

Our ref: NIA/5275/14/4984/v3/King's Road

14th November 2017

Christina Meyer Homes
c/o Jon Spires Architects Limited
9 Monks Way
Reading
RG30 3DP



Sent by email only jon@spiresarchitects.com

Dear Sirs,

**NOISE IMPACT ASSESSMENT
CHANGE OF USE FROM OFFICE (CLASS B1A) TO 6 RESIDENTIAL UNITS (CLASS C3)
177 KING'S ROAD, READING, RG1 4EY**

1.00 INTRODUCTION

- 1.01 Environmental Noise Solutions Ltd (ENS) has been commissioned by Christina Meyer Homes to carry out a noise impact assessment for a consented change of use from office (Class B1a) to 6 residential dwelling flats (Class C3) at 177 King's Road, Reading, RG1 3EY (hereafter referred to as the site). For reference the site is understood to be a Grade II Listed Building.
- 1.02 Planning Permission 160749 for the change of use was granted by Reading Borough Council (RBC) in February 2017, subject to conditions. Condition 11 considered noise control as follows:

No development shall take place until a detailed scheme, informed by an assessment of the current noise environment, for protecting the dwellings from the external noise environment of the area has been submitted to and approved, in writing, by the Local Planning Authority. The scheme itself shall be designed, specified and constructed so that the sound insulation performance of the structure and the layout of the dwellings are such that the indoor ambient noise levels do not exceed the values detailed in Table 4 of BS 8233:2014. Thereafter, the development shall not be carried out other than in accordance with the approved scheme which shall be completed before any part of the accommodation hereby approved is occupied and retained in accordance with such thereafter. Reason: To protect the amenity of future occupants of the proposed development, in accordance with Policy DM4.

- 1.03 The objectives of the noise impact assessment were therefore to:
- Measure the ambient noise climate at the application site during representative periods of the daytime and night time
 - Assess the potential impact of the ambient noise climate on the proposed residential development with reference to British Standard 8233:2014 Guidance on Sound Insulation and Noise Reduction for Buildings
 - Provide recommendations for a scheme of sound attenuation works, as necessary, to ensure that the future occupants of the proposed residential development do not experience any unacceptable loss of amenity due to noise (subject to any constraints imposed by the Grade II listed status).
- 1.04 This report details the methodology and results of the assessment and provides recommendations for the building envelope (glazing). It has been prepared to discharge Condition 11 (Noise) of Planning Permission 160749 granted by RBC.
- 1.05 It is understood that: an application is currently under consideration to discharge Condition 12 (Ventilation) of Planning Permission 160749 granted by RBC; and Condition 2 (Ventilation) of Listed Building Consent 160750 granted by RBC was discharged in November 2017.

1.06 This report has been prepared for Christina Meyer Homes for the sole purpose described above and no extended duty of care to any third party is implied or offered. Third parties making reference to the report should consult Christina Meyer Homes, Jon Spires Architects Limited and ENS as to the extent to which the findings may be appropriate for their use.

1.07 A glossary of acoustic terms used in the main body of the text is contained in Appendix 1.

2.00 SITE SETTING AND PROPOSED DEVELOPMENT

2.01 The application site is located to the east of Reading town centre. The application site is bound by (see Appendix 2):

- The A329 King's Road to the south
- Residential use to the west
- Commercial use (adjoining offices) to the west
- A car parking area to the north

2.02 The A329 King's Road is moderately trafficked and is the principal noise source at the application site (note: there is also intermittent aircraft noise).

3.00 BASELINE NOISE SURVEY

3.01 In order to establish the ambient and background noise levels at the application site, a baseline noise survey was undertaken on Monday 19th and Tuesday 20th May 2014.

