

12-18 Crown Street, Reading

Environmental Noise Survey and Noise Impact Assessment

6 June 2024

Client: Marson Property Ltd
15-16 Margret Street
London
W1W 8RW

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Please Note

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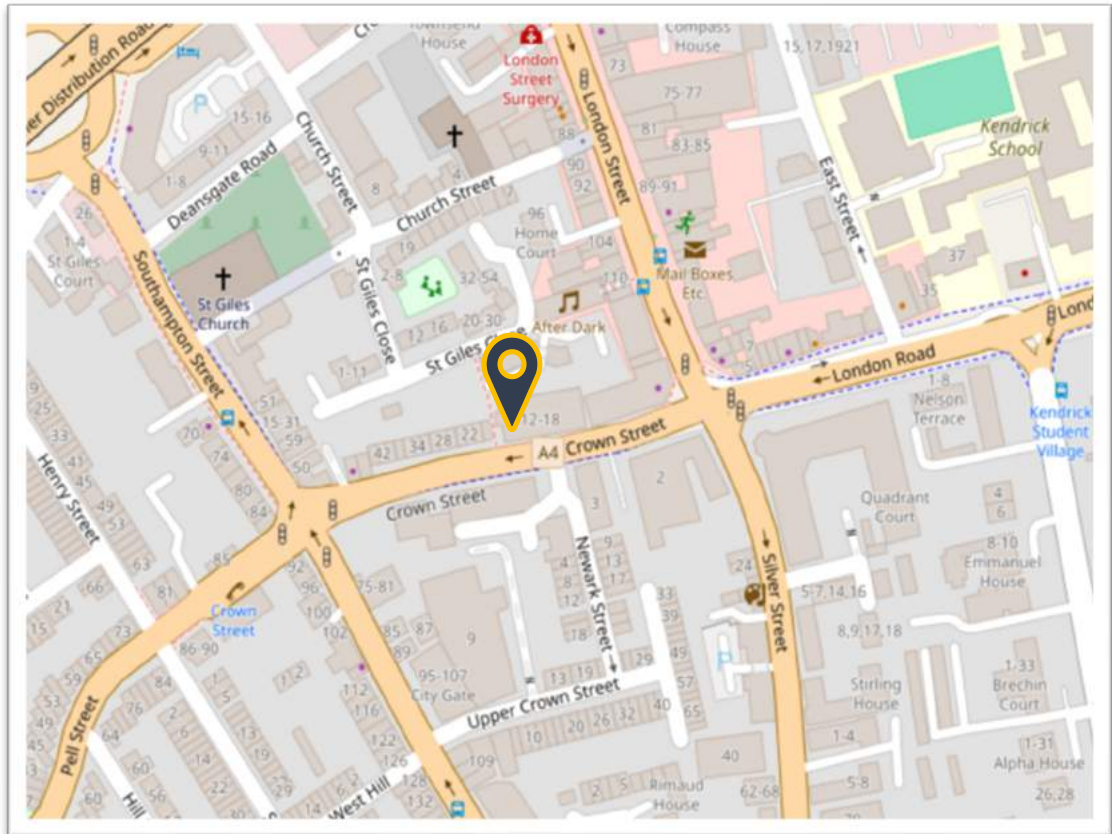
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1.0 INTRODUCTION

- 1.1 This Noise Impact Assessment has been prepared in relation to Planning Condition 8 of Planning application, Ref: 201138. This is to be submitted to Reading Brough Council by the Applicant, 'Marson Property Ltd, (hereafter referred to as 'the Applicant') for the proposed development at 12-18 Crown Street, Reading.
- 1.2 This report presents the results of noise monitoring undertaken at the site and considers the suitability of the site for residential development in the context of national and local planning policy.

2.0 SITE DESCRIPTION

- 2.1 The site is located towards the centre of Reading town centre, as shown in the figure below.



- 2.2 The site is located adjacent to the A4/ Crown Street in Reading. The site is current being used as services accommodation.
- 2.3 The north of the site is predominantly residential, adjoining Nelson Mews.
- 2.4 To south of the site is a mixture of residential and commercial including a health care facility.
- 2.5 The east of the site bounds towards London Road extending to the town centre and has a mixture of residential and food outlets.
- 2.6 The West of the site is predominantly residential.
- 2.7 In summary the surrounding area noise environmental is dominated by the A4 which is busy most of the day and night. An aerial view of the site showing neighbouring land uses is shown in the figure below.



