41-42 The Hill, Northfleet, Gravesend, DA11 9EX

BS4142 & BS8233 NOISE ASSESSMENT

26 July 2024

Avtar Toor

Airtight Building Solutions LTD
11 Imperial Drive,
North Harrow,
London,
HA2 7BP,

nilav@airtightbuildingsolutions.co.uk
+44(0)7482 316963

Address: 41-42 The Hill, Northfleet, Gravesend, DA11 9EX

BS4142 & BS8233 NOISE ASSESSMENT

Report Reference: ABSLCR261724-01

Revision	Description	Issued by	Issue date
-	First Issue	Nilav Babariya	26/07/24

DISCLAIMER

This report has been prepared by Airtight Building Solutions LTD and Crimson Remote Services Ltd with due care and diligence in accordance with the instruction of the client and within the terms and conditions of the Contract with the Client.

The report is for the sole use of the Client. Airtight Building Solutions LTD and Crimson Remote Services Ltd shall not be held responsible for any use of the report or its content for any purpose other than that for which it was prepared and provided to the Client.

Airtight Building Solutions LTD and Crimson Remote Services Ltd accepts no responsibility of whatever nature to any third parties who may have been made aware of or have acted in the knowledge of the report or its contents.

No part of this document may be copied or reproduced without the prior written approval of Airtight Building Solutions LTD and Crimson Remote Services Ltd.

Airtight Building Solutions LTD
11 Imperial Drive,
North Harrow,
London,
HA2 7BP,

info@airtightbuildingsolutions.co.uk
+44(0)7482 316963

Table of Contents

INTRODUCTION

Airtight Building Solutions have been commissioned to undertake a noise impact survey and assessment for 41-42 The Hill, Northfleet, Gravesend, DA11, 9EX.

The methodology used for this assessment will be BS8233:2014 as this is a new development within the designated area. BS4142:2014+A1:2019 will also be considered with the possibility of industrial noise to the rear of the proposed dwellings.

The report will also issue recommendations of acoustic performance of glazing and, if required, ventilation proposals in order for the future dwelling to meet all necessary criteria.

DEVELOPMENT DESCRIPTION

The proposed dwellings are located in what is currently an office-use building just off of The Hill, Northfleet.

The development consists of a three-storey set of residential dwellings above a proposed restaurant on the ground floor. This involves both the existing building and an extension in the vacant land to the south-East of the main building.

The main noise sources likely to disrupt the proposed building are traffic and patron noise to the front of the building and any industrial noise to the rear from the large factory development. There is, however, a drop of approximately 15-20m down to the industrial area below the ridge.

With the above sources in mind the monitoring took place at the front and rear of the existing building to ascertain the façade levels around the proposed dwellings.

Locations of Monitors

Two Type 1 sound level meters were installed in the areas covering the front and rear of the building.

Figure 1 & 2 shows the area where the monitor was installed

All locations are displayed on site map in figure 3

Figure 1 – Rear Industrial

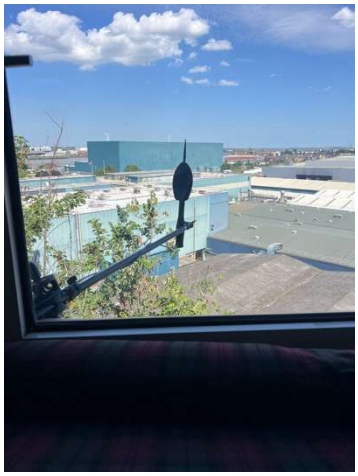


Figure 2 - Front

Measurements were made in 15 minute periods, on 1 second averaging, to allow for the removal of anomalies and increased accuracy. The data was averaged into L_{Aeq_16hr} daytime and L_{Aeq_8hr} night-time with data also recorded for L_{AMax} in both day and night periods for the BS8233:2014 assessment. L_{A90} was also measured for the BS4142:2014 aspect.

The monitoring was conducted using 2 x Norsonic 140 sound level meters, outdoor case with batteries and outdoor microphone protection.

The measurements were taken by a fully qualified engineer with MIOA status with the institute of Acoustics.

All measurements were taken after a field calibration was undertaken to ensure accuracy and repeatability of measurements. Drift was also checked post measurement to validate the data collected.

