



BRAIDEN ACOUSTICS LTD

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

NOISE IMPACT ASSESSMENT

Prepared For : Lapas Chowdhury

Date : 28 Aug 2024

Site : 5 Appleford Drive, Cheetham Hill

Report No. : 11321

1 INTRODUCTION

Braiden Acoustics has been commissioned by Lapas Chowdhury to undertake an acoustic survey at the site of 5 Appleford Drive, Cheetham Hill in support planning application 140562/FO/2024 which proposes “Upward extension to create additional storey and two-storey side extension to create a total of 4no. additional dwellings. Extension to existing warehouse to create 1no. additional warehouse.”

1.1 AIM

This report assesses noise break in to the new residential units and sets noise limits for any external plant associated with the warehouse use.

2 DESCRIPTION OF SITE

The site is the former Beech Hill Social Club on Appleford Drive in Cheetham Hill. The site currently consists of 2no. warehouses, a residential dwelling with 4no. apartments and parking spaces.



Figure 1
Site street view

2.1 SITE LOCATION AND SURROUNDING AREA

The site is bounded by Darrell Walk to the north, Appleford Drive to the east, an empty parcel of land to the south and Museum of Transport, Greater Manchester¹ to the west.

Further to the north and west are residential properties.

¹ The Museum of Transport, Greater Manchester is only open three days a week from 10:00 – 16:00.

To the south, beyond the empty parcel of land, is Queens Drive A6010 which has a mixture of commercial and residential uses. It is a busy road ,taking traffic west / east.



Figure 2
Site location and surrounding area

2.2 PROPOSED USE

The proposal is to create 4no. additional residential units, with two atop the existing residential building and two between warehouse B and the western boundary wall. There will also be the construction of an additional warehouse on the eastern flank of the site between warehouse B and the eastern boundary.

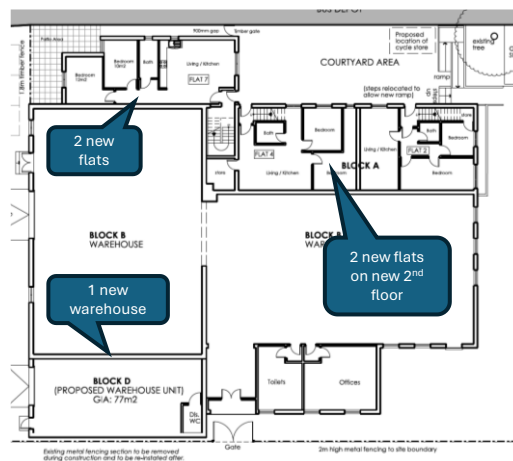


Figure 3
Proposed front elevation

3 ACOUSTIC CRITERIA AND METHODOLOGY

Below are relevant standards and guidance.



3.1 NATIONAL PLANNING POLICY FRAMEWORK (NPPF)

The National Planning Policy Framework is the current document for planning guidance. Paragraph 180 of the revised NPPF states:

180. 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; and*
- c) limit the impact of light pollution from artificial light on local amenity, intrinsically dark landscapes and nature conservation.*

Paragraph 180 refers to the Noise Policy Statement for England which shall be briefly discussed in the next Section.

3.2 NOISE POLICY STATEMENT FOR ENGLAND

The main aim of the Noise Policy Statement is to:

Promote good health and a good quality of life through the effective management of noise within the context of Government policy on sustainable development.

Therefore, the NPSE is mainly concerned with environmental noise.

The document sets out categories in order to help distinguish if there is an adverse effect due to noise and if there is, how significant it is.

NOEL – No Observed Effect Level

This is the level below which no effect can be detected. In simple terms, below this level, there is no detectable effect on health and quality of life due to the noise.

LOAEL – Lowest Observed Adverse Effect Level

This is the level above which adverse effects on health and quality of life can be detected.