3.0 PROPOSED DEVELOPMENT

- 4.1 The proposed Change of use of building from 44 serviced apartments (Class C1) to 44 flats (C3) comprising of 4no studios, 27 x one bedroom and 13 x two bedroom units with associated parking.
- 3.1 The sample concept masterplan for the site is shown below:



4.0 PLANNING CONTEXT AND DESIGN GUIDANCE

- 4.2 The following legislative background, planning policy context and design guidance is relevant to the development:

Legislation

- The Control of Pollution Act 1974;
- The Environmental Protection Act 1990;
- The Building Regulations 2010 (as amended), including:
 - Approved Document E: Resistance to the Passage of Sound;
 - Approved Document F1: Ventilation;
 - Approved Document O: Overheating.

National Planning Policy

- Noise Policy Statement for England (2010);
- National Planning Policy Framework (2023); and

Local Planning Policy

- Conditions 8 and 16 of the Full Planning Application No: 201138

Design Guidance

- BS 8233: 2014: *"Guidance on sound insulation and noise reduction for buildings"*.
- *"Guidelines for Community Noise"*: World Health Organisation, 1999 ;
- *"Night Noise Guidelines for Europe"*. World Health Organisation, 2009 ;
- Acoustics Ventilation and Overheating: Residential Design Guide. Ver. 1.1. (2020); and

National Planning Policy Framework

- 4.3 The overarching aim of the planning regime is to ensure the compatibility of land uses. With regard to noise, the National Planning Policy Framework sets out two primary policies which seek to ensure that new noise sensitive development is adequately protected from noise; that the impact of noise from new noise generating land uses on existing residential uses is minimised and that existing commercial/industrial uses and community facilities do not have unreasonable restrictions imposed on them by new noise sensitive development:

Paragraph 189:

Planning policies and decisions should ensure that:

- a) a site is suitable for its proposed use taking account of ground conditions and any risks arising from land instability and contamination. This includes risks arising from natural hazards or former activities such as mining, and any proposals for mitigation including land remediation (as well as potential impacts on the natural environment arising from that remediation);*
- b) after remediation, as a minimum, land should not be capable of being determined as contaminated land under Part IIA of the Environmental Protection Act 1990; and*
- c) adequate site investigation information, prepared by a competent person, is available to inform these assessments.*

Paragraph 191:

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 life⁶⁹ ;*

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.

Noise Policy Statement for England

4.4 With regard to 'adverse' impacts and 'significant adverse' impacts, the NPPF directs the reader to the advice contained in DEFRA's "Noise Policy Statement for England" (NPSE). This Policy Statement introduces the concept of a "Significant Observed Adverse Effect Level" (SOAEL), "Lowest Observed Adverse Effect Level" (LOAEL) and "No Observed Effect Level" (NOEL). These are concepts aligned with toxicology outcomes derived from guidance given by the World Health Organisation.

- NOEL – No Observed Effect Level

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

- LOAEL – Lowest Observable 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.

Planning Practice Guidance

4.5 The application of national planning is amplified in the government's "National Planning Practice Guidance" (NPPG). This seeks to help clarify understanding the perception of noise effects, outcomes and actions that should be taken to align decision making with the NPPF. In line with the NPPF concept of basing decision making on the identification of "significant" or "other" impacts on health and quality of life, the NPPG aligns its guidance with the NPSE.

Response	Examples of Outcomes	Increasing Effect Level	Action
No Observed Effect Level (NOEL)			
Not present	No effect	No Observed Effect	No specific measures required
Present and not intrusive	Noise can be heard but does not cause any change in behaviour or attitude. Can slightly affect the acoustic character of the area but not such that there is a perceived change in the quality of life.	No Observed Adverse Effect	No specific measures required
Lowest Observed Adverse Effect Level (LOAEL)			
Present and intrusive	Noise can be heard and causes small changes in behaviour and/or attitude, e.g. turning up volume of television; speaking more loudly; where there is no alternative ventilation, having to close windows for some of the time because of the noise. Potential for some reported sleep disturbance.	Observed Adverse Effect	Mitigate and reduce to a minimum
Significant Observed Adverse Effect Level (SOAEL)			
Present and disruptive	The noise causes a material change in behaviour and/or attitude, e.g. avoiding certain activities during periods of intrusion; where there is no alternative ventilation, having to keep windows closed most of the time because of the noise. Potential for sleep disturbance resulting in difficulty in getting to sleep, premature awakening and difficulty in getting back to sleep. Quality of life diminished due to change in acoustic character of the area.	Significant Observed Adverse Effect	Avoid
Present and very disruptive	Extensive and regular changes in behaviour and/or an inability to mitigate effect of noise leading to psychological stress or physiological effects, e.g. regular sleep deprivation/awakening; loss of appetite, significant, medically definable hard, e.g. auditory and non-auditory.	Unacceptable Adverse Effect	Prevent

