



BRAIDEN ACOUSTICS LTD

Innovation Forum | 51 Frederick Road | Salford | Manchester | M6 6FP

NOISE IMPACT ASSESSMENT

Prepared For : Alsadiq Academy

Date : 18 Feb 2025

Site : Briarmede, 426-428 Rochdale Rd, Middleton

Report No. : 11372

1 INTRODUCTION

Braiden Acoustics has been commissioned by Alsadiq Academy to undertake an acoustic survey at the site of Briarmede, 426-428 Rochdale Rd, Middleton in order to support planning application 24/01260/FUL which proposes the following:

Change of use from nursing home to student accommodation and educational facility together with associated car parking and landscaping

1.1 AIM

This is a noise impact assessment report that shall identify potential noise sources and receivers and determine noise limits for industrial noise.

Noise break-in-in will also be assessed for the residential accommodation.

2 DESCRIPTION OF SITE

The site is a large two-storey detached property, as shown in Figure 1.



Figure 1
Site location

2.1 SITE LOCATION AND SURROUNDING USES

The site is bounded by Rochdale Road to the west, residential properties either side and a playing field to the rear that belongs to the local school.



Figure 2
Site location

2.2 PROPOSED USE

The proposed development is a change of use from a care home (C2) to student accommodation which includes:

- 11no. bedrooms with en-suite shower rooms
- 1no. bedroom for night guard
- 2no. studio apartments
- Storage
- Study rooms
- Computer rooms
- Library
- Toilets
- 2no. kitchens
- Dining hall / Game room.

There are no external changes shown on the proposed plans except that windows will be replaced. The property would have access off Rochdale Road.

Parking and bin storage is proposed.

There will be accommodation for overnight stays and a security guard will be present at night. This is considered ancillary to the main use.



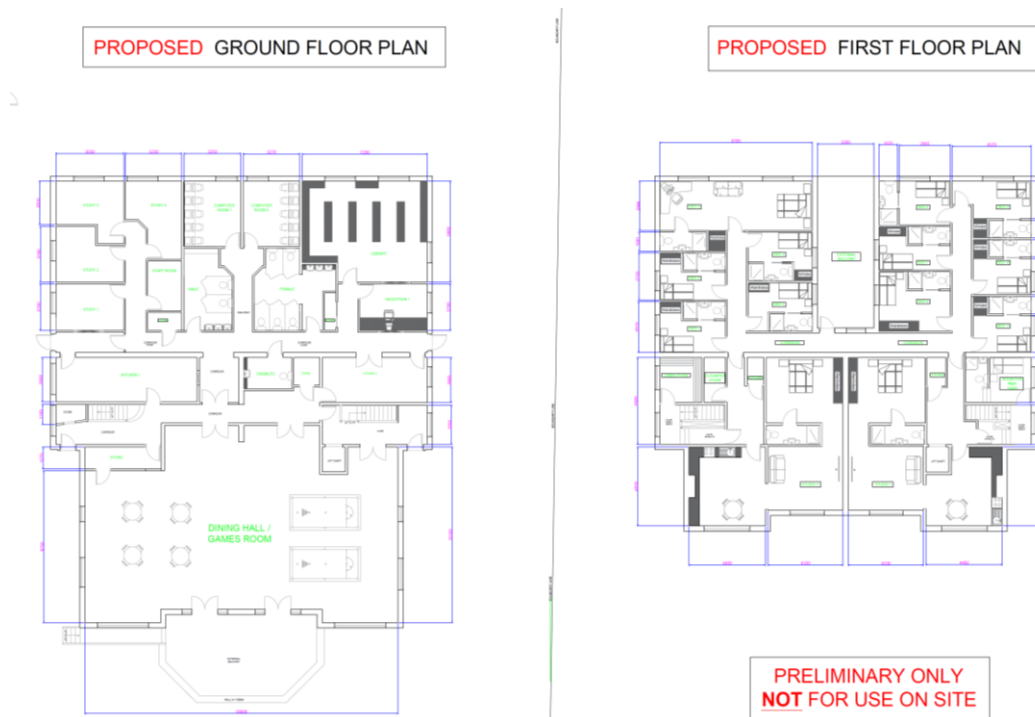


Figure 3
Proposed ground and first floor layout

2.2.1 Building services

There will not be kitchen ventilation or condenser units for air conditioning.

