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SITE ON CARR ROAD, BUXTON, DERBYSHIRE

NOISE EXPOSURE ASSESSMENT

Report **7753-NEA-01**

Prepared on 18 December 2012

Issued For

Copperleaf Buxton Ltd

Oakfield House

Tytherington Business Park

Macclesfield

Cheshire

SK10 2XA

ISO 17025
ISO 9001
committed to CSCS Platinum award

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1.0 INTRODUCTION

Clement Acoustics has been commissioned Copperleaf Buxton Ltd to assess the suitability of a site on Carr Road, Buxton, Derbyshire for residential development in accordance with the National Planning Policy Framework published on 27 March 2012 (replacing Planning Policy Guidance 24).

Proposals are to redevelop the existing site to erect a number of residential houses on an existing open site.

This report presents the results of environmental noise surveys undertaken in order to measure prevailing background levels and outlines any necessary mitigation measures.

2.0 ENVIRONMENTAL NOISE SURVEY

2.1 Procedure

Due to on-site access restrictions, a road traffic noise survey was undertaken in accordance with the shortened measurement procedure described in 'Calculation of Road Traffic Noise' (CRTN): 1988 [DoT – Welsh Office. HMSO].

Noise levels were monitored at three positions on the proposed site over consecutive 15-minute periods between 06:30 hours and 09:30 on 27 November 2012 as shown on the indicative site plan 7753-SP1. The measurement period was chosen to ensure peak periods of traffic noise during typical rush hour times could be assessed.

Noise levels at the monitoring positions were dominated by road traffic noise from Leek Road. During early hours, between 06:30 and 08:00, noise levels were dominated by the sporadic passing of HGVs on Leek Road. From 08:00, the noise was dominated by more constant use of the road by cars, with HGV passes becoming less frequent.

During the survey weather conditions were generally dry with light winds, therefore suitable for the measurement of environmental noise.

Noise survey measurement procedures generally complied with BS7445:1991. Description and measurement of environmental noise, Part 2- Acquisition of data pertinent to land use.

2.2 Equipment

The equipment calibration was verified before and after use and no abnormalities were observed.

The equipment used was as follows:

- 1 No. Svantek 957 Class 1 Sound Level Meter
- Norsonic Type 1251 Class 1 Calibrator

3.0 MANUAL NOISE MEASUREMENTS

3.1 Procedure

During the course of the CRTN Assessment as detailed above, manual spot measurements were also taken at the locations indicated in site plan 7753-SP1. This was in order to assess how noise generated at the Leek Road boundary propagates through the site.

Noise measurements were taken simultaneously with measurements towards the noisiest Carr Road boundary, such that relative levels during measurement periods could be compared.

Manual measurements lasted between 10-20 minutes and were undertaken during periods to ensure both the noise emissions of HGV dominated traffic as well as car dominated traffic could be assessed.

3.2 Equipment

The equipment calibration was verified before and after use and no abnormalities were observed.

The equipment used was as follows:

- 1 No. 01dB Stell Grey Class 1 Sound Level Meter
- Norsonic Type 1251 Class 1 Calibrator

4.0 SITE DESCRIPTION

The site is bounded by Leek Road to the east, Carr Road to the north and open space to the south and west. At the time of the survey, the background noise climate was dominated by road traffic noise from Leek Road.

Measured noise levels during the CRTN Assessment are representative of worst case noise exposure levels expected to be experienced by the noisiest facades of the proposed development.

5.0 RESULTS

5.1 CRTN Survey

The daytime average ambient noise level ($L_{Aeq,16hr}$) has been calculated by following the methodology given in CRTN. Average noise levels for the daytime period as calculated from measurements at the three monitoring positions are shown in Table 5.1.

Location	$L_{A10,3hr}$ dB	Equivalent $L_{A10,8hr}$ dB	Equivalent $L_{Aeq,16hr}$ dB
Position 1	69	68	66
Position 2	69	68	66
Position 3	68	67	65

Table 5.1: Calculation of LAeq,16hr from LA10,3hr

The $L_{Aeq:\ 15min}$ acoustic parameters were also measured and correspond closely to the calculated $L_{Aeq,16hr}$. Measurement results are shown in Table 5.2.

