



NOISE ASSESSMENT

**44-46 YORKSHIRE STREET
ROCHDALE
OL16 1JW**



Report by
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SBM Safety Solutions Ltd.

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Site Visited: 2nd, 5th, 6th and 8th September 2022
Site Visited by: S.B. Mellor
Signed:

A handwritten signature in blue ink, appearing to read 'S.B. Mellor'.

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1.0 INTRODUCTION

At the request of Mr. N. Fletcher of Cassel and Fletcher, SBM Safety Solutions Ltd undertook a noise assessment in connection with the proposed development of an existing building at 44-46 Yorkshire Street, Rochdale, OL16 1JW. It is proposed that the upper floors of the building will be developed for domestic use and the lower floor retained for other uses (formerly used for retail).

Transportation and other sources of noise (where applicable) would be examined where they could affect future residents of this development.

Noise monitoring equipment was installed over 24 hours or more (over a weekend period for the positions overlooking the Yorkshire Street shopping area and bars to the rear). The monitoring would establish the existing noise climate for this location, ambient and background levels LA90.

We will also refer to noise data for road and rail traffic which is available from DEFRA. We can use this data as a comparison. ¹

¹ Department of Environment Food & Rural Affairs

This report considers measurements made on site, the requirements of NPPF (see below for details) and current standards such as BS4142: 2014, BS8233:2014 (also detailed below), plus other appropriate criteria; and makes recommendations as necessary.

References are included in Appendix 1; Acoustic terminology is explained in Appendix 2 of this report; The author's qualifications and experience are described in Appendix 3; and views of the site in Appendix 4.

2.0 SITE DESCRIPTION

The façade facing Yorkshire Street sits directly opposite a multi-story car park and the Rochdale Exchange Shopping Centre. There are a variety of other shops and uses adjacent to the shopping centre including, e.g. Greggs, B&M and Marks and Spencer.

To the rear off Baillie Street there are bars, pubs and restaurants including a large Wetherspoon's pub (The Regal Moon) at approximately 20m, a Hogarth's pub at approximately 30m (there is also a closer outdoor seating area) and a café (The Petit Bistro) at approximately 15m.

(see Figure 1 below – source Google Earth).

Figure 1



Source – Google Earth

To the observer, there appeared to be a very low volume of vehicles at the rear – access for business use only. Yorkshire Street is pedestrianised. (See subjective impression for more details below).

3.0 ASSESSMENT CRITERIA

3.1 NPPF (National Planning Policy Framework)

When considering applications for new residential development adjacent to existing noise sources, the relevant document is the “National Planning Policy Framework” or NPPF (2019). This replaces an earlier version from 2012.

The national Planning Practice Guidance (PPG) web-based resource was launched by the Department for Communities and Local Government (DCLG) on 6 March 2014 to support the original National Planning Policy Framework and make it more accessible. The overall aim of the guidance, tying in with the principles of the NPPF and the Explanatory Note of the Noise Policy Statement for England, is to identify whether the overall effect of noise exposure is, or would be, above or below the significant observed adverse effect level and the lowest observed adverse effect level for the given situation.

A summary of the effects of noise exposure associated with both noise generating developments and noise sensitive developments is presented within the PPG:

Table 1

Perception	Examples of Outcomes	Increasing Effect Level	Action
Not noticeable	No Effect	No Observed Effect	No Specific Measures Required
Noticeable and not intrusive	Noise can be heard but does not cause any change in behaviour or attitude. Can slightly affect the acoustic character of the area but not such that there is a perceived change in the quality of life.	No Observed Adverse Effect (NOEL)	No Specific Measures Required
Lowest Observed Adverse Effect Level (LOAEL)			
Noticeable and intrusive	Noise can be heard and causes small changes in behaviour and/or attitude, e.g. turning up volume of television; speaking more loudly; closing windows for some of the time because of the noise. Potential for non-awakening sleep disturbance. Affects the acoustic character of the area such that there is a perceived change in the quality of life.	Observed Adverse Effect	Mitigate and reduce to a minimum
Significant Observed Adverse Effect Level (SOAEL)			
Noticeable and disruptive	The noise causes a material change in behaviour and/or attitude, e.g. having to keep windows closed most of the time, avoiding certain activities during periods of intrusion. Potential for sleep disturbance resulting in difficulty in getting to sleep, premature awakening and difficulty in getting back to sleep. Quality of life diminished due to change in acoustic character of the area.	Significant Observed Adverse Effect	Avoid
Noticeable and very disruptive	Extensive and regular changes in behaviour and/or an inability to mitigate effect of noise leading to psychological stress or physiological effects, e.g. regular sleep deprivation/awakening; loss of appetite, significant, medically definable harm, e.g. auditory and non-auditory.	Unacceptable Observed Adverse Effect	Prevent

The NPPF, NSPE and PPG:Noise do not, however, present absolute noise level criteria which define SOAEL, LOAEL and NOEL which is applicable to all sources of noise in all situations. Therefore, within the context of the proposed development, national planning policy and appropriate guidance documents including the ‘World Health Organisation Community Noise Guidelines’ (1999) and ‘BS 8233 – Guidance on Sound Insulation and Noise Reduction for Buildings (2014), which presents the noise level criteria used as a basis for this assessment.

The PPG:Noise also states that neither the NPSE nor the NPPF (which reflects the Noise Policy Statement) expects noise to be considered in isolation, separately from the economic, social and other environmental dimensions of the proposed development.

3.2 ProPG Professional Practice Guidance on Planning & Noise (May 2017) excerpts are reproduced below

The Professional Practice Guidance on Planning and Noise (ProPG) has been produced to provide practitioners with guidance on a recommended approach to the management of noise within the planning system in England.

The scope of ProPG is restricted to the consideration of new residential development that will be exposed predominantly to airborne noise from transport sources.

New apartments, flats and houses are the most common type of new residential development; however, the guidance can also be applied to other types of residential developments such as residential institutions, care homes etc.

The two sequential stages of the overall approach are:

Stage 1 – an initial noise risk assessment of the proposed development site; and

Stage 2 – a systematic consideration of four key elements.

The overall Stage 1 approach is considered to support wider Government planning and noise policy and guidance at the date of publication of this document, including the NPPF, NPSE and PPG-Noise.

The noise risk assessment may be based on measurement or prediction (or a combination) as appropriate and should aim to describe noise levels over a “typical worst case” 24-hour day either now or in the foreseeable future.

The four key elements to be undertaken in parallel during Stage 2 of the recommended approach are:

- **Element 1 – demonstrating a “Good Acoustic Design Process”;**
- **Element 2 – observing internal “Noise Level Guidelines”;**
- **Element 3 – undertaking an “External Amenity Area Noise Assessment”;** and
- **Element 4 – consideration of “Other Relevant Issues”.**

The approach is underpinned by the preparation and delivery of an “Acoustic Design Statement” (ADS). An ADS for a site assessed as high risk should be more detailed than for a site assessed as low risk.

An ADS should not be necessary for a site assessed as negligible risk. The choice of recommendation is as follows: “grant without conditions”, “grant with conditions”, “avoid” or “prevent”.

The recommended ProPG internal noise level guidelines are described in Figure 2. These guidelines reflect and extend current practice contained in BS8233:2014.

Figure 2

ACTIVITY	LOCATION	07:00 – 23:00 HRS	23:00 – 07:00 HRS
Resting	Living room	35 dB $L_{Aeq,10hr}$	-
Dining	Dining room/area	40 dB $L_{Aeq,10hr}$	-
Sleeping (daytime resting)	Bedroom	35 dB $L_{Aeq,10hr}$	30 dB $L_{Aeq,8hr}$ 45 dB $L_{Amax,7 (10min A)}$

NOTE 1 The Table provides recommended internal L_{Aeq} target levels for overall noise in the design of a building. These are the sum total of structure-borne and airborne noise sources. Ground-borne noise is assessed separately and is not included as part of these targets, as human response to ground-borne noise varies with many factors such as level, character, timing, occupant expectation and sensitivity.

NOTE 2 The internal L_{Aeq} target levels shown in the Table are based on the existing guidelines issued by the WHO and assume normal diurnal fluctuations in external noise. In cases where local conditions do not follow a typical diurnal pattern, for example on a road serving a port with high levels of traffic at certain times of the night, an appropriate alternative period, e.g. 1 hour, may be used, but the level should be selected to ensure consistency with the internal L_{Aeq} target levels recommended in the Table.

NOTE 3 These internal L_{Aeq} target levels are based on annual average data and do not have to be achieved in all circumstances. For example, it is normal to exclude occasional events, such as fireworks night or New Year's Eve.

NOTE 4 Regular individual noise events (for example, scheduled aircraft or passing trains) can cause sleep disturbance. A guideline value may be set in terms of SEL or $L_{Amax,5}$, depending on the character and number of events per night. Sporadic noise events could require separate values. In most circumstances in noise-sensitive rooms at night (e.g. bedrooms) good acoustic design can be used so that individual noise events do not normally exceed 45dB $L_{Amax,5}$ more than 10 times a night. However, where it is not reasonably practicable to achieve this guideline then the judgement of acceptability will depend not only on the maximum noise levels but also on factors such as the source, number, distribution, predictability and regularity of noise events (see Appendix A).

NOTE 5 Designing the site layout and the dwellings so that the internal target levels can be achieved with open windows in as many properties as possible demonstrates good acoustic design. Where it is not possible to meet internal target levels with windows open, internal noise levels can be assessed with windows closed, however any facade openings used to provide whole dwelling ventilation (e.g. trickle ventilators) should be assessed in the “open” position and, in this scenario, the internal L_{Aeq} target levels should not normally be exceeded, subject to the further advice in Note 7.