3 ACOUSTIC CRITERIA AND METHODOLOGY

3.1 BS 4142

BS 4142:1999 “Method for rating industrial noise affecting mixed residential and industrial areas” [1] assesses industrial noise with regards to nearby residential dwellings. The guidance is commonly used to compare the equivalent noise from an industrial source only (*specific noise level*), L_{Aeq} , to the background noise level, L_{A90} , at the nearest sensitive receptor (NSR).

This Standard has been recently updated, BS 4142:2014 “Methods for rating and assessing industrial and commercial sound” [2]. Whereas the old standard added 5dB ‘penalty’ to the Specific Noise Level (SNL) if the noise source has a ‘character’ that can draw attention that may be described as tonal, intermittent or impulsive, the new standard gives clearer guidance on noise ‘character’. Furthermore, the previous Standard gave only one 5 dB penalty whereas the new Standard may not. When added to the specific noise level it forms the *rating level*. The new Standard gives the guidance for the following types of noise character:

Where appropriate, establish a rating penalty for sound based on a subjective assessment of its characteristics. This would also be appropriate where a new source cannot be measured because it is only proposed at that time, but the characteristics of similar sources can subjectively be assessed.

Correct the specific sound level if a tone, impulse or other characteristic occurs, or is expected to be present, for new or modified sound sources.

NOTE 1 *The prominence of tonal or impulsive sound from a source can be masked by residual sound. In many cases the amount of masking varies as the residual sound changes in level and possibly character. The source’s tonal and/or impulsive characteristics could also vary with time.*



Consider the subjective prominence of the character of the specific sound at the noise-sensitive locations and the extent to which such acoustically distinguishing characteristics will attract attention.

Tonality

For sound ranging from not tonal to prominently tonal the Joint Nordic Method gives a correction of between 0 dB and +6 dB for tonality. Subjectively, this can be converted to a penalty of 2 dB for a tone which is just perceptible at the noise receptor, 4 dB where it is clearly perceptible and 6 dB where it is highly perceptible.

Impulsivity

A correction of up to +9 dB can be applied for sound that is highly impulsive, considering both the rapidity of the change in sound level and the overall change in sound level. Subjectively, this can be converted to a penalty of 3 dB for impulsivity which is just perceptible at the noise receptor, 6 dB where it is clearly perceptible and 9 dB where it is highly perceptible.

Other sound characteristics

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.

NOTE 2 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.

Intermittency

When the specific sound has identifiable on/off conditions, the specific sound level ought to be representative of the time period of length equal to the reference time interval which contains the greatest total amount of on time. This can necessitate measuring the specific sound over a number of shorter sampling periods that are in combination less than the reference time interval in total, and then calculating the specific sound level for the reference time interval allowing for time when the specific sound is not present. If the intermittency is readily distinctive against the residual acoustic environment, a penalty of 3 dB can be applied.

Once a penalty for noise character is added to the Specific Noise Level then this is termed the Rating Level.

The background level is then compared to the rating level. It is usual that the rating level due to the source should be below the background noise level at the nearest sensitive receptor; indeed BS 4142 states:

*“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.**”*

3.2 BS 8233: 2014

The British Standard BS 8233:2014 “Guidance on sound insulation and noise reduction for buildings” gives guidance on recommended indoor ambient noise levels for residential dwellings.



Room	Criterion	$L_{Aeq,T}$	
		night	day
Bedroom	Sleeping	30	35
Dining Room/Area	Dining	--	40
Living Room	Resting	--	35

Table 1

Recommending indoor ambient noise level thresholds from anonymous noise (taken from Table 4, BS 8233:2014)

Internal levels are simply predicted by the subtraction of the estimated sound reduction index (SRI) of the building façade from the external free field noise measurements. When considering the SRI of a particular façade it is usual to only consider the glazing as this is the weakest element acoustically.

3.3 COUNCIL CRITERIA

3.3.1 Industrial noise

Section 11 d) of BS 4142:2014 says

“Where the rating level does not exceed the background sound level, this is an indication of the specific sound source having a low impact”

Therefore, the Rating Level should not exceed the Background Level to ensure any potential noise has a low or no impact.

3.3.2 Residential noise criteria

For residential developments, the noise thresholds are taken from BS8233:

- Bedrooms (night time - 23.00 - 07.00) 30 dB LAeq (individual noise events should not normally exceed 45 dB LAmax,F by more than 15 times)
- Living Rooms (daytime - 07.00 - 23.00) 35 dB LAeq
- Gardens and terraces (daytime) 55 dB LAeq

4 MEASUREMENT DETAILS

A site visit measured external background noise levels at the front, for the following:

- ambient noise for noise break-in

Spot noise measurements revealed that the rear is 10dB less than the front of the building due to road noise being prevalent.