3.02 For the purpose of the assessment, the following noise monitoring positions were adopted:

- MP1 was 1 metre from the southern façade (2nd floor level) overlooking A329 King's Road
- MP2 was 1 metre from the northern façade (2nd floor level) overlooking the car park

Note: Internal noise measurements also undertaken inside the southern façade

3.03 Noise measurements were undertaken using a Bruel & Kjaer 2260 Type 1 integrating sound level meter and a Bruel & Kjaer 2260 Type 1 integrating sound level meter. Measurements consisted of A-weighted broadband parameters, together with linear one-third octave band L_{eq} levels.

3.04 The measurement system calibration was verified immediately before the commencement of the measurement sessions and again at the end, using a Bruel & Kjaer Type 4231 calibrator. No drift in calibration level was noted. Weather conditions throughout the survey were appropriate for monitoring with no wind (note: a windshield was fitted for all measurements).

3.05 The following table contains a summary of the measurement data for each measurement session, at each measurement position, rounded to the nearest decibel. Noise measurements at MP1 and MP2 were made in a reflective field and therefore a -3 decibel façade enhancement correction has been applied to the noise measurement data in order to establish the free field noise levels.

3.06 The ambient noise levels were moderately loud at MP1 (southern façade overlooking the A329 King's Road) and relatively low at MP2 (northern façade screened from the A329 King's Road). The ambient noise levels are considered commensurate with the application site setting.

3.07 For reference, an internal noise measurement was undertaken within a 2nd floor room on the southern façade overlooking the A329 King's Road. The internal noise level was circa 44 dB L_{Aeq} . This indicates an external to internal reduction on circa 25 decibels, which is wholly consistent with the typical sound insulation of a single glazed sash window.

Table 3.1 – Summary of Noise Measurement Data

Position	Date	Time	L _{Aeq} (dB)	L _{A90} (dB)	L _{A10} (dB)	L _{AF1} (dB)	Comments
MP1 (2F)	20/05/2014	07:00-10:15	70	60	70	80	A329 road traffic and distant aircraft
	19/05/2014	16:15-23:00	69	58	69	75	
	19/05/2014	23:00-07:00	64	45	68	72	
Daytime ambient noise level 69 dB L _{Aeq} (07:00–23:00)							
Night time ambient noise level 64 dB L _{Aeq} (23:00–07:00)							
MP2 (2F)	20/05/2014	06:00-07:00	51	45	52	59	Distant A329 road traffic and distant aircraft
	20/05/2014	09:15-11:15	51	45	52	59	
	20/05/2014	14:45-17:30	51	45	53	60	
	19/05/2014	22:30-00:00	49	40	48	56	
Daytime ambient noise level 51 dB L _{Aeq} (07:00–23:00)							
Night time ambient noise level 49 dB L _{Aeq} (23:00–07:00)							

4.00 NOISE IMPACT ASSESSMENT CRITERIA

- 4.01 BS 8233:2014 'Guidance on Sound Insulation and Noise Reduction for Buildings' (BS 8233) defines a range of internal noise level criteria for dwellings as follows.

Table 4.1 – Indoor Ambient Noise Levels in Dwellings

Activity	Location	Good Indoor Ambient Noise Levels	
Dining	Dining Room/Area	40 dB L _{Aeq} (0700–2300)	-
Resting	Living Room	35 dB L _{Aeq} (0700–2300)	-
Sleeping (daytime resting)	Bedroom	35 dB L _{Aeq} (0700–2300)	30 dB L _{Aeq} (2300–0700)-

Table 4.2 – Indoor Ambient Noise Levels in Dwellings

Activity	Location	Reasonable Indoor Ambient Noise Levels	
Dining	Dining Room/Area	45 dB L _{Aeq} (0700–2300)	-
Resting	Living Room	40 dB L _{Aeq} (0700–2300)	-
Sleeping (daytime resting)	Bedroom	40 dB L _{Aeq} (0700–2300)	35 dB L _{Aeq} (2300–0700)-

- 4.02 The internal noise level criteria are based on average annual data and do not have to be achieved in all circumstances. It is normal to exclude occasional events.

