MAHDIEH PIKANO

273 WELLINGTON ROAD SOUTH, STOCKPORT

NOISE ASSESSMENT FOR PLANNING PURPOSES

29 February 2024

AEC REPORT: P5161/R1/NRS

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DOCUMENT STATUS

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1.0 INTRODUCTION

1.1 Acoustic & Engineering Consultants Limited (AEC) has been instructed by Mahdieh Pikano to undertake a noise assessment in relation to the proposed conversion of first-floor storage space into a single apartment located at 273 Wellington Road South, Stockport.

1.2 This report details the baseline noise levels measured by AEC on the same street as the development site, presents the assessment criteria and discusses the implications on the building design, to achieve acceptable internal noise levels as required by the Local Authority.

1.3 Acoustic terminology is discussed in brief in Appendix A.

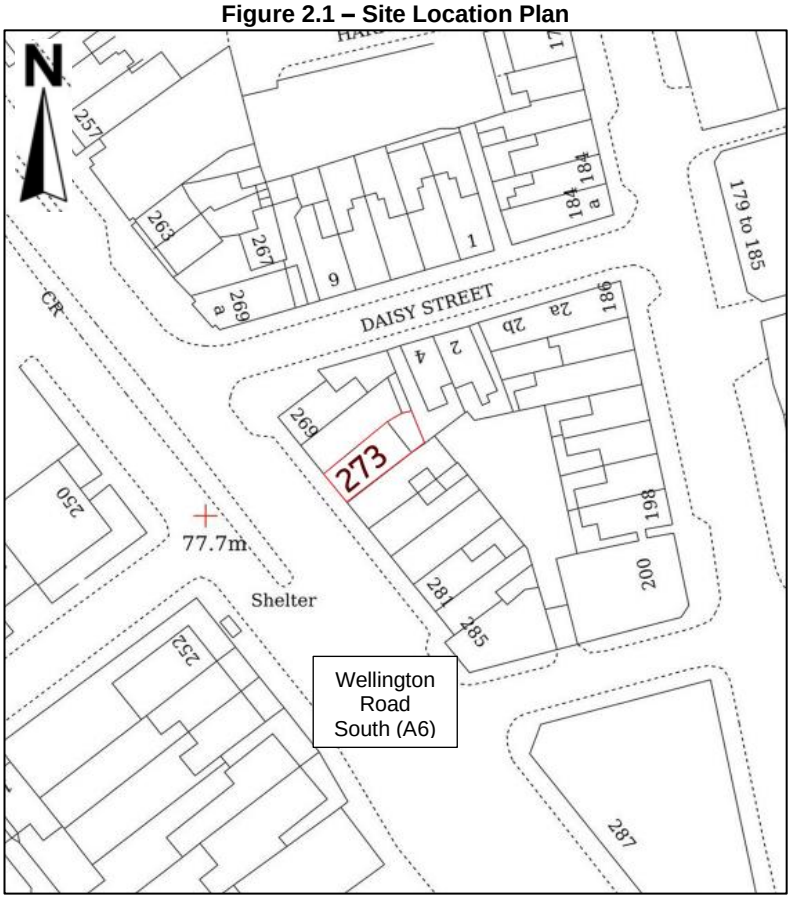
2.0 BACKGROUND AND SITE DESCRIPTION

Site Location

2.1 The proposed development is located on Wellington Road South (A6) as indicated on Figure 2.1, below.

2.2 As identified below, the site is bound by the A6 to the south-west and commercial spaces directly adjacent to the site to the north-west and south-east.

Figure 2.1 – Site Location Plan



Proposed Scheme

2.3 The proposed scheme consists of converting the first-floor storage space into a single apartment, as identified on Figure 2.2, below.