NOTE 6 Attention is drawn to the requirements of the Building Regulations.

NOTE 7 Where development is considered necessary or desirable, despite external noise levels above WHO guidelines, the internal L_{Aeq} target levels may be relaxed by up to 5 dB and reasonable internal conditions still achieved. The more often internal L_{Aeq} levels start to exceed the internal L_{Aeq} target levels by more than 5 dB, the more that most people are likely to regard them as “unreasonable”. Where such exceedances are predicted, applicants should be required to show how the relevant number of rooms affected has been kept to a minimum. Once internal L_{Aeq} levels exceed the target levels by more than 10 dB, they are highly likely to be regarded as “unacceptable” by most people, particularly if such levels occur more than occasionally. Every effort should be made to avoid relevant rooms experiencing “unacceptable” noise levels at all and where such levels are likely to occur frequently, the development should be prevented in its proposed form (see Section 3.D).

It should be noted that the acoustic performance of the building envelope will be reduced in the event windows are opened for ventilation or cooling purposes, typically reducing the insulation to no more than 10 to 15 dB(A). Most residents value the ability to open windows at will, for a variety of reasons. *“The acoustic environment of external amenity areas that are an intrinsic part of the overall design should always be assessed and noise levels should ideally not be above the range 50 – 55 dB LAeq,16hr.”*

ProPG Stage 1

For an initial assessment, the following table can be referred for indications of suitability:

Table 2

Level Day	Level Night	Risk	Conclusion
Below 50 dB(A) day	Below 40 dB(A) at night	Negligible Risk	Site is likely to be acceptable
Between 50 and 60-65 dB(A) day	Between 40 and 50-55 dB(A) night	Low Risk	Likely to be acceptable provided that Good Acoustic Design (GAD) is followed
Between 60-65 and 70 dB(A) day	Between 50-55 and 60 dB(A) night	Medium Risk	Likely to be less suitable and application may be refused unless ADS demonstrates GAD, how adverse effects will be mitigated, and significant adverse effects avoided
Above 70 dB(A) day	Above 60 dB(A) night	High Risk	Increased risk of refusal, which may be reduced by demonstrating GAD in a detailed ADS, expert advice recommended

3.3 British Standard 8233:2014 (Guidance on Sound Insulation and Noise Reduction for Buildings)

The latest version of BS.8233 “Guidance on Sound Insulation and Noise Reduction for Buildings”, was published in February 2014. BS 8233:2014 adopts guideline external noise values provided in WHO for external amenity areas such as gardens and patios. The Standard states that it is “desirable” that the external noise does not exceed 50 dB $L_{Aeq,T}$ with an upper guideline value of 55 dB $L_{Aeq,T}$. Where design standards cannot be achieved for traditional amenity spaces (e.g. gardens and patios) then the ‘lowest practical levels’ should be achieved.

An extract of the “Design Range” of BS.8233's Table 4 for indoor noise levels (with Notes 4 & 7) appears below and it should also be noted that the assessment period is for the whole of the day (16 hours) or night (8 hours).

Figure 3

Table 4 Indoor ambient noise levels for dwellings

Activity	Location	07:00 to 23:00	23:00 to 07:00
Resting	Living room	35 dB $L_{Aeq,16hour}$	—
Dining	Dining room/area	40 dB $L_{Aeq,16hour}$	—
Sleeping (daytime resting)	Bedroom	35 dB $L_{Aeq,16hour}$	30 dB $L_{Aeq,8hour}$

NOTE 4 regular individual noise events (for example, scheduled aircraft or passing trains) can cause sleep disturbance. A guideline value may be set in terms of SEL or L_{Amax,P} depending on the character and number of events per night. Sporadic noise events could require separate values.

NOTE 7 Where development is considered necessary or desirable, despite external noise levels above WHO guidelines, the internal target levels may be relaxed by up to 5 dB and reasonable internal conditions still achieved.

“For traditional external areas that are used for amenity space, such as gardens and patios, it is desirable that the external noise level does not exceed 50 dB L_{Aeq,T}, with an upper guideline value of 55 dB L_{Aeq,T}, which would be acceptable in noisier environments. However, it is also recognized that these guideline values are not achievable in all circumstances where development might be desirable.”

3.4 WHO “Guidelines for Community Noise”

These guidelines entitled “Guidance for Community Noise”; were approved by the World Health Organisation and consider guideline values for annoyance in the community. These have been set at 50 or 55 dBA, representing daytime levels below which a majority of the adult population will be protected from becoming moderately or seriously annoyed, respectively. An extract of “Table 4.1 from Section 4.4” appears below:

Figure 4

Table 4.1: Guideline values for community noise in specific environments (Extract).

<i>Specific environment</i>	<i>Critical health effect(s)</i>	<i>L_{Aeq} [dB]</i>	<i>Time base [hours]</i>	<i>L_{Amax,fast} [dB]</i>

Outdoor living area	Serious annoyance, daytime and evening Moderate annoyance, daytime and evening	55	16	-
		50	16	-
Dwelling, indoors Inside bedrooms	Speech intelligibility and moderate annoyance, daytime and evening Sleep disturbance, night-time	35	16	
		30	8	45
Outside bedrooms	Sleep disturbance, window open (outdoor values)	45	8	60

The guidelines also suggest that; “At night, sound pressure levels at the outside façades of the living spaces should not exceed 45 dB LAeq and 60 dB L_Amax, so that people may sleep with bedroom windows open. These values have been obtained by assuming that the noise reduction from outside to inside with the window partly open is 15 dB.” LAeq for daytime is for 16 h and for night-time 8h. BS8223 is based on the WHO Guidelines and as can be seen has similar values.

3.5 BS4142:2014 – Rating Industrial Noise Affecting Mixed Residential and Industrial Areas

BS4142:2014 states, “Response to sound can be subjective and is affected by many factors, both acoustic and non-acoustic. The significance of its impact, for example, can depend on such factors as the margin by which a sound exceeds the background sound level, its absolute level, time of day

and change in the acoustic environment, as well as local attitudes to the source of the sound and the character of the neighbourhood...This British Standard describes methods for rating and assessing sound of an industrial and/or commercial nature”.

This British Standard describes a method for assessing whether a specific sound may have an adverse impact.

The Standard requires that the ambient noise ***(totally encompassing sound in a given situation at a given time, usually composed of sound from many sources near and far)*** including the “specific” sound from the source in question is measured in terms of the equivalent continuous sound level LAeq [see Appendix 1 for acoustic terms], which is then corrected for the residual sound (total LAeq excluding the “specific” sound).

A correction for character is made if ***“a tone, impulse or other characteristic occurs”***. For tonality a correction of between +2dB and 6dB is considered acceptable and for impulsivity between 3 and 9dB. See Table below.

Table 3

Character	Just Perceptible	Clearly Perceptible	Highly Perceptible
Tonality	+2dB	+4dB	+6dB
Impulsivity	+3dB	+6dB	+9dB

Where the specific sound features characteristics that are neither tonal nor impulsive, though otherwise are readily distinctive against the residual acoustic environment, a penalty of 3 dB can be applied.

Where tonal and impulsive characteristics are present in the specific sound within the same reference period then these two corrections can both be taken into account. If one feature is dominant, then it might be appropriate to apply a single correction. Where both features are likely to affect perception and response, the corrections ought normally to be added in a linear fashion.

The final figure, including any character correction is known as the Rating level.

This Rating Level is then compared with the measured background [LA90] level. The greater this difference the greater the likelihood of “adverse impact” (See Notes 1 & 2 from BS4142:2014 below).

NOTE 1

- a) Typically, the greater this difference, the greater the magnitude of the impact.*
- b) A difference of around +10 dB or more is likely to be an indication of a significant adverse impact, depending on the context.*
- c) A difference of around +5 dB is likely to be an indication of an adverse impact, depending on the context.*
- d) The lower the rating level is relative to the measured background sound level, the less likely it is that the specific sound source will have an adverse impact or a significant adverse impact. Where the rating level does not exceed the background sound level, this is an indication of the specific sound source having a low impact, depending on the context.*

NOTE 2

Adverse impacts include, but are not limited to, annoyance and sleep disturbance. Not all adverse impacts will lead to complaints and not every complaint is proof of an adverse impact.

It can be seen above that the conclusions to a BS4142 assessment also depend on the context and Section 11 of the British Standard states:

"Where the initial estimate of the impact needs to be modified due to the context, take all pertinent factors into consideration, including the following...