5.00 SOUND ATTENUATION SCHEME PROPOSALS

- 5.01 As stated, the internal noise level measured inside a 2nd floor room on the southern façade overlooking the A329 King's Road was circa 44 dB L_{Aeq} (10:20–10:40 hours).
- 5.02 In order to reduce internal noise levels to less than 35 dB L_{Aeq} (07:00–23:00) and less than 30 dB L_{Aeq} (23:00–07:00), which represent good resting and sleeping conditions, it is recommended that secondary glazing be provided to habitable rooms (living rooms and bedrooms) on the southern façade of the building.

- 5.03 The secondary glazing should consist of a 10 mm pane of glass in a separate frame (which may be a single pane of 10 mm glass or double or triple glazing with a combined thickness of glass of at least 10 mm) to create a (minimum) 150 mm cavity from the existing glazing. The sound insulation of a secondary glazed unit (in conjunction with the existing single glazed sash window) will be at least 39 dB R_w+C_{tr} (a circa 15 decibel improvement on the existing window). For enhanced acoustic performance, the top and side reveals formed between the existing window and the secondary glazing could be lined with an acoustically absorbent tile.
- 5.04 As a consequence, the corresponding internal noise level measured inside habitable rooms on the southern façade of the building (overlooking the A329 King's Road) would be reduced to well below 35 dB $L_{Aeq} (07:00-23:00)$ and 30 dB $L_{Aeq} (23:00-07:00)$. Such internal levels represent 'good' resting / sleeping conditions as set out in BS 8233:2014 'Guidance on Sound Insulation and Noise Reduction for Buildings' (BS 8233).

6.00 CONCLUSIONS

- 6.01 A noise impact assessment has been undertaken for a consented change of use to residential dwelling flats at 177 King's Road, Reading.
- 6.02 The ambient noise climate at the site is due to the A329 King's Road.
- 6.03 A scheme of sound insulation works has been developed to protect the residential dwelling flats in accordance with British Standard 8233:2014 Guidance on Sound Insulation and Noise Reduction for Buildings.
- 6.04 It is therefore considered that Condition 12 (Ventilation) of Planning Permission 160749 granted by Reading Borough Council should be discharged.

I trust the foregoing is sufficient for your needs. Should you have any queries regarding the above, please do not hesitate to contact me.

Yours sincerely

Jonathan Rigg
MIOA, Dipl. Acoustics & Noise Control, MEng (Hons)
Environmental Noise Solutions Limited

cc File

Appendix 1

Glossary of Acoustic Terms

Sound Pressure Level (L_p)

The basic unit of sound measurement is the sound pressure level. As the pressures to which the human ear responds can range from 20 μ Pa to 200 Pa, a linear measurement of sound levels would involve many orders of magnitude. Consequently, the pressures are converted to a logarithmic scale and expressed in decibels (dB) as follows:

$$L_p = 20 \log_{10}(p/p_0)$$

Where L_p = sound pressure level in dB; p = rms sound pressure in Pa; and p_0 = reference sound pressure (20 μ Pa).

A-weighting Network

A frequency filtering system in a sound level meter, which approximates under defined conditions the frequency response of the human ear. The A-weighted sound pressure level, expressed in dB(A), has been shown to correlate well with subjective response to noise.

Equivalent continuous A-weighted sound pressure level, $L_{Aeq, T}$

The value of the A-weighted sound pressure level in decibels of continuous steady sound that within a specified time interval, T , has the same mean-square sound pressure as a sound that varies with time. $L_{Aeq, 16h}$ (07:00 to 23:00 hours) and $L_{Aeq, 8h}$ (23:00 to 07:00 hours) are used to qualify daytime and night time noise levels.

$L_{A10, T}$

The A-weighted sound pressure level in decibels exceeded for 10% of the measurement period, T . $L_{A10, 18h}$ is the arithmetic mean of the 18 hourly values from 06:00 to 24:00 hours.

$L_{A90, T}$

The A-weighted sound pressure level of the residual noise in decibels exceeded 90% of a given time interval, T . L_{A90} is typically taken as representative of background noise.

