NOISE IMPACT ASSESSMENT

1-3 Union Street, Brighton, BN1 1HA

21st November 2023

ISSUE 01

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1.0 INTRODUCTION

DAA Group has been appointed to carry out a Noise Impact Assessment at 1-3 Union Street, Brighton, BN1 1HA to support a Planning Application for the Change of use of first floor from office (E) to residential to create 1no flat (C3), in accordance with:

- National Planning Policy Framework 2021 (NPPF)
- National Planning Practice Guidance (NPPG)
- Brighton Local Plan

Using results of the noise survey, the sound insulation performance for the whole building envelope including glazing (windows) is assessed.

The technical content of this assessment has been provided by a Tech member of the Institute of Acoustics.

The Institute of Acoustics is the UK's professional body for those working in acoustics, noise and vibration

2.0 NOISE CRITERIA

2.1 NATIONAL PLANNING POLICY FRAMEWORK (NPPF)

The Department for Communities and Local Government introduced the National Planning Policy Framework (NPPF) in March 2012. The latest revision of the NPPF is dated July 2021.

The NPPF sets out the Government's planning policies for England and how these are expected to be applied. It provides a framework where local Councils can produce their own local and neighbourhood plans which reflect the needs of their communities.

In conserving and enhancing the natural environment, the planning system should prevent both new and existing development from contributing to, or being put at, unacceptable risk from environmental factors including noise.

Planning policies and decisions should aim to avoid noise giving rise to significant adverse impacts on health and quality of life as a result of new development. Conditions may be used to mitigate and reduce noise to a minimum so that adverse impacts on health and quality of life are minimised. It must be recognised that development will often create some noise and existing businesses wanting to develop in continuance of their business should not have unreasonable restrictions put on them. Reference is made within NPPF to the Noise Policy Statement for England (NPSE) as published by DEFRA in March 2015

2.2 NOISE POLICY STATEMENT FOR ENGLAND (NPSE)

The long-term vision of the NPSE is stated within the documents scope, to 'promote good health and a good quality of life through the effective management of noise within the context of Government policy on sustainable development'. The policy aims are stated to:

- avoid significant adverse impacts on health and quality of life;
- mitigate and minimise adverse impacts on health and quality of life; and
- where possible, contribute to the improvement of health and quality of life.

The application of NPSE should mean that noise is properly taken into account at the appropriate time (for example in planning applications or appeals) where it must be considered alongside other relevant issues. The guiding principles of Government policy on sustainable development should be used to assist in the implementation of the NPSE.

The NPSE should apply to all types of noise apart from occupational noise in the workplace. The types of noises defined in the NPSE includes:

- Environmental noise from transportation sources;
- Neighbourhood noise which includes noise arising from within the community; industrial premises, trade and business premises, construction sites and noise in the street

The Noise Policy Statement England (NPSE) outlines observed effect levels relating to the above, as follows:

- **NOEL – No Observed Effect Level**

o This is the level below which no effect can be detected. In simple terms, below this level, there is no detectable effect on health and quality of life due to the noise.

• **LOAEL – Lowest Observed Adverse Effect Level**

o This is the level above which adverse effects on health and quality of life can be detected.

• **SOAEL – Significant Observed Adverse Effect Level**

o This is the level above which significant adverse effects on health and quality of life occur.

As stated in The Noise Policy Statement England (NPSE), it is not currently possible to have a single objective based measure that defines SOAEL that is applicable to all sources of noise in all situations. Specific noise levels are not stated within the guidance for this reason, and allow flexibility in the policy until further guidance is available.

2.3 ProPG: PLANNING AND NOISE

As outlined above, the National Planning Policy Framework encourages improved standards of design, although it provides no specific noise levels which should be achieved on site for varying standards of acoustic acceptability, or a prescriptive method for the assessment of noise.

ProPG: Planning and Noise was published in May 2017 in order to encourage better acoustic design for new residential schemes in order to protect future residents from the harmful effects of noise. This guidance can be seen as the missing link between the current NPPF and its predecessor, PPG24 (Planning Policy Guidance 24: Planning and Noise), which provided a prescriptive method for assessing sites for residential development, but without the nuance of 'good acoustic design' as outlined in ProPG.

ProPG allows the assessor to take a holistic approach to consider the site's suitability, taking into consideration numerous design factors which previously may not have been considered alongside the noise level measured on site, for example the orientation of the building in relation to the main source of noise incident upon it.

It should be noted this document is not an official government code of practice, and neither replaces nor provides an authoritative interpretation of the law or government policy, and therefore should be seen as a good practice document only.

2.4 ACOUSTICS VENTILATION AND OVERHEATING

The AVO Guide includes:

* an explanation of ventilation requirements under the building regulations and as described in Approved Document F, along with typical ventilation strategies and associated noise considerations;
* an explanation of the overheating assessment methodology described in CIBSE TM59; potential acoustic criteria and guidance relating to different ventilation and overheating conditions, for both environmental noise ingress and building services noise;
* and a worked example of the application of the AVO Guide including indicative design solutions.

The AVO Guide is intended for the consideration of new residential development that will be exposed predominantly to airborne sound from transport sources, and to sound from mechanical services that are serving the dwellings in question. Although the policy coverage is limited to England, the approach may be applicable in other parts of the UK.

The AVO Guide is intended to contribute to the practice of good acoustic design, as emphasised in the Professional Practice Guidance on Planning and Noise (ProPG). In particular

2.5 BRITISH STANDARD BS 8233:2014

British Standard Code of Practice BS8233:2014 'Sound insulation and noise reduction for buildings' provides recommended guideline value for internal noise levels within dwellings which are similar in scope to guideline values contained within the World Health Organisation Guidelines for Community Noise 1999 (WHO).