3) 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, such as:

- i. facade insulation treatment;*

- ii. *ventilation and/or cooling that will reduce the need to have windows open so as to provide rapid or purge ventilation; and*
- iii. *acoustic screening."*

4.0 NOISE LEVEL INFORMATION

4.1 Existing Noise Climate

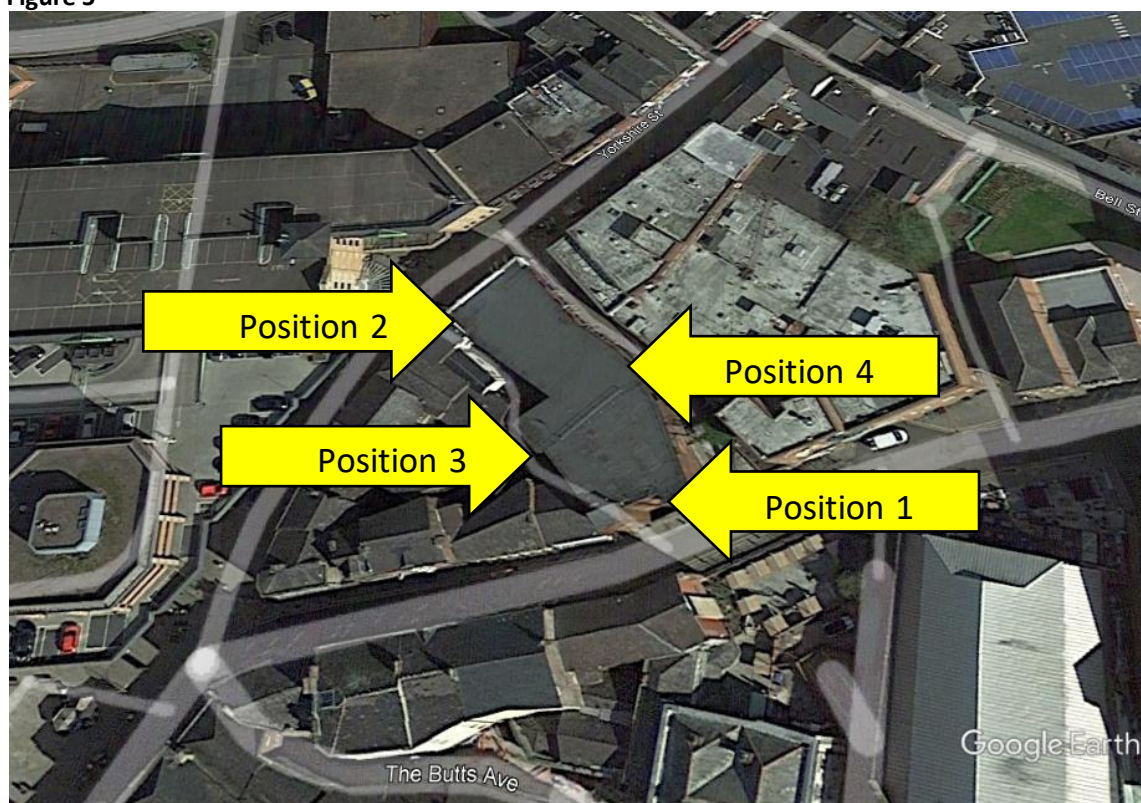
Methodology

The site was visited on 2nd, 5th, 6th and 8th September 2022 and SBM Safety Solutions installed noise monitoring instrumentation at the positions shown below for at least 24 hours or more.

The equipment was suspended over the edges of the roof as open windows could not be used as they were either sealed, boarded or had security bars across.

No correction for façade reflection is necessary but at the rear of the building (position 1) we will have to correct for the increased distance in comparison with first floor window positions (approximately double the distance).

Figure 5



The weather was dry, warm with sunny spells and light wind speeds, between <0.5 and 1.5m/s (SW/S/SE) measured on an electronic anemometer. The temperature ranged between 13-20 degrees Celsius.

It is not considered that the weather conditions would have influenced the results.

The sound level meters used (with “outdoor kit”) plus on-site calibrator can be found in Table 4 below. The meters calibrated correctly before and

after the measurements; all instrumentation had been laboratory calibrated within the preceding 2 years.

Table 4

Instrument	Type	Serial No.	Calibration Cert. No.	Date of Due Calibration
Svan 977A	Sound Level Meter	69280	1501866-1	07/03/2024
Svan SV12L	Preamp	71675	1501866-1	07/03/2024
Aco Pacific 7052E	Microphone	70160	1501866-1	07/03/2024
Cirrus 511E	Calibrator	39816	Cirrus 248531	26/04/2024
Svan 977	Sound Level Meter	36870	1502651-1	30/05/2023
Svan SV12L	Preamp	110531	1502651-1	30/05/2023
Aco Pacific 7052E	Microphone	61121	1502651-1	30/05/2023
Svan SV33B	Calibrator	112680	1502651-2	30/05/2023
With outdoor kit and all-weather windmuffs				

4.2 Results and Calculations

Period measurements are shown below in Tables 5-10.

Table 5 - Monitoring Position 1 dBA

Start date & time	LAeq	LAmx	LAmn	L01	L10	L50	L90	L95
02/09/2022 11:00:00	54.8	72.3	49.4	60.3	56.5	54.0	52.3	51.9
02/09/2022 12:00:00	55.5	71.9	49.3	62.1	57.3	54.4	52.4	51.9
02/09/2022 13:00:00	58.2	74.2	51.0	64.8	60.5	56.9	54.3	53.7
02/09/2022 14:00:00	63.1	77.3	52.1	68.9	65.6	62.2	57.7	56.5
02/09/2022 15:00:00	66.2	81.1	57.2	72.2	68.1	65.2	62.6	61.8
02/09/2022 16:00:00	66.4	87.0	55.1	74.6	68.1	64.5	61.2	60.2
02/09/2022 17:00:00	63.0	83.8	50.6	69.0	65.5	61.9	58.6	57.5
02/09/2022 18:00:00	61.4	77.8	49.8	68.9	64.2	59.6	55.4	54.3
02/09/2022 19:00:00	60.4	84.2	50.2	66.3	62.5	58.9	55.3	54.0
02/09/2022 20:00:00	62.5	78.7	48.6	69.5	65.5	60.7	56.4	55.3
02/09/2022 21:00:00	63.3	80.0	50.5	69.6	65.7	62.2	58.8	57.8
02/09/2022 22:00:00	62.3	80.1	51.1	69.2	64.9	60.9	57.4	56.4
02/09/2022 23:00:00	58.8	76.8	47.4	65.8	61.8	57.2	51.8	50.4
03/09/2022 00:00:00	52.5	84.5	44.7	59.0	50.8	48.5	46.8	46.4

03/09/2022 01:00:00	48.9	70.7	43.8	57.7	50.0	47.5	45.9	45.5
03/09/2022 02:00:00	51.6	81.8	42.1	57.5	48.2	46.3	44.7	44.3
03/09/2022 03:00:00	46.4	66.3	40.4	54.5	47.2	45.1	43.4	42.9
03/09/2022 04:00:00	51.8	74.0	39.7	60.8	54.9	45.3	43.0	42.4
03/09/2022 05:00:00	46.4	61.6	39.0	55.0	47.2	45.3	43.5	42.9
03/09/2022 06:00:00	48.5	65.0	43.3	57.8	49.4	46.6	45.3	44.9
03/09/2022 07:00:00	48.7	68.6	43.9	56.3	50.2	47.4	45.8	45.4
03/09/2022 08:00:00	54.4	78.7	45.2	63.8	56.0	50.9	47.6	47.1
03/09/2022 09:00:00	53.3	73.1	47.8	60.7	56.2	51.1	49.4	49.0
03/09/2022 10:00:00	53.3	72.4	47.6	61.6	55.0	51.4	49.8	49.4
03/09/2022 11:00:00	55.8	72.3	49.1	62.2	58.1	54.6	51.8	51.2
03/09/2022 12:00:00	55.7	77.9	49.2	61.2	57.9	54.7	52.3	51.6
03/09/2022 13:00:00	56.3	74.4	50.2	62.0	58.5	55.3	53.0	52.5
03/09/2022 14:00:00	57.9	73.8	50.1	63.5	60.1	57.0	54.5	53.9
03/09/2022 15:00:00	58.4	75.5	50.9	64.5	60.4	57.4	55.0	54.4
03/09/2022 16:00:00	59.1	73.0	51.9	65.1	61.3	58.0	55.4	54.7
03/09/2022 17:00:00	60.1	81.4	51.1	66.7	62.4	58.8	55.9	55.1
03/09/2022 18:00:00	59.4	83.6	49.9	66.9	61.5	57.5	54.4	53.6
03/09/2022 19:00:00	62.0	76.8	50.1	68.5	65.0	60.5	56.3	55.3
03/09/2022 20:00:00	62.6	81.6	50.1	68.3	65.0	61.5	57.9	56.6
03/09/2022 21:00:00	63.4	78.1	52.0	69.0	66.0	62.4	58.5	57.4
03/09/2022 22:00:00	63.6	79.9	52.7	69.3	65.9	62.7	59.3	58.2
03/09/2022 23:00:00	60.9	81.0	49.1	67.5	63.9	59.2	54.4	53.3
04/09/2022 00:00:00	53.9	71.7	47.2	64.1	55.2	51.0	49.3	48.9
04/09/2022 01:00:00	57.4	85.5	45.2	60.7	52.4	49.4	47.9	47.6
04/09/2022 02:00:00	48.8	65.7	44.2	55.4	50.1	47.9	46.2	45.8
04/09/2022 03:00:00	47.2	62.2	41.5	54.4	48.3	46.2	44.6	44.1
04/09/2022 04:00:00	47.4	63.4	41.5	55.2	49.0	45.9	44.0	43.5
04/09/2022 05:00:00	46.3	64.6	40.3	53.0	47.8	45.2	43.5	42.9
04/09/2022 06:00:00	47.7	71.3	41.0	57.6	47.7	45.2	43.6	43.1
04/09/2022 07:00:00	47.8	66.2	41.6	55.2	49.6	46.4	44.4	43.9
04/09/2022 08:00:00	52.0	71.4	44.0	60.7	54.9	48.7	46.4	46.0
04/09/2022 09:00:00	55.7	73.3	44.2	65.1	60.1	48.8	46.5	46.1
04/09/2022 10:00:00	57.8	69.9	47.0	65.5	61.5	55.0	50.7	50.0
04/09/2022 11:00:00	55.1	71.1	47.6	63.7	58.6	52.2	50.1	49.6
04/09/2022 12:00:00	53.8	70.8	48.1	60.7	55.9	52.5	50.5	50.0
04/09/2022 13:00:00	54.5	70.8	48.3	61.3	56.7	53.1	50.9	50.4
04/09/2022 14:00:00	54.1	72.5	47.9	61.0	56.2	52.7	50.6	50.1
04/09/2022 15:00:00	54.5	75.1	47.6	60.8	56.8	53.0	50.6	50.0