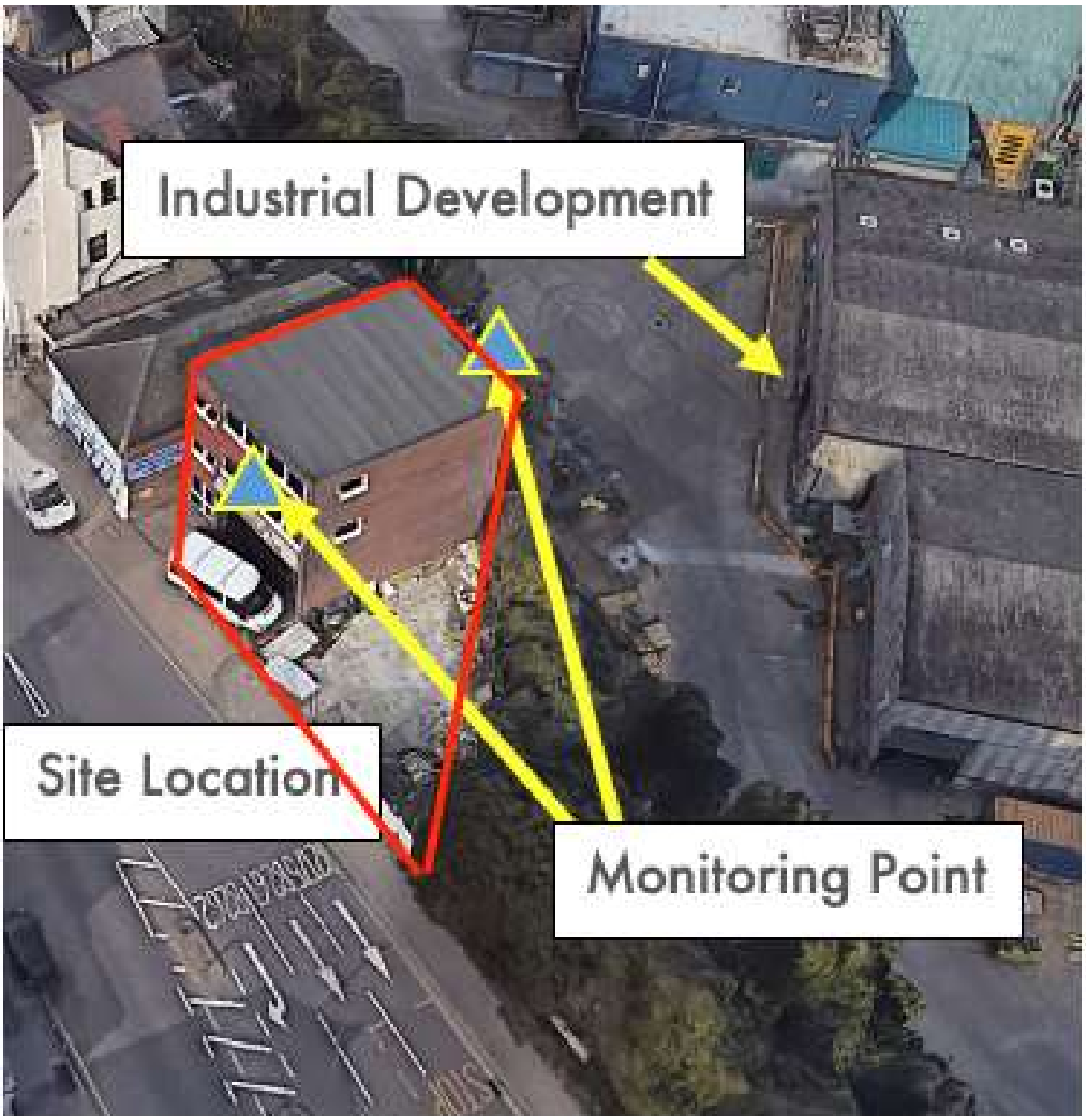
Further data such as wind speed, wind direction, rainfall intensity, temperature and cloud cover were all recorded at the beginning and end of the assessment at the monitoring location.

Any anomalies (such as noise by the engineer during setup and collection of the kit) were removed from the survey for a true reflection of the ambient levels in the vicinity. This was done by recording audio throughout the survey at each location and listening back through the files during the analysis process to confirm what was recorded manually during the survey.

Care was taken to inform any residents in the area that audio recording was taking place.