4.1 EXTERNAL NOISE MONITORING DETAILS

Personnel: John Braiden, BSc & MSc Acoustics, MIOA.

Weather: 8-12- ° C; <5ms⁻¹ wind; ~40 - 60% cloud; no precipitation.

Equipment: NTi XL2 integrated real time analyser & B&K 4231 calibrator.

Date: Monday 17th July 2023

The sound level meter was calibrated before after the measurements with no drift reported.



Monitoring was unmanned.

4.1.1 Monitoring locations

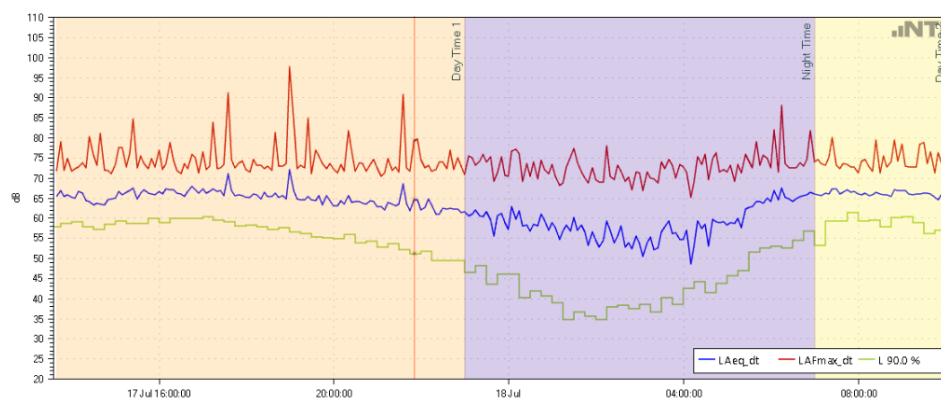
The noise monitoring location was 1m from a first-floor façade on the front and rear elevations.



Figure 4
Monitoring locations

4.1.2 Monitoring results

4.1.2.1 FRONT



Cursor: Position=2023-07-17 21:50:00 LAeq_dt=64.4 dB LAFmax_dt=79.1 dB L 90.0 %=51.1 dB

Figure 5
Time history

Noise levels at the front were relatively high due to fast moving vehicles on Rochdale Road; as well as noise from the surrounding road network.



Location	Time		Duration	Time Period	L_{A90} dB	L_{Aeq} dB	L_{Amax} dB
	Start	Finish					
Front	13:35:56	23:00:00	20:26:31	day	55.4	65.4	97.7
	23:00:00	07:00:00	08:00:00	Night	39.4	60.6	87.9
	07:00:00	12:13:37:00	05:37:00	day	58.3	66.1	84.4

Table 2
Summary of noise monitoring results

The overall free field¹ noise levels are as follows:

$$L_{Aeq}(\text{night}) \quad 61 - 3 = 58 \text{ dB(A)}$$

$$L_{Aeq}(\text{day}) \quad 66 - 3 = 63 \text{ dB(A)}$$

4.1.2.2 REAR

Noise monitoring at the rear was undertaken for four hours, in order to determine the difference in noise levels between the front and rear.

Road traffic noise was evident at the rear elevation, although lower is level that the front.

The noise monitoring included the evening rush hour up to almost 18:00.

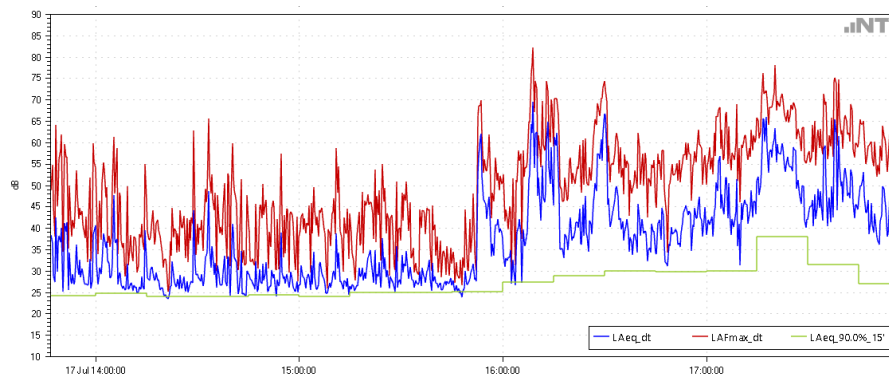


Figure 6
Time history - REAR

Location	Time		Duration	Time Period	L_{A90} dB	L_{Aeq} dB	L_{Amax} dB
	Start	Finish					
Rear	13:46:54	17:56:31	04:09:3	day	24.9	50.9	82.2
Front	13:45:00	17:55:00	05:37:00	day	58.8	66.2	91.2

Table 3
Summary of noise monitoring results -Rear (compared with same time on front elevation)

¹ Monitoring was made 1m from a façade.