04/09/2022 16:00:00	55.2	80.7	48.0	62.0	57.3	53.4	51.0	50.4
04/09/2022 17:00:00	55.8	76.5	48.0	63.3	58.3	53.9	51.2	50.6
04/09/2022 18:00:00	56.5	74.0	47.9	64.6	59.4	54.1	50.8	50.2
04/09/2022 19:00:00	54.9	71.0	46.9	62.5	57.6	53.0	50.2	49.6
04/09/2022 20:00:00	53.7	73.0	47.5	60.3	56.0	52.2	50.2	49.7
04/09/2022 21:00:00	59.7	81.0	48.0	69.9	62.1	55.3	51.4	50.6
04/09/2022 22:00:00	52.5	71.3	45.0	61.6	54.4	50.2	47.8	47.3
04/09/2022 23:00:00	51.7	80.0	42.6	61.8	52.8	47.7	45.2	44.6
05/09/2022 00:00:00	48.0	73.7	41.7	55.9	49.0	45.6	43.8	43.4
05/09/2022 01:00:00	50.4	79.9	40.1	57.4	48.6	44.6	42.9	42.4
05/09/2022 02:00:00	61.1	78.0	39.4	73.3	61.4	49.0	43.3	42.6
05/09/2022 03:00:00	45.2	62.2	40.5	50.7	46.5	44.1	42.4	42.0
05/09/2022 04:00:00	54.7	74.1	40.8	66.3	56.0	48.2	43.5	42.9
05/09/2022 05:00:00	49.5	76.7	42.9	58.8	49.6	46.9	45.0	44.5
05/09/2022 06:00:00	50.1	64.2	45.3	57.2	51.9	49.0	47.2	46.8
05/09/2022 07:00:00	64.9	94.0	47.1	72.5	62.4	52.1	49.1	48.7
05/09/2022 08:00:00	58.1	81.6	47.7	69.3	59.0	54.8	51.0	50.2
05/09/2022 09:00:00	53.3	73.7	47.7	61.1	55.1	51.6	49.8	49.3
05/09/2022 10:00:00	54.6	72.8	48.1	61.0	56.7	53.5	50.4	49.9
05/09/2022 11:00:00	58.3	80.3	50.6	66.9	59.8	56.3	53.8	53.1
05/09/2022 12:00:00	57.3	71.6	51.1	62.5	59.3	56.5	54.2	53.6
05/09/2022 13:00:00	56.5	74.1	50.1	62.5	58.4	55.5	53.3	52.7
05/09/2022 14:00:00	58.2	75.0	50.6	65.3	60.4	57.0	54.3	53.7

	L _{Aeq}	Time
Day	59.6	52 hours
Night	53.9	32 hours

The roof monitoring position (no windows were accessible as noted above) +6dB.
Therefore, daytime = **65.6dBA** and night time = **59.9dBA**

Table 6 – Monitoring Position 2 dBA

Start date & time	L _{Aeq}	L _{Amax}	L _{Amin}	L ₀₁	L ₁₀	L ₅₀	L ₉₀	L ₉₅
02/09/2022 11:00:00	63.2	85.2	57.8	70.2	65.0	61.6	59.6	59.3
02/09/2022 12:00:00	63.6	89.2	57.8	70.5	65.2	61.9	59.9	59.4
02/09/2022 13:00:00	64.2	90.7	57.7	70.7	65.7	62.3	60.0	59.5
02/09/2022 14:00:00	64.6	87.5	58.2	72.1	66.4	62.6	60.3	59.8
02/09/2022 15:00:00	64.1	81.3	58.0	71.8	66.4	62.2	60.0	59.5
02/09/2022 16:00:00	64.1	85.1	57.8	72.6	66.0	61.7	59.5	59.1
02/09/2022 17:00:00	60.1	88.3	47.1	70.0	61.6	54.4	50.2	49.5
02/09/2022 18:00:00	53.3	81.2	46.7	62.7	54.6	50.4	48.5	48.1

02/09/2022 19:00:00	52.2	74.0	46.8	61.3	53.2	50.0	48.6	48.3
02/09/2022 20:00:00	52.5	71.8	46.9	61.9	53.1	50.3	49.0	48.6
02/09/2022 21:00:00	53.8	75.7	46.9	64.2	54.7	50.5	48.9	48.6
02/09/2022 22:00:00	51.5	74.7	46.9	57.1	52.2	50.0	48.8	48.4
02/09/2022 23:00:00	53.5	80.6	45.9	64.2	53.4	49.0	47.6	47.3
03/09/2022 00:00:00	50.5	79.9	44.7	58.7	49.6	47.5	46.3	45.9
03/09/2022 01:00:00	50.2	73.4	42.9	60.5	50.4	46.7	45.3	44.8
03/09/2022 02:00:00	46.5	69.0	43.0	52.4	47.1	45.4	44.4	44.1
03/09/2022 03:00:00	47.2	74.3	42.3	52.3	46.5	45.1	44.0	43.8
03/09/2022 04:00:00	47.2	71.7	41.7	54.0	49.9	45.1	43.8	43.4
03/09/2022 05:00:00	49.3	71.0	42.8	53.9	51.2	47.9	45.5	44.9
03/09/2022 06:00:00	54.0	89.5	46.0	54.8	50.1	48.5	47.5	47.3
03/09/2022 07:00:00	52.4	79.7	47.0	61.4	52.4	49.7	48.6	48.3
03/09/2022 08:00:00	55.4	82.9	48.4	63.1	57.6	52.3	50.3	49.9
03/09/2022 09:00:00	68.6	89.2	57.3	81.4	70.4	60.4	58.9	58.7
03/09/2022 10:00:00	61.7	81.3	51.3	67.8	63.4	60.7	59.3	58.9
03/09/2022 11:00:00	62.4	80.3	58.2	67.9	64.1	61.4	59.8	59.4
03/09/2022 12:00:00	63.0	88.2	58.1	69.7	64.6	61.5	59.9	59.5
03/09/2022 13:00:00	64.4	83.1	59.0	72.2	66.2	62.7	60.7	60.3
03/09/2022 14:00:00	65.5	84.5	59.1	73.8	67.6	63.6	61.3	60.8
03/09/2022 15:00:00	64.9	81.9	58.9	72.0	67.0	63.4	61.2	60.7
03/09/2022 16:00:00	64.4	83.5	58.6	72.1	66.1	62.6	60.4	60.0
03/09/2022 17:00:00	61.1	88.7	47.6	69.3	63.1	59.8	50.8	50.0
03/09/2022 18:00:00	53.3	80.5	46.4	62.3	54.6	50.1	48.3	48.0
03/09/2022 19:00:00	52.0	73.6	46.3	61.6	52.5	49.6	48.0	47.7
03/09/2022 20:00:00	53.7	79.9	46.0	63.6	53.1	49.6	48.1	47.7
03/09/2022 21:00:00	51.1	74.9	46.3	58.8	51.6	49.4	48.0	47.7
03/09/2022 22:00:00	51.8	77.7	45.3	60.6	51.3	49.0	47.6	47.3
03/09/2022 23:00:00	53.1	79.3	45.1	64.4	52.7	48.6	47.0	46.7
04/09/2022 00:00:00	55.3	85.9	44.2	66.6	53.0	47.3	45.8	45.5
04/09/2022 01:00:00	56.4	89.6	43.5	62.6	52.8	46.9	45.3	44.9
04/09/2022 02:00:00	46.2	67.7	42.9	52.5	46.8	45.3	44.3	44.0
04/09/2022 03:00:00	45.2	62.0	42.1	49.5	45.8	44.5	43.6	43.3
04/09/2022 04:00:00	45.0	58.5	42.0	49.1	46.0	44.6	43.5	43.3
04/09/2022 05:00:00	45.4	63.8	42.4	50.5	46.3	44.8	43.8	43.5
04/09/2022 06:00:00	46.1	65.4	42.7	50.7	47.0	45.5	44.4	44.2
04/09/2022 07:00:00	49.3	73.5	43.7	56.2	50.0	47.8	45.8	45.3
04/09/2022 08:00:00	55.3	89.5	47.2	59.2	52.8	50.0	48.6	48.3
04/09/2022 09:00:00	53.9	78.9	47.4	64.2	54.4	50.7	49.0	48.7