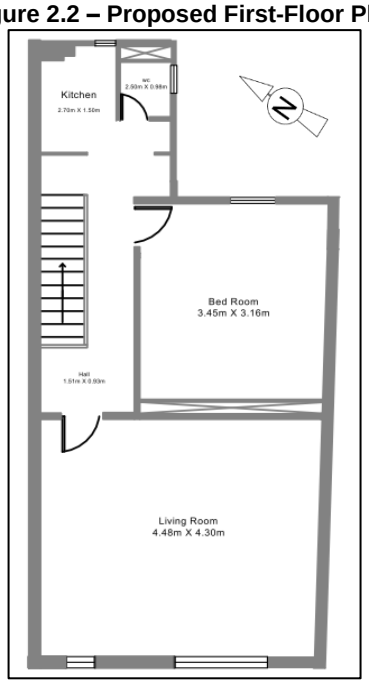
2.4 Please note that the ground floor space will continue to be used as a commercial unit (Salon).

2.5 It is understood that there are no windows to habitable rooms on the north-west and south-east facades (connected to adjacent buildings) of the site and hence, these elevations are not considered further in the assessment.

2.6 In addition, based on the proposed floor layout there are only living rooms on the south-western façade overlooking the A6. Therefore, only a daytime assessment has been undertaken on this elevation.

2.7 About 500m to the north-west of the site on the A6 is the Stockport College. AEC previously undertook noise measurements for Stockport College in May 2021 and these measured noise levels (road traffic on the A6 and noise from aircraft) are considered to be representative of the noise climate in the area and therefore have formed the basis of this report.

Figure 2.2 – Proposed First-Floor Plan



3.0 NOISE CLIMATE

General

3.1 Extended unattended noise level measurements (24hrs) were undertaken at a single location identified as A on Figure 3.1, below, overlooking the A6 between approximately 1100h on Tuesday 18 May 2021 and 1100h on Wednesday 19 May 2021. Full logged data over 15-minute periods are held on file by AEC and is available on request.

3.2 All measurements were undertaken in general accordance with BS7445-1: 2003 '*Description and measurement of environmental noise. Guide to quantities and procedures*'.

3.3 A full measurement procedure is presented in Appendix B and Table B1, and the measured data is presented in Graph B1 (façade levels). A -2.5dB correction has been applied to the façade noise levels to obtain the equivalent free-field levels, discussed below.

Road Traffic Noise from A6

3.4 Based on the noise levels measured at Location A, the free field noise levels due to road traffic on A6 would be around 68dB$L_{Aeq,16h}$ and 62dB$L_{Aeq,8h}$ during daytime and night-time periods, respectively.

3.5 Maximum free field night-time noise levels due to vehicle movements on the A6 were typically no greater than 80dB$L_{Amax,F}$.

Aircraft Noise

3.6 Based on Manchester Airport's Noise Action Plan 2019-2023, the site is in the 54-57dB$L_{Aeq,16h}$ and 48-51dB$L_{Aeq,8h}$ noise level contours during the daytime and night-time periods, respectively.

3.7 AEC has previously measured typical night-time maximum noise levels of around 70dB$L_{Amax,F}$ from aircraft flying over a number of other sites within the same noise contour.

Figure 3.1 – Proposed Site Location Showing Monitoring Location

4.0 BASIS OF ASSESSMENT

National Planning Policy Framework

4.1 Current national planning policies are set out in the National Planning Policy Framework (NPPF) published by the Department for Communities and Local Government, dated March 2012, and revised most recently in December 2023.

4.2 The planning policies which relate specifically to noise are presented in paragraphs 180, 191 and 193 which are reproduced below:

"180. Planning policies and decisions should contribute to and enhance the natural and local environment by:

(e) preventing new and existing development from contributing to, being put at unacceptable risk from, or being adversely affected by, unacceptable levels of soil, air, water or noise pollution or land instability. Development should, wherever possible, help to improve local environmental conditions such as air and water quality, taking into account relevant information such as river basin management plans

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 life65;

(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.

193. Planning policies and decisions should ensure that new development can be integrated effectively with existing businesses and community facilities (such as places of worship, pubs, music venues and sports clubs). Existing businesses and facilities should not have unreasonable restrictions placed on them as a result of development permitted after they were established. Where the operation of an existing business or community facility could have a significant adverse effect on new development (including changes of use) in its vicinity, the applicant (or 'agent of change') should be required to provide suitable mitigation before the development has been completed.