Activity	Location	07:00 to23:00	23:00 to 07:00
Resting	Living room	35 dB $L_{Aeq,\ 16hour}$	
Dining	Dining room/area	40 dB $L_{Aeq,\ 16hour}$	
Sleeping (daytime resting)	Bedroom	35 dB $L_{Aeq,\ 16hour}$	30 dB $L_{Aeq,\ 8hour}$

2.4.1 Indoor ambient noise levels for dwellings

The WHO guideline noise criteria set an internal sleep disturbance noise limit of 45dB LAmax,F which should not be exceeded on a regular basis.

3.0 SITE SURVEYS

3.1 SITE DESCRIPTION

The application site is a terrace property located on the pedestrianised Union street . The area is a mix of commercial and residential properties, typical of an urban cityscape environment. The dominant noise source is traffic noise from the surrounding roads. (See Figure 3.1)

Figure 3.1 – Proposed Site

3.2 ENVIRONMENTAL SITE SURVEY PROCEDURE

In order to characterise the sound profile of the area an environmental sound survey has been carried out from 17/11/2023 to 20/11/2023. The monitoring position was chosen in order to collect representative data for the potential noise break in to the habitable rooms.
Noise Measurements were carried out 1m from a first floor window on the façade facing union Street. See figure 5.1.3.

3.3 EQUIPMENT

Instrument manufacturer	**Rion**
Model	**NA-28**
Serial Number	**00392485**
Microphone Type	**UC-59**
Serial Number	**14934**
Calibrator	**NC-74**
Serial Number	**34494274**
Cirrus CK: 675 Outdoor Kit	

The calibration of the sound level meters was verified in-situ before any measurements were taken, using the handheld calibrator and reference tone of 114dB at 1kHz. Validation checks at the end of the survey indicated that all instruments had operated within permitted tolerances for drift and measured level.

Calibration certificates are available on request.

3.4 METEOROLOGICAL CONDITIONS

As the environmental noise survey was carried out over a long un-manned period no localized records of weather conditions were taken. However, during the set up and collection of the monitoring equipment, the weather conditions have been documented in the following table. All measurements have been compared with met office weather data of the area, specifically the closest weather station, the data from the weather station is outlined in the table below. When reviewing the time history of the noise measurements, any scenarios that were considered potentially to be affected by the local weather conditions have been omitted. The analysis of the noise data includes statistical and percentile analysis and review of minimum and maximum values, which aids in the preclusion of any periods of undesirable weather conditions. The weather conditions were deemed suitable for the measurement of environmental noise in accordance with BS7445 Description and Measurement of Environmental Noise. The table below presents the average temperature, wind speed and rainfall range for each 24-hour period during the entire measurement.

Weather Conditions – Shoreham Airport Weather station				
Time Period	**Air Temp (◦C)**	**Rainfall mm/h**	**Prevailing Wind Direction**	**Wind Speed (m/s)**
17/10/2023 – 00:00 – 23:59	7 - 12	0.0	NW	4-9
18/10/2023 – 00:00 – 23:59	8 - 14	0.1	SSW	2-6
19/10/2023 – 00:00 – 23:59	6 - 13	0.0	WNW	6 – 11
20/10/2023 – 00:00 – 23:59	6 - 11	0.0	W	3 - 16

Table 3.4 – Weather Summary

4.0 NOISE SURVEY

The following free-field sound levels have been derived for assessment of environmental noise break-in.
A maximum value is provided for each night-time measurement period. Based on the World Health Organisation interpretation that for a noise to be regular it needs to occur several (i.e. more than two) times per hour; the LAmax(f) noise needs to be based upon an average of 10-15 events that are typical in nature. The aim of protecting against maximum noise levels is to ensure protection against typical intermittent noise levels rather than one-off events; whereby an arithmetic average of the 15 typical maximum events across each night period is used to determine values of dB LAmax(f) reported below. These have been summarised in table 4.1 below.

Measurement Data	Free Field Sound Pressure Level dB		
	MP1		
Time	$L_{Aeq,T}$	$L_{AMAX,(f)}$	Lowest L_{90}
07:00 – 23:00	48LAeq,15	66dB $L_{AMAX,15}$	33dB, $L_{90,15}$
23:00 – 07:00	41dB LAeq,15	60dB $L_{AMAX,15}$	27dB, $L_{90,15}$

Table 4.1 Measurement Levels

Leq, ff noise levels are taken as the continuous equivalent free-field sound pressure level outside the room elements under consideration.

Location	T	Time		Free-Field Sound Pressure Level Leq, T dB re.20µPa							
			63Hz	125Hz	250Hz	500Hz	1kHz	2kHz	4kHz	8KHz	A
MP1	16h	Day	43	51	49	46	42	38	33	28	48
	8h	Night	36	35	43	39	35	31	26	21	41
		LAMax	56	63	61	58	54	50	45	40	60