04/09/2022 10:00:00	64.2	85.2	48.9	76.0	66.5	53.7	51.0	50.6
04/09/2022 11:00:00	60.8	85.2	49.9	70.2	61.5	55.7	52.5	51.9
04/09/2022 12:00:00	58.1	77.4	50.5	65.9	60.7	56.2	53.2	52.6
04/09/2022 13:00:00	62.1	86.9	50.9	71.8	64.1	58.0	54.3	53.5
04/09/2022 14:00:00	59.2	82.8	50.5	67.8	61.4	56.6	53.5	52.8
04/09/2022 15:00:00	58.2	80.4	49.2	67.4	60.5	55.2	52.2	51.6
04/09/2022 16:00:00	56.6	88.5	46.4	65.6	57.9	51.8	48.9	48.3
04/09/2022 17:00:00	51.0	74.0	45.7	57.9	52.0	49.3	47.8	47.4
04/09/2022 18:00:00	50.7	71.7	45.4	58.6	51.5	49.0	47.6	47.3
04/09/2022 19:00:00	49.3	71.2	45.4	55.6	50.6	48.2	47.0	46.7
04/09/2022 20:00:00	51.7	76.4	45.6	61.7	52.3	48.5	47.2	46.9
04/09/2022 21:00:00	49.3	66.4	44.9	57.5	50.4	48.1	46.7	46.4
04/09/2022 22:00:00	49.6	73.5	44.5	59.0	49.9	47.4	46.0	45.7
04/09/2022 23:00:00	55.4	89.7	42.8	64.7	52.7	46.9	44.9	44.5
05/09/2022 00:00:00	47.5	69.5	42.5	56.6	48.3	45.3	44.1	43.8
05/09/2022 01:00:00	47.2	67.1	42.2	56.9	48.0	44.8	43.7	43.4
05/09/2022 02:00:00	57.3	74.8	41.8	68.8	59.5	49.0	44.2	43.8
05/09/2022 03:00:00	47.2	60.2	42.2	58.5	46.9	44.7	43.4	43.2
05/09/2022 04:00:00	52.7	76.4	42.9	66.1	51.2	47.3	44.9	44.4
05/09/2022 05:00:00	54.2	89.1	43.5	58.2	49.9	48.1	45.4	45.0
05/09/2022 06:00:00	51.3	71.9	47.5	57.3	52.2	50.4	49.2	48.9
05/09/2022 07:00:00	64.5	82.6	48.9	79.0	64.1	52.2	50.3	49.9
05/09/2022 08:00:00	63.7	93.9	49.9	77.3	62.4	54.8	52.3	51.7
05/09/2022 09:00:00	60.3	83.5	50.5	68.1	62.8	58.9	53.3	52.6
05/09/2022 10:00:00	62.9	85.0	57.2	69.9	64.9	61.4	59.3	58.9
05/09/2022 11:00:00	66.5	83.0	58.3	73.2	69.5	65.0	60.9	60.2
05/09/2022 12:00:00	65.0	83.1	57.9	73.1	67.2	63.1	60.4	59.9
05/09/2022 13:00:00	63.7	80.0	57.8	70.6	66.0	62.3	59.9	59.4
05/09/2022 14:00:00	71.1	84.2	58.2	79.0	74.4	69.3	62.2	60.9
	LAeq	Time						
Day	62.1	52 hours						
Night	51.9	24 hours						

Table 7 – Monitoring Position 3 dBA

Start date & time	LAeq	LAmaz	LAmín	L01	L10	L50	L90	L95
05/09/2022 16:00:00	52.0	71.3	47.7	56.6	53.1	51.3	49.9	49.6
05/09/2022 17:00:00	52.2	72.5	46.6	60.3	53.0	50.6	48.9	48.5
05/09/2022 18:00:00	50.7	64.2	44.4	56.2	52.3	50.0	48.0	47.4
05/09/2022 19:00:00	48.8	69.8	44.0	54.3	50.5	48.0	46.3	45.8

05/09/2022 20:00:00	49.6	75.0	44.9	54.9	50.3	48.2	46.7	46.3
05/09/2022 21:00:00	48.4	58.8	43.8	53.0	50.1	47.8	46.1	45.6
05/09/2022 22:00:00	54.3	68.1	41.9	65.1	59.8	46.8	44.2	43.8
05/09/2022 23:00:00	52.7	62.8	44.4	58.9	55.3	51.6	48.1	47.4
06/09/2022 00:00:00	52.1	66.9	42.6	58.5	56.0	50.4	45.3	44.4
06/09/2022 01:00:00	51.2	63.6	41.1	61.2	56.7	44.6	43.0	42.7
06/09/2022 02:00:00	61.3	71.1	41.7	70.1	68.5	44.4	42.9	42.7
06/09/2022 03:00:00	61.4	71.9	40.6	70.3	68.6	43.6	42.1	41.8
06/09/2022 04:00:00	60.9	70.3	40.7	69.6	68.3	44.1	42.5	42.1
06/09/2022 05:00:00	50.8	64.4	39.9	60.1	55.5	45.7	42.4	41.8
06/09/2022 06:00:00	50.3	69.8	46.3	54.8	51.0	49.8	48.2	47.6
06/09/2022 07:00:00	53.7	71.9	46.5	63.9	55.8	50.5	48.5	48.0
06/09/2022 08:00:00	53.3	69.5	45.2	61.6	56.9	50.4	47.6	47.1
06/09/2022 09:00:00	50.7	69.4	46.5	57.3	52.0	49.5	48.1	47.8
06/09/2022 10:00:00	55.8	66.7	46.5	64.0	59.9	51.2	48.2	47.8
06/09/2022 11:00:00	56.1	64.7	48.9	62.0	59.4	54.7	51.8	51.1
06/09/2022 12:00:00	52.0	63.0	48.3	55.7	53.3	51.5	50.3	49.9
06/09/2022 13:00:00	52.8	70.1	48.3	58.0	54.7	51.9	50.2	49.8
06/09/2022 14:00:00	53.0	82.3	48.3	58.4	54.7	52.0	50.2	49.8
06/09/2022 15:00:00	52.9	68.8	48.0	58.0	54.8	52.0	50.2	49.8
	LAeq	Time						
Day	52.8	16 hours						
Night	57.7	8 hours						

Table 8 – Monitoring Position 4 dBA

Start date & time	LAeq	LAmaz	LAmín	L01	L10	L50	L90	L95
06/09/2022 17:00:00	56.3	72.7	47.8	63.6	58.8	54.7	51.8	51.0
06/09/2022 18:00:00	56.9	75.4	46.1	66.2	59.4	54.3	50.9	50.0
06/09/2022 19:00:00	58.2	69.5	45.1	64.2	61.2	56.8	52.1	50.9
06/09/2022 20:00:00	58.0	71.3	44.6	64.6	61.3	56.3	50.5	49.3
06/09/2022 21:00:00	55.6	76.7	45.4	63.2	58.1	53.2	49.3	48.3
06/09/2022 22:00:00	54.4	80.1	45.0	60.5	56.9	53.0	49.8	48.9
06/09/2022 23:00:00	49.6	71.9	42.2	58.1	51.1	47.3	44.8	44.2
07/09/2022 00:00:00	49.2	73.6	40.6	59.5	48.9	45.0	43.1	42.7
07/09/2022 01:00:00	44.9	68.5	39.1	54.4	45.0	42.7	40.9	40.4
07/09/2022 02:00:00	45.4	64.9	38.6	58.0	44.5	41.9	40.2	39.9
07/09/2022 03:00:00	48.9	74.5	37.9	60.2	50.2	42.1	40.0	39.5
07/09/2022 04:00:00	48.8	78.0	39.1	57.1	47.9	43.7	42.0	41.5
07/09/2022 05:00:00	47.3	72.5	40.5	51.3	48.2	46.4	44.2	43.6

07/09/2022 06:00:00	50.6	66.4	46.4	57.8	51.6	49.8	48.0	47.6
07/09/2022 07:00:00	55.7	76.3	48.3	67.8	55.6	50.9	49.8	49.4
07/09/2022 08:00:00	64.6	91.7	48.3	77.0	60.6	52.3	50.1	49.7
07/09/2022 09:00:00	57.1	77.8	50.0	67.4	58.3	53.7	52.0	51.7
07/09/2022 10:00:00	55.7	74.7	50.9	62.7	57.8	54.3	52.5	52.1
07/09/2022 11:00:00	56.9	72.0	51.2	63.4	59.0	55.8	53.7	53.2
07/09/2022 12:00:00	57.5	78.3	51.8	63.9	59.3	56.2	54.2	53.7
07/09/2022 13:00:00	58.3	79.1	51.0	66.1	59.8	56.5	54.1	53.6
07/09/2022 14:00:00	57.4	82.6	51.1	63.4	59.1	55.9	53.7	53.2
07/09/2022 15:00:00	58.8	79.9	51.4	67.1	60.9	56.6	54.1	53.6
07/09/2022 16:00:00	58.7	77.6	51.1	67.0	60.8	56.7	54.2	53.6
07/09/2022 17:00:00	57.1	80.9	49.2	64.8	59.2	55.4	52.9	52.2
07/09/2022 18:00:00	56.4	73.7	46.7	64.1	59.3	54.4	50.6	49.7
07/09/2022 19:00:00	58.0	72.9	47.3	63.9	60.6	57.0	53.5	52.5
07/09/2022 20:00:00	56.8	68.4	45.7	62.8	59.5	55.7	51.8	50.7
07/09/2022 21:00:00	56.5	68.2	44.4	63.0	59.4	55.3	51.0	49.8
07/09/2022 22:00:00	56.0	79.7	43.4	62.9	59.3	53.9	45.5	45.0
07/09/2022 23:00:00	50.6	68.3	42.7	57.5	55.8	46.7	45.0	44.6
08/09/2022 00:00:00	50.8	68.7	40.9	57.2	55.8	45.0	43.0	42.5
08/09/2022 01:00:00	50.3	65.0	37.1	57.2	55.6	42.9	40.4	39.6
08/09/2022 02:00:00	43.1	63.5	37.5	48.3	44.1	42.2	40.1	39.6
08/09/2022 03:00:00	46.6	69.6	37.9	56.5	46.1	42.2	40.3	39.8
08/09/2022 04:00:00	47.1	72.3	39.5	56.3	48.3	44.0	41.3	40.9
08/09/2022 05:00:00	45.7	70.7	39.1	53.1	46.1	43.6	41.4	40.8
08/09/2022 06:00:00	59.0	93.8	42.0	65.1	53.2	47.1	44.7	44.2
08/09/2022 07:00:00	58.4	75.2	44.1	68.5	64.0	49.2	45.9	45.4
08/09/2022 08:00:00	57.6	93.5	45.3	67.9	55.6	51.2	48.0	47.4
08/09/2022 09:00:00	58.3	85.2	49.6	69.5	60.7	53.5	51.3	50.9
08/09/2022 10:00:00	55.4	73.9	49.2	64.2	57.4	53.0	50.9	50.5
08/09/2022 11:00:00	56.1	76.6	49.7	64.6	58.0	54.0	51.9	51.4
08/09/2022 12:00:00	56.6	84.4	50.0	64.0	57.5	53.9	51.9	51.5
08/09/2022 13:00:00	56.0	78.8	50.0	64.1	57.7	54.2	52.3	51.8
08/09/2022 14:00:00	58.4	82.4	49.9	66.3	60.6	56.3	52.9	52.2
	LAeq	Time						
Day	57.8	30 hours						
Night	50.6	16 hours						