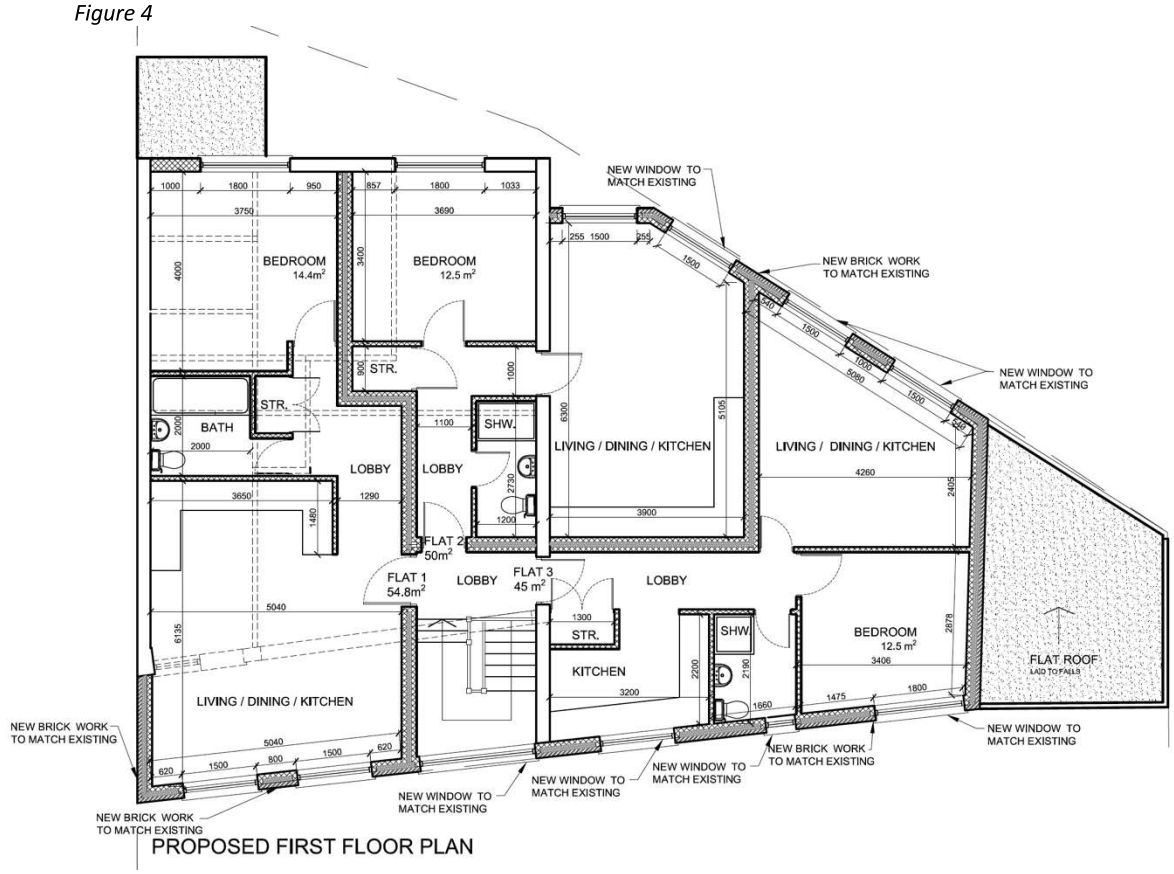
PLAN VIEWS OF SITE WITH DESIGNATED WORK AREAS

Figure 3



Proposed Layout

Figure 4



NOISE ASSESSMENT CRITERIA

The National Planning Policy Framework (NPPF) sets out the Government's economic, environmental and social planning policies for England and "these policies articulate the Government's vision of sustainable development." In respect of noise, Paragraph 174 of the NPPF states the following:

"Planning policies and decisions should contribute to and enhance the natural and local environment by:

preventing new and existing development from contributing to, being put at unacceptable risk from, or being adversely affected by, unacceptable levels of soil, air, water or noise pollution or land instability."

Paragraph 185 goes on to mention:

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

a) mitigate and reduce to a minimum potential adverse impacts resulting from noise from new development – and avoid noise giving rise to significant adverse impacts on health and the quality of life;

b) identify and protect tranquil areas which have remained relatively undisturbed by noise and are prized for their recreational and amenity value for this reason;"

The NPPF reinforces the March 2010 DEFRA publication, "Noise Policy Statement for England" (NPSE), which states three policy aims, as follows:

"Through the effective management and control of environmental, neighbour and neighbourhood noise within the context of Government policy on sustainable development:

avoid significant adverse impacts on health and quality of life;

mitigate and minimise adverse impacts on health and quality of life;

and where possible, contribute to the improvement of health and quality of life."

Together, the first two aims require that no significant adverse impact should occur and that, where a noise level which falls between a level which represents the lowest observable adverse effect and a level which represents a significant observed adverse effect, then according to the explanatory notes in the statement:

"... all reasonable steps should be taken to mitigate and minimise adverse effects on health and quality of life whilst also taking into consideration the guiding principles of sustainable development. This does not mean that such effects cannot occur."

It is possible to apply objective standards to the assessment of noise and the effect produced by the introduction of a certain noise source may be determined by several methods, as follows:

The effect may be determined by reference to guideline noise values. British Standard (BS) 8233:2014 and World Health Organisation (WHO) "Guidelines for Community Noise" contain such guidelines.

Another method is to compare the resultant noise level against the background noise level (L_{A90}) of the area. This is the method employed by BS 4142:2014 to determine the likelihood of complaint from noise of an industrial nature. It is best suited to the assessment of steady or pseudo-steady noise.

British Standard 8233:2014 is principally intended to assist in the design of new dwellings; however, the Standard does state that it may be used in the assessment of noise from new sources being brought to existing dwellings.

The WHO guideline values are appropriate to what are termed “critical health effects”. This means that the limits are at the lowest noise level that would result in any psychological or physiological effect. The WHO/BS 8233 guideline noise values are summarised in the following table:

Table 1

Guidance Document	L_{AeqT}	L_{AMax}	Outcome
World Health Organisation "Community Noise 2000"	55dB		Serious annoyance, daytime and evening. (Continuous noise, outdoor living areas)
	50dB		Moderate annoyance, daytime and evening. (Continuous noise, outdoor living areas).
	35dB		Moderate annoyance, daytime and evening. (Continuous noise, dwellings, indoors)
	30dB		Sleep disturbance, night-time (indoors)
		60dB	Sleep disturbance, windows open at night. (Noise peaks outside bedrooms, external level).
		45dB	Sleep disturbance at night (Noise peaks inside bedrooms, internal level)
BS 8233:2014 "Sound Insulation and noise reduction for buildings"	55dB		Upper limit for external steady noise. (gardens and patios).
	50dB		Desirable limit for external steady noise. (gardens and patios).
	L_{Aeq} 16 hours = 35 dB		Resting, living room day. (Internal – steady noise)
	L_{Aeq} 16 hours = 40 dB		Dining, dining room day. (Internal – steady noise)
	L_{Aeq} 16 hour = 35 dB		Sleeping, bedroom day (Internal – steady noise)
	L_{Aeq} 8 hours = 30 dB		Sleeping, bedroom day (Internal – steady noise)

For L_{AeqT} criteria the time base (T) given in the documents is 16 hours for daytime limits and 8 hours for night time limits. All surveys are conducted on 1 hour daytime and 15 minute night values – based on 1 second readings on a Type 1 sound level meter. The readings are taken every 5 mins for noise to allow the elimination of erroneous data if required.