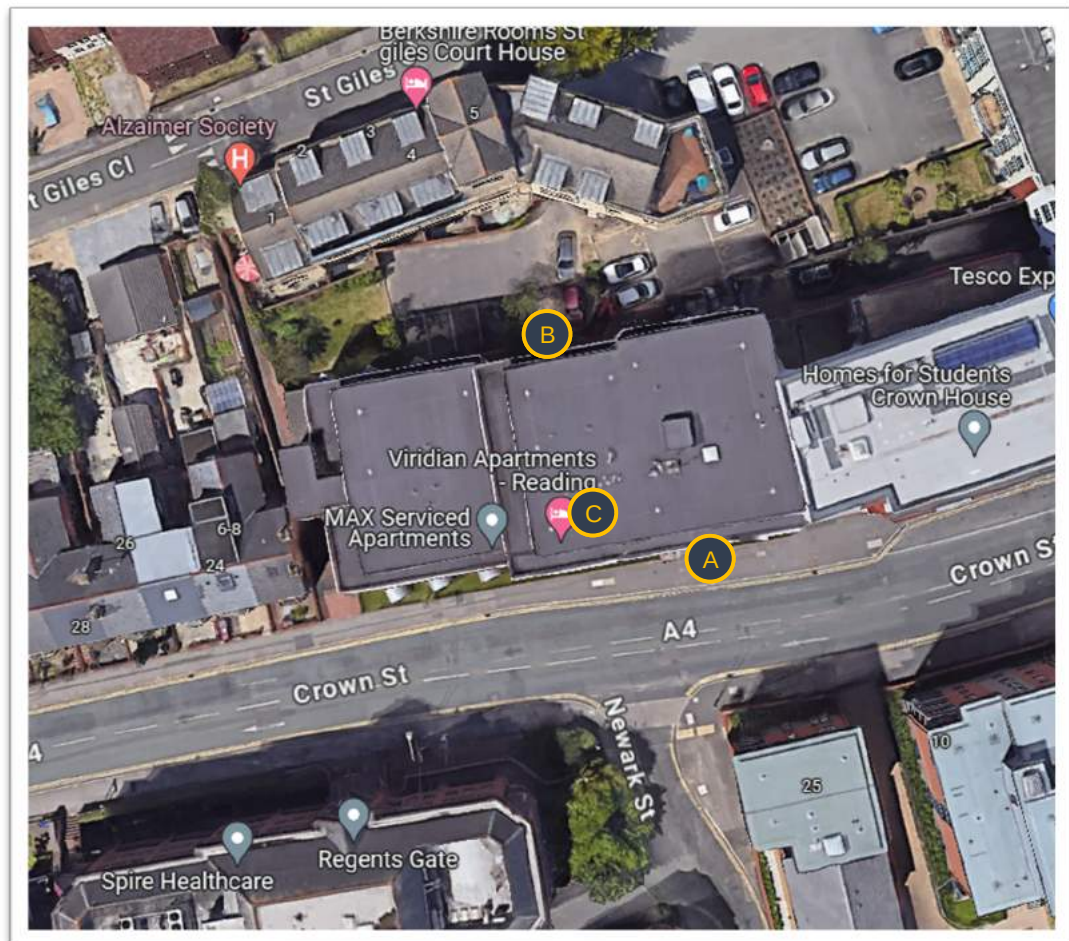
5.0 EXISTING NOISE LEVELS

Automated Noise Monitoring

- 5.1 An automated environmental noise survey was undertaken from approximately 15:00 hours on Wednesday 24th April 2024 to approximately 16:00 hours on Friday 26th April 2024.