Location	$L_{Aeq:\ 15min}$ dB
Position 1	65
Position 2	65
Position 3	64

Table 5.2: Average measured noise levels

5.2 Manual Noise Measurements

Manual noise measurements have been analysed and the measured levels compared with those obtained close to Leek Road during the same period. Measured noise levels are shown in Table 5.3, where they are compared with the corresponding Leek Road measurements.

Location	Dominant Noise	Measured Level at Measurement Position	Corresponding Level at Leek Road
Position 1 [*06:33 - 06:53*]	Sporadic HGV Passes	55 dB(A)	65 dB(A)
Position 2 [*06:55 - 07:15*]	Sporadic HGV Passes	52 dB(A)	64 dB(A)
Position 1 [*08:04 - 08:20*]	Frequent Car Passes	57 dB(A)	66 dB(A)
Position 2 [*08:21 - 08:33*]	Frequent Car Passes	54 dB(A)	67 dB(A)

Table 5.3: Calculation of Noise Propagation from Leek Road

As shown in Table 5.3, manual measurements at Manual Measurement Position 1 have demonstrated levels 9-10 dB lower than those obtained close to Leek Road. Manual measurements at Manual Measurement Position 2 have demonstrated levels 12-13 dB lower than those obtained close to Leek Road.

6.0 NOISE EXPOSURE ASSESSMENT

6.1 Internal Noise Criteria

BS8233:1999 "*Sound insulation and noise reduction for buildings*" describes recommended good to reasonable internal noise levels for residential spaces. These levels are shown in Table 6.1.

Criterion	Typical Situations	Design range $L_{Aeq,T}$ dB Good	Reasonable
Reasonable resting/sleeping conditions	Living Rooms	30	40
	Bedrooms	30	35

Table 6.1: BS8233 recommended internal background noise levels

The external building fabric would need to be carefully designed to achieve these recommended internal levels.

6.2 External Building Fabric - Non Glazed Elements

It is currently assumed that the non-glazed external building fabric elements of the proposed development would be comprised of blockwork. This would contribute towards a significant reduction of ambient noise levels in combination with a good quality secondary-glazed window configuration, as shown in Section 6.3.

All non-glazed elements of the building facades have been assumed to provide a sound reduction performance of at least the figures shown in Table 6.2 when tested in accordance with BS EN ISO 140-3:1995.

Element	Octave band centre frequency SRI, dB					
	125	250	500	1k	2k	4k
Non glazed element SRI	41	43	48	50	55	55

Table 6.2 Non-glazed elements assumed sound reduction performance

6.3 External Building Fabric - Specification of Glazed Units

Sound reduction performance calculations have been undertaken in order to specify the minimum performance required from glazed elements in order to achieve 'good' internal noise levels shown in Table 6.1, taking into account worst case average noise levels monitored during the CRTN survey for properties close to Leek Road.

For more properties further from Leek Road, a correction of -8dB has been applied to measured noise levels close to the road. This is considered robust based on the findings detailed in Section 5.2.

For the purpose of calculations, bedrooms facing towards Leek Road have been modelled, as noise-sensitive spaces facing the worst affected boundary. Bedrooms have been modelled with a relatively high ratio of glazing to masonry.

The minimum sound reduction index (SRI) value required for glazed elements to be installed on the loudest and more distant boundaries is shown in Table 6.3. The performance is specified for the whole window unit, including the frame and other design features. The required locations for each type of glazing are indicated in site plan 7753-SP1.