4.3 Further to the above, the Governments '*Planning Practice Guidance'* (PPG) published on 6 March 2014 and most recently updated in December 2023 states:

'Noise needs to be considered when development may create additional noise, or would be sensitive to the prevailing acoustic environment (including any anticipated changes to that environment from activities that are permitted but not yet commenced). When preparing plans, or taking decisions about new development, there may also be opportunities to make improvements to the acoustic environment. Good acoustic design needs to be considered early in the planning process to ensure that the most appropriate and cost-effective solutions are identified from the outset.'

4.4 In addition, the guidance indicates that, whilst noise can override other planning concerns, it is important to look at noise in the context of the wider characteristics of a development proposal, its likely users, and its surroundings, as these can have an important effect as to whether or not noise is likely to pose a concern.

Internal Noise Level Limits due to External Noise Ingress

4.5 Based on AEC's experience of assessments previously undertaken for Stockport Metropolitan Borough Council (SMBC), it is understood that they require the scheme to be designed such that internal noise levels are controlled to meet those presented in Section 7 of BS 8233:2014 '*Guidance on sound insulation and noise reduction for buildings'* (BS8233) and The Association of Noise Consultants (ANC) document Professional Practice Guidance (ProPG) on Planning and Noise '*New Residential Development*' (2017).

4.6 The daytime and night-time noise limit levels to be achieved in habitable rooms due to transportation noise sources are presented in Table 4.1, below.

Table 4.1 – Internal Noise Level Limits within Habitable Rooms

Activity	Location	Noise Level Limit, dB		
		Daytime 0700 – 2300h $L_{Aeq,16h}$	Night-Time 2300 – 0700h	
			$L_{Aeq,8h}$	$L_{Amax,F}$
Resting	Living Room	35	-	-
Dining	Dining Room/Area	40	-	-
Sleeping (daytime resting)	Bedroom	35	30	45

4.7 In relation to maximum noise levels in bedrooms during the night-time period, Note 4 of ProPG states that "*Regular individual noise events (for example, scheduled aircraft or passing trains) can cause sleep disturbance. 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*."

4.8 Based on this AEC would propose to design the façade in order that maximum noise levels in bedrooms do not typically exceed 45dB$L_{Amax,F}$ during the night-time period 2300h to 0700h and any non-typical events such as a one-off emergency siren or noisy motorbike pass-by will be excluded from the assessment.

Ventilation Provision

Whole Dwelling Ventilation

4.9 The above internal noise level limits need to be achieved with whole dwelling ventilation, as defined in Approved Document F '*Ventilation*' (2021) of the Building Regulations.

4.10 Whole dwelling ventilation is typically achieved either via background ventilators (e.g., an open window or trickle ventilators) or mechanical means.

4.11 The ANC document ProPG, states that the attenuation of external to internal noise levels provided by a window partially open for ventilation is no more than -15dB.

4.12 Therefore, for whole dwelling ventilation to be provided via a partially open window, the external noise levels presented in Table 4.2 should not be exceeded.

Table 4.2 – Allowable External Free-field Noise Levels for Whole Dwelling Ventilation via a Partially Opened Window

Activity	Location	Noise Level Limit, dB		
		Daytime 0700 – 2300h $L_{Aeq,16h}$	Night-Time 2300 – 0700h	
			$L_{Aeq,8h}$	$L_{Amax,F}$
Resting	Living Room	50	-	-
Dining	Dining Room/Area	55	-	-
Sleeping (daytime resting)	Bedroom	50	45	60

4.13 In relation to purge ventilation, ProPG suggests that as this should only occur occasionally (e.g., to remove odour from painting and decorating or from burnt food), the internal desired noise levels are not generally applicable. Therefore, internal noise levels due to windows being opened for purge ventilation has not been discussed further.

4.14 ADF states that information about overheating is given in Approved Document O (ADO) *'Requirement 01: Overheating Mitigation Regulations: 40B'* (2021 edition).