The WHO guidelines are also concerned with the L_{AMax} for night-time sleep disturbance. The guideline states:

> "For a good sleep, it is believed that indoor sound pressure levels should not exceed approximately 45 dB L_{AFmax} more than 10-15 times per night"

On this basis, for the purpose of assessing night-time L_{AFmax} noise events, it is considered appropriate to adopt the 10th highest L_{AFmax} noise event occurring in a typical night-time (23:00 – 07:00) period.

Audio recordings are taken throughout the measurements to allow for further assessments on high levels. Listening to the audio and performing tonal analysis will allow anomalies to be removed from the data, if required.

BS4142:2014 +A1 (2019)

Noise effects on residential properties due to the current operational hours of the industrial plant have been assessed according to the guidance in BS 4142:2014. This standard primarily provides a numerical method by which to determine the significance of sound of an industrial nature (i.e. the 'specific sound' from the proposed development) at residential sensitive receptors.

The specific sound level may then be corrected for the character of the sound (e.g. perceptibility of tones and/or impulses), if appropriate, and it is then termed the 'rating level', whether or not a rating penalty is applied. The 'residual sound' is defined as the ambient sound remaining at the assessment location when the specific sound source is suppressed to such a degree that it does not contribute to the ambient sound.

According to BS 4142:2014, the background sound levels adopted for the assessment should be representative of the periods being assessed. The standard recommends that the background sound level should be collected from continuous measurements of normally not less than 15-minute intervals. However, the Standard states that there is no 'single' background sound level that can be derived from such measurements. It is particularly difficult to determine what is 'representative' of the night-time period because it can be subject to a wide variation in background sound levels between the shoulder night periods.

The method chosen for this section of the report is to use the data collected at the nearest NSR for the day and night periods to provide the ambient and background noise levels. The

mode $L_{Aeq\_1hr(Day)}$ and $L_{Aeq\_15min(Night)}$) value will then be used for each time period over the course of the measurement as the most appropriate way of creating a representative value.

The specific sound levels have been determined separately in terms of the L_{Aeq1hr} during the daytime $L_{Aeq15min}$ during the night-time. Daytime is typically between 07:00 and 23:00 hours and night-time is typically between 23:00 and 07:00 hours, so these periods have been adopted for this assessment.

At each of the most likely sensitive receptor locations, the rating level has been determined from the predicted specific sound level. Where it has considered it to be appropriate, a rating penalty has been applied for tonality, impulsivity and/or intermittent specific sounds as described in the commentary to paragraph 9.2 of BS4142:2014. This has been applied with consideration for the main sound sources from site that contribute to the level of specific sound at the receptor location.

As per the requirements of the standard, an initial estimate of the impact of the specific sound has been obtained by subtracting the measured background sound level from the rating level of the specific sound. Table 2 provides the initial evaluation of impact following this method.

Table 2

Magnitude	Difference Between rating Level and Background Level	Comments
High	**+10dB**	**Significant Adverse impact Likely**
Medium	**+5 to +10dB**	**Adverse impact Likely**
Low	**0 to +5 dB**	**Adverse impact unlikely**
Negligible	**Less than 0dB**	**Low chance of Adverse Impact**

Following the initial evaluation of impact, the context of the sound has also been considered, which is a key requirement of the Standard. In evaluation of the context, the following factors have been considered:

the absolute level of the sound;

the character and level of the residual sound compared to the character and level of the specific sound and

the sensitivity of the receptor and whether dwellings or other premises used for residential purposes will already incorporate design measures that secure good internal and/or outdoor acoustic conditions.

Chosen Criteria

Based on the proposed development for a new dwelling, BS8233 was selected for this assessment. BS4142:2014 will also be looked at due to the presence of plant/machinery noise to the rear of the proposed dwellings.