Table 4.2 Summary of octave -band sound levels for break in assessment

5.0 PROPOSED LAYOUT DESIGN

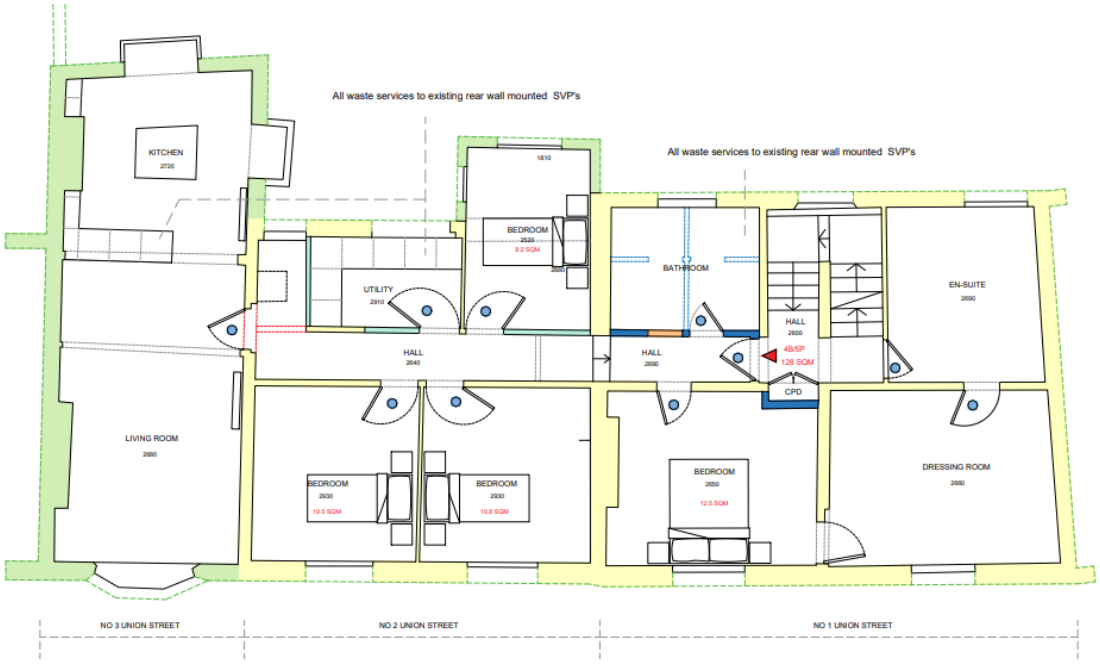

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Figure 5.0 - Proposed First Floor Layout

5.1 EXTERNAL SOUND LEVELS

It shall be read from Table 4.2 in Section 4.0 of this report, that the external sound levels taken by means of average equivalent or maximum sound levels are within the World Health Organisation requirements for external noise as described by Community Noise Guidelines (1999) in Section 2.5 of this report.

5.1.1 Pro PG Acoustic Design Statement

The scope of ProPG is restricted to the consideration of new residential development that will be exposed predominantly to airborne noise from transport sources. New apartments, flats and houses are the most common type of new residential development, however the guidance can also be applied to other types of residential developments such as residential institutions, care homes etc. As such it is directly applicable to this development.

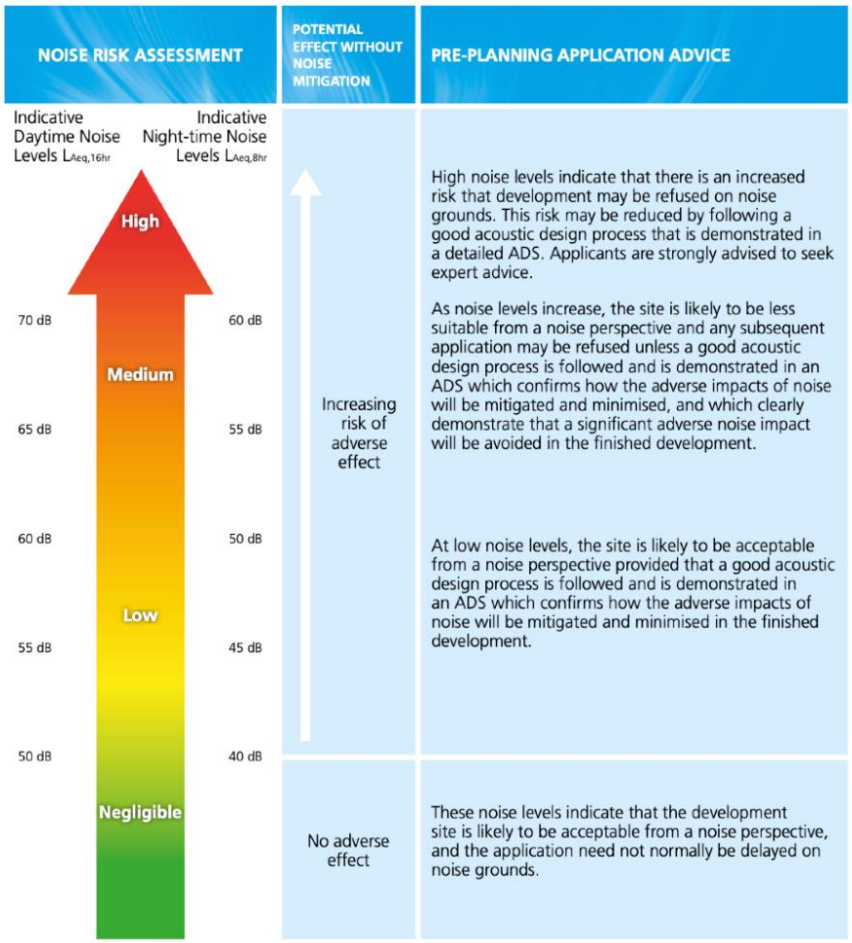


Figure 5.1 - ProPG Noise risk assessment guide

The following table assesses the ProPG noise risk for the measured data. The purpose of this is to provide a view of the noise risk at the site.