Overheating Strategy

4.15 Paragraph 0.3 of ADO states that the "*document applies to new residential buildings only"*. Therefore, as this is a conversion of an existing building AEC has deemed it appropriate to consider the guidance presented in the ANC's guidance document '*Acoustics, Ventilation and Overheating: Residential Design Guide (2020)'* (AVO) for daytime and night-time internal noise levels.

4.16 It is important to note that AVO is a design guide only and not a statutory document and the Local Authority may have their own requirements.

4.17 Table 3.3 of AVO presents guidance for allowable noise from transportation sources whilst windows are open for the control of overheating. With reference to this document AEC would propose that windows can be utilised in the control of overheating provided that the resultant internal ambient noise levels are below approximately 50dB$L_{Aeq,16h}$ during the daytime, and 42dB$L_{Aeq,8h}$ and 65dB$L_{Amax,F}$ during the night-time.

4.18 These internal noise levels are the upper end of the medium risk category for adverse effects. Where these internal noise levels would be exceeded, AVO states that "*noise causes a material change in behaviour (e.g., having to keep windows closed most of the time)*". In this situation, AEC would suggest alternative means for the control of overheating are considered, which do not rely on open windows.

4.19 AVO states that where transportation is the main source of noise, *"it is assumed that a partially open window will provide an outside-to-inside level difference of 13dB and is considered representative of typical domestic rooms with simple façade openings of around 2% of the floor area"*.

4.20 Considering the above, it is considered acceptable to control summertime heating via opening windows where external free-field noise levels are no greater than those presented in the following Table 4.3. This is based on simple façade openings to around 2% of the floor area.

4.21 The limits presented in Table 4.3 are subject to agreement with the Local Authority and may be subject to change.

Table 4.3 – External Free-Field Noise Level Limits for the Control of Overheating via Openable Windows

Activity	Location	Noise Level Limit, dB		
		Daytime 0700 – 2300h $L_{Aeq,16h}$	Night-Time 2300 – 0700h	
			$L_{Aeq,8h}$	$L_{Amax,F}$
Resting	Living Room	63	-	-
Dining	Dining Room/Area	63	-	-
Sleeping (daytime resting)	Bedroom	63	55	78

Noise Transfer from Ground Floor Commercial Unit

4.22 In order to comply with the 2010 Building Regulations, the separating floor between the ground floor commercial unit and the first-floor apartment should comply with the minimum sound insulation performance requirements of Approved Document E (ADE).

4.23 However, based on AEC's experience, it is recommended that noise from the commercial unit is controlled so as to not exceed a maximum noise level of no greater than NR30L_{max} in habitable rooms during the daytime and NR25L_{max} in bedrooms at night in the apartment above.

5.0 ASSESSMENT OF PROPOSED DEVELOPMENT

Determining of External Noise Levels

5.1 The main source of noise affecting the site is road traffic on the A6 and to a lesser extent noise from aircraft flying over.

5.2 As stated above, the external free-field noise levels affecting the building facade overlooking the A6 (south-west façade) would be around 68dB$L_{Aeq,16h}$ during the daytime period.

5.3 Based on Manchester Airport's Noise Action Plan 2019-2023, the site is in the 54-57dB$L_{Aeq,16h}$ and 48-51dB$L_{Aeq,8h}$ noise level contours during the daytime and night-time periods, respectively. AEC has previously measured typical night-time maximum noise levels of around 70dB$L_{Amax,F}$ from aircraft flying over at a number of other sites within the same noise contour.

5.4 It should be noted that even though noise from aircraft flying over the site would be audible, it will not increase the ambient noise levels on the elevation facing the A6 which will be dominated by road traffic.

5.5 On the rear elevation facing away from the A6, road traffic noise levels would be at least approximately 10-15dB quieter and aircraft noise levels would be similar to road traffic noise levels.