Table 9 – Octave Band Levels (Position 1 - Total Monitoring Period)

1/1 Octave	125 Hz	250 Hz	500 Hz	1000 Hz	2000 Hz	4000 Hz
Day	56.4	53.6	54.6	54.2	48.9	42.2
Night	52.0	48.5	47.7	46.9	42.7	37.1

Table 10 – Octave Band Levels (Position 2 - Total Monitoring Period)

1/1 Octave	125 Hz	250 Hz	500 Hz	1000 Hz	2000 Hz	4000 Hz
Day	57.0	56.9	55.9	54.6	50.2	43.6
Night	52.6	49.0	46.6	44.9	41.8	35.8

In addition to the above, the maximum readings were recorded, and the 10th highest L_{Amax} reading at night for position 1 has been established at 72.0dB (+6dB for extra distance to the roof = **78dB**), Position 2 - **74.5dB**, Position 3 - **70.9dB** and Position 4 - **74.3dB** (see traces below).

Figure 6 – Position 1

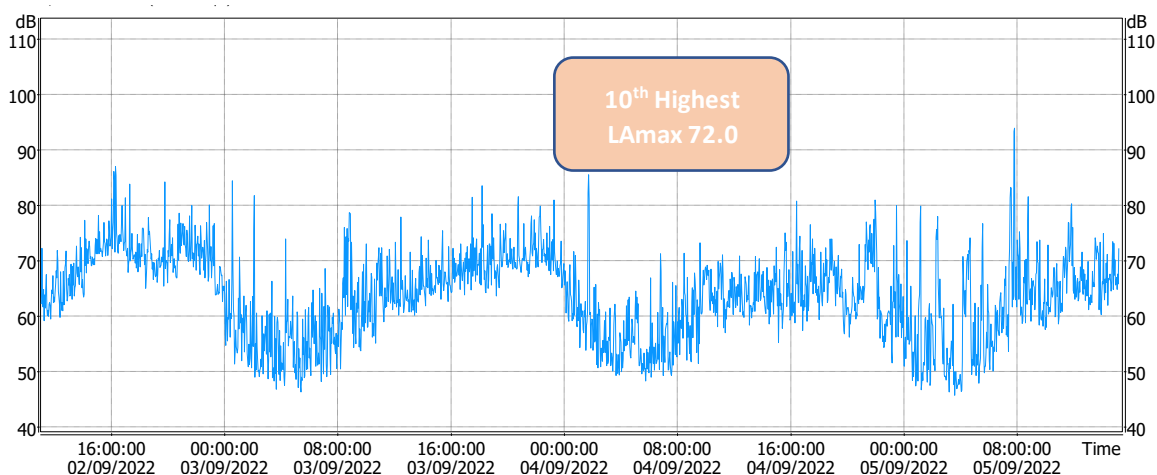


Figure 7 – Position 2

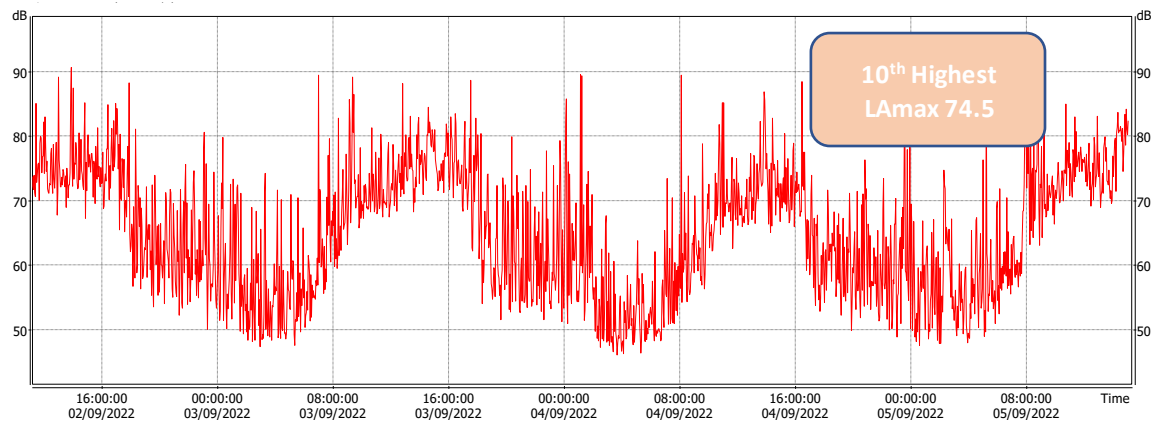


Figure 8 – Position 3

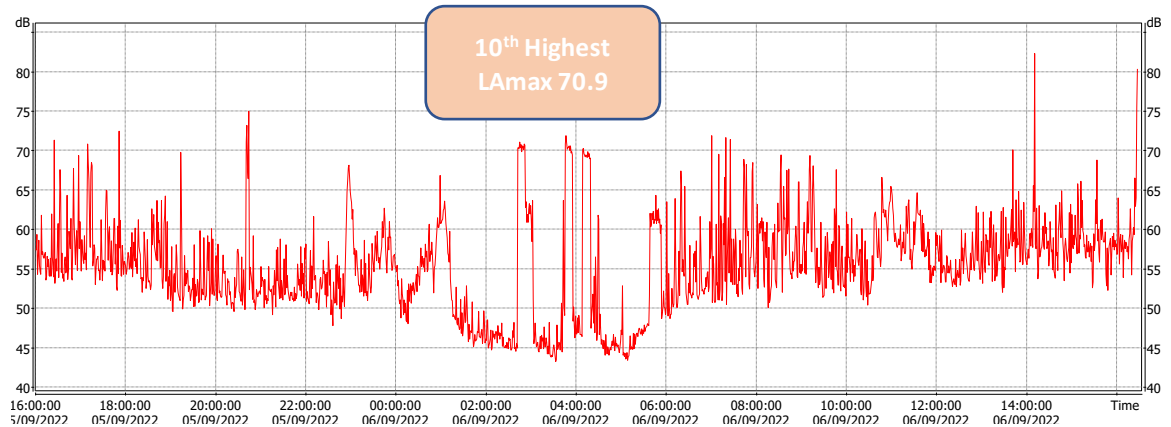
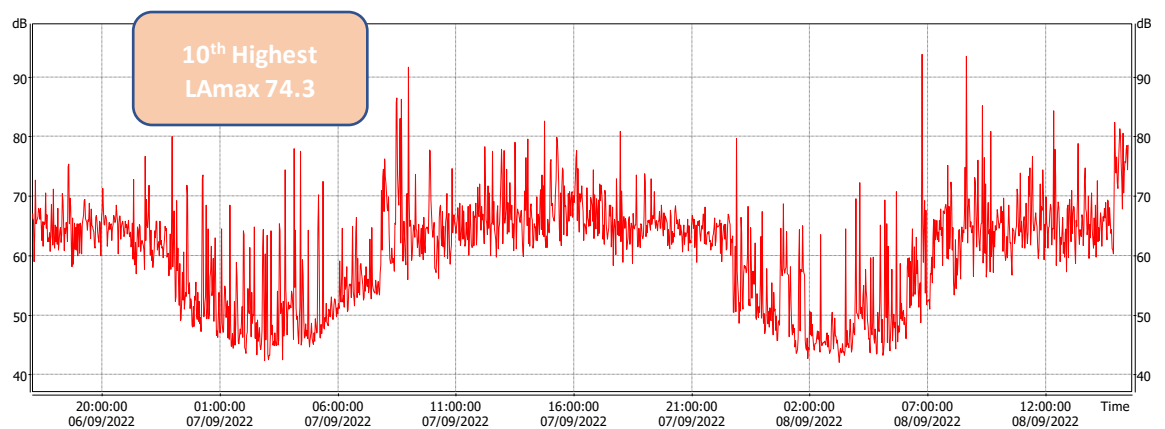


Figure 8 – Position 4



When considering maximum noise levels generated by road traffic, it is generally found that these levels are not governed by the volume of traffic, but by specific single events such as a car or motorbike passing by at high speed, an empty lorry passing over bumps or potholes in a section of road, a car horn, emergency siren or a vehicle skidding (see impression below).

4.3 DEFRA Data

We can also compare measured levels with synthetic data available from DEFRA for road / rail traffic noise at this location. The noise levels from the DEFRA data² are reproduced below.

² [Site Suitability Indicator \(SSI\) For New Residential Development 1st June 2020](#)

Strategic noise mapping data in England as prepared by the Department for Environment, Food and Rural Affairs (Defra) with the Initial Risk Assessment approach as advocated in ProPG. Freely available, the SSI aims to help provide noise practitioners, developers and Local Planning Authorities with an initial understanding of the suitability of a site in England for new residential development from a noise perspective.