60dB Aircraft Contour	Daytime $L_{Aeq, 16hr}$ 07:00 – 23:00	Night-time $L_{Aeq, 8hr}$ 23:00 – 07:00	Noise Exposure Catergory
Noise Level	48dB	41dB	**A**
ProPG Noise Risk	LOW	LOW	

Table 5.1.1 : ProPG Stage 1 Assessment table

ProPG states that "Particular care should be taken to ensure that any noise events (as quantified by LAmax,F) have been properly identified and assessed". On attendance, the greatest LAFMax events were found to be generated by vehicle movements. No other noise source was found to potentially generate comparable LAFMax levels through the night.

5.1.2 Noise Control

Noise Sources : It is not possible to control the traffic noise as source

Building Orientation : The building is fixed in orientation

Building Layout : Good acoustic design may be achieved by careful consideration of the internal room layout. It is generally considered practical to have bedroom windows positioned along quieter facades to minimise noise ingress during summer months when it is desirable to have windows open through the night. Dual use rooms may sometimes allow adequate ventilation to be attained through the opening of windows on the quieter side of the building. However, this generally demands open plan living and is not generally feasible for residences with 2 or more bedrooms.

5.1.3 EXISTING COMMERCIAL SOURCES

Adjacent to the site is a pub – The Font. The operating hours are:
Monday, Wednesday, Sunday – 12:00 – 23:00
Tuesday – 12:00 – 03:00
Thursday, Friday – 12:00 – 01:00
Saturday – 12:00 – 02:00

Measurements were taken 1m outside a window adjacent to The Font during a weekend period to record worst case scenario.
To the rear of the site is two condenser units and kitchen extraction system belonging to 5 Union Street – Casa Don Carlos.
The operating hours are: Wednesday – Monday – 12:30 – 9pm
It was not possible to open the windows at the rear of the site and there was no access to the rear. To assess the potential noise disturbance from the plant, typical data was used for our calculations.

Figure 5.1.3 – Existing Commercial Sources

	The Font
	Proposed Site
	Measurement Position
	Casa Don Carlos Extraction Outlet

5.1.4 BS4142:2014+A1:2019 ASSESSMENT – 1m Outside Nearest proposed NSR

Character corrections should be added to the 'specific sound level' if it exhibits any tonality, impulsivity, other specific characteristics and/or intermittency at the assessment location. Based on our site visit and knowledge of such units, corrections to be applied are as follows: • Tonality – From our measurements the plant was not tonal.
• Intermittency – We do not consider plant to have distinguishable intermittency.
• Impulsivity – Plant such as this is not normally impulsive.
• Other Sound Characteristics – we have applied a +3dB correction for other sound.

BS4142:2014 Assessment	
Source Operating Period	Existing Commercial Plant 07:00 – 23:00
Reference Time Interval (Tr) Element	15 minutes Level (dB)
Specific Sound Level	44
Representative Background Noise Level (LA90)	33
Acoustic feature correction	3
Rating Level	47
Excess of Rating over Background Sound Level	+14

Detailed calculations can be found in Appendix C.

5.1.5 DISCUSSIONS AND CONTEXT

BS4142 states: "Where the initial estimate of the impact needs to be modified due to the context, take all pertinent factors into consideration, including the following:
The sensitivity of the receptor and whether dwellings or other premises used for residential purposes will already incorporate design measures that secure good internal and/or outdoor acoustic conditions, such as:

- Façade sound insulation treatment
- Ventilation and/or cooling that will reduce the need to have windows open so as to provide rapid or purge ventilation

- Acoustic screening." With regard to 'good acoustic conditions'

There is only one proposed bedroom with windows on the rear façade. We have reduced the internal noise levels to 10dB below the standard requirements in the habitable rooms at the rear façade to secure good internal acoustic conditions and acoustic treated mechanical ventilation will be required to reduce the need to open windows.

5.2. EXTERNAL BUILDING FABRIC SPECIFICATION

Sound reduction performance calculations have been undertaken in order to specify the minimum performance required from glazed and non-glazed elements in order to achieve the recommended internal noise levels shown in Table 2.5, taking into account average and maximum noise levels monitored during the environmental noise survey.

In accordance with the assessment guidance in Annex G of BS 8233:2014, the sound insulation performance of the building can be estimated by simple calculation from the free-field noise

564CALCULATION		A	B	(A-B) +5
Location	Period	Highest Free-Field Noise Levels LAeq,T dB	BS8233/WHO Internal Noise Guidance Criteria LAeq, T dB	Typical Insulation Specification dB Rw
MP1	**Day 07:00 – 23:00**	**48**	**35**	**18**
	Night 23:00 – 07:00	**41**	**30**	**16**
		60	**45**	**20**

Typical sized bedrooms with a high ratio of glazing to masonry have been used for all calculations in order to specify glazing.

As a more robust assessment, LAmax spectrum values of night-time peaks have also been considered and incorporated into the glazing calculation in order to cater for the interior limit of 45 dB LAmax for individual events, as recommended in WHO Guidelines.

5.2.1 NON-GLAZED ELEMENTS

The non-glazed external building fabric elements of the proposed development is 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 5.3.

All non-glazed elements of the building facades should provide a sound reduction performance of at least the figures shown in Table 5.2.1 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	45	45	54	58	60

Table 5.2.1 Non-glazed elements sound reduction performance.

5.3 SPECIFICATION OF GLAZED UNITS

When assessing the sound insulation performance of an external building fabric system, it is generally regarded that the glazing element is the weakest path for external noise intrusion into internal areas. It is assumed that the non-glazed areas of any façade systems may incorporate sufficient acoustic treatment such that the glazing remains the weakest path for external noise intrusion. As such, the acoustic performance of the glazing will be the most critical element in determining the overall sound insulation performance of the external façade.