5.6 Based on the above, the determined free-field daytime ambient and night-time ambient and maximum noise levels affecting the proposed development are presented in Table 5.1, below

Table 5.1 – Determined Free-Field External Noise Levels

Elevation	Noise Level, dB		
	Daytime	Night-time	
	Ambient, $dBL_{Aeq,16h}$	Ambient, $dBL_{Aeq,8h}$	Maximum, $dBL_{Amax,F}$
South-West (Facing A6)	68	-	-
North-East (Facing away from A6)	≤ 58	≤ 52	≤ 70

Glazing and Ventilation Requirements

5.7 As stated in Section 3.0, for habitable rooms to have whole dwelling ventilation provided via a window partially open, external noise levels should not exceed $50dBL_{Aeq,T}$ during the daytime and $45dBL_{Aeq,T}$ and $60dBL_{Amax,F}$ at night.

5.8 A comparison between these levels and the determined noise levels presented in Table 5.1, indicates that windows would need to remain closed and, as such, alternative means of whole dwelling (background) ventilation would need to be provided to all habitable rooms. It is assumed that trickle ventilation will be used.

5.9 The minimum sound insulation performances of the glazing and ventilators to meet the required internal noise levels limits have been calculated based on the measured source noise levels and the glazing and room sizes stated on the provided drawings. The minimum sound insulation performances are presented in Table 5.2, below.

Table 5.2 – Outline Requirements of Glazing and Ventilation to Achieve Internal Noise Levels in Habitable Rooms

Elevation	Sound Insulation Performance	
	Daytime (Living Rooms etc.) and Night-time (Bedrooms only)	
	Glazing	Ventilator
South-West (A6)	$37dBR_w$ / $32dBR_w + C_{tr}$	$38dBD_{n,e,w}$
North-East (Rear)	$33dBR_w$ / $28dBR_w + C_{tr}$	$33dBD_{n,e,w}$

5.10 Example glazing build-ups, to achieve the required sound insulation performances presented in Table 5.2, are provided in Table 5.3 below. The ventilator performance is given in the open position.

Table 5.3 – Example Glazing Constructions

Sound Insulation Performance	Example Construction
$37dBR_w$ / $32dBR_w + C_{tr}$	6mm Glass / 6-16mm TC / 10mm Lam. Glass
$33dBR_w$ / $28dBR_w + C_{tr}$	6mm Glass / 6-16mm TC / 6.8mm Lam Glass

5.11 Prior to any glazing being installed, octave band sound insulation performance data of the glazing build-ups and ventilators selected must be verified by AEC or others.

5.12 All background ventilation sound insulation requirements have been based on the use of a single ventilator per room. If more than one unit is required, such as may be required to satisfy Building Control requirements, the performance of each unit might need to be increased.

Control of Overheating

5.13 If it is determined by others that there is a need to control overheating within the development, a comparison between the noise levels presented in Table 5.1 and those presented in Table 4.3, indicates that windows can be opened to aid with the control of overheating in all habitable rooms on the rear facade (north-east) of the development during both the daytime and night-time periods.

5.14 In relation to the south-western façade (A6), an enhanced ventilation system (mechanical) or attenuated openings may need to be installed to the living room to aid with the control of overheating. This would only be the case if there is a concern that the living room on this façade would be at risk of overheating, which would need to be determined by others.

External Envelope

5.15 To maintain the sound insulation performance of the external envelope the remainder of the façade construction should have a sound insulation performance of at least 10dB higher than the glazing. Therefore, the external walls and roof would need to achieve a sound insulation performance of at least around $47dBR'_w$. This would be readily achievable with the existing traditional masonry construction.

Noise Transfer from Ground Floor Commercial Unit

5.16 As a minimum the separating floor between the commercial unit and first floor apartment would need to achieve an airborne sound insulation performance of $43dBD_{nT,w} + C_{tr}$ in order to comply with ADE of The Building Regulations.