Glazing Type	Required Overall Sound Reduction Performance R_w	Double Glazing Type *Indicative Only*
Type A Glazing [*Properties Close to Leek Road*]	37 dB	R_w 37 dB Double Glazed Unit [*eg 6mm glass / 12 mm air / 10mm glass*] Acoustic Trickle Ventilator [*Required $D_{n,e,w}$ 35 dB*]
Type B Glazing [*Properties Away From Leek Road*]	31 dB	R_w 31 dB Double Glazed Unit [*eg 4mm glass / 12 mm air / 4mm glass*] Generic Trickle Ventilator [*Required $D_{n,e,w}$ 23 dB*]

Table 6.3: Required glazing performance

We would also recommend the verification of spectral attenuation data once the final glazing selection is made in order to ensure that the overall required attenuation is met.

7.0 CONCLUSION

A road traffic noise survey has been undertaken at a site on Carr Road, Buxton, Derbyshire in order to measure ambient noise levels in the area.

Measured noise levels have allowed an assessment of the level of exposure to noise of the proposed development site to be made.

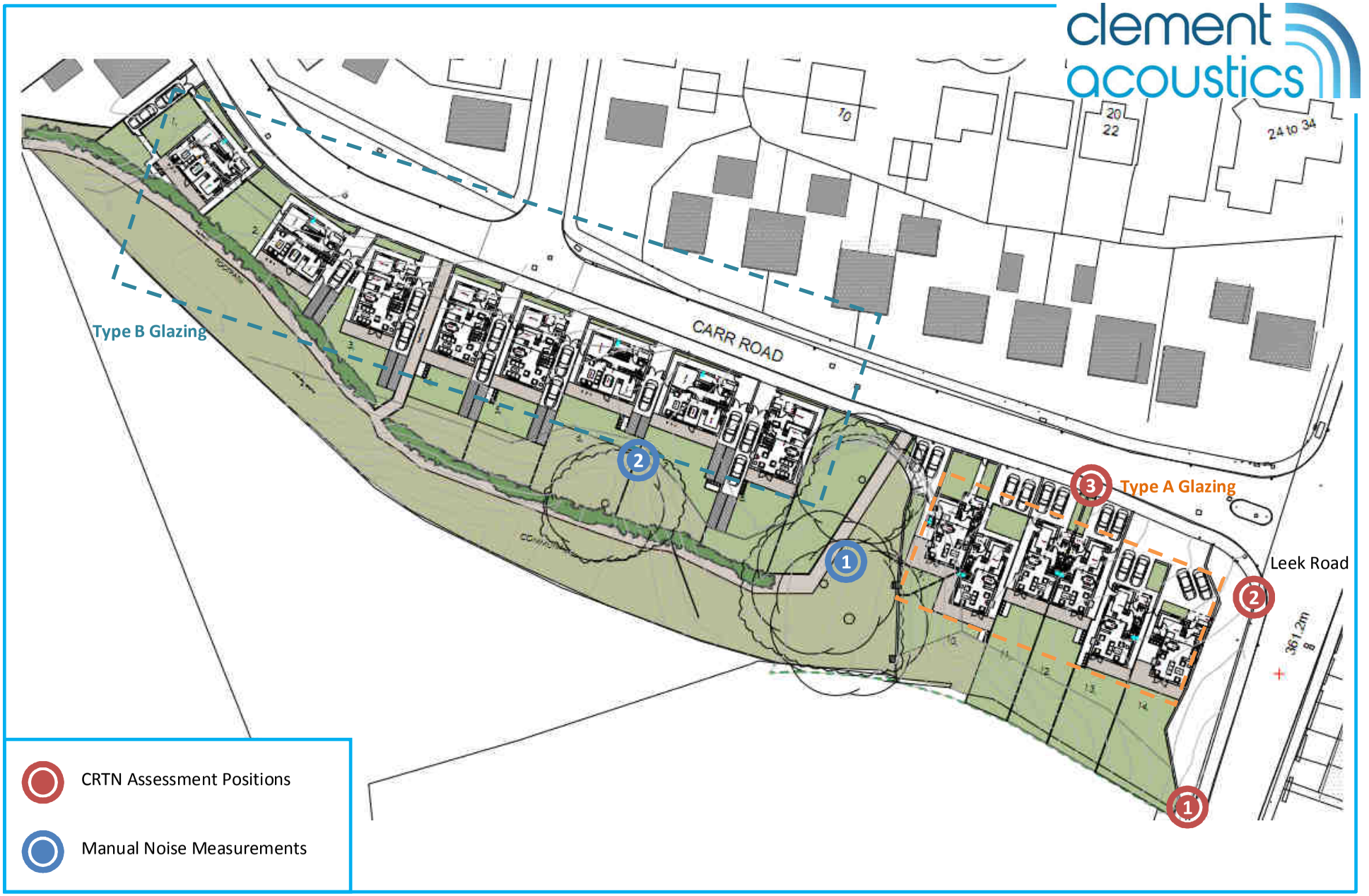
Outline mitigation measures, including a glazing and trickle vent specification, have been recommended and should be sufficient to achieve 'good' internal noise levels for the proposed development according to BS8233:1999.