SOAEL – Significant Observed Adverse Effect Level

This is the level above which significant adverse effects on health and quality of life occur

It is not possible to have a single objective noise-based measure that defines SOAEL that is applicable to all sources of noise in all situations. Consequently, the SOAEL is likely to be different for different noise sources, for different receptors and at different times. It is acknowledged that further research is required to increase our understanding of what may constitute a significant adverse impact on health and quality of life from noise. However, not having specific SOAEL values in the NPSE provides the necessary policy flexibility until further evidence and suitable guidance is available.

3.3 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).

When measuring the Background Noise Level, the Standard states:

Choose outdoor measurement locations that will give results that are representative of the ambient sound and residual sound at the assessment location(s). Make the measurement of the ambient sound level, the residual sound level and the background sound level at a height of 1.2 m to 1.5 m above the ground, unless there is a



specific reason to use an alternative height (which should be justified), and under similar conditions, e.g. similar influence of reflections and measurement height above the ground. Where practical, minimize the influence of reflections by making the measurements at least 3.5 m from any reflecting surface other than the ground.

Where it is necessary to undertake measurements above ground floor level, choose a location which is approximately 1 m from the facade on the relevant floor of the building if it is not practical to make the measurements at least 3.5 m from the facade at this elevation. NOTE When measurements for distant sources are made at 1 m from a facade, the measured level can be adjusted to an equivalent free-field level by subtracting a 3 dB correction factor. For sources that are relatively close or not perpendicular to the facade the correction may be 1 dB or 2 dB, in which case the reasons for not using a correction of 3 dB ought to be explained.

Essentially, background noise measurement should be made free field. If measurements are made at the façade, then a correction should be made in order to represent the free field.

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.”

3.4 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)

3.5 COUNCIL NOISE CRITERIA

3.5.1 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

3.5.2 Industrial noise criteria

For external plant the noise criterion is as follows:

‘The development should be designed so as to achieve a rating level of 5dB (LAeq) below the typical background (LA90) level at the nearest noise sensitive location’.

4 MONITORING DETAILS

As part of the acoustic assessment, the following noise measurements have been undertaken:

1. external ambient noise at the front (east).



2. external ambient noise at the back (west).

4.1 NOSIE MONITORING – FRONT

4.1.1 Overview

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

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

Weather 14- 18degC, <5m/s wind, 40-60% cloud

Time / Date: Thursday 18/07/2024 at 11:05:04 for over 24 hours.

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

Monitoring was unmanned.

Background noise (L_{A90}), 'average' noise levels (L_{Aeq}) and maximum noise levels (L_{Amax}) were taken in 15-minute intervals.

4.1.2 Monitoring Location

Noise monitoring took place on the northern elevation of the site, location '1' in Figure 4. The microphone was 1m from a first-floor window.

Location 2 was towards the south end of the existing residential building in order to pick up any noise from the Transport Museum². Again, 1m from a first-floor window.



Figure 4
Site showing monitoring locations

4.1.3 Monitoring results

The clearly prevalent noise source at the front of the site was road traffic noise from Hyde Road.

² Noise monitoring was done at the weekend when the Transport Museum is open.