Measurement Procedure

- 5.2 Noise monitoring equipment was located at three locations, as shown in the figure below:



Position	Description
Position A	Towards the southern side of the site boundary. The sound level meter was fixed to a pole and suspended 3m above local ground level.
Position B	Towards the northern side of the site boundary. The sound level meter was fixed to a pole and suspended approximately 4m above local ground level.
Position C	Situated inside the building in a dwelling the southern side of the site. The sound level meter was fixed to a tripod and suspended 1.5m above the ground.

5.3 The sound level analysers positioned at A & B were configured to continuously log “fast” A-weighted sound pressure levels. These monitoring locations were selected to provide an indication of likely worst case traffic noise levels that could be experienced at the northern and eastern boundary of the proposed residential development area.

5.4 The monitoring equipment at Position C was configured to record the L_{A90} , L_{Aeq} and $L_{Amax, fast}$ sound pressure level over consecutive 3-minute periods to provide a detailed time history profile showing fluctuations in noise levels. The equipment was also configured to undertake higher resolution logging to assist with the identification and discrimination of noise events. This monitoring location was selected to provide information regarding noise reduction associated with a closed and open window. The results have been used to inform the assessment to discharge Condition A.

Equipment

5.5 Details of the equipment used for the survey are summarised below.

Location	Manufacturer	Type	Serial Number
A	Svantek	971A	124647
B	Svantek	971A	124770
C	Svantek	971A	124770

5.6 All instruments hold current laboratory calibration certificates (available on request).

- 5.7 A field calibration checks on all equipment was made at the start of the survey and a further calibration check made on completion. No significant drift in the calibration of any instrument was observed.

Weather

- 5.8 A local weather station was used to determine the conditions of the survey.
- 5.9 Over the whole survey period the low temperature of 1°C and highs of 12°. There were moderate humidity levels of 79%. The average wind speed was below 5m/s and there was brief precipitation recorded throughout the period. On further analysis this has not adversely affected the recorded levels.

Results

- 5.10 A summary of the measured daytime ($L_{Aeq,16\text{ hour}}$) and night-time ($L_{Aeq,8\text{ hour}}$) are presented in the following table. These values represent noise levels from all noise sources (i.e. both transportation noise sources and noise associated with neighbouring residential/commercial uses):

Position A	Daytime (07:00 – 23:00)	Night-time (23:00 – 07:00)
24/04/2024	70.3	64.1
25/04/2024	72.7	65.2
26/04/2024	71.3	-
Position B	Daytime (07:00 – 23:00)	Night-time (23:00 – 07:00)
24/04/2024	52.7	43.8
25/04/2024	53.6	45.0
26/04/2024	53.1	-
*Data is average for available time period		

- 5.11 The $L_{Amax,fast}$ values exceeded no more than 10 times per night are summarised in the table below:

Measurement Location	Night-time Noise Level, $L_{Amax,8 \text{ hour}}$ (dB)
Position A	84
Position B	66

Attended Noise Measurements

- 5.12 Attended noise measurements were undertaken during a site visit on 26th April 2024.
- 5.13 As the window arrangement/ specification could not be confirmed, a visual inspection of the window has been undertaken as well as attended noise measurements.
- 5.14 The measurements obtained were to ascertain the external to internal noise level reduction whilst the windows were open and closed.
- 5.15 Each of the measurements were made over a 3-minute period between 10:57 and 11:04 hours.

Results

- 5.16 The A-weighted L_{eq} noise levels were measured during consecutive 3-minute periods with the windows open and closed. The results are presented in the table below:

Measurement Condition	Measured Noise Level $L_{Aeq,3 \text{ mins}}$ (dB)
A – External	67
Internal - Windows Open	54
Internal - Windows Closed	42

Discussion

- 5.17 The measurements have confirmed the external noise level reduction across the front elevation with the windows open was approximately 13dBA and with the windows closed, approximately 25dBA.
- 5.18 All windows across the front and rear elevations appeared to be of similar design/configuration to that of what was tested. We would therefore assume the measured reductions would typically apply to all windows.

6.0 INDOOR AMBIENT NOISE LEVELS

Internal Acoustic Design Recommendations for Dwellings

- 6.1 The following table outlines the internal acoustic design recommendations for dwellings in line with BS8223.

Activity	Location	Daytime (07.00 to 23.00 hours)	Night-time (23.00 to 07.00 hours)
Resting	Living Room	35dB $L_{Aeq,16hour}$	--
Dining	Dining Room/Area	40dB $L_{Aeq,16hour}$	--
Sleeping	Bedroom	35dB $L_{Aeq,16hour}$	30dB $L_{Aeq,8hour}$ 45 dB $L_{Amax,F}$

- 6.2 The above values are taken to represent “Lowest Observed Adverse Effect Levels” in line with national planning practice guidance.

