

APPROVED RESIDENTIAL DEVELOPMENT ON LAND OFF SHOP LANE, KIRKHEATON, HUDDERSFIELD

SCHEME OF NOISE MITIGATION

On behalf of:

Worstead Developments Ltd

**APPROVED RESIDENTIAL DEVELOPMENT ON LAND OFF SHOP LANE, KIRKHEATON, HUDDERSFIELD**

**SCHEME OF NOISE MITIGATION**

Report prepared by:  
Hepworth Acoustics Ltd  
21 Little Peter Street  
Manchester  
M15 4PS

On behalf of:  
Worstead Developments Ltd

Report prepared by:  
David Thurstan BSc MIOA - Senior Consultant

Report checked by:  
Paul Bassett BSc MSc FIOA – Technical Director

## **CONTENTS**

1.0	INTRODUCTION	1
2.0	ACOUSTIC DESIGN CRITERIA	2
3.0	NOISE SURVEY	4
4.0	NOISE MITIGATION SCHEME	6
5.0	SUMMARY	8
	FIGURE 1 – SITE LOCATION & NOISE MEASUREMENT POSITIONS	9
	FIGURE 2 – SITE LAYOUT & SCHEME OF NOISE MITIGATION	10
	APPENDIX I: NOISE UNITS & INDICES	11
	APPENDIX II: NOISE SURVEY RESULTS	13

## 1.0 INTRODUCTION

1.1 Hepworth Acoustics Ltd was commissioned by John R Paley Associates, on behalf of Worstead Developments Ltd, to carry out a noise impact assessment in connection with a reserved matters application for the residential development at Shop Lane, Kirkheaton, Huddersfield. Outline planning permission was granted for the residential development of the site on 12 April 2018, planning reference 2014/60/92535/W.

1.2 Condition 15 of the outline planning approval states;

*“15. Prior to development commencing a noise attenuation scheme relating to dwellings which front onto Shop Lane and also the rear elevations and garden areas of dwellings to the NE corner of this site, shall be submitted to and approved in writing by the Local Planning Authority. The approved scheme shall be implemented prior to the occupation of the dwellings concerned.”*

1.3 This report provides recommendations for noise mitigation measures for the development which have been informed by the following:

- An inspection of the site and surrounding area;
- Measurement of noise levels on the site over a 24 hour weekday period.

1.4 The location of the approved residential development is shown in Figure 1. The site is bounded by Shop Lane to the south-east and east. The site is generally surrounded by existing dwellings with buildings of Kirkheaton Engineering Co Ltd bounding the site to the north. In this report it is assumed that the ‘NE corner of the site’ referred to in the planning condition refers to the northernmost part of the development that would be nearest to the rear of Kirkheaton Engineering Co Ltd.

1.5 The approved development is for 42 dwellings consisting of a mixture of terraced, detached and semi-detached houses. Vehicular access to the development will be via Shop Lane to the south of the site.

1.6 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 ACOUSTIC DESIGN CRITERIA

### BS8233:2014

2.1 Guidance on acceptable noise levels in habitable rooms and private gardens is set out in British Standard 8233: 2014, 'Guidance on sound insulation and noise reduction for buildings', which carries the full weight of an adopted British Standard. The design criteria recommended in BS 8233 for daytime periods (07:00 – 23:00 hours) and night-time periods (23:00 – 07:00 hours) are summarised in Table 1:

**Table 1: BS 8233:2014 recommended acoustic design criteria**

Activity	Location	Daytime 07:00 – 23:00 hours	Night-time 23:00 – 07:00 hours
Resting	Living room	35 dB $L_{Aeq,16hr}$	-
Dining	Dining room/area	40 dB $L_{Aeq,16hr}$	-
Sleeping (daytime resting)	Bedroom	35 dB $L_{Aeq,16hr}$	30 dB $L_{Aeq,8hr}$

2.2 BS 8233 also recognises that regular individual noise events at night can cause sleep disturbance. Peaks of noise from individual events are usually described in terms of  $L_{Amax,F}$  values and these can be highly variable and unpredictable.