Calculations indicate that the minimum sound insulation performance of the glazing is 20Rw. It is understood that D10 thin double glazed low emistivity cylinder glass- 3mm low E (non tinted / Anti Sun / 4mmCavity / 3mm clear glass is to be used to replace the existing which will achieve at least 29Rw.

Description	Weighted Sound Reduction Index, R_w
Any type of window in a facade when partially open	15
Single glazed windows (4mm glass)	29
Single glazed windows (6mm glass)	31
Double glazed units (4-16-4)	33
Double glazed units (4-16-6)	35
Double glazed units (6-16-6)	36
Double glazed units (4-16-6.4mm laminated glass)	39
Secondary glazed windows (4-100-4)	35 - 40
Secondary glazed windows (6-200-6)	40 - 45

Table 5.3 – Sound Insulation of typical windows.

6.0 CALCULATION RESULTS

For the daytime assessment for living areas, the desirable limit of BS8233:2014 suggests a guideline of 35 dB LAeq,16hr for resting conditions, and up to 40 dB is considered acceptable for necessary developments.
All results, with the proposed construction, would place the internal levels in kitchen/living areas as below 35 dB, therefore within the desirable category.
For the night-time assessment for bedrooms, BS8233:2014 suggests a desirable guideline of 30 dB LAeq, 8hr for sleeping conditions, with an acceptable limit of 35 dB LAeq, 8hr. Individual noise events (Measured with fast time-weighted Maximum) should not normally exceed 45 dB LAFmax (as in BS8233:1999).
The proposed construction would place the internal continuous levels in bedrooms as below 30 dB and the maximum noise events as typically below 45 dB LAFmax, therefore within the desirable category.

Monitoring Period	Calculated Internal Noise Levels	Noise Criteria
07:00 – 23:00	21 dB LAeq(16hr)	35 dB
23:00 – 07:00	15 dB LAeq(8hr)	30 dB

Table 6.0 –Internal Noise Levels LAeq

Monitoring Period	Noise Criteria LAMAX	No. times exceeded LAMAX
07:00 – 23:00	55dB	1
23:00 – 07:00	45dB	3

Table 6.1 – Noise Criteria LAMAX

7.0 VENTILATION

Guidance on ventilation and associated acoustic considerations is given in Acoustic Ventilation and Overheating – Residential Design Guide [AVO] issued jointly by the Association of Noise Consultants and the Institute of Acoustics. In this guide, the need for ventilation (as falls under the requirements of Approved Document F [ADF] are covered in three main requirements as follows:

- Whole Dwelling Ventilation - General ventilation – continuous ventilation of rooms or spaces at a relatively low rate

- Extract Ventilation - Removal of air from a space or spaces (typically stale air from bathrooms or kitchens) to outside

- Purge Ventilation - Manually controlled removal of air at a high rate to eliminate fumes and odours, e.g. during painting and decorating or from burnt food. May be provided by natural or mechanical means.

Four main template systems for providing each of the above ADF ventilation requirements are summarised in the AVO guide as shown in Table 7.0.

Ventilation System	Method Of Whole Dwelling Ventilation	Method of Extract Ventilation	Method of purge Ventilation
System 1 (Background Ventilators and intermittent extract Fans	Background ventilators (Trickle Vents)	Intermittent extract fans	Typically provided by opening windows
System 2 (Passive Stack)	Background ventilators (Trickle Vents) & Passive Stack	Continuous via passive stack	Typically provided by opening windows
System 3 (Contunuous Mechanical Extract (MEV)	Continuous mechanical extract (low rate), trickle vents provide fresh air	Continuous mechanical extract (high rate), trickle vents provide fresh air	Typically provided by opening windows
System 4 (Continuously mechanical supply and extract with heat recovery (MVHR)	Continuous mechanical supply and extract (low rate)	Continuous mechanical supply and extract (high rate)	Typically provided by opening windows

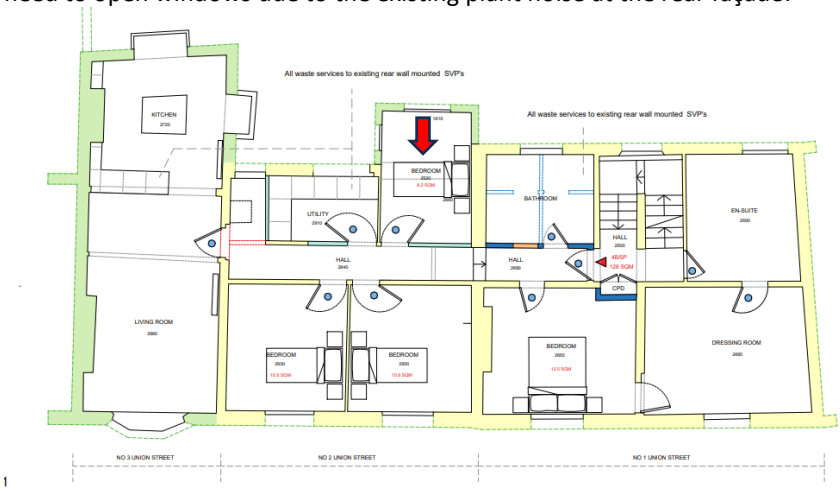
Table 7.0 – Summary of ADF Ventilation Requirements

The Below Table outlines the appropriate ventilation strategies for this development.