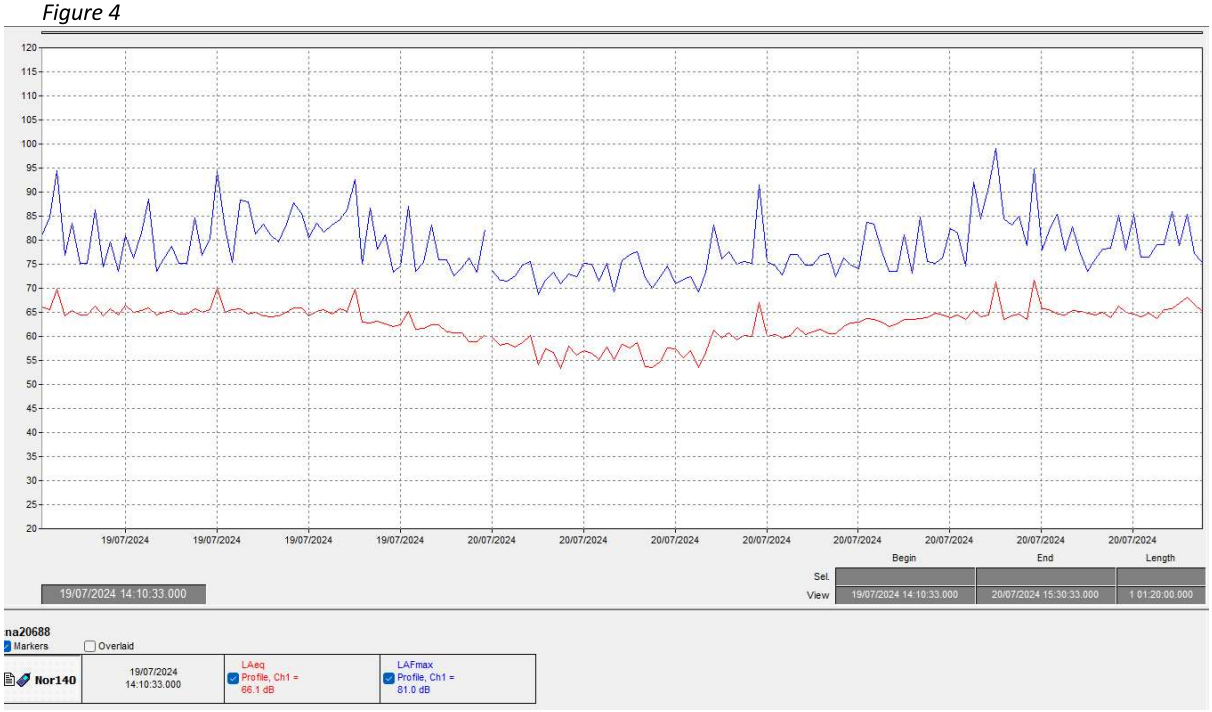
RESULTS

Noise Assessment (Front)– 15.01pm 19/07/24 – 15.40pm 20/07/24

Table 3

Location	L_{Aeq_16hr}	L_{Aeq_8hr}	$L_{Amax\ (10th\ highest)}$	L_{A90}
Day	**65.0dBA**			**61.2dBA**
Night		**58.7dBA**	**77.1dBA**	**56.6dBA**

Figure 4



Comments: Mainly traffic pass-by noise. No tonal features

Table 4

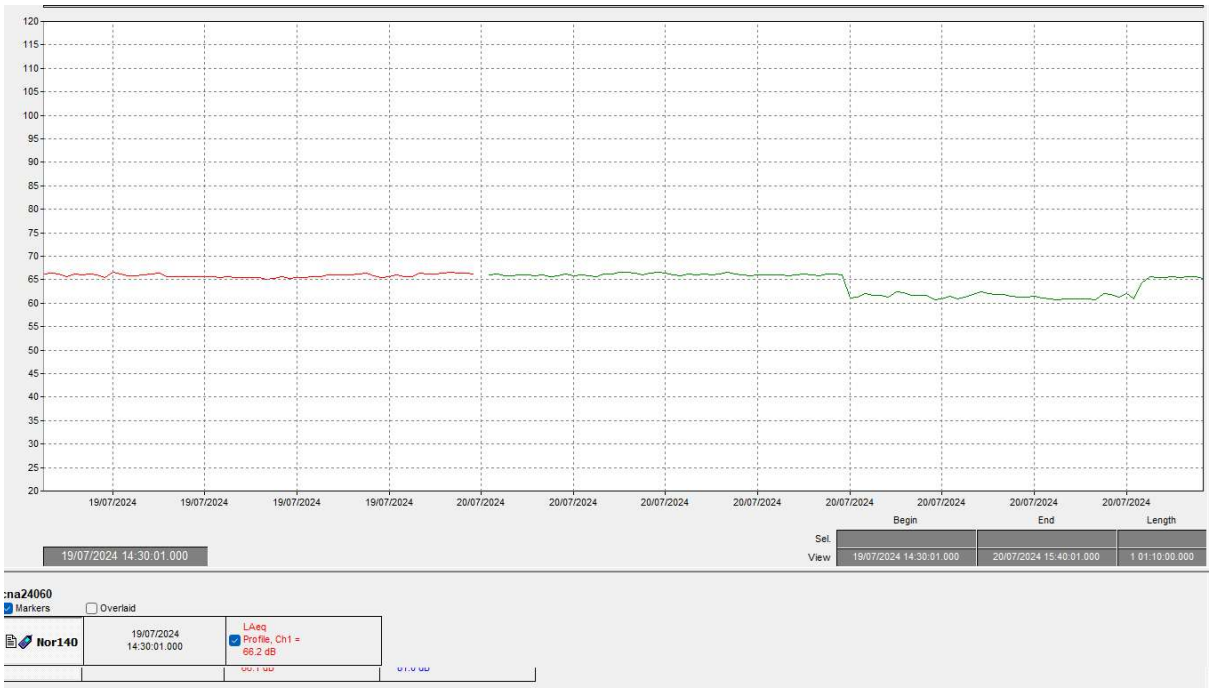
Day/Time	Cloud Cover	Temperature (Celcius)	Prescence of fog/snow/ice	Wind Speed (m/s)	Wind Direction
Installation	1	22	No	1.2	NW
Collection	3	20	No	1.7	SSW

Noise Assessment (Rear)– 15.00pm 19/07/24 – 15.40pm 20/07/24

Table 5

Location	L_{Aeq_16hr}	L_{Aeq_8hr}	$L_{Amax\ (10th\ highest)}$	L_{A90}
Day	**66.0dBA**			**65.5dBA**
Night		**66.0dBA**	**68.7dBA**	**65.8dBA**

Figure 5



Comments: Heavy industrial noise sources.

Table 6

Day/Time	Cloud Cover	Temperature (Celcius)	Prescence of fog/snow/ice	Wind Speed (m/s)	Wind Direction
Installation	1	22	No	0.4	NW
Collection	3	20	No	0.9	SSW

Comparison of Results to BS8233

Table 7

Location/ Time Period	L_{AeqT} (16hr Day & 8hr Night)	L_{AMax}	BS8233 & WHO Internal noise	BS8233 & WHO External Noise	Difference to L_{Aeq} (internal/external) limit	Difference to Max (internal/external)
Front						
Day (0700-2300)	65dBA		35dBA	55dBA	(+30dBA/ +10dBA)	-
Night (2300-0700)	59dBA	77dBA (10th Highest)	30dBA (45dBA L_{AMax})	(60dBA L_{AMax})	(+29dBA)	(+32dBA)
Rear						
Day (0700-2300)	66dBA		35dBA	55dBA	(+31dBA/ +11dBA)	-
Night (2300-0700)	66dBA	69dBA (10th Highest)	30dBA (45dBA L_{AMax})	(60dBA L_{AMax})	(+36dBA)	(+24dBA)

OBSERVATIONS AND FURTHER DISCUSSIONS

The measured L_{Aeq} values for both the day and the night periods are shown in table 7. The day period is 30dBA above the limit for indoor noise levels to the front of the building. The rear of the building is 31dBA above the limits and can therefore have a lower-grade window type compared to the front.

The night value is also 29dBA above the recommended value for internal noise to prevent sleep disturbance to the front of the proposed dwelling, with the rear 36dBA above the limit. Again, this further supports the comment in 5.0.1 that a lower-grade window would be suitable to the front of the building.

BS8233 assumes that a standard double-glazed window will provide up to 15dB reduction when open (with some council guidelines leaning on the side of caution and assuming a 10dB reduction). Either option would mean that any modern double-glazed window in the building cannot be the main source of ventilation with a low chance of sleep disturbance being had by the inhabitants of the proposed dwellings. Trickle vents/acoustic vents will therefore for required throughout the proposed building to prevent overheating in accordance with document O of the building regs.

The L_{AMax} value to prevent the likelihood of sleep disturbance is set at 60dBA external and 45dBA internal. Based on the highest value from the tenth-highest daily value measured during the week the reading for L_{AMax} night was 77dBA at the front. This value is 32dBA above

the required value externally for sleep disturbance. This therefore increases the required specification of windows to the front of the building slightly, and will be used as the figures for the BS8233 Annex G calculation procedure to provide specific product examples for the glazing and ventilation in the proposed dwelling. The night L_{Aeq} comparison value will be used to the rear of the building as the highest potential difference.

BS8233:2014 Annex G Calculations

	Overall dBA	Octave Band Frequency (Hz)					
Time Period		125	250	500	1000	2000	4000
LAMax	77.1	68	68	70	71	70	68

Room Details	(m)	Bedroom Front
Height	2.2	
Width	3.406	
Length	2.878	
Sample Room Volume	21.5654296	
Sample Room Surface Area	27.6496	

Element	Area/No.of	Element Specification
External Wall	7.4932	Traditional brick and block with ties and insulation
Windows	1.5	6 mm / 16 mm argon /6.8 mm Pilkington Optiphon™
Ceiling	9.802468	
Ventilation	1	Standard acoustic trickle ventilator typically ≥ Dn,e,w 35dB

Element SRI

		Octave Band Frequency (Hz)						Single Figure Rating
Element	Area/No.of	125	250	500	1000	2000	4000	
Walls	4	41	49	56	63	67	72	57
Windows	1	21	28	37	48	48	54	40
Ceiling	1	28	34	40	45	49	52	
Ventilation (Dn,e)	1	33	33	34	35	32	31	35

Overal Sound Reduction

Calculated Internal SPL

	Overall	Octave Band Frequency (Hz)					
		125	250	500	1000	2000	4000
Leq,2	44.8	31.2	32.7	36.1	37.6	39.9	38.8
Limit	45						
Value under limit	0.2						

		Overall dBA	Octave Band Frequency (Hz)					
Time Period			125	250	500	1000	2000	4000
LAeq	Night	66.0	55	57	60	61	57	56

Room Details	(m)	Bedroom Rear
Height	2.2	
Width	3.69	
Length	3.4	
Sample Room Volume	27.6012	
Sample Room Surface Area	31.196	

Element	Area/No.of	Element Specification
External Wall	8.118	Traditional brick and block with ties and insulation
Windows	1.5	6 mm / 16 mm argon /6.8 mm Pilkington Optiphon™
Ceiling	12.546	
Ventilation	1	DucoMax acoustic trickle ventilator ≥ Dn,e,w 45dB

Element SRI

		Octave Band Frequency (Hz)						Single Figure Rating
Element	Area/No.of	125	250	500	1000	2000	4000	
Walls	4	41	49	56	63	67	72	60
Windows	1	21	28	37	48	48	54	40
Ceiling	1	28	34	40	45	49	52	
Ventilation (Dn,e)	1	32	34	41	50	42	41	45

Overal Sound Reduction

Calculated Internal SPL

	Overall	Octave Band Frequency (Hz)					
		125	250	500	1000	2000	4000
Leq,2	28.6	18.6	21.6	23.8	21.7	18.4	17.1
Limit	30						
Value under limit	1.4						

GLAZING, STRUCTURAL AND VENTILATION

RECOMMENDATIONS

External Walls

External walls of the proposed building are understood to be traditional 9" brick:

Table 8

Description	Octave Band Centre Frequency (Hz) Sound Reduction Index *R* dB					
	125	250	500	1k	2k	4k
Traditional solid 300mm brick & insulation	39	44	51	58	63	68

Glazing

Suitable sound insulation performance of all windows and patio doors of the development may be achieved the example product for noise reduction shown in table 9.

Table 9

Location	Description	Octave Band Centre Frequency (Hz) Sound Reduction Index *R* dB						Rw (C; Ctr)
		125	250	500	1k	2k	4k	
Front	8 mm / (16 mm argon) / 8.8 mm Pilkington Optiphon	21	30	39	47	50	55	42 (-3,-8)
Rear	8 mm / (16 mm argon) / 8.8 mm Pilkington Optiphon	21	30	39	47	50	55	42 (-3,-8)

Ventilation

It is anticipated that a ventilation system will be needed to be incorporated into the scheme design, such that residents of the properties are able to have background ventilation without necessarily needing to open windows.

If ventilation is provided where windows are decided not to be openable the specification will need to meet or exceed that provided in table 10. Any mechanical ventilation will also need to make sure the internal levels within rooms are not increased as this may exceed the BS8233:2014 limits post glazing specification.

Table 10

Location	Description	Octave Band Centre Frequency (Hz) Sound Reduction Index $D_{n,e}$ dB					
		125	250	500	1k	2k	4k
Rear	DucoMax acoustic trickle ventilator ≥ Dn,e,w 45dB	32	34	41	50	42	41
Front	Standard non-acoustic trickle ventilator typically ≥ Dn,e,w 30dB	30	30	30	30	30	28

BS4142:2014+A1:2019 CONSIDERATION

With the possibility of industrial noise to the rear of the proposed development it is important to consider the BS4142:2104 standard in addition to the BS8233 proposal. This includes comparison to the background noise level at the façade location. As the background noise to the rear of the building is almost equal to the LAeq, the front background noise level has been used as this is masked from the rear industrial noise. A suitable proxy location was not used as there was not another location where there would be a suitable balance between road background noise and other sources in the area.

The measured lowest L_{A90_15min} value of 55dBA provides a representative value for the background noise level when shielded from the industrial estate. This can then be used for the assessment in table 10 to calculate the likely level of impact of any industrial noise sources to the rear of the proposed dwellings, assuming that all sources are continuously operational (as they appear to be).

Any further plant noise from the proposed dwellings and restaurant itself has not been included as they have not currently been specified. A further BS4142:2014 assessment may also be required once the occupier of the restaurant has been decided upon, and then the nature and location of any additional plant.

Table 10

Measurement Type	Parameter	Result	Comment
Day – Rear			
Ambient sound	L_{Aeq}	**66dBA**	**Measured at NSR- Source present (rear)**
Residual sound level	L_{Aeq1hr}	**61dBA**	**Measured at NSR- Source not present (front)**
Background sound level	L_{A901hr}	**55dBA**	**Measured at NSR- Source not present (front)**
Specific Sound Level	L_{Aeq1hr}	**66dBA**	**Measured (rear)**
Acoustic Feature Correction	**dBA**	**+6**	**Tonal noise sources**
Rating Level	**dBA**	**72dBA**	
Difference of Background vs Rating level	**dBA**	**+17dB**	
Likelihood of complaints			**Significant Chance of Adverse impact**

With the assumptions made related to the source itself and activity it is considered that there will be a significant chance of adverse impact from industrial sources on the rear of the proposed development.

CONCLUSION

The use of the suggested configuration specification in section 6 will allow the proposed site to meet the regulations for acoustic performance in accordance with BS8233:2014.

The existing plant noise to the rear of the property, accompanied by the proposed glazing and ventilation plan, will also mean that the site fully conforms to the specified standards.

Despite the above comments the tonal nature would mean that windows at the rear should not be openable as the noise from the industrial estate is continuous through the night period. The high levels at the external façade would mean there is a significant chance of adverse impact. As there is no method of mitigation against the industrial estate, other than erecting a substantial fence/shielding structure that is the same height of the building, mechanical ventilation would be the best option with the current design layout.