$L_{AF \max}$

The maximum A-weighted noise level recorded during the measurement period. The subscript 'F' denotes fast time weighting, slow time weighting 'S' is also used.

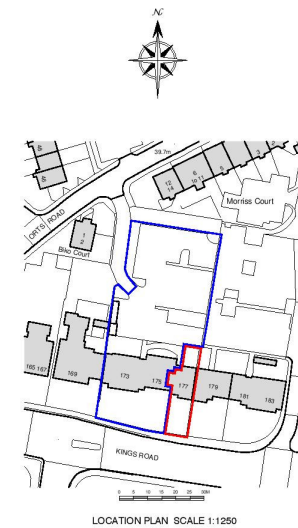
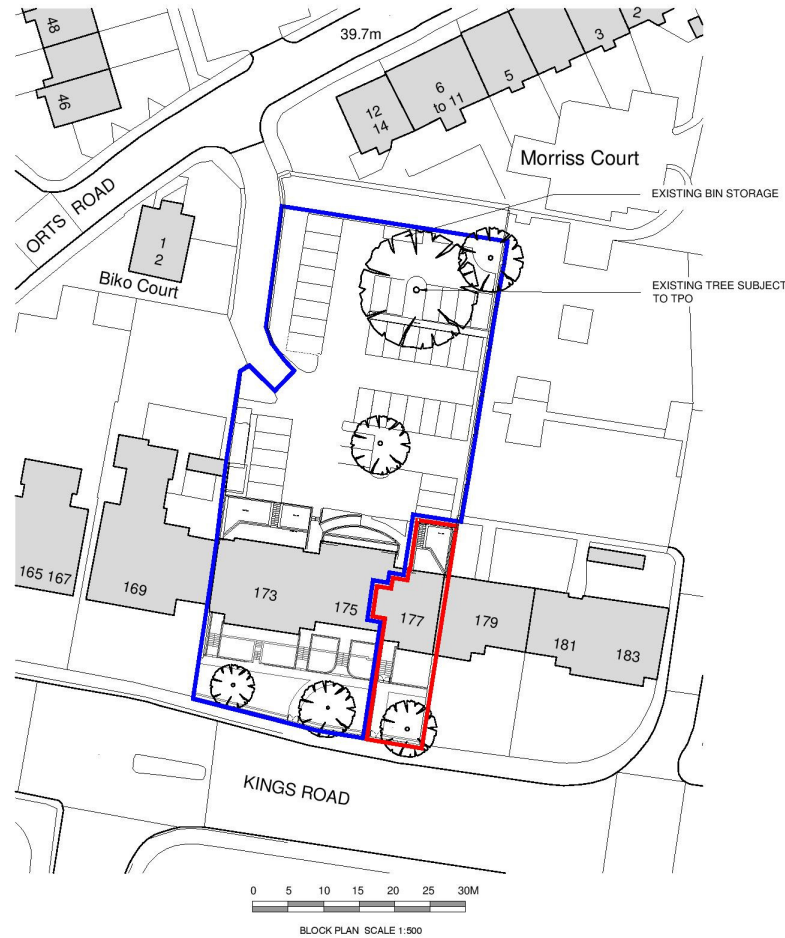
Sound Exposure Level (SEL or L_{AE})

The energy produced by a discrete noise event averaged over one second, no matter how long the event actually took. This allows for comparison between different noise events which occur over different lengths of time.

Weighted Sound Reduction Index (R_w)

Single number quantity which characterises the airborne sound insulation properties of a material or building element over a defined range of frequencies (R_w is used to characterise the insulation of a material or product that has been measured in a laboratory).

Appendix 2 Site Location Plan



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Date: 15/02/2016 Ref: 16-P1255-04		Planning Issue: PLANNING ISSUE	
Planning Application: PLANNING APPLICATION		Christina Meyer	
177 KINGS ROAD READING		Location and Block Plan	
Scale: 1:500 (1:1250 @ A3) Date: FEB 15 Drawn: DH		16-P1255-04	
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