Noise levels at the rear were much lower than the front due to significant shielding and greater distance to Rochdale Road.

The overall free field² noise levels are as follows:

$$L_{Aeq, REAR} (13:45 - 17:55) \quad 51 - 3 = 48 \text{ dB(A)}$$

$$L_{Aeq, FRONT} (13:45 - 17:55) \quad 66 - 3 = 63 \text{ dB(A)}$$

So there is a 15dB difference between front and rear elevations.

5 ACOUSTIC ASSESSMENT

5.1 ENVIRONMENT NOISE BREAK IN

Given the external noise levels, the initial glazing scheme can be suggested. However, it should be noted that this assumes windows closed in order to achieve the internal noise levels based on BS 8223.

The amount of attenuation from the building façades were readily computed using the simple method in Appendix G of BS 8233:2014 whereby the sound insulation index (SRI) of the glazing (the weakest element of the building façade, acoustically) is determined by simply deducting the required internal noise level from the external free field noise level.

5.1.1 Façade effect

A -3dB façade correction was necessary as the noise monitoring was not free-field.

5.1.2 Distance correction

There was a no distance correction applied because the monitoring position was at the location of the proposed accommodation.

5.1.3 Barrier effect

There is no barrier correction due to direct line of sight to the noise sources.

5.1.4 BS 8233 assessment

The weakest structural element is the glazing. The required glazing was calculated using recommended internal values. The Table below shows the required Sound Reduction Indices (SRI) for the bedrooms (night) and living areas (day) on each relevant elevation.

² Monitoring was made 1m from a façade.



Façade	period	room	External Levels measured / calc'd		Internal Levels recommended		Required glazing	
			L_{Aeq} (dB)	L_{Amax} (dB)	L_{Aeq} (dB)	L_{Amax} (dB)	SRI ($R_w + C_{tr}$)	Example Spec ³
FRONT / SIDE	night	bedroom	58		30		28	6 (6-16) 4
	day	lounge	63		35		28	6 (6-16) 4
REAR	night	bedroom	43		30		13	4 (6-16) 4
	day	lounge	48		35		13	4 (6-16) 4

Table 4
Calculated SRI values and recommended glazing

The glazing for habitable rooms, on the front and side elevations, can achieve adequate internal noise levels with slightly upgrade double glazing of 6 / (6-16) / 4mm.

Standards 4mm double glazing will suffice for the rear elevation.

6 CONCLUSION

An acoustic survey has taken place at Briarmede, 426-428 Rochdale Rd, Middleton to determine noise levels in and around the proposed site for the planning application to change the use to student accommodation.

The predominant noise source was road traffic noise from Rochdale Road.

No external plant is proposed

The habitable rooms on the front and side elevations should have the following glazing: 6 / (6-16) / 4mm.

Standard 4mm double glazing will suffice for the rear elevation.

7 REFERENCES

- [1] BS 4142: 1997
Method for Rating industrial noise affecting mixed residential and industrial areas
British Standards Institute, 1997.
- [2] BS 4142: 2014
Methods for rating and assessing industrial and commercial sound
British Standards Institute, 2014.

³ Example glazing build up and performance from BS 12354-3 – table in Appendix. Other glazing build-ups available.



Appendix



A1 DRAWINGS

A1.1 Drawings

PROPOSED GROUND FLOOR PLAN PROPOSED FIRST FLOOR PLAN PRELIMINARY ONLY NOT FOR USE ON SITE	PROPOSED REAR ELEVATION PROPOSED SIDE ELEVATION- SOUTH VIEW PROPOSED FRONT ELEVATION PROPOSED SIDE ELEVATION- NORTH VIEW	NOTES
		REVISIONS
PROJECT: 426 - 428 ROCHDALE RD MANCHESTER, LANCASHIRE TO STUDENT ACCOMMODATION CLIENT: ADEEL SCALE: 1:100 ON A3 PAPER REFERENCE NO: 1344 PROPOSALS REV 2		BARRY CULLEN Acoustic Consultant 426-428 Rochdale Rd Manchester, M8 7LW email: barrycullen@btinternet.com mob: 07851242898