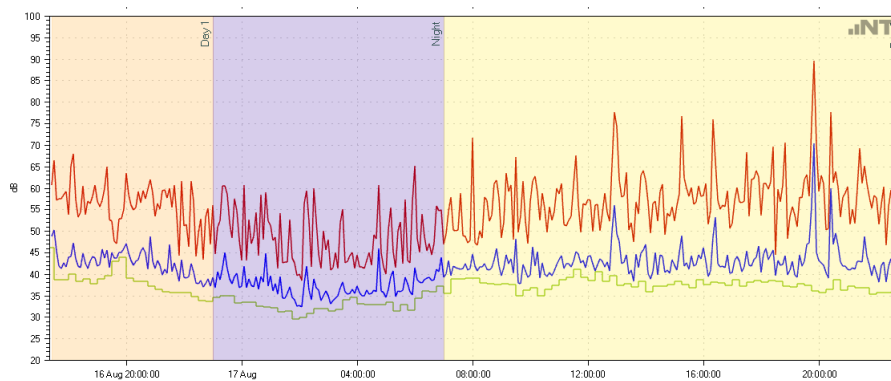


Figure 5
Time history

A summary of the overall noise levels is given in Table 2

Day	Time		Duration	Time Period	L _{A90} dB	L _{Aeq} dB	L _{Amax} dB
	Start	Finish					
Fri	17:20:16	23:00:00	05:35:00	day	36.5	43.4	67.9
	23:00:00	07:00:00	08:00:00	night	32	38.3	65.2
	07:00:00	15: 41:06	08:41:06	day	33.2	43.9	78.4

Table 2
Summary of noise monitoring results - FRONT

The night time max level is the level that is not exceeded more than 10 times during the night time period.

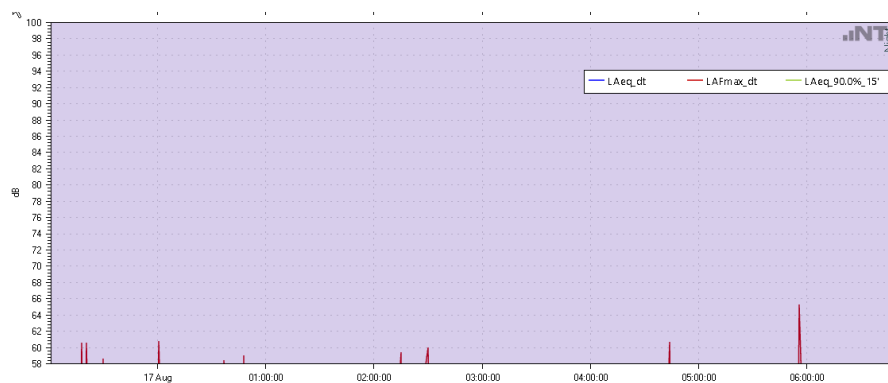


Figure 6
Max levels that were exceed no more than 10 times during the night.

Figure 6 shows that the max level of 58dB was not exceeded more than 10 times during the night period.

The overall free field³ noise levels are as follows:

$$L_{Aeq}(\text{night}) \quad 38 - 3 = 35 \text{ dB}$$

$$L_{Aeq}(\text{day}) \quad 44 - 3 = 41 \text{ dB}$$

$$L_{Amax, <10}(\text{night}) \quad 58 - 3 = 55 \text{ dB}$$

³ Monitoring was not made in a free field location



4.2 REAR

4.2.1 Monitoring overview

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

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

Weather 14- 21degC, <5m/s wind, 40-60% cloud

Time / Date: Friday 16/08/2024 at 17:10:56 for over 42 hours.

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

Monitoring was unmanned.

Background noise (L_{A90}), 'average' noise levels (L_{Aeq}) and maximum noise levels (L_{Amax}) were taken in 15-minute intervals.

4.2.2 Monitoring location

The microphone was 1m from a rear first-floor window, as shown in Figure 4.

4.2.3 Monitoring results

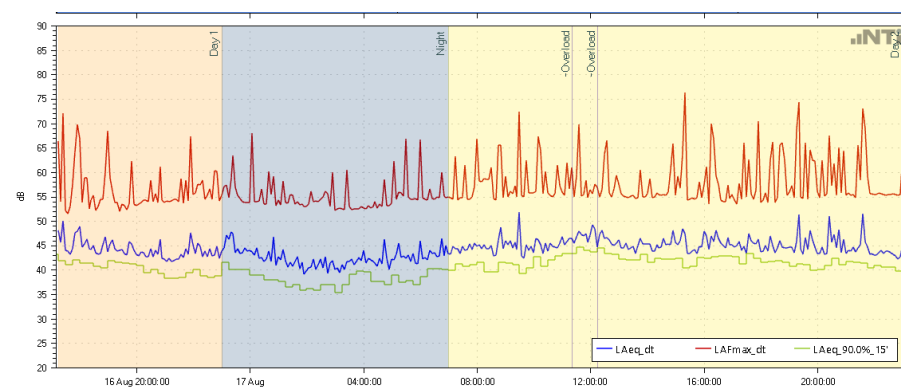


Figure 7
Time history

Some data were excluded from the dataset which included sirens.

A summary of the overall noise levels is given in Table 2

Day	Time		Duration	Time Period	L_{A90} dB	L_{Aeq} dB	L_{Amax} dB
	Start	Finish					
Friday	17:10:56	23:00:00	5:45:00	day	40.0	44.5	72.0
	23:00:00	07:00:00	08:00:00	night	37.5	42.9	67.9
	07:00:00	23:00:00	16:00:00	day	41.3	45.5	76.3

Table 3
Summary of noise monitoring results - REAR

The night time max level is the level that is not exceeded more than 10 times during the night time period.



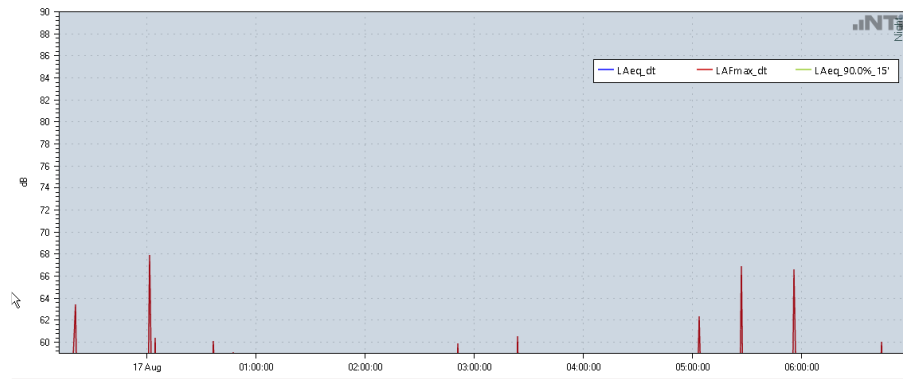


Figure 8

Max levels that were exceed no more than 10 times during the night.

Figure 6 shows that the max level of 57dB was not exceeded more than 10 times during the night period.

The overall free field⁴ noise levels are as follows:

$$L_{Aeq}(\text{night}) \quad 43 - 3 = 40 \text{ dB}$$

$$L_{Aeq}(\text{day}) \quad 45 - 3 = 42 \text{ dB}$$

$$L_{Amax, <10}(\text{night}) \quad 57 - 3 = 54 \text{ dB}$$

4.2.3.1 Background noise level

The Rating Level of any external plant associated with the warehouse use should be 5dB lower than the typical Background Noise Level for either the day or night period (depending on when any external plant is in use).

Background Noise Levels (BNL) were recorded in 15-minute intervals throughout the night and day time periods and a histogram was generated to determine the 'typical' BNL for that period.

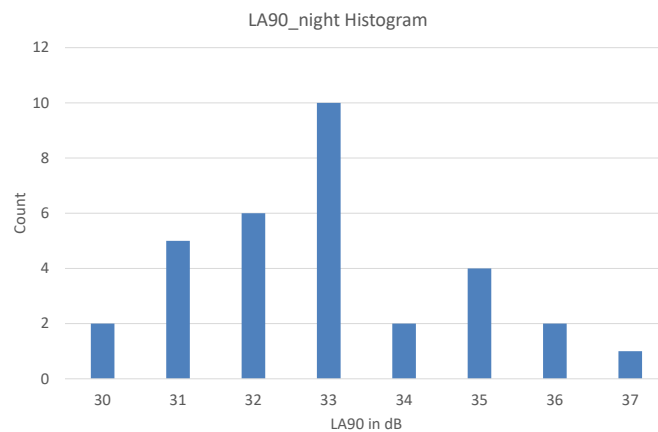


Figure 9

Background Noise Level Histogram - night

The typical night-time Background Level at the rear at night was 33dB $L_{A90,15min}$.

⁴ Monitoring was not made in a free field location



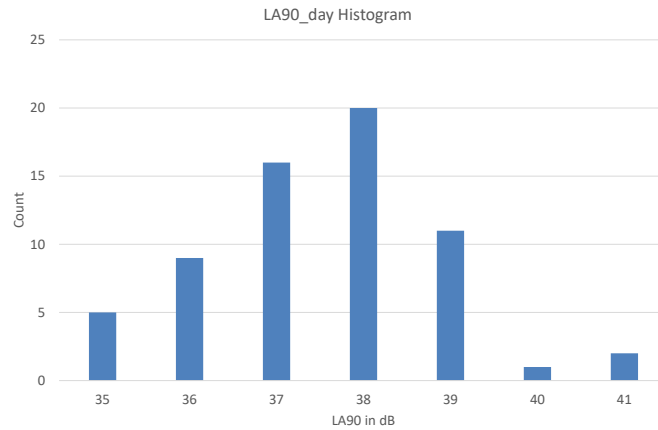


Figure 10
Background Noise Level Histogram - day

The typical night-time Background Level at the rear at day was 38dB $L_{A90,15min}$.

5 ACOUSTIC ASSESSMENT

The following are to be assessed:

- noise break-in front and rear
- noise from the proposed condenser unit at the rear.

5.1 EXTERNAL PLANT NOISE

The Rating Level of any external plant associated with the warehouse, at the nearest habitable window, should not exceed:

28 dB L_{A90} (night)

33 dB L_{A90} (day)

5.2 ENVIRONMENTAL 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 BS8233:2014.

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.

5.2.1 Façade effect

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

5.2.2 Distance correction

There was no distance correction applied as the monitoring location was representative of the location proposed residential dwellings.

5.2.3 Barrier effect

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



5.2.4 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.

Front / Side

$$L_{Aeq}(\text{night}) \quad 38 - 3 = 35 \text{ dB}$$

$$L_{Aeq}(\text{day}) \quad 44 - 3 = 41 \text{ dB}$$

$$L_{Amax, <10}(\text{night}) \quad 58 - 3 = 55 \text{ dB}$$

Rear

$$L_{Aeq}(\text{night}) \quad 43 - 3 = 40 \text{ dB}$$

$$L_{Aeq}(\text{day}) \quad 45 - 3 = 42 \text{ dB}$$

$$L_{Amax, <10}(\text{night}) \quad 57 - 3 = 54 \text{ dB}$$

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 ⁵
REAR	night	bedroom	40	54	30	45	10	4 / (6-16) / 4 mm
	day	lounge	42		35		7	4 / (6-16) / 4 mm
FRONT	night	bedroom	35	55	30	45	10	4 / (6-16) / 4 mm
	day	lounge	41		35		6	4 / (6-16) / 4 mm

Table 4
Calculated SRI values and recommended glazing

Standard double glazing will suffice for all habitable

5.2.5 Ventilation

Adequate ventilation can be achieved with open windows.

6 CONCLUSION

An acoustic survey has taken place at the 5 Appleford Drive, Cheetham Hill to support planning application 140562/FO/2024 for the erection of 4no. apartments and 1no. warehouse.

Environmental Noise Break In assessment revealing that standard double glazing will suffice throughout.

Background Noise measurement have determined the threshold for any external plant associate with the warehouse use:

28 dB L_{A90} (night)

33 dB L_{A90} (day)

7 REFERENCES

⁵ Example glazing build up and performance from Saint Gobain – specifications and performance shown in Appendix. Other glazing build-ups available.



[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.



A1 DRAWINGS

A1.1 First floor