Figure 9 – Daytime Noise Levels for Road Traffic Noise

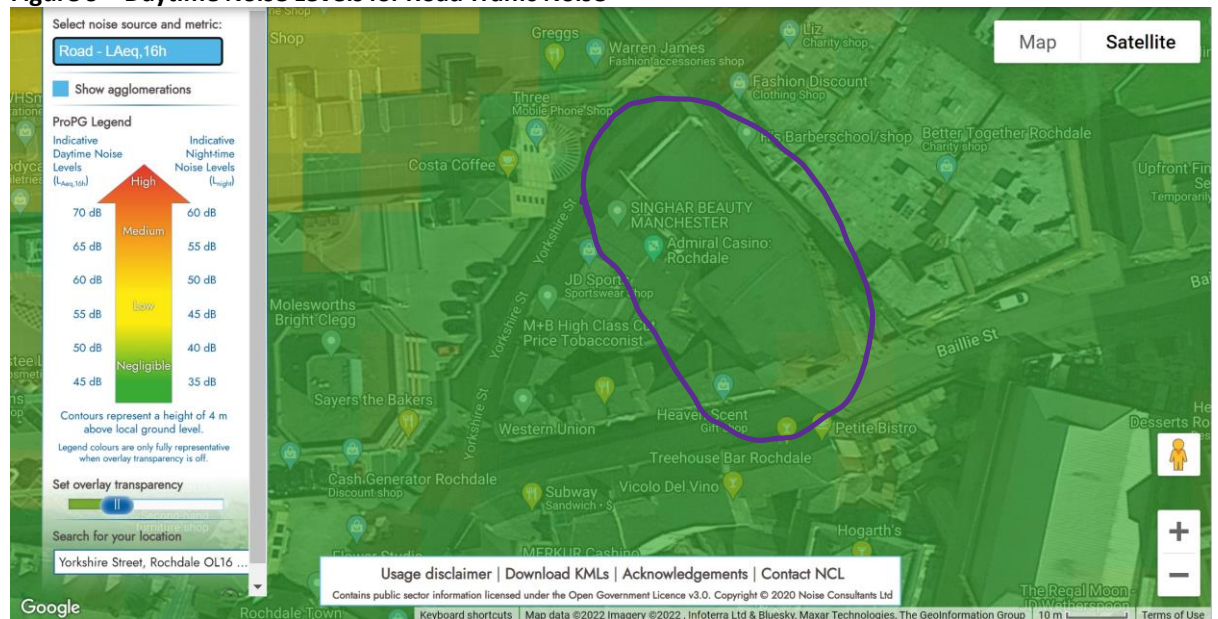


Figure 10 – Night-time Noise Levels for Road Traffic Noise



The site suitability indicator for road traffic noise levels suggests a “negligible-low” risk for this location. This is the sort of range we would anticipate considering the measured levels as noted above. The measured levels also include night-time economy sources and shoppers etc.

Table 11 – Site Suitability Indicator (Road Traffic Noise)

Level Day	Level Night	Risk	Conclusion
Between 50 and 60-65 dB(A) day	Between 40 and 50-55 dB(A) night	Low Risk	Likely to be acceptable provided that Good Acoustic Design (GAD) is followed

4.4 BS4142 – Night-time

BS4142:2014 recognises that at night residents will be inside their properties [BS4142 A.6.1 and A.6.3] and that consequently *"Other guidance, such as BS 8233, might be applicable in this instance."* Also, BS4142 is directed primarily to the circumstances of a proposed or existing noise source affecting existing property, i.e. circumstances where insulating the property is impracticable. Therefore, BS4142 can't take into account circumstances where the properties have not yet been built and where noise control, such as acoustic glazing and ventilation, can be incorporated such to alleviate *"...the primary concern is the potential for disturbance of residents who could be sleeping with open bedroom*

windows." The provision of acoustic glazing, ventilation and screening can all change the impact of external noise. Consequently, where noise control can be incorporated into the properties [as here] SBM Safety Solutions uses BS 8233:2014.

The recommended glazing and ventilation will account for any associated noise from the shopping area and bars to the rear as noted below.

4.5 Subjective Impressions

Noise sources associated with a large town as Rochdale is (within Greater Manchester) were present on attendance, such as e.g. distant road traffic of all types and sizes including public transport, HGV's, cars and motorbikes. Pedestrians passing the front and rear, to access the nearby pubs, restaurants and shops. There was occasional distant construction noise. The observer also noted audible music from the "beer garden" connected to Hogarth's.

5.0 ASSESSMENT AND DISCUSSION

5.1 Position 1 Daytime (07:00 to 23:00)

L_{Aeq},16hr = 65.6dB

Position 1 Night-time Levels (23:00 to 07:00)

L_{Aeq},8hr = 59.9dB

5.2 Position 2 Daytime (07:00 to 23:00)

L_{Aeq},16hr = 62.1dB

Position 2 Night-time Levels (23:00 to 07:00)

L_{Aeq},8hr = 51.9dB

5.3 Position 3 Daytime (07:00 to 23:00)

L_{Aeq},16hr = 52.8dB

Position 3 Night-time Levels (23:00 to 07:00)

L_{Aeq},8hr = **57.7dB**

5.4 Position 4 Daytime (07:00 to 23:00)

L_{Aeq},16hr = **57.8dB**

Position 4 Night- time Levels (23:00 to 07:00)

L_{Aeq},8hr = **50.6dB**

5.5 External Noise Levels

There is not likely to be any external amenity spaces from available images:

Figure 11 – Converted Building Project



5.6 Internal Noise Levels

Detailed internal levels have been calculated below using the typical octave band levels (from Tables above) and an example construction using the methodology described in BS EN 12354-3:2000 [6] and the LAeq levels as have been established above.

For the purposes of prediction, the following have been as internal layouts for this new application have yet to be finalised:

- Reverberation time is 0.3s for bedrooms
- Volume for an example small box bedroom (worst case) = 19m³
- Window area for example rooms = 4m²

5.7 Example Construction and Glazing

For the purpose of the following calculations we will use the octave band levels for the daytime and nighttime, adjusted to the LAeq, t for daytime (hours measured). With external levels of 51-66dB LAeq, night / day, desirable internal levels should be achievable where the structure is of solid brickwork, brick/block cavity or brick clad timber frame roof with 9-20kg/m² plasterboard ceiling, 100mm sound absorbing layer (e.g. mineral

wool loft insulation) with window and ventilation specification as described below.

5.8 Open Windows

Desirable internal levels are not likely to be met where windows are opened for ventilation allowing for 13-15dBA attenuation for a partially open window (from ANC Guidance, BS8233 and WHO Guidance ³), e.g. $59.9 - 13 = 46.9$ (Position 1 at night and desirable level being 30dBA).

5.9 Position 1 Example Bedroom

For example bedroom facing off position 1, it can be seen (Table 12) that the predicted internal daytime noise level of **30.3dB LAeq,16hr** using double glazing 10/12/10 double glazing and Greenwood Acoustic Wall Vent or similar alternatives would meet the daytime criteria of 35dB LAeq, 16hr from BS8223:2014 for bedrooms.

³ See References in the Appendix

Table 12 (Bedroom Off Position 1 – Rear Baillie Street)

BS EN 12354-Calcs		Use	Volume	Volume		19	LAeq Ext		65.6
Version		4.3	length				LAeq Int		30.3
© 2014 Martec Environmental Consultants Ltd		width	RT		0.3	dBA Diff		35	
& Acute Acoustics Ltd		height	Octave Band Centre Frequency [Hz]						dBA
			125	250	500	1k	2k	4k	
External Spectrum Leq (Free Field & Linear)			56.4	53.6	54.6	54.2	48.9	42.2	57.5
Adjustment to Given Level if required									65.6
External Spectrum Adjusted for Level			64.5	61.7	62.7	62.3	57.0	50.3	65.6
		Area m2	Element Sound Reduction Index [SRI]						Contrib
Wall	Brick/block/cavity	8.0	41	45	45	54	58	58	18.7
Window	10/12/6_double_glazing	4.0	26	27	34	40	38	38	29.8
Window	None	0.0	0	0	0	0	0	0	0.0
Door	None	0.0	0	0	0	0	0	0	0.0
Roof	None	0.0	0	0	0	0	0	0	0.0
		# Vents							
Vent Dn,e	Greenwood MA3051 Acoustic Wall vent	1.0	47	46	49	56	66	69	16.5
									dBA
		Internal SPL/dBIn	37.8	33.9	28.5	21.8	18.0	11.3	30.3

5.10 Position 2 Example Bedroom

For an example bedroom facing off position 2 (Yorkshire Street), it can be seen (Table 13) that the predicted internal daytime noise level of **27.6dB LAeq,16hr** using double glazing 10/12/10 double glazing and Greenwood Acoustic Wall Vent or similar alternatives would meet the daytime criteria of 35dB LAeq, 16hr from BS8223:2014 for bedrooms.

Table 13 (Bedroom Close to Station Road)

BS EN 12354-Calcs		Use	Volume	Volume	19	LAeq Ext	62.1			
Version	4.3	length				LAeq Int	27.6			
© 2014 Martec Environmental Consultants Ltd		width		RT	0.3	dBA Diff	34			
& Acute Acoustics Ltd		height		Octave Band Centre Frequency [Hz]				dBA		
				125	250	500	1k	2k	4k	
	External Spectrum Leq (Free Field & Linear)			57.0	56.9	55.9	54.6	50.2	43.6	58.6
	Adjustment to Given Level if required									62.1
	External Spectrum Adjusted for Level			60.5	60.4	59.4	58.1	53.7	47.1	62.1
			Area m2	Element Sound Reduction Index [SRI]						Contrib
Wall	Brick/block/cavity		8.0	41	45	45	54	58	58	15.6
Window	10/12/6_double_glazing		4.0	26	27	34	40	38	38	27.2
Window	None		0.0	0	0	0	0	0	0	0.0
Door	None		0.0	0	0	0	0	0	0	0.0
Roof	None		0.0	0	0	0	0	0	0	0.0
			# Vents							
Vent Dn,e	Greenwood MA3051 Acoustic Wall vent		1.0	47	46	49	56	66	69	13.6
										dBA
		Internal SPL/dBLin		33.8	32.6	25.3	17.7	14.8	8.1	27.6

Given the difference between daytime and nighttime noise levels [62.1-51.9=10.2dBa] then this specification for glazing and ventilation would also achieve the desirable internal nighttime levels for bedrooms at **17.4dB** [27.6-10.2=17.4].

