		-16.1	-8.6	-3.2	0	1.2	
L _{Aeq} (internal)		18.9	23.2	21.3	16.8	12.7	26.9
Façade Atten.		26.2 dB					
External L _{Aeq} ,8hr	45.7	Internal	19.5	Guideline	30		
External L _{Amax}	69.0	Internal	42.8	Guideline	45		

BS8233:2014 Annexe G2 - Rigorous Calculation of Façade Sound Insulation							
Unit 14 Bedroom 2							
Wall area		9.0					
Window Area		2.1					
Ceiling/Roof		12.2					
Room Vol.		29.3					
Frequency (Hz)		125	250	500	1000	2000	L _{Aeq}
Measured Façade Leq		56.6	53.6	51.0	50.0	47.3	53.1
Ventilator Dne	Trickle vent	25	25	26	32	35	
Window R	4/16/4	21	17	25	35	37	
Wall	Masonry Cavity	40	44	45	51	56	
Ceiling+Roof R	Std. Roof	28	34	40	45	49	
Absorption		11	14	16	16	15	
Vent		0.001492	0.001492	0.001185	0.000298	0.000149	
		-28.3	-28.3	-29.3	-35.3	-38.3	
Windows		0.000787	0.001976	0.000313	0.000031	0.000020	
		-31.0	-27.0	-35.0	-45.0	-47.0	
Wall		0.000033	0.000013	0.000010	0.000003	0.000001	
		-44.9	-48.9	-49.9	-55.9	-60.9	
Ceiling/roof		0.000912	0.000229	0.000058	0.000018	0.000007	
		-30.4	-36.4	-42.4	-47.4	-51.4	
Composite R		-24.9	-24.3	-28.1	-34.6	-37.5	
Abs. Correction		2.8	1.8	1.2	1.2	1.5	
Leq (int)		34.6	31.1	24.2	16.6	11.3	
A-Weighting		-16.1	-8.6	-3.2	0	1.2	
L _{Aeq} (internal)		18.5	22.5	21.0	16.6	12.5	26.4
Façade Atten.		26.7	dB				
External L _{Aeq} ,8hr	46.4	Internal	19.7	Guideline	30		
External L _{Amax}	69.0	Internal	42.3	Guideline	45		