Report by

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7753-SP1 Indicative site plan showing CRTN monitoring positions and manual monitoring positions **Date:** 18 December 2012

APPENDIX A

GLOSSARY OF ACOUSTIC TERMINOLOGY

dB(A)

The human ear is less sensitive to low (below 125Hz) and high (above 16kHz) frequency sounds. A sound level meter duplicates the ear's variable sensitivity to sound of different frequencies. This is achieved by building a filter into the instrument with a similar frequency response to that of the ear. This is called an A-weighting filter. Measurements of sound made with this filter are called A-weighted sound level measurements and the unit is dB(A).

L_{eq}

The sound from noise sources often fluctuates widely during a given period of time. An average value can be measured, the equivalent sound pressure level L_{eq}. The L_{eq} is the equivalent sound level which would deliver the same sound energy as the actual fluctuating sound measured in the same time period.

L_{10}

This is the level exceeded for not more than 10% of the time. This parameter is often used as a "not to exceed" criterion for noise

L_{90}

This is the level exceeded for not more than 90% of the time. This parameter is often used as a descriptor of "background noise" for environmental impact studies.

L_{max}

This is the maximum sound pressure level that has been measured over a period.

Octave Bands

In order to completely determine the composition of a sound it is necessary to determine the sound level at each frequency individually. Usually, values are stated in octave bands. The audible frequency region is divided into 10 such octave bands whose centre frequencies are defined in accordance with international standards.

Addition of noise from several sources

Noise from different sound sources combines to produce a sound level higher than that from any individual source. Two equally intense sound sources operating together produce a sound level which is 3dB higher than one alone and 10 sources produce a 10dB higher sound level.

Attenuation by distance

Sound which propagates from a point source in free air attenuates by 6dB for each doubling of distance from the noise source. Sound energy from line sources (e.g. stream of cars) drops off by 3dB for each doubling of distance.

Subjective impression of noise

Sound intensity is not perceived directly at the ear; rather it is transferred by the complex hearing mechanism to the brain where acoustic sensations can be interpreted as loudness. This makes hearing perception highly individualised. Sensitivity to noise also depends on frequency content, time of occurrence, duration of sound and psychological factors such as emotion and expectations. The following table is a reasonable guide to help explain increases or decreases in sound levels for many acoustic scenarios.

Change in sound level (dB)	Change in perceived loudness
1	Imperceptible
3	Just barely perceptible
6	Clearly noticeable
10	About twice as loud
20	About 4 times as loud

Barriers

Outdoor barriers can be used to reduce environmental noises, such as traffic noise. The effectiveness of barriers is dependent on factors such as its distance from the noise source and the receiver, its height and its construction.

Reverberation control

When sound falls on the surfaces of a room, part of its energy is absorbed and part is reflected back into the room. The amount of reflected sound defines the reverberation of a room, a characteristic that is critical for spaces of different uses as it can affect the quality of audio signals such as speech or music. Excess reverberation in a room can be controlled by the effective use of sound-absorbing treatment on the surfaces, such as fibrous ceiling boards, curtains and carpets.