

Extracts from The Crescent House Façade Noise Assessment

Noise Assessment Report Interpretative Summary

The report shows the British Standard Guidance on internal noise levels with the levels that should be achieved in dwellings in terms of day and night-time (table 2-1). The dB levels show the maximum noise levels that should be achieved in dwelling areas at the different times of day. (i.e. in a residential living room the maximum should be: 35dB LAeq,16h) (this is effectively the average sound pressure level over a given period: 16 hours).

The Report then goes on to clarify professional Practice Guidance and describes the noise survey methodology used around Crescent House showing the noise monitoring locations that were used (figure 3-1).

The long-term measurement results are shown in section 3.4.1 and the short term measurement results in section 3.4.2.

Table 4-1 gives the façade assessment results and table 4-2 gives the minimum sound insulation performance requirements.

Table 4-3 gives examples of glazing systems that would typically meet the acoustic performances set out in table 4-2.

It can be seen from the results that the noise values measured on Crescent House greatly exceed the BS 8233 :2014 Guidance levels.

Daytime Long Term Measurements being recorded as between 71 – 68 LAeq 16hr
Daytime Short Term Measurement being recorded as between 69 -53 LAeq dB
Daytime Façade Assessment Levels being recorded as between 70 – 58 LAeq 16hr

The large difference between the results measured on Crescent House and the BS 8233: 2104 Guidance levels shows the importance of improving the acoustic performance of the facade to bring the final LAeq levels as close to the BS 8233 :2014 Guidance as can be achieved.

Report 2. Noise Guidance and Assessment Criteria

2.1 BS 8233:2014 Guidance on Sound Insulation and Noise Reduction for Buildings

Table 2-1 below reproduces the desirable upper limits for internal noise levels within dwellings.

Table 2-1. Indoor ambient noise levels in dwellings (BS8233:2014)

Location	Activity	Period		Criteria
Residential living room	Resting	Daytime	07:00 - 23:00	35 dB $L_{Aeq,16h}$
	Dining room/area	Daytime		40 dB $L_{Aeq,16h}$
Residential bedroom	Resting Sleeping	Daytime	07:00-23:00	35 dB $L_{Aeq,16h}$
		Night-time	23:00-07:00	30 dB $L_{Aeq,8h}$

Regular individual noise events at night have the potential to disturb the sleep of inhabitants in dwellings. BS 8233 states that:

“A guideline value may be set in terms of SEL or L_{AFmax} , depending on the character and number of events per night”

¹ British Standard 8233:2014 Guidance on sound insulation and noise reduction for buildings, BSI, 2014

² Association of Noise Consultants/ Institute of Acoustic/ Chartered Institute of Environmental Health (2017); Professional

Planning Guidance: Planning and Noise.

2.2 Professional Practice Guidance: Planning and Noise, 2017

Professional Practice Guidance: Planning and Noise (ProPG)² has been produced by the Institute of Acoustics (IoA), the Association of Noise Consultants (ANC) and the Chartered Institute of Environmental Health (CIEH) to provide practitioners with guidance on a recommended approach to the management of noise within the planning system in England. ProPG provides planning guidance for the consideration of new residential developments that will be exposed predominantly to airborne noise from transport sources.

The indoor ambient noise levels recommended by ProPG are identical to those within BS 8233:2014. In addition, with regards to sleep quality and well-being, a noise level of 45 dB L_{Amax} inside bedrooms has been identified as a threshold value above which sleep

effects due to individual events become observable. In most circumstances, good acoustic design should be used so that individual noise events do not normally exceed this threshold value more than 10 times a night.

ProPG allows some flexibility with reference to the BS 8233:2014 internal $LA_{eq,T}$ noise criteria and individual noise events (LA_{max}) for areas, stating that they can be relaxed by up to 5 dB and still achieve reasonable internal conditions where development is considered necessary or desirable.

3. Noise Survey

3.1 Noise Survey Methodology

The noise climate around Crescent House was established by undertaking a combination of long and short-term noise monitoring between Wednesday 11th May and Wednesday 18th May 2022.

A long-term (LT) unattended measurement was carried out at the external façade of Flat 347 from Wednesday 11th May to Wednesday 18th May. The long-term monitor was positioned outside the window of the studio flat facing Goswell Road. The monitor recorded noise levels continuously over the 7 days.

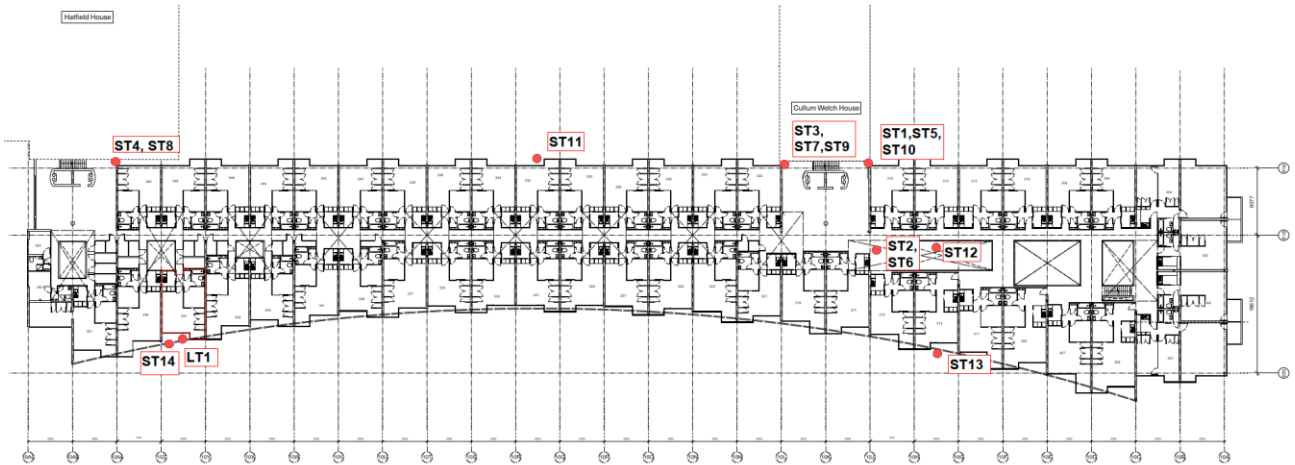
In addition to the long-term noise monitoring, a series of short-term (ST) attended noise measurements were carried out at locations around the building to capture external noise levels. These were carried out on the 11th May, but were repeated on the 18th May due to poor weather during the original measurements on the 11th May. Noise data from the 11th were excluded from the assessment.

Note that, due to the unavailability of other flats and the layout of Flat 347 which did not include a separate living area facing Goswell Road, it was not possible to carry out simultaneous external and internal noise measurements within the flat to establish current internal noise levels and estimate the acoustic performance of the existing façade. Nevertheless, since a secondary glazed element is not proposed in addition to the existing glazed frame but instead proposals include partial or complete replacement of the existing glazed elements. Consequently, data on the existing internal noise levels was not considered essential for the purposes of this assessment.

All noise measurements were carried out in accordance with BS 7445-1:2003 'Description and Measurement of Environmental Noise'.

Figure 3-1 presents the location of both long term and short term noise measurements.

Figure 3-1 Noise Monitoring Locations



3.4 Noise Survey Results

3.4.1 Long-term (LT) Measurements

Long-term noise monitoring results for location LT1 are presented in Table 3-2. Detailed noise level time history for all long-term noise monitoring is given in Appendix B.

Measurement data are provided for overall ambient noise ($L_{Aeq,T}$), background noise ($L_{A90,T}$) and maximum noise ($L_{AFmax,T}$ noise events).

Table 3-2. Long-term (LT) Measurement Results (non-free field)

		Daytime (07:00 – 23:00)			Night-time (23:00 – 07:00)		
Measurement Location	Date	$L_{Aeq,T}$ dB**	$L_{A90,T}$ dB	L_{AFmax} dB**	$L_{Aeq,T}$ dB**	$L_{A90,T}$ dB	L_{AFmax} dB**
LT1 – Flat 347, Floor 3 (external, at façade)	11/05/2022	71*	62*	95*	67	53	85
	12/05/2022	70	63	94	67	55	89
	13/05/2022	71	62	97	68	55	92
	14/05/2022	68	59	92	67	56	86
	15/05/2022	68	57	90	66	52	85

	16/05/2022	71	61	98	66	52	86
	17/05/2022	70	62	95	66	53	89
	18/05/2022	71*	63*	94*	-	-	-

* *Incomplete monitoring period*

** *Logarithmic average of the ambient noise measurements*

** *The value presented is the 90th percentile of all values of $L_{Amax,15min}$ (the maximum noise level in each 15-minute period) over the day or night-time measurement period*

3.4.2 Short-term (ST) Measurements

Results of short-term noise monitoring within and outside flats are presented in Table 3-3.

Measurement data are provided for overall ambient noise ($L_{Aeq,T}$), background noise ($L_{A90,T}$) and maximum noise

($L_{Amax,T}$ noise events).

Table 3-3. Short-term (ST) Measurement Results

Location	Location Description	Start Time	Duration (min)	$L_{Aeq,T}$ dB	$L_{A90,T}$ dB	$L_{Amax,T}$ dB	Comments
ST1	Third Floor Balcony - Facing Courtyard	18/05/2022 11:10	15	54	48	70	Traffic noise, some aircraft noise
ST2	Third Floor - Internal Courtyard	18/05/2022 11:28	15	53	48	74	Traffic noise, some aircraft noise
ST3	Third Floor Balcony - Facing Tennis Court	18/05/2022 11:44	15	57	50	80*	Traffic, noise from tennis court, reversing lorry alarm
ST4	Third Floor Balcony - Facing Courtyard (N)	18/05/2022 12:01	15	53	50	72	Traffic noise, residents noise
ST5	Second Floor Balcony - Facing Courtyard	18/05/2022 12:20	15	53	49	68	Traffic noise, some aircraft noise, residents noise