Ventilation Strategy (according to ADF)	
System 1: Intermittent Extract Fans System 2: Passive Stack Ventilation	✓
System 3: Continuous Mechanical Extract (MEV)	✓
System 4: Continuous Mechanical Supply & Extract (MVHR)	✓

Table 7.0.1 – Ventilation Options

It is advised that the bedroom highlighted below installs acoustic treated ventilation to negate the need to open windows due to the existing plant noise at the rear façade.



We therefore recommend the following options:

- Acoustically screened wall mounted mechanical (ie. Powered) acoustic ventilators such as Titon Sonair F+ or Silavent Energex SHHRV units
- Any other similar performing acoustic ventilators or ventilation system.

8.0 RESIDENTIAL SOUND INSULATION REVIEW

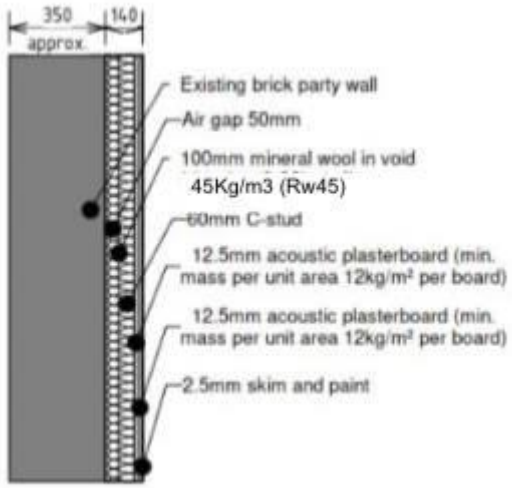
The ceiling and wall structure may be subject to pre-completion testing in accordance with requirements of The Building Regulations 2010 Approved Document E (2003 Edition & amendments). It should be expected that the proposed dwelling will exceed the minimum performance standards of the Regulations, as stipulated between dwellings in terms of dB DnT,w +Ctr.

The following Table 8.0 confirms the minimum sound insulation requirements of Part E.

Base Levels	Airborne sound Insulation DnTw + Ctr, dB (Minimum values)	Impact sound Insulation L'nTw dB (Maximum values)
Purpose built dwelling-house and flats		
Walls Floors and stairs	45 45	- 62
Dwelling-houses and flats Formed by material change of use		
Walls Floors and stairs	43 43	- 64

Table 8.0 - Sound insulation requirements of Part E.

8.1 PARTY WALLS TO ADJACENT BUILDING



Existing Party Wall Acoustically Upgraded

Expected n-Situ Sound Insulation Performance: DnT,W + Ctr 48-55dB

8.2 SEPARATING CELING CONSTRUCTION BETWEEN RESIDENTIAL PROPERTIES

The following construction specification is provided:

- Minimum 200mm Joists with 100mm Mineral Wool Insulation (density ≥45Kg/m3)
- 16mm Resilient Bars
- 2 x 15mm Fireline or Sound Bloc Plasterboard.

Projected Airborne Sound Performance:
50 DnTw + Ctr dB.

8.3 SEPARATING FLOOR CONSTRUCTION BETWEEN COMMERCIAL & RESIDENTIAL PROPERTY

The following construction specification is provided:

- 100mm rockwall (density ≥45Kg/m3) between timber joists, capped with 2 x of 15mm Fireline or Sound Bloc Plasterboard.
- 22mm T & G chipboard
- 5mm Regapol

Projected Airborne Sound Performance:
52 DnTw + Ctr dB.

8.4 DOOR REQUIREMENTS

Where a degree of sound insulation is deemed necessary, doors with rated acoustic performance would be required. Recommendations with regards to the necessary sound insulation performance of the door units to be installed are shown in Table 5.1.

Rw (dB)	Typical Door Construction
Entrance Doors	Solid Core timber door with drop seals and gaskets, or high quality acoustic perimeter and threshold seals
Internal Doors	Solid core timber door, no seals around the perimeter Solid core timber door, foam tape seals around the perimeter

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Table 8.4 – Acoustic Specification of Door Systems

Some general points that should be followed regarding the acoustic performance of doors are as follows.

- Non-hardening caulk should be used to seal joints airtight
- If hollow metal frames are used, they should be fibre- or grout-filled
- Doors should be gasketed around the entire perimeter to be airtight when closed
- Seals should be adjustable to compensate for wear, thermal movement, settlement

of building structure and other factors that cause misalignment of the doors

- Good quality hydraulic closers should be fitted on all doors likely to be subjected to heavy use

8.5 LIGHTWEIGHT WALL DETAILING

Socket backs in lightweight partitions should be boxed in using two layers of plasterboard of the same mass as the partition wall and should be staggered by at least 300mm. Party walls should 'break' any lightweight flanking constructions to ensure acoustic discontinuity between the leaves of the partition.

8.6 DOWNLIGHTERS

Downlighters should be installed in accordance with the manufacturer's guidelines at a density of no more than 1 light per 2m2 of ceiling and at centres not less than 0.75m. Openings should be no larger than 100mm diameter, or 10mm x 100mm.

8.7 WALL JUNCTIONS

Where party walls meet other constructions, the party wall construction must 'break' the flanking construction, such as the plasterboard lining of external walls. Blockwork for internal leaves of external and flanking walls should have a minimum density of 1850kg/m3 . With these proposed works implemented the flanking construction is expected to achieve the uprated performance requirements. Cavity stops should be used at all junctions between walls and floors in the external cavity

9.0 SUMMARY AND CONCLUSIONS

A baseline noise survey has been undertaken by DAA Group to establish the prevailing noise climate in the locality of 1-3 Union Street, Brighton, BN1 1HA in support of a planning application for the Change of use of first floor from office (E) to residential to create 1no flat (C3).