5.17 However, a higher sound insulation performance of around $53dBD_{nT,w} + C_{tr}$ is likely to be required to achieve a noise level of no greater than $NR25L_{max}$ in the apartment bedroom

5.18 This level of performance can be achieved with a mass barrier ceiling in the commercial unit, formed from at least 2 layers of 15mm thick dense plasterboard (such as British Gypsum SoundBloc) supported off resilient hangers, with mineral wool in the cavity. A floating floor may need to be installed in the apartments directly above the commercial unit.

5.19 This will require further development once the floor construction has been confirmed.

6.0 SUMMARY & CONCLUSIONS

6.1 Acoustic & Engineering Consultants Limited (AEC) has been appointed by Mahdieh Pikano, to undertake a noise assessment in relation to the proposed conversion of first-floor storage space into a single apartment located at 273 Wellington Road South, Stockport.

6.2 A daytime and night-time noise survey was undertaken by AEC in May 2021 and the main noise source in the area was road traffic on the A6 and noise from aircraft flying over. Full details of the noise level survey are presented in Appendix B. A summary of the noise levels measured and the sources of noise affecting the proposed development are discussed in Section 3.0.

6.3 Based on AEC's experience of noise assessments with Stockport Metropolitan Borough Council (SMBC), it is understood that that internal noise levels in new residential properties should comply with guidance presented in BS8233 and the Association of Noise Consultants (ANC) document *'ProPG: Planning and Noise - New Residential Development*', 2017 (ProPG). This is discussed in Section 4.0.

6.4 An assessment of the noise levels measured and affecting the proposed development is presented in Section 5.0. Based on this assessment, the sound insulation requirements of the building envelope and ventilation have been determined and are presented in Table 5.2. In brief, acoustically enhanced glazing is required, and ventilation can be provided by through the frame acoustic trickle vents.

6.5 In terms of the control of overheating, based on the noise levels provided in Section 5.0, windows can be opened for all habitable rooms on the rear facade (north-east) of the development during both the daytime and night-time periods. However, for all habitable rooms on the south-western façade an alternate means of cooling would be required such as a decentralised or separate system of cooling.

6.6 Based on this assessment, noise should not be considered a determining factor in relation to any planning permission being sought.

APPENDIX A – Acoustic Terminology in Brief

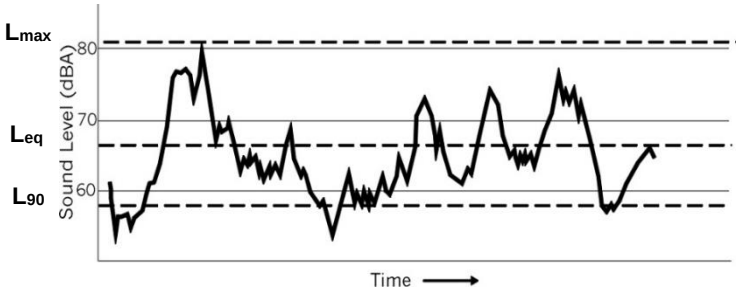
General

Sound is produced by mechanical vibration of a surface, which sets up rapid pressure fluctuations in the surrounding air. The rate at which the pressure fluctuations occur determines the pitch or *frequency* of the sound. The frequency is expressed in Hertz *(Hz)*, that is, cycles per second. The human ear is sensitive to sounds from about 20 Hertz to 20,000 Hertz. Although sound can be of one discreet frequency - a 'pure tone' - most noise is made up of many different frequencies.

The human ear is more sensitive to some frequencies than others, and modern instruments can measure sound in the same subjective way. This is the basis of the A-weighted sound pressure level *dBA,* normally used to assess the effect of noise on people. The dBA weighting emphasizes or reduces the importance of certain frequencies within the audible range

Sound / Noise Units

The figure below shows an example of sound level varying with time. Because of this variation over time the same period of noise can be described by several different levels. The most common of these are described below.



Commonly Used Descriptors for Sound / Noise	
$L_{Amax,F/S}$	The maximum (A-weighted) sound level measured during a given time. 'Fast' or 'Slow' meter response should be cited.
$L_{Aeq,T}$	The equivalent continuous (A-weighted) sound level. It may be thought of as the "average" sound level over a given time, T. It is used for assessing noise from various sources: industrial and commercial premises, construction sites, railways and other intermittent noises. **It can be considered as the "ambient" noise level.**
Free-field Level	This refers to the sound level measured outside, away from reflecting surfaces.
NR	Noise rating – a graphical method for assigning a single number rating to a noise spectrum and is often use to specify noise level limits for mechanical services.
R_w	Single number rating used to describe the laboratory airborne sound insulation properties of a material or building element over a range of frequencies, typically 100-3150Hz.
R'_w	Apparent sound reduction index - Single number rating used to describe the sound reduction index of an on-site construction over a range of frequencies, typically 100-3150Hz.
D_w	Single number rating used to describe the on-site airborne sound insulation properties of a material or building element over a range of frequencies, typically 100-3150Hz.
$D_{nT,w}$	Weighted standardized level difference. A single number rating used to describe the on-site airborne sound insulation performance properties of a material or building element over a range of frequencies, typically 100-3150Hz. Standardized to a reference reverberation time of 0.5s (unless otherwise stated).

$D_{n,e,w}$	Element normalised level difference. Single number rating used to describe the sound insulation performance of small elements
C_{tr}	A road traffic spectrum adaptation term which is used to describe the low frequency sound insulation performance of building elements.
RT	Reverberation Time. Time (in seconds) required for the sound pressure level in a room to decrease by 60dB after the sound source has stopped
T_{mf}	The average value of the reverberation times one of the frequency range 500Hz–2KHz.

APPENDIX B – Noise Survey Details

TABLE B1 – Measurement Procedure

<table>
<tr><td>Date & Time of Survey:</td><td colspan="6">Unattended: Tuesday 18 May 2021, 1100h to Wednesday 19 May 2021, 1100h.</td></tr>
<tr><td>Personnel:</td><td colspan="6">David Terry (AEC).</td></tr>
<tr><td>Equipment Used:</td><td colspan="6">Unattended: Cirrus CR:171B Real Time Analyser (AEC Kit 5)</td></tr>
<tr><td>Calibration:</td><td colspan="6">The sound level analysers, which conforms to BS EN 61672-1: 2013 ‘Electroacoustics – Sound level meters - Part 1 Specifications’ for Class 1 Type Z meters, was in calibration and check calibrated before and after the measurement periods using a Brüel & Kjær type 4231 (94dB) calibrator. There was no significant drift of calibration. Calibration certificates are available on request.</td></tr>
<tr><td rowspan="4">Weather Conditions:</td><td colspan="6">Unattended:</td></tr>
<tr><td>Date</td><td>Period</td><td>Wet/Dry</td><td>Temp°C</td><td>Wind Speed & Direction</td><td>Cloud Cover</td></tr>
<tr><td>18/05/2021</td><td>Day</td><td>Dry</td><td>16°C</td><td>South-westward and 3m/s</td><td>50%</td></tr>
<tr><td>18/05/2021</td><td>Night</td><td>Dry</td><td>5°C</td><td>Northward and 1m/s</td><td>95%</td></tr>
<tr><td>Measurement Locations:</td><td colspan="6">Unattended: The microphone was connected via an extension cable and fixed externally at a location 1m from the elevation overlooking the A6, at first floor level, identified as A on Figure B1.</td></tr>
<tr><td>Measurement Details:</td><td colspan="6">Unattended: Measurements were logged continuously over 1s for post processing and assessment. This location was selected to represent the worst-case affected façade of the development that would be affected by noise from road traffic noise on the A6.</td></tr>
<tr><td>Façade / Free-Field:</td><td colspan="6">Unattended: Façade level.</td></tr>
<tr><td></td><td colspan="6">The measured daytime and night-time periods for the unattended survey is presented on Graph B1.</td></tr>
<tr><td>Measured Data:</td><td colspan="6">Full octave band centre frequency data was obtained for all measurements.</td></tr>
</table>

GRAPH B1 – Measured Façade Noise Levels (24hrs) on the Elevation Facing the A6 – Location A