Sound Insulation Requirements for Façades

- 6.3 The required level of sound insulation for a building's façade to achieve the above design targets is determined by:
- The noise levels affecting specific areas of the façade, with higher insulation needed for units facing noisy sources like roads.
 - The sound insulation properties of building elements, such as windows in masonry walls;
 - The proportion of different building elements; larger façades require more insulation; and
 - The acoustics of the receiving room, with harder (reverberant) rooms needing more insulation.

Sound Reduction Performance Considerations

- 6.4 The sound insulation capabilities of a particular building façade are determined by the sound insulation capabilities of the individual construction components. The acoustic performance of the windows will typically determine noise intrusion in masonry exterior walls with windows.
- 6.5 It should be noted that the relative proportion of the building elements will also influence the sound insulation capabilities of any particular façade. As an external area increases, so does the need for sound insulation. When the proportional area of weaker performing elements is increased, such as windows, the amount of sound insulation required will also increase.
- 6.6 It is assumed that external walls will maintain the following minimum apparent sound reduction index performance:

Assumed Minimum Apparent Octave Band Sound Reduction Index, dB					
125	250	500	1k	2k	4k
41	43	48	50	55	55

- 6.7 It is assumed that dwellings will be ventilated with a scheme of background and extract ventilation compliant with Approved Document F of the Building Regulations 2010 (as amended) based on continuously running mechanical ventilation.
- 6.8 The acoustic performance values are specified in terms of the “Weighted Sound Reduction Index” (R_w) as determined in accordance with BS EN ISO 10140-2:2021: “Acoustics. Laboratory Measurement of Sound Insulation of Building Elements. Measurement of Airborne Sound Insulation.” and BS EN ISO 10140-4:2021: “Acoustics. Laboratory measurement of sound insulation of building elements. Measurement procedures and requirements” and rated in accordance with BS EN ISO 717-1: 2020: “Acoustics. Rating of Sound Insulation in Buildings and of Building Elements – Airborne Sound Insulation”. The sound reduction index relates to the composite performance of the complete window system including the glass, framing, mullions, transoms, seals, etc.

Assessments of Existing Glazing / External Facade

6.9 An assessment of the current glazing/external facade has been undertaken.

6.10 The following table summarises the predicted internal noise levels on the southern façade during the daytime.

Location	Proposed Daytime Criterion L _{Aeq} (dBA) (07.00 to 23.00 hours)	Predicted Internal Noise Level L _{Aeq} (dBA)
Living Room	35	38
Dining Room/Area	40	38
Bedroom	35	43

6.11 The following table summarises the predicted internal noise levels on the southern façade during the nighttime.

Location	Proposed Night-time (dBA) (23.00 to 07.00 hours)	Predicted Internal Noise Level (dBA)
Bedroom	30 L _{Aeq}	34 L _{Aeq}
	45 L _{Amax}	53 L _{Amax}

6.12 The following table summarises the predicted internal noise levels on the northern façade during the daytime.

Location	Daytime Criterion L _{Aeq} (dBA) (07.00 to 23.00 hours)	Predicted Internal Noise Level L _{Aeq} (dBA)
Living Room	35	22
Dining Room/Area	40	22
Bedroom	35	27

6.13 The following table summarises the predicted internal noise levels on the northern façade during the nighttime.

Location	Night-time (dBA) (23.00 to 07.00 hours)	Predicted Internal Noise Level (dBA)
Bedroom	30 L _{Aeq}	18 L _{Aeq}
	45 L _{Amax}	38 L _{Amax}

- 6.14 The results indicate that the internal noise levels on the southern façade are predicted to exceed the noise criteria specified in BS 8223.