The measured levels have been assessed against currently available standards and guidance documents including The National Planning Policy Framework 2021 (NPPF), National Planning Practice Guidance (NPPG) and Local Authority requirements.

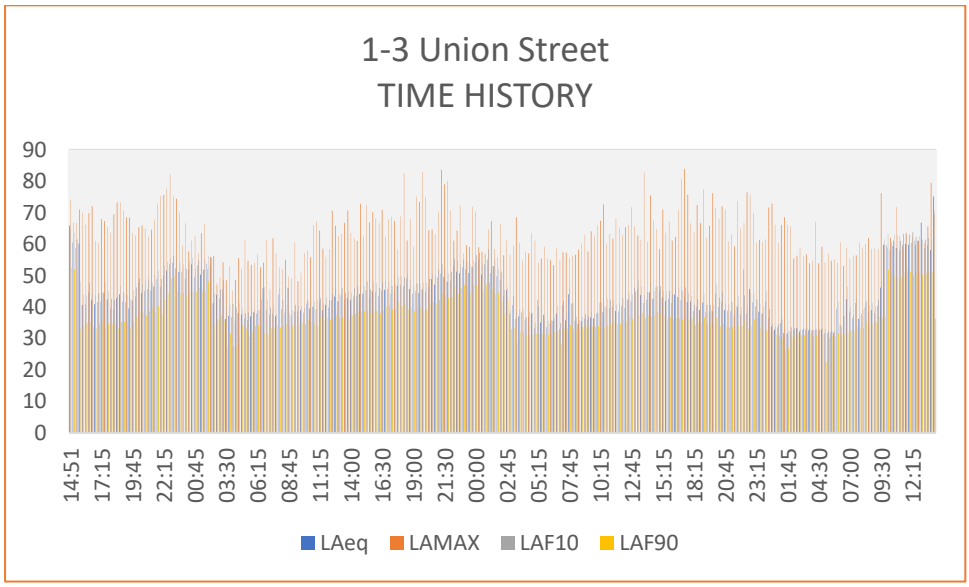
Using results of the noise survey, the sound insulation performance for the whole building envelope including glazing (windows) is assessed, and a scheme of noise mitigation measures is established and included in the report verified by BS8233:2014 rigorous method building envelope sound insulation calculations.

A scheme of noise mitigation measures in the report provides specification details as appropriate for sound insulation upgrade treatment to the separating walls and separating floors.

A BS4142:2014+A1:2019 Assessment has been carried to assess the noise from the nearby existing commercial plant. Noise ingress has been mitigated to at least 10dB lower than the recommended guidelines and mechanical ventilation is proposed for the bedroom on the rear façade.

It is concluded that, the impact of noise from commercial premises will not prejudice the amenities of any future occupants provided the above points are taken into consideration

APPENDIX A – MEASUREMENTS



APPENDIX B - ACOUSTIC TERMINOLOGY

B.1 WEIGHTED DECIBEL, dB(A)

The unit generally used for measuring environmental, traffic or industrial noise is the A-weighted sound pressure level in decibels, denoted dB(A). The weighting is based on the frequency response of the human ear and has been found to correlate well with human subjective reactions to various sounds. An increase or decrease of approximately 10 dB corresponds to a subjective doubling or halving of the loudness of a noise, and a change of 2 to 3 dB is subjectively barely perceptible.

B.2 EQUIVALENT CONTINUOUS SOUND LEVEL, LAeq

Another index for assessment for overall noise exposure is the equivalent continuous sound level, L_{Aeq}. This is a notional steady level which would, over a given period, deliver the same sound energy as the actual time-varying sound over the same period.

B.3 MAXIMUM NOISE LEVEL, LAmax

The maximum noise level identified during a measurement period. Experimental data has shown that the human ear does not generally register the full loudness of transient sound events of less than 125 ms in duration.

B.4 NOISE RATING, NR

Noise ratings are used as a single figure criterion for specifying services noise in buildings. Each noise rating value has an associated spectrum of defined values in each third or octave frequency band. To determine the noise rating of a room the measured spectrum is compared to a set of noise rating curves. The highest NR curve that crosses any single frequency band of the measurement determines the noise rating for the room. The single figure noise rating is read at the 1 kHz band.

B.5 SOUND LEVEL DIFFERENCE (D)

The sound insulation required between two spaces may be determined by the sound level difference needed between them. A single figure descriptor which characterises a range of frequencies, the weighted sound level difference, D, is sometimes used (BS EN ISO 717-1). This parameter is not adjusted to reference conditions.

The standardized level difference, Dn, T is a measure of the difference in sound level between two rooms, in each frequency band, where the reverberation time in the receiving room has been normalised to 0.5 s. This parameter measures all transmission paths, including flanking paths.

The weighted standardized level difference, DnTw, is a measure of the difference in sound level between two rooms, which characterises a range of frequencies and is normalised to a reference reverberation time

B.6 SOUND REDUCTION INDEX (R)

The sound reduction index (or transmission loss) of a building element is a measure of the loss of sound through the material, i.e. its attenuation properties. It is a property of the component, unlike the sound level difference which is affected by the common area between the rooms and the acoustic of the receiving room. The weighted sound reduction index, Rw, is a single figure description of sound reduction index characterising a range of frequencies, which is defined in BS EN ISO 717-1: 1997. The Rw is calculated from measurements in an acoustic laboratory

B.7 STATISTICAL NOISE LEVELS (L_{A90}, (T) L_{A1}, (T) L_{A10}, (T) etc.)