2.3 ProPG: Planning & Noise 'Professional Practice Guidance on Planning & Noise' 2017 states that "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  $L_{Amax,F}$  more than 10 times a night".

### Criteria

2.1 For this development we therefore recommend the following noise criteria be adopted in respect of road traffic noise:

- Daytime noise below 35 dB  $L_{Aeq,16hr}$  inside living rooms and bedrooms, 40 dB  $L_{Aeq,16hr}$  inside dining rooms; and
- Night-time noise levels not exceeding 30 dB  $L_{Aeq,8hr}$  and generally not exceeding 45 dB  $L_{Amax,F}$  in bedrooms (i.e. no more than 10 times per night).

2.2 For private outdoor amenity spaces of the new houses (e.g. rear gardens) BS 8233 states that 'it is desirable that the external noise level does not exceed 50 dB  $L_{Aeq,16hr}$  with an upper guideline value of 55 dB  $L_{Aeq,16hr}$  which would be acceptable in noisier environments'. In our experience, most local

planning authorities have traditionally adopted, or accepted, the 55 dB(A) guideline value for rear gardens of proposed new residential developments near busy roads. However, the 2014 version of the standard also recognises that these guideline values are not achievable in all circumstances where development might be desirable and in such cases, for sites near to the 'strategic transport network' higher noise levels than 55 dB  $L_{Aeq,16hr}$  in gardens may be acceptable.

2.3 Our outline noise mitigation recommendations are described in Section 5.0.

### 3.0 NOISE SURVEY

3.1 Noise measurements were taken at locations representative of the nearest proposed dwellings to Shop Lane and also a location in the northernmost area of the site. The purpose of the survey was to measure road traffic noise from Shop Lane and any noise from Kirkheaton Engineering Co Ltd.

3.2 Noise measurements were carried out at three locations on the site. The measurement locations are indicated in Figure 1 and are described below:

- Location 1: Eastern boundary, 5 metres from Shop Lane
- Location 2: Southern boundary, 5 metres from Shop Lane
- Location 3: Northernmost area of site

3.3 Automated noise measurements were carried out at Location 1 in consecutive 5-minute periods between 14:40 Monday 8 March 2021 and 14:40 on Tuesday 9 March 2021. The automated noise measurements were supplemented with attended noise measurements which were carried out in the daytime on Tuesday 9 March 2021. All supplementary noise measurements at Locations 2 and 3 were undertaken in 5-minute samples, and these were each concurrent with individual 5-minute measurement samples at Location 1. Kirkheaton Engineering Co Ltd did not appear to be open or operating during either of our visits to the site and therefore it was not possible to determine the likely noise impact from their operations.

3.4 The noise measurements were taken in 'free-field' conditions and at a microphone height of approximately 1.4m above the ground. Calibration checks were carried out both before and after the measurement periods with no variance in levels noted. Audio was also recorded during the monitoring period in order to identify sources of noise making up the noise climate and frequency analysis was also carried out.

3.5 The weather conditions during the noise survey were suitable for the purposes of the survey and subsequent assessment.

3.6 In general accordance with the 'Comparative Measurements' technique set out in the Department of Transport document 'Calculation of Road Traffic Noise' (CRTN), 1988, the overall daytime and night-time noise levels at the supplementary measurement locations has been determined by applying the average difference in measured 5-minute samples noise levels at these locations with the concurrent

measurements at Location 1, to the overall daytime and night-time noise levels determined by way of continuous monitoring at Location 1.

- 3.7 Overall daytime and night-time noise levels derived for all locations are presented in Table 2, and the full results along with details of the equipment used, and the weather conditions during the survey periods, are shown in Appendix II.