ST6	Second Floor - Internal Courtyard	18/05/2022 12:45	15	59	52	80*	Traffic noise, residents noise
ST7	Second Floor Balcony - Facing Tennis Court	18/05/2022 13:15	15	55	50	74	Noise from tennis court, traffic
ST8	Second Floor Balcony - Tennis Court (N)	18/05/2022 13:35	15	54	49	70	Construction noise, traffic, noise from tennis court
ST9	First Floor Balcony - Facing Tennis Court	18/05/2022 13:52	15	53	49	80*	Residents noise, construction noise from tennis court, traffic noise
ST10	First Floor Balcony - Facing Courtyard	18/05/2022 14:10	15	58	48	77	Residents noise, traffic noise, construction noise
ST11	Ground Floor - Rear - Facing Tennis Court	18/05/2022 14:31	15	55	52	75	Residents noise, traffic noise, construction noise
ST12	Ground Floor - Atrium - Next to Shakespear Pub	18/05/2022 1450	15	66	57	78	Traffic noise, residents noise, construction noise
ST13	Goswell Road - Next to Shakespeare Pub	18/05/2022 15:10	15	68	59	79	Traffic and residents noise
ST14	Goswell Road - Ground Floor - Below Flat 347	18/05/2022 15:27	15	69	60	81	Traffic noise

* Non-typical noise activities such as people shouting at the microphone, lorry reversing alarm, angle grinder noise

4. Façade Assessment

Results of the noise monitoring on site indicated the prevailing ambient noise levels incident on the facades of Crescent House on Goswell Road and internal/rear courtyard areas.

A summary of external noise levels used as basis for the façade assessment is presented in Table 4-1.

Table 4-1. Representative external noise levels at Crescent House (dB)

Facade	Period	Description	External noise level (dB)
Goswell Road	Day-time (07:00 - 23:00)	$L_{Aeq,16hr}$	70
		$L_{Aeq,8hr}$	67
	Night time (23:00 - 07:00)	$L_{AFmax,T}$	84
Rear / Internal Courtyards	Day-time (07:00 - 23:00)	$L_{Aeq,16hr}$	58
		$L_{Aeq,8hr}$	55*
	Night time (23:00 - 07:00)	$L_{AFmax,T}$	74

* In the absence of night time noise data within the courtyard areas, a similar to the Goswell Road night time noise reduction of 3 dB has been assumed.

Based on the above external noise information and provided information on Crescent House flat layouts and elevations, calculations were carried out following the methodology given in BS 8233:2014 to predict the minimum sound insulation performance of façade elements to meet the internal ambient noise guideline values given in Table 2-2.

Table 4-2 presents the minimum required sound insulation performance for glazed and non-glazed elements of the facades.

Table 4-2 Minimum sound insulation performance requirements

Building Element	$R / D_{n,e}$ at octave band centre frequency (Hz)							R_w (-Ctr) (dB)
	63	125	250	500	1000	2000	4000	

External Wall	All Facades	35	41	45	45	54	55	55	52 (-)
Glazed elements	Goswell Road facades	33	36	36	44	47	49	58	47 (-4)
	Courtyard facades	16	18	24	33	44	48	48	36 (-6)

For guidance, Table 4-3 provides example glazing systems that would typically meet the acoustic performances set out in Table 4-2.

Table 4-3 Typical glazed systems

Building Element

Glazed elements	Goswell Road facades	10mm glass / 16 mm Argon / 6 mm glass / 16 mm Argon / 12.2 mm acoustic laminated glass
	Courtyard facades	4 mm float glass / 12 mm Argon / 4 mm float glass / 12 mm Argon / 6.2 mm laminated glass

Due to the high levels of noise incident upon the Goswell Road façade (including facades that have direct line of sight to Goswell Road) and the large façade glazed areas, the sound insulation requirements for the glazed elements are particularly onerous.

The above performance (overall and per frequency) must be met by the entire glazing unit, i.e. glass, frames, seals, ventilators etc. Weak non-glass elements will require the use of higher performance glass units to maintain the required sound insulation. If ventilators are to be incorporated in the frames, these should not result in a reduction of the combined glazed element sound insulation performance per frequency given in Table 4-2 when in an open condition to allow air movement. There should be no gaps at the frame perimeter or anywhere else on the glazed system, e.g. where openable panes meet.

Test reports of a typical framed element performance must be submitted from independent test authorities.

Any non-glazed elements of the façade, e.g. existing external wall should meet (or be upgraded to meet) the minimum sound insulation performance values given in Table 4-2.

Note that in the case a decision is made to retain the existing timber frames and only replace the glazing, as the sound insulation performance of the existing frames is unknown and cannot be tested in isolation, it would not be possible to predict and confirm compliance with the BS 8233 guideline values. It is expected that the existing frame sound insulation performance would be significantly lower to that of the proposed glass and therefore would result in a sound insulation performance reduction of the overall system.