The 10th highest LA_{max} level at night has been established at 75dB. Given the predicted difference between external and internal levels of 34dB this would equate to internal levels of **41dB LA_{max}**, which meets the LA_{max} criteria of 45dB LA_{max} [75-34=41].

5.11 Position 3 Example Bedroom

For example bedroom facing off position 3 (side elevation), it can be seen (Table 14) that the predicted internal daytime noise level of **17.5dB LA_{eq,16hr}** using double glazing 10/12/10 double glazing and Greenwood Acoustic Wall Vent or similar alternatives would meet the daytime criteria of 35dB LA_{eq, 16hr} from BS8223:2014 for bedrooms.

Table 14 (Bedroom Position 3)

BS EN 12354-Calcs		Use	Volume	Volume	19	LAeq Ext	52.8			
Version	4.3	length				LAeq Int	17.5			
© 2014 Martec Environmental Consultants Ltd		width		RT	0.3	dBA Diff	35			
& Acute Acoustics Ltd		height		Octave Band Centre Frequency [Hz]						
				125	250	500	1k	2k	4k	dBA
External Spectrum Leq (Free Field & Linear)				56.4	53.6	54.6	54.2	48.9	42.2	57.5
Adjustment to Given Level if required										52.8
External Spectrum Adjusted for Level				51.7	48.9	49.9	49.5	44.2	37.5	52.8
		Area m2		Element Sound Reduction Index [SRI]						Contrib
Wall	Brick/block/cavity	8.0		41	45	45	54	58	58	5.9
Window	10/12/6_double_glazing	4.0		26	27	34	40	38	38	17.0
Window	None	0.0		0	0	0	0	0	0	0.0
Door	None	0.0		0	0	0	0	0	0	0.0
Roof	None	0.0		0	0	0	0	0	0	0.0
		# Vents								
Vent Dn,e	Greenwood MA3051 Acoustic Wall vent	1.0		47	46	49	56	66	69	3.7
										dBA
Internal SPL/dBLin				25.0	21.1	15.7	9.0	5.2	0.0	17.5

The measured night time level was higher than the daytime level at this position, likely due to night time economy activities at the rear at +4.9dBA. The desirable internal noise level would also be met at night $17.5+4.9=22.4\text{dBA}$.

The 10th highest LA_{max} level at night has been established at 71dB. Given the predicted difference between external and internal levels of 35dB this would equate to internal levels of **36dB LA_{max}**, which meets the LA_{max} criteria of 45dB LA_{max} [75-34=36].

5.12 Position 4 Example Bedroom

For example bedroom facing off position 4 (side elevation), it can be seen (Table 15) that the predicted internal daytime noise level of **22.5dB LA_{eq,16hr}** using double glazing 10/12/10 double glazing and Greenwood Acoustic Wall Vent or similar alternatives would meet the daytime criteria of 35dB LA_{eq, 16hr} from BS8223:2014 for bedrooms.

Table 15 (Bedroom Position 4)

BS EN 12354-Calcs		Use	Volume	Volume	19	LAeq Ext	57.8		
Version	4.3	length				LAeq Int	22.5		
© 2014 Martec Environmental Consultants Ltd		width		RT	0.3	dBA Diff	35		
& Acute Acoustics Ltd		height		Octave Band Centre Frequency [Hz]				dBA	
				125	250	500	1k	2k	4k
	External Spectrum Leq (Free Field & Linear)			56.4	53.6	54.6	54.2	48.9	42.2
	Adjustment to Given Level if required								57.5
	External Spectrum Adjusted for Level			56.7	53.9	54.9	54.5	49.2	42.5
									57.8
		Area m2		Element Sound Reduction Index [SRI]					Contrib
Wall	Brick/block/cavity		8.0	41	45	45	54	58	58
Window	10/12/6_double_glazing		4.0	26	27	34	40	38	38
Window	None		0.0	0	0	0	0	0	0
Door	None		0.0	0	0	0	0	0	0
Roof	None		0.0	0	0	0	0	0	0
		# Vents							
Vent Dn,e	Greenwood MA3051 Acoustic Wall vent		1.0	47	46	49	56	66	69
									8.7
									dBA
		Internal SPL/dBLin		30.0	26.1	20.7	14.0	10.2	3.5
									22.5

Given the difference between daytime and nighttime noise levels [57.8-50.6=7.2dBA then this specification for glazing and ventilation would also achieve the desirable internal nighttime levels for bedrooms at **15.3dB** [22.5-7.2=15.3].

The 10th highest L_{Amax} level at night has been established at 77dB. Given the predicted difference between external and internal levels of 35dB this would equate to internal levels of **42dB L_{Amax}**, which meets the L_{Amax} criteria of 45dB L_{Amax} [77-35=42].

6.0 CONCLUSIONS AND RECOMMENDATIONS

The recommended specification for the construction, windows and ventilation is robust enough to mitigate for any increases in surround activity, including the night time at the rear .

The above demonstrates that with considered specification appropriate noise levels can be met with reference to BS8233: 2014 and sources of noise mitigated.

- For all habitable rooms, windows should be fitted with double glazing 10/12/6, or similar / better and Greenwood MA3051 wall ventilation or similar / better.

Pre-completion testing can be completed under Approved Document E to ensure that the sound insulation between the ground floor retail space and upper floor apartments is sufficient.

Table 16: Required Element Performance or similar / better and approved [dB]

Element	Unit	Octave Band Centre Frequency [Hz]					
		125	250	500	1k	2k	4k
Glazing	SRI	26	27	34	40	38	38
Ventilation	SRI	47	46	49	56	66	69

APPENDIX 1

EXPLANATION OF ACOUSTIC TERMS

The dB or the decibel, is the unit of noise. The number of decibels or the level, is measured using a sound level meter. It is common for the sound level meter to filter or 'weight' the incoming sound so as to mimic the frequency response of the human ear. Such measurements are designated **dB(A)**.

A doubling of the sound is perceived, by most people, when the level has increased by 10 dB(A). The least discernible difference is 2 dB(A). Thus, most people cannot distinguish between, say 30 and 31 dB(A).

If a noise varies over time, then the **equivalent continuous level, or LAeq**, is the notional constant level of noise which would contain the same amount of acoustic energy as the time varying noise.

The following table gives an indication of the comparative loudness of various noises expressed in terms of the A weighted scale:

Source of noise	dB(A)	Nature of Noise
Inside Quiet bedroom at night	30	Very Quiet
Quiet office	40	
Rural background noise	45	
Normal conversational level	60	
Busy restaurant	65	
Typewriter @ 1m	73	
Inside suburban electric train	76	
Alarm clock ringing @ .5m	80	
Hand clap @ 1m	80	
HGV accelerating @ 6m	92	Very Loud

APPENDIX 2

REFERENCES

1. National Planning Policy Framework or NPPF (2019).
2. British Standard 8233:2014 (Guidance on Sound Insulation and Noise Reduction for Buildings).
3. WHO “Guidelines for Community Noise”.
4. BS4142:2014 – Rating Industrial Noise Affecting Mixed Residential and Industrial Areas.
5. ProPG Professional Practice Guidance on Planning & Noise, May 2017
6. BS EN 12354-3:2000 *Building Acoustics-Estimation of Acoustic Performance in buildings from the performance of elements. Part 3 Airborne sound Insulation against outdoor sound.”*
7. ANC Acoustics Ventilation, and Overheating, Residential Design Guide, 2020.

APPENDIX 3

QUALIFICATIONS AND EXPERIENCE OF S.B. MELLOR

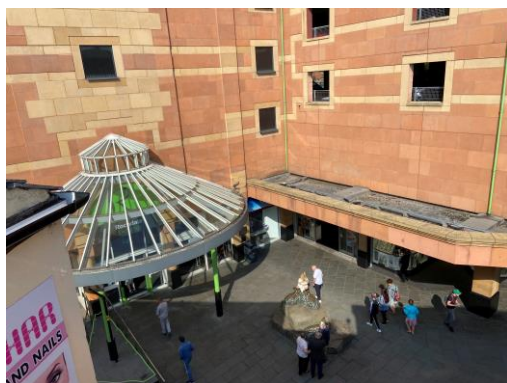
My full name is Steven Brian Mellor. I am the principal of the firm of SBM Safety Solutions Ltd, a consultancy company that specialises in health, safety and environmental services including noise assessment and control.

I hold a Master's degree in Health, Safety and Environmental Law, British Occupational Health Society (BOHS) M104 certificate in Noise and Vibration and Institute of Acoustics Certificate of Competence in Environmental Noise Measurement (Derby University) and Diploma in Acoustics and Noise Control (Bristol University). I am a member of the professional body for noise and vibration specialists, the Institute of Acoustics - MIOA.

I have some 20 years of experience dealing with problems caused by noise and vibration, both regarding noise and vibration in the environment, the workplace and the home. The firm of SBM Safety Solutions Ltd. was formed 18 years ago. During that time, we have advised many groups including employers, residents and developers about the problems of noise and vibration in the workplace and environment.

APPENDIX 4

Views of the Site and Location



Yorkshire Street – Shopping Centre



View of Yorkshire Street



Monitoring above first floor position 2



Baillie Street