Incident Noise Levels

- 6.15 The incident noise levels from the surrounding sources have been provided in the Section 5 above. Based on this we have estimated the likely glazing/ ventilation specifications required on each façade.
- 6.16 It is understood the proposed dwellings will be fitted with an MVHR unit with additional cool air bypass where required.
- 6.17 The bedrooms on the southern façade (overlooking Crown Street) are predicted to require the following performance.
- Windows - rated at R_w 39dB. (This could typically be achievable with double glazed units comprising of 6mm glass / 16mm air / 10.8mm glass)
 - MVHR - (system 4) Ventilation with cooling module.
- 6.18 The living/ dining rooms on the southern façade (overlooking Crown Street) are predicted to require the following performance.
- Windows - rated at R_w 30dB. (This could typically be achievable with double glazed units comprising of 4mm glass / 16mm air / 4mm glass.
 - MVHR - (system 4) Ventilation with cooling module.
- 6.19 Both bedroom and dining areas on the northern façade are predicted to require the following performance.
- Windows - rated at R_w 30dB. (This could typically be achievable with double glazed units comprising of 4mm glass / 16mm air / 4mm glass)
 - MVHR - (system 4) Ventilation.

Sound Reduction of the Glazing

- 6.20 The following table presents the recommended minimum sound reduction indices for new windows to residential internal areas.

Location	Minimum Sound Reduction Index (R _w) at Octave Band Centre Frequencies (Hz)							
	63	125	250	500	1k	2k	4k	8k
Southern Elevation Bedrooms	25	25	27	34	41	41	50	50
Southern Elevation Living Rooms	24	24	18	26	40	45	39	39
Northern Elevation Bedroom/ Living Rooms	24	24	18	26	40	45	39	39

- 6.21 It is the responsibility of the glazing manufacturer and/or supplier to demonstrate and achieve compliance with the above values.
- 6.22 Testing of the whole façade system and all elements should be accordance with BS 476-22:1987 and BS EN 1364-1:2015 from an independent UKAS accredited or international equivalent laboratory, with reports provided to Quantum Acoustics for review.

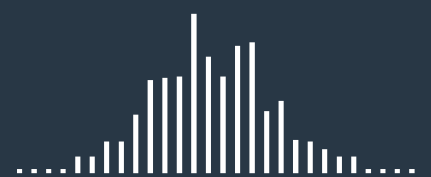
Approved Document F1 (2021)

- 6.23 Approved Document F1 (ADF) of the Building Regulations 2010 (as amended in 2021) requires that all habitable rooms in dwellings are provided with “whole house” (background) ventilation and air extraction from humid areas. Three approaches to providing ventilation are acceptable:
- Natural ventilation with background ventilators and intermittent extract fans;
 - Continuous mechanical extract ventilation (with background ventilators);
 - Mechanical ventilation with heat recovery (MVHR).
- 6.24 It is understood that the ventilation strategy to be adopted throughout the development is the use of Mechanical Ventilation with Heat Recovery (MVHR) (in line with the “system 4” approach outlined in Approved Document E of the Building regulation 2010 (as amended). The system will be fitted with an additional cool air bypass where necessary.

- 6.25 The provisions of such a system should ensure that the sound insulation of the facade remains effective even under whole-house ventilation conditions.
- 6.26 Whilst the above commentary implies that there is a need for windows to be “closed” to provide acoustic control, this should not be inferred that this means that windows need to be “sealed” shut. Unless there are other design reasons for doing so, we recommend that all windows remain openable as a matter of occupant choice and to satisfy the “purge” ventilation requirement of Approved Document F of the Building Regulations 2010 (as amended). Furthermore, where the need for an acoustic “restrictor” is proposed, it is recommended that the restrictor can also be overridden by the occupant at their choice.
- 6.27 As a mechanical approach to thermal control is proposed, early consideration will also need to be given to noise generated by the mechanical systems to ensure this is appropriately controlled. This will be especially true if ductwork systems need to handle high air volumes which could create air generated noise if flow velocities are not reasonably controlled.

7.0 CONCLUSIONS

- 7.1 Quantum Acoustics has undertaken an environmental noise survey to establish the existing noise levels. The noise survey concluded that the site is dominated by traffic noise from Telford Way and the A505.
- 7.2 The potential noise ingress to the site has been assessed in with national and local planning policies and guidance have been undertaken.
- 7.3 The assessment demonstrates the proposed development can be designed to deliver appropriate internal noise levels with the proposed glazing and ventilation specification outlined in Section 6 above.
- 7.4 The assessment demonstrates:
- The scheme follows a good acoustic design process to mitigate noise levels.
 - The proposed development can be designed to deliver appropriate internal noise levels with an MVHR system. An additional cool air bypass is likely to be required on the southern facades.
- 7.5 Considering the above, it is concluded that the proposed development complies fully with noise related national and local planning policies.



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