One final consideration, in accordance with ProPG recommendations, would be for the internal layout to be reorganised so there are no bedrooms to the rear of the proposed development. As the glazing and ventilation specification to the front is far lower, the recommendations from section 6 would be used for all bedrooms across the site and there would be no need for mechanical ventilation.

CREDENTIALS

Name	Title	Credentials
James Flitton BSc AMIOA	Acoustic Consultant	CSCS Professionally Qualified person
		Associate Member Institute of Acoustics
		IOA Diploma in Acoustics and Noise Control
		Affiliate Member of IDE
		Affiliate Member of IOR
Nilav Babariya BEng AMIOA	Acoustic Consultant	Associate Member Institute of Acoustics
Signed	[redacted]	

APPENDIX A – ACOUSTIC TERMINOLOGY

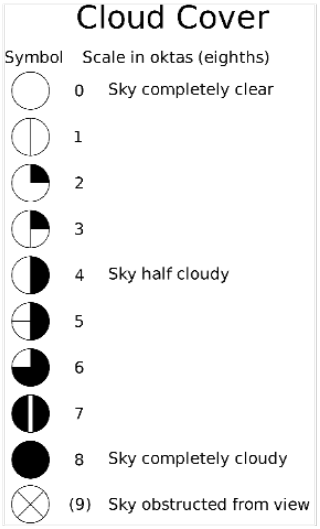
Parameter	Description
Ambient Noise Level	The totally encompassing sound in a given situation at a given time, usually composed of a sound from many sources both distant and near (LAeq,T).
Decibel (dB)	A scale for comparing the ratios of two quantities, including sound pressure and sound power. The difference in level between two sounds s1 and s2 is given by 20 log10 (s1/s2). The decibel can also be used to measure absolute quantities by specifying a reference value that fixes one point on the scale. For sound pressure, the reference value is 20μPa. The threshold of normal hearing is in the region of 0 dB and 140 dB is the threshold of pain. A change of 1 dB is only perceptible under controlled conditions.
dB(A), L_{Ax}	Decibels measured on a sound level meter incorporating a frequency weighting (A weighting) which differentiates between sounds of different frequency (pitch) in a similar way to the human ear. Measurements in dB(A) broadly agree with people's assessment of loudness. A change of 3 dB(A) is the minimum perceptible under normal conditions, and a change of 10 dB(A) corresponds roughly to halving or doubling the loudness of a sound. The background noise in a living room may be about 30 dB(A); normal conversation about 60 dB(A) at 1 metre; heavy road traffic about 80 dB(A) at 10 metres; the level near a pneumatic drill about 100 dB(A).
Free-field	Sound pressure level measured outside, far away from reflecting surfaces (except the ground), usually taken to mean at least 3.5 metres
Façade	Sound pressure level measured at a distance of 1 metre in front of a large sound reflecting object such as a building façade.
$L_{Aeq,T}$	A noise level index called the equivalent continuous noise level over the time period T. This is the level of a notional steady sound that would contain the same amount of sound energy as the actual, possibly fluctuating, sound that was recorded.
$L_{max,T}$	A noise level index defined as the maximum noise level recorded during a noise event with a period T. L_{max} is sometimes used for the assessment of occasional loud noises, which may have little effect on the overall Leq noise level but will still affect the noise environment. Unless described otherwise, it is measured using the 'fast' sound level meter response.
$L_{10,T}$	A noise level index. The noise level exceeded for 10% of the time over the period T. L_{10} can be considered to be the "average maximum" noise level. Generally used to describe road traffic noise. $L_{A10,18h}$ is the A –weighted arithmetic average of the 18 hourly $L_{A10,1h}$ values from 06:00-24:00.
$L_{90,T}$	A noise level index. The noise level exceeded for 90% of the time over the period T. Generally used to describe background noise level.

APPENDIX B - NOISE SURVEY INSTRUMENTATION

Type	Manufacturer	Model	Serial Number	Last Cal	Cal Due
SLM	Norsonic	140	1404768	30/11/2022	30/11/2024
Calibrator	Rion	NC-74	35046846	14/02/2024	14/02/2024
Vibration	Sigicom	C22	107923	24/11/2023	24/11/2025

APPENDIX C – WEATHER CONDITIONS CHART USED

(Blank version)

<table>
<tr><th colspan="5">Weather Conditions</th></tr>
<tr><th>Measurement Location</th><th>Date/Time</th><th>Description</th><th>Beginning of Survey</th><th>End of Survey</th></tr>
<tr><td></td><td></td><td>Temperature:</td><td></td><td></td></tr>
<tr><td colspan="2" rowspan="8"> 
</td><td>Precipitation:</td><td></td><td></td></tr>
<tr><td>Cloud cover (oktas - see guide)</td><td></td><td></td></tr>
<tr><td>Presence of fog/snow/ice</td><td></td><td></td></tr>
<tr><td>Presence of damp roads/wet ground</td><td></td><td></td></tr>
<tr><td>Wind Speed (m/s)</td><td></td><td></td></tr>
<tr><td>Wind Direction</td><td></td><td></td></tr>
<tr><td>Conditions that may cause temperature inversion (i.e. calm nights with no cloud)</td><td></td><td></td></tr>
</table>