For levels of noise that vary widely with time, for example road traffic noise, it is necessary to employ an index which allows for this variation. The L_{A10} is the level exceeded for ten per cent of the time under consideration, has historically been
adopted in the UK for the assessment of road traffic noise. The LA90 is the level exceeded for ninety per cent of the time, has been adopted to represent the background noise level. The L_{A1} the level exceeded for one per cent of the time, is representative of the maximum levels recorded during the sample period. A weighted statistical noise levels are denoted LA10, dB LA90, dB. etc. The reference time (T) is normally included, e.g. LA10, (5min), & LA90, (8hr).

B.8 TYPICAL NOISE LEVELS

Typical noise levels are given in the following table.

Noise Level dB(A)	Example
130	Threshold of pain
120	Jet aircraft take-offs at 100 m
110	Chain saw at 1 m
100	Inside disco
90	Heavy lorries at 5 m
80	Kerbside of busy street
70	Loud radio (in typical domestic room)
60	Office or restaurant
50	Domestic fan heaters at 1m
40	Living room
30	Ventilation Noise in Theatre
20	Remote countryside on still night
10	Sound insulated test chamber
0	Threshold of hearing.

APPENDIX C – CALCULATIONS

NOISE EMISSION CALCULATION														
ITEM	**PARAMETER**			**HZ**		**63**	**125**	**250**	**500**	**1K**	**2K**	**4K**	**8K**	**dBA**
1	**Schedule of Plant**	Qty												
2														
3	Typical Existing Plant Noise	1	Spl	dB	+	44	45	42	59	59	56	52	46	56
4														
5														
6	Revised Spl:	1	Spl	dB	+	44	45	42	59	59	56	52	46	56
7														
8														
9														
10														
11	Distance to nearest receptor Metres:	4		dB	-	-12	-12	-12	-12	-12	-12	-12	-12	-12
12	SPL=L1-20log$_{10}$(r2/r1)	1												
13														
14														
15														
16	Spl at receptor			dB	+	32	33	30	47	47	44	40	34	44
17														
18														
19	Acoustic correction	0		dB	+	3	3	3	3	3	3	3	3	3
20	Intermittant noise correction	0		dB	+	0	0	0	0	0	0	0	0	0
21														
22														
23	Specific noise level at receptor			dB	+	47	48	45	62	62	59	55	49	47
24	(1m outside noise sensitive window)													
25	**Lowest Background Noise Levels:(L_{A90})**													
26	**Day time (07:00 - 23:00)**													**33**
27	**Difference:** (Assessment level)			dB	-									**14**
28	E&OE													

BS4142 Calculations

BS8233 Break In Calculations

Calculation Sheet

MP1 - 07:00 - 23:00 to LR

		Octave Band Centre Frequency (Hz)								
		63	125	250	500	1k	2k	4k	8k	
Noise Source										
Noise Source - MP1 - 07:00 - 23:00										
Noise Levels		**43.0**	**51.0**	**49.0**	**46.0**	**42.0**	**38.0**	**33.0**	**28.0**	**47.8 dBA**
Composite SRI										
Facade Width (m)	3.0									
Facade Height (m)	3.0									
Main Element - External Wall										
SRI		-	41	43	48	50	55	55	-	Rw 51
Window Width (m)	0.7									
Window Height (m)	1.2									
No. of Windows (no)	2.0									
Glazed Element - 29Rw										
SRI		-	14	19	24	31	41	21	-	Rw 29
No. of Vents (no)	2.0									
Vent - Standard Vents										
Dne		36	36	38	36	32	37	39	48	Dnew 36
		-	*-20.9*	*-25.6*	*-28.8*	*-28.1*	*-33.4*	*-27.5*	-	
10 log (S/A)										
Internal Receiver - LR										
		-	*-2.3*	*-2.3*	*-2.3*	*-2.3*	*-2.3*	*-2.3*	-	
+3										
		-	*3.0*	*3.0*	*3.0*	*3.0*	*3.0*	*3.0*	-	
Internal Receiver Noise										
Internal Receiver Noise - LR										
Reverberant Field, LPrev		**-**	**30.7**	**24.0**	**17.8**	**14.6**	**5.3**	**6.1**	**-**	**21.2 dBA**

Calculation Sheet

MP1 23:00 - 07:00 to BR

		Octave Band Centre Frequency (Hz)								
		63	125	250	500	1k	2k	4k	8k	
Noise Source										
Noise Source - MP1 23:00 - 07:00										
Noise Levels		**36.0**	**35.0**	**43.0**	**39.0**	**35.0**	**31.0**	**26.0**	**21.0**	**40.8 dBA**
Composite SRI										
Facade Width (m)	3.0									
Facade Height (m)	3.0									
Main Element - External Wall										
SRI		-	41	43	48	50	55	55	-	Rw 51
Window Width (m)	0.7									
Window Height (m)	1.2									
No. of Windows (no)	2.0									
Glazed Element - 29Rw										
SRI		-	14	19	24	31	41	21	-	Rw 29
No. of Vents (no)	2.0									
Vent - Standard Vents										
Dne		36	36	38	36	32	37	39	48	Dnew 36
		-	*-20.9*	*-25.6*	*-28.8*	*-28.1*	*-33.4*	*-27.5*	-	
10 log (S/A)										
Internal Receiver - BR										
		-	*-1.1*	*-1.1*	*-1.1*	*-1.1*	*-1.1*	*-1.1*	-	
+3										
		-	*3.0*	*3.0*	*3.0*	*3.0*	*3.0*	*3.0*	-	
Internal Receiver Noise										
Internal Receiver Noise - BR										
Reverberