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115A SALE ROAD, WYTHENSHAWE - APPROVED RESIDENTIAL DEVELOPMENT: NOISE MITIGATION SCHEME

On behalf of:

Q+A Planning Ltd

Report No: P20-255-R02v1
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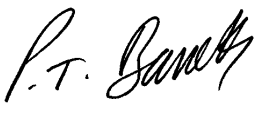

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1.0 INTRODUCTION

1.1 Hepworth Acoustics Ltd was commissioned by Q&A Planning to advise on any necessary noise mitigation measures, in connection with an approved residential development at 115a Sale Road in Wythenshawe (Planning Reference 127586/F0/2020).

1.2 Condition 11 of the aforementioned planning permissions states:

> *"Before the development commences a scheme for acoustically insulating the proposed residential accommodation against noise from Sale Road shall be submitted to and approved in writing by the City Council as local planning authority. There may be other actual or potential sources of noise which require consideration on or near the site, including any local commercial/industrial premises. The approved noise insulation scheme shall be completed before any of the dwelling units are occupied.*
>
> *Noise survey data must include measurements taken during a rush-hour period and night-time to determine the appropriate sound insulation measures necessary. The following noise criteria will be required to be achieved:*
>
> *Bedrooms (night-time: 23.00 – 07.00): 30 dB L_{Aeq}*
> *(individual noise events shall not exceed 45 dB $L_{Amax,\ F}$ by more than 15 times)*
>
> *Living Rooms (daytime: 07.00 – 23.00): 35 dB L_{Aeq}*
>
> *Gardens and terraces (daytime): 55 dB L_{Aeq}"*

1.3 The development land, which is located in a broadly residential area, is currently vacant and overgrown, and extends to approximately 0.09 hectares. The site fronts onto the busy Sale Road (B5166) to the north which has a 30mph speed limit, with shops and dwellings on the other side of the road. There is a bus stop in front of the site.

1.4 The east of the site is bounded by the rear of a parade of shops including a convenience store and takeaway, with living accommodation above. On the western elevation of the convenience store is a wall mounted condenser unit that we noted runs on demands for short periods during the day. To the south and west the site is bounded by rear gardens of the dwellings on Yarmouth Drive and Newhall Drive respectively. The location of the development site is shown in Figure 1 and the floor plans of the development are shown in Figures 2, 3 & 4.

1.5 The proposals are for the construction of a three-storey building comprising a total of nine residential apartments. Including three one-bedroom apartments and six two-bedroom apartments.

1.6 The noise assessment has included:

- An inspection of the site and surrounding area;
- Measurement of road traffic noise levels during representative periods of the daytime (including rush hour) and night/early morning;
- Recommending a scheme of noise mitigation measures in order to comply with the requirements of Condition 11 of the planning approval.

1.7 The various noise units and indices referred to in this report are described in Appendix I. All noise levels mentioned in the text have been rounded to the nearest decibel, as fractions of decibels are imperceptible.

2.0 ROAD TRAFFIC NOISE SURVEY

2.1 A road traffic noise survey has been undertaken in order to inform the specification of the noise mitigation scheme.

2.2 Road traffic noise measurements were carried out at a location on the site representative of the proposed frontage of the building 10m from Sale Road. The noise survey location is indicated in Figure 1.

2.3 The noise levels were measured in consecutive 15 minute periods, measurements were taken during the daytime between approximately 13:30 on Thursday 23rd July 2020 and 10:00 on Friday 24th July 2020. Therefore, the noise survey included daytime periods incorporating evening and morning rush hour periods, as well as the entire night.

2.4 The survey was carried out using a Rion NL52 'Class 1' integrating sound level meter (s/n: 00242747). complying with BS EN 60804:2001). Acoustic calibration of the sound level meter was carried out before and after the noise measurements using an acoustic calibrator that had been calibrated within the preceding 12 months. No significant variation in the calibrated noise level was noted. The noise measurements have been carried out in general compliance with BS 7445: 2003. The noise measurements were taken in 'free-field' conditions and at a microphone height of approximately 1.5 m above the ground. Octave band frequency analysis was also carried out to assist with the design of sound insulation measures.

2.5 Weather conditions during the daytime were warm, dry and overcast with a light breeze (<5 m/s). During the night-time the weather conditions were mild, dry and overcast with a light breeze (<3 m/s).

2.6 The daytime measured noise levels $L_{Aeq(12\ hour)}$ have been logarithmically averaged to obtain a representative $L_{Aeq\ (16\ hour)}$ value. It is important to note that measured daytime noise level includes daytime and evening rush hour periods.

2.7 The measured night-time L_{Aeq} values have been logarithmically averaged to obtain a $L_{Aeq\ (8\ hour)}$ value. The full results of the traffic noise survey are shown in Appendix II and summarised in Table 1:

Table 1: Road Traffic Noise Exposure Levels (dB)

Location	Daytime $L_{Aeq\ (16\ hour)}$	Night-time $L_{Aeq\ (8\ hour)}$
10m from Sale Road	63	56

2.8 The measured noise level between 16:30 and 18:30 on the 15th of July was 63 dB L_{Aeq}, additionally the noise level measured between 07:30 and 09:30 on Friday 16th July was also 63 dB $L_{Aeq.}$ Therefore, the road traffic noise exposure levels in Table 1 are applicable throughout the day-time period and the scheme of noise mitigation will be commensurate for rush hours periods.

2.9 Corresponding peaks of noise at night were in the range 67 – 85 dB L_{Amax} due to passing vehicles and stationary buses at the nearby bus stop. It was noted that the condenser runs on demand throughout the day and was just audible in the lulls in road traffic.

2.10 The implications of the road traffic noise exposure values are set out in Section 4.0

3.0 RECOMMENDED NOISE MITIGATION SCHEME

3.1 We recommend that the following noise mitigation measures are implemented in order to comply with the requirements of Condition 11. The requirements of Condition 11 are summarised below in Table 2.

Table 2: Condition 11 Acoustic Design Criteria

Location	07:00 – 23:00 (Daytime)	23:00 – 07:00 (Night-time)
Living room	35 dB $L_{Aeq,(16\ hour)}$	-
Bedroom	-	30 dB $L_{Aeq,(8\ hour)}$ / 45 dB L_{Amax}
Gardens	55 dB L_{Aeq}	-

3.2 Some sound insulation measures are necessary for parts of the site which are exposed to road traffic noise. Our recommendations are made below.

3.3 Windows of standard well-sealed thermal double glazing (4mm glass – 4mm glass) have a typical sound reduction performance of 25 dB $R_w + C_{tr}$ (Note $R_w + C_{tr}$ is sometimes notated as R_{tra}) Therefore, where traffic noise levels exceed 60 dB $L_{Aeq,(16\ hour)}$ during the daytime and/or 55 dB $L_{Aeq,(8\ hour)}$ and/or 70 dB L_{Amax} at night, higher specification glazing will be necessary. Please note the following recommendations apply to all floors of the development.

3.4 For windows of all habitable rooms that will face onto the Sale Road (marked on Figures 2, 3 & 4) we recommend that the living rooms and bedrooms of the dwellings are fitted with double glazing having a sound reduction specification of at least 29 dB $R_w + C_{tr}$. A suitable double glazing system that would achieve this rating is:-

- 8mm glass - nominal (8-20mm) cavity - 4mm glass.

3.5 We also recommend that the sound insulation measures described above are provided for bedrooms one and two of Apartment 2 and bedroom two of Apartments 5 and 6 as we noted some noise in this area from a condenser unit on the western elevation of the convenience store. Our recommendations include any Velux type bedroom windows that are proposed in the roof space of bedroom one of apartment 8 as well as bedroom two of apartment 9.

3.6 For all other bedrooms, and all living rooms on the development, standard double glazing of 4mm glass - nominal (10-16mm) cavity - 4mm glass (25 dB $R_w + C_{tr}$) will suffice.

3.7 We understand that all apartments are to be fitted with a Nuaire MRXBOXAB-ECO2-SW mechanical ventilation and heat recovery (MVHR) system; this will allow ventilation of a room whilst preserving closed windows. As such the sound insulation performance of the windows will not be compromised by the need to open windows for cooling or rapid purge ventilation. (See Appendix III for data sheet)

3.8 The option to open windows should remain and be openable at the occupants' discretion but can be kept closed for noise insulation purposes and a commensurate level of ventilation will still be available.

Garden/Balconies

3.9 We note from the drawings that care has been taken to ensure that balconies are located away from Sale Road and balustrades have been incorporated into the initial design. Since balconies are to be at the rear of the building, significantly further back from the road and effectively shielded from the road by the building itself, the daytime noise criterion of 55dB will be achieved without any specific noise mitigation measures.

4.0 SUMMARY

4.1 An environmental noise survey has been carried out for the approved residential development at 115a Sale Road in Wythenshawe, Greater Manchester.

4.2 The survey found that noise from road traffic on the surrounding road network was the main source of noise in the area.

4.3 An appropriate noise mitigation scheme, including upgraded glazing for the most exposed living rooms and bedrooms, has been recommended in order to meet the requirements of Condition 11 of the planning approval.

Key:

Not to scale

1 Noise Measurement Location

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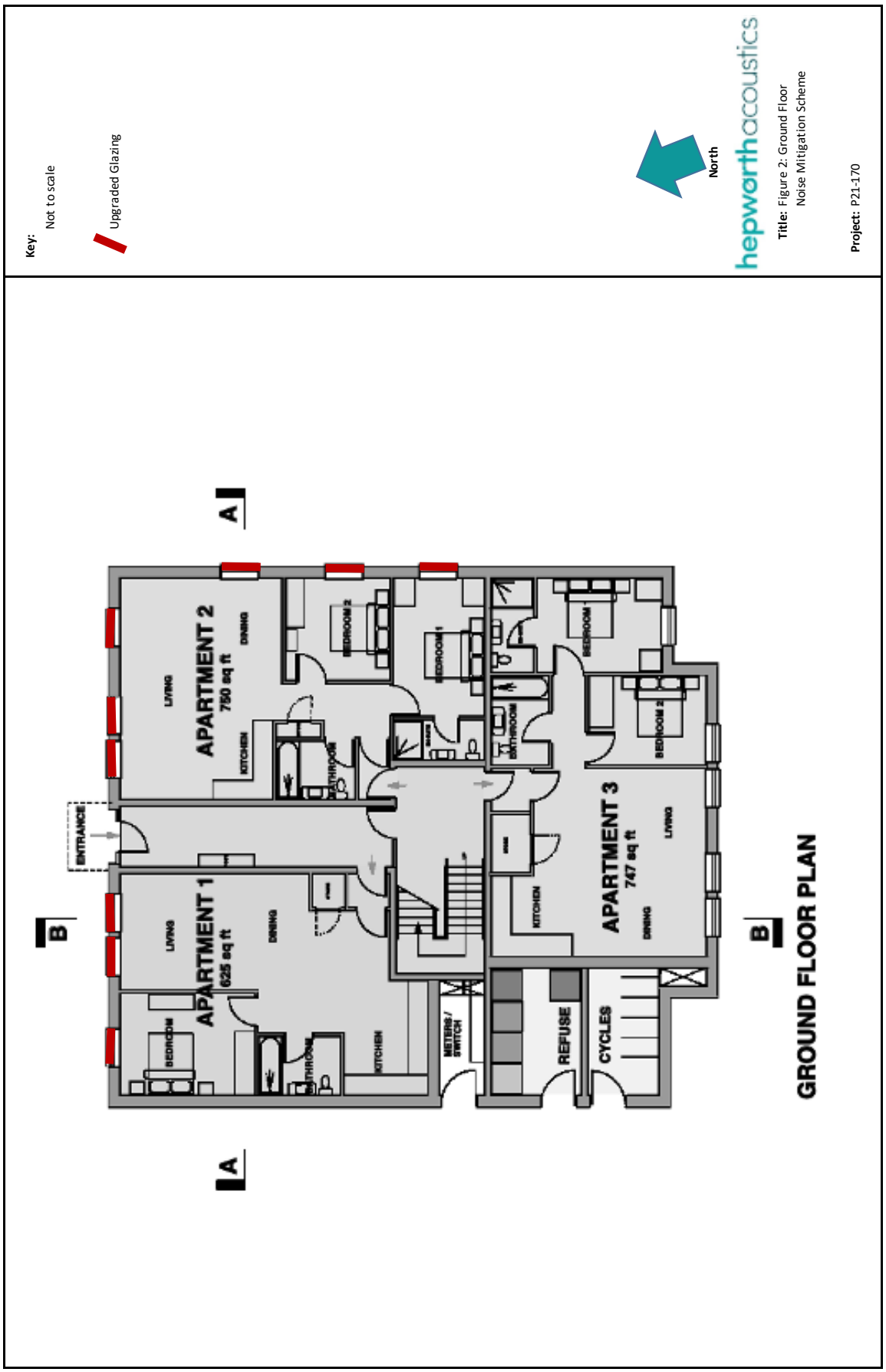
Title: Figure 1: Site Location and Noise Measurement Position

Project: P20-255


Key:
Not to scale
Upgraded Glazing
North
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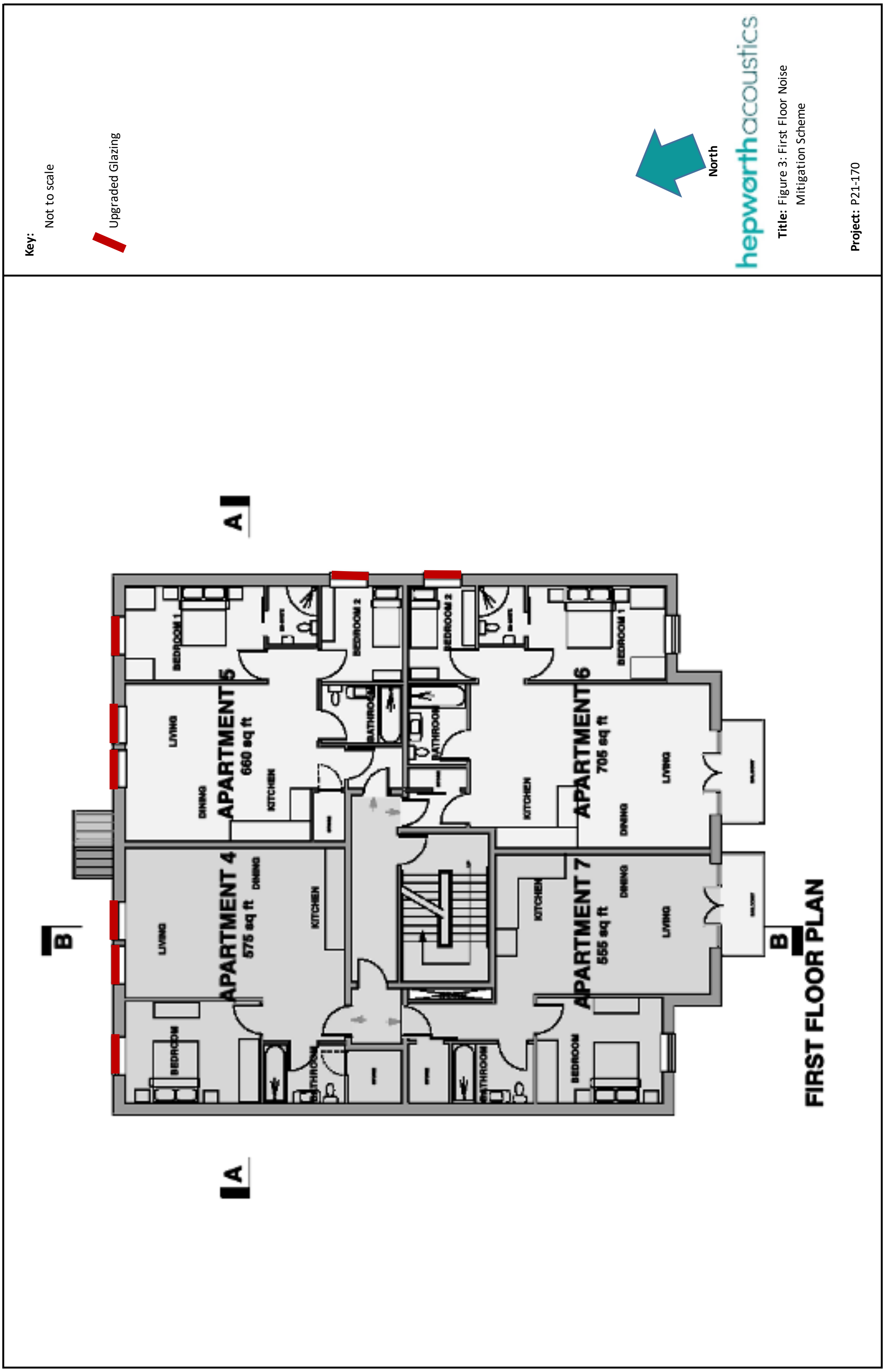
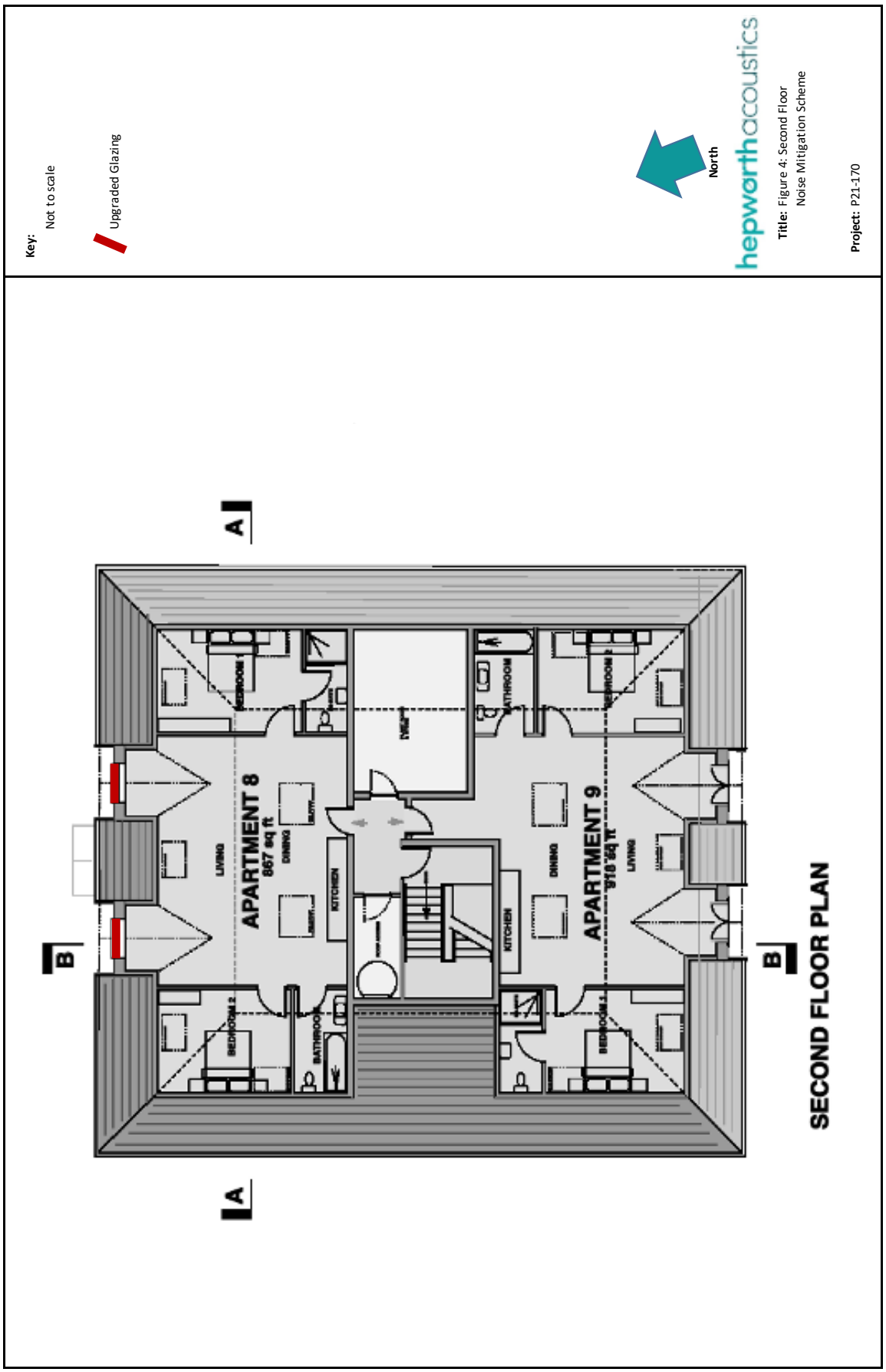
Title: Figure 2: Ground Floor Noise Mitigation Scheme
Project: P21-170
A
B
APARTMENT 1
625 sq ft
LIVING
DINING
BEDROOM
KITCHEN
BATHROOM
APARTMENT 2
750 sq ft
LIVING
DINING
KITCHEN
BATHROOM
BEDROOM 1
BEDROOM 2
ENTRANCE
APARTMENT 3
747 sq ft
LIVING
DINING
KITCHEN
BATHROOM
BEDROOM 1
BEDROOM 2
METERS / SWITCH
REFUSE
CYCLES
GROUND FLOOR PLAN


Key:
Not to scale
Upgraded Glazing
North
hepworthacoustics
Title: Figure 3: First Floor Noise Mitigation Scheme
Project: P21-170
FIRST FLOOR PLAN
APARTMENT 4
575 sq ft
APARTMENT 5
660 sq ft
APARTMENT 6
705 sq ft
APARTMENT 7
555 sq ft
A
B


Key:
Not to scale
Upgraded Glazing
North
hepworthacoustics
Title: Figure 4: Second Floor Noise Mitigation Scheme
Project: P21-170
A
B
APARTMENT 8
867 sq ft
APARTMENT 9
LIVING
DINING
KITCHEN
BEDROOM 2
BATHROOM
BEDROOM 1
SECOND FLOOR PLAN

Appendix I: Noise Units & Indices

Sound and the decibel

A sound wave is a small fluctuation of atmospheric pressure. The human ear responds to these variations in pressure, producing the sensation of hearing. The ear can detect a very wide range of pressure variations. In order to cope with this wide range of pressure variations, a logarithmic scale is used to convert the values into manageable numbers. Although it might seem unusual to use a logarithmic scale to measure a physical phenomenon, it has been found that human hearing also responds to sound in an approximately logarithmic fashion. The dB (decibel) is the logarithmic unit used to describe sound (or noise) levels. The usual range of sound pressure levels is from 0 dB (threshold of hearing) to 120dB (threshold of pain).

Due to the logarithmic nature of decibels, when two noises of the same level are combined together, the total noise level is (under normal circumstances) 3 dB(A) higher than each of the individual noise levels e.g. 60 dB(A) plus 60 dB(A) = 63 dB(A). In terms of perceived 'loudness', a 3 dB(A) variation in noise level is a relatively small (but nevertheless just noticeable) change. An increase in noise level of 10 dB(A) generally corresponds to a doubling of perceived loudness. Likewise, a reduction in noise level of 10 dB(A) generally corresponds to a halving of perceived loudness.

The ear is not equally sensitive to sound at all frequencies. It is less sensitive to sound at low and very high frequencies, compared with the frequencies in between. Therefore, when measuring a sound made up of different frequencies, it is often useful to 'weight' each frequency appropriately, so that the measurement correlates better with what a person would actually hear. This is usually achieved by using an electronic filter called the 'A' weighting, which is built into sound level meters. Noise levels measured using the 'A' weighting are denoted dB(A) or dBA.

Frequency and Hertz (Hz)

As well as the loudness of a sound, the frequency content of a sound is also very important. Frequency is a measure of the rate of fluctuation of a sound wave. The unit used is cycles per second, or hertz (Hz). Sometimes large frequency values are written as kiloHertz (kHz), where 1 kHz = 1000 Hz.

Young people with normal hearing can hear frequencies in the range 20 Hz to 20 kHz. However, the upper frequency limit gradually reduces as a person gets older.

Glossary of Terms

When a noise level is constant and does not fluctuate, it can be described adequately by measuring the dB(A) level. However, when the noise level varies with time, the measured dB(A) level will vary as well. In this case it is therefore not possible to represent the noise climate with a simple dB(A) value. In order to describe noise where the level is continuously varying, a number of other indices can be used. The indices used in this report are described below.

C_{tr} This is an A-weighted urban traffic noise spectrum, which can be added to $D_{nT,w}$ or R_w in some standards to take into account different source spectra such as low frequency sound.

L_{Aeq} This is the A–weighted 'equivalent continuous noise level' which is an average of the total sound energy measured over a specified time period. In other words, L_{Aeq} is the level of a continuous noise which has the same total (A–weighted) energy as the real fluctuating noise, measured over the same time period. It is increasingly being used as the preferred parameter for all forms of environmental noise.

L_{Amax} This is the maximum A–weighted noise level that was recorded during the monitoring period.

L_{A10} This is the A–weighted noise level exceeded for 10% of the time period. L_{A10} is usually used as a measure of traffic noise.

L_{A90} This is the A–weighted noise level exceeded for 90% of the time period. L_{A90} is used as a measure of background noise.

Appendix II: Noise Survey Results

Date(s):	
	Night-time – Thursday 23rd / Friday 24th July 2020
Equipment:	Rion NL-52 'Class 1' sound level meter (serial no. 00242747) with tripod and calibrator
Weather:	Daytime – Dry, warm and light breeze (<5 m/s) overcast skies
	Night-time – Dry and mild with a light breeze (<2 m/s) overcast skies

All levels in dB(A)

Location 1:


Measured Noise Level (dB)
100
90
80
70
60
50
40
30
20
10
0
13:28
13:58
14:28
14:58
15:28
15:58
16:28
16:58
17:28
17:58
18:28
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19:28
19:58
20:28
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01:58
02:28
02:58
03:28
03:58
04:28
04:58
05:28
05:58
06:28
06:58
07:28
07:58
08:28
08:58
09:28
09:58
Measurement Time (hh:mm)
LAmax
LAeq
LA10
LA90