**Table 2: Summary of measured noise levels (dB)**

Location	Daytime $L_{Aeq,16hr}$	Night-time $L_{Aeq,8hr}$
1. Eastern boundary, 5 metres from Shop Lane	58	51
2. Southern boundary, 5 metres from Shop Lane	56	49
3. Northernmost area	<50	<45

- 3.8 Noise levels measured on the site were due to road traffic on Shop Lane. Short-term peaks of noise at Location 1 during the night-time period were in the range 34 – 78 dB  $L_{Amax,F}$ , with the 10<sup>th</sup> highest value being 69 dB  $L_{Amax,F}$ . Peaks of noise at Locations 2 are likely to be similar based on the measured daytime noise levels and compared with the night-time values at Location 1.
- 3.9 This noise survey was undertaken during the COVID-19 pandemic with national travel restrictions in place. However, Hepworth Acoustics previously carried out a noise survey on the site in August 2010 as part of the outline planning application (HAL ref 10553.01v1). The results of the 2010 survey are similar to those measured recently.
- 3.10 The implications of the noise exposure values are set out in Section 4.0 and have been used to determine the type and extent of any noise mitigation measures necessary to achieve appropriate noise design criteria.

## 4.0 NOISE MITIGATION SCHEME

- 4.1 Road traffic noise levels close to Shop Lane are low to moderate during the daytime and at night. Nevertheless, some noise mitigation measures will be necessary for dwellings nearest to Shop Lane, particularly to control peaks of noise from traffic in bedrooms at night.
- 4.2 No noise was measured from Kirkheaton Engineering Co Ltd during the survey. Nevertheless, we recommend the implementation of some mitigation measures to ameliorate the impact of any potential industrial noise, as envisaged by the planning condition.

### *Gardens*

- 4.3 The majority of rear gardens on the proposed development will be located away from Shop Lane and will be screened adequately from traffic noise by the houses themselves. However, in order to achieve acceptable traffic noise levels in all of the gardens, it will be necessary to install acoustic fencing in some limited areas as indicated in Figure 2.
- 4.4 We also recommend the installation of an acoustic fence along the boundary of the site with Kirkheaton Engineering Co Ltd. The fence should be installed along the highest point of the boundary.
- 4.5 We recommend that proprietary acoustic fencing of minimum 2 metres in height in the areas shown in Figure 2.
- 4.6 The acoustic fencing should be at least 2 metres in height and must be imperforate (i.e. have no holes or gaps), have a surface mass no less than 10 kg/m<sup>2</sup> and be at least 20mm thick.
- 4.7 Suppliers of proprietary acoustic fences include GRAMM Barrier Systems Ltd ([www.grammbarriers.com](http://www.grammbarriers.com)) Jacksons Fencing ([www.jacksons-fencing.co.uk](http://www.jacksons-fencing.co.uk)), Guardian Fencing ([www.guardianfencing.com](http://www.guardianfencing.com)) and Ransfords ([www.ransfords.co.uk](http://www.ransfords.co.uk)).

### *Glazing*

- 4.8 We recommend that bedrooms of the dwellings indicated in Figure 2 are fitted with the following specification of glazing (minimum 29 dB R<sub>w</sub> + C<sub>tr</sub>):
- 6.4mm Solaglas 'Stadip Silence' laminated glass - nominal (8-20mm) cavity - 4mm glass; or
  - 8mm glass - nominal (8-20mm) cavity - 4mm glass.

- 4.9 For all other bedrooms, and all living rooms, on the development, we recommend standard double glazing of 4mm glass - nominal (10-16mm) cavity - 4mm glass (25 dB  $R_w + C_{tr}$ ).
- 4.10 Due care and attention must be taken to ensure that all glazing is well-fitted.

### *Ventilation*

- 4.11 The adopted internal noise criteria will be achieved in all living rooms and bedrooms closest to Shop Lane, with windows closed and acoustically treated trickle ventilation, instead of standard window frame slot vents. The plots requiring acoustically treated trickle ventilation are indicated in Figure 2. We would recommend either:

- Aereco EHA2 Acoustic Trickle Ventilator with acoustic canopy and sleeve (44 dB  $D_{n,e,w}$ ); or
- Rytons AAC125HP Super Acoustic Controllable LookRyt AirCore Ventilator (43 dB  $D_{n,e,w}$ ); or
- Another ventilation system with a good acoustic performance (i.e. above 40 dB  $D_{n,e,w}$ ).

- 4.12 However, if the Local Authority require an alternative mechanical means of ventilation to be provided, we recommend that acoustically treated mechanical ventilation is installed for all living rooms and bedrooms as indicated in Figure 2. We would recommend either:

- Wall mounted mechanical-acoustic ventilators such as Silavent Type SM2/C or Titon 'Sonair F+' units; or
- Fully ducted system (including Positive Input Ventilation systems) with duct terminations on shielded side of the building only.

- 4.13 Ventilation proposals will need to be agreed with the Local Authority at an early stage. Details regarding the air change rates etc should be confirmed by others.

### *Rooms in Roof Spaces*

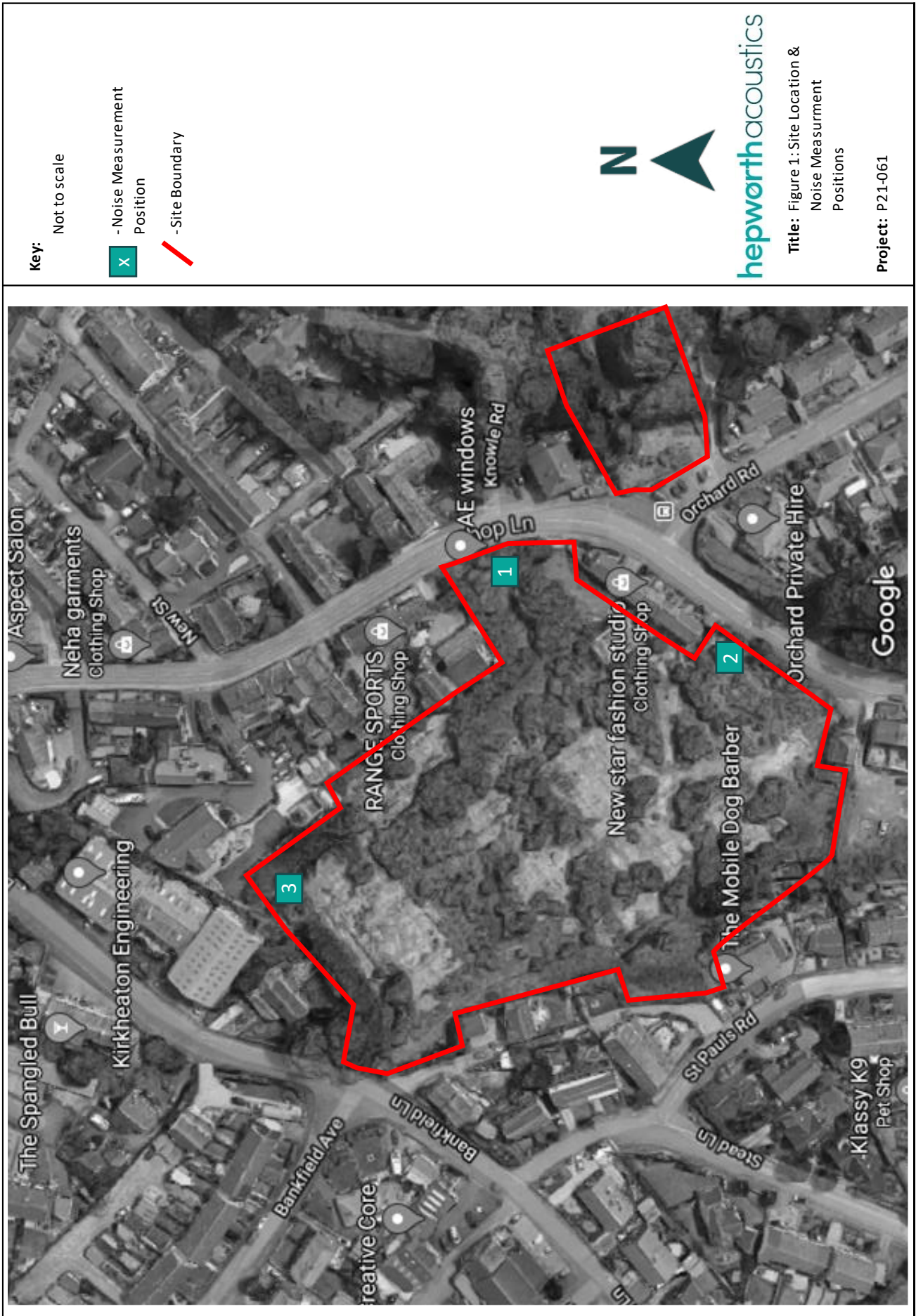
- 4.14 We recommend that any bedrooms in roof spaces on outward facing elevations closest to the Shop Lane, as indicated in Figure 2 have ceilings of 2 layers of 15mm dense plasterboard (e.g. Gyproc 'SoundBloc' or Gyproc 'Fireline', or equivalent).

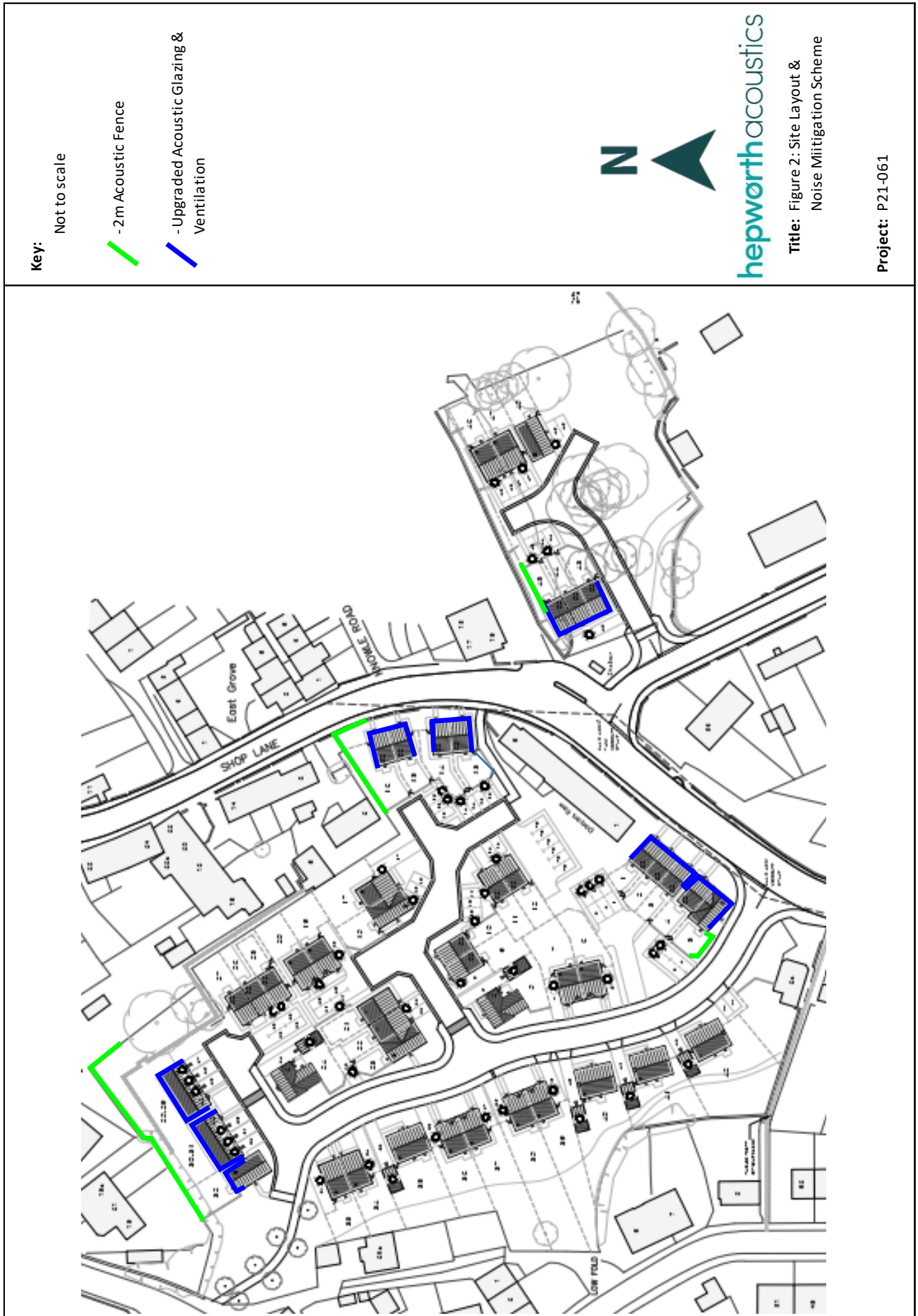
### *External Walls*

- 4.15 The exact construction of the external walls is not known at this stage however it is assumed that the sound insulation performance of the wall construction will not be less than 50 dB  $R_w$ .

## 5.0 SUMMARY

- 5.1 A noise mitigation scheme has been recommended in connection with the reserved matters application for the approved residential development on land off Shop Lane, Kirkheaton, Huddersfield. The noise mitigation scheme is required by Condition 15 of the outline planning permission
- 5.2 Our recommendations are based upon the results of a noise measurement survey that was carried out at the site and appropriate acoustic design criteria that have been adopted from British Standard 8233:2014.
- 5.3 As required by the planning condition, the noise mitigation scheme includes the plots that will be nearest to Shop Lane and those in the northernmost area.





## 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.
- $R$  This is the 'Sound Reduction Index' as measured in a laboratory, and is a measure of the sound insulation properties of an building element in a stated frequency band.
- $R_w$  This is the 'Weighted Sound Reduction Index', and is a single figure quantity of  $R$ , the laboratory measured Sound Reduction Index.
- $D_{n,e,w}$  This is the weighted element normalized level difference as measured in a laboratory, and is a measure of the sound insulation properties of small building elements such as ventilators.
- $L_{Aeq}$  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

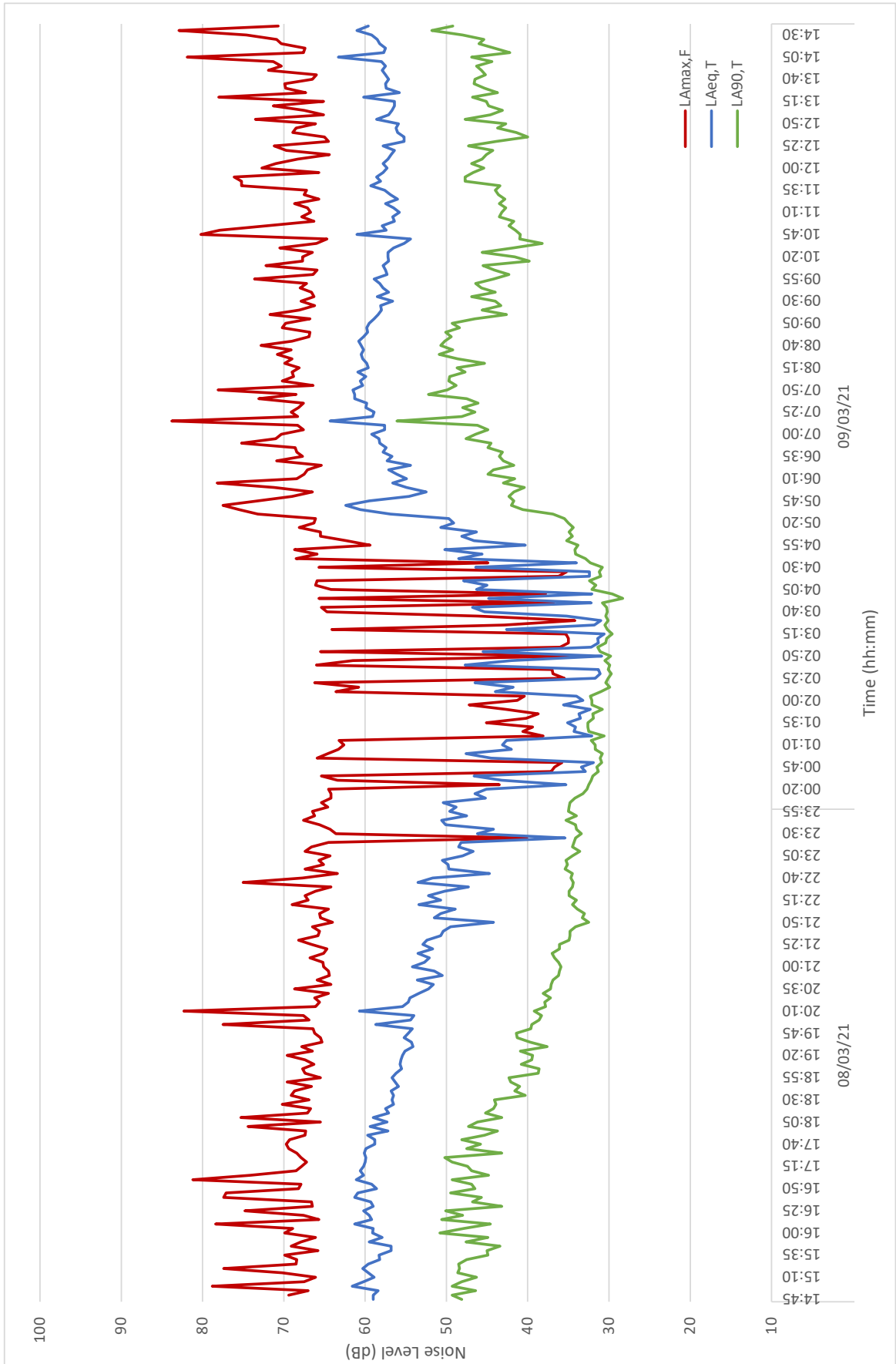
Date(s): Monday/Tuesday 8/9 March 2021

Equipment: B&K 2260 'Type 1' sound analyser (serial no. 2467016) with tripod and calibrator  
Rion NL-52 'Class 1' sound level meter (serial no. 00242747) with calibrator and environmental kit, pole and windshield

Weather: Dry, mild (~7-9°C), clear skies and calm (<3 m/s)

All levels in dB(A)

**Location 1: Eastern Boundary**



**Location 2: 5m from Shop Lane, to southeast of the site**

Time		Measured Noise Levels (dB)				Comments
Start	End	L <sub>Amax</sub>	L <sub>A10</sub>	L <sub>Aeq</sub>	L <sub>A90</sub>	
14:20	14:25	68.5	58.0	55.3	45.6	Occasional road traffic on Shop Lane, birdsong
14:25	14:30	63.9	58.8	55.3	44.0	
14:30	14:35	66.1	59.2	56.2	46.8	

**Location 3: Northernmost area of site**

Time		Measured Noise Levels (dB)				Comments
Start	End	L <sub>Amax</sub>	L <sub>A10</sub>	L <sub>Aeq</sub>	L <sub>A90</sub>	
14:00	14:05	64.1	45.2	44.1	40.0	Distant road traffic, birdsong
14:05	14:10	56.6	48.0	45.7	42.4	
14:10	14:15	58.0	46.2	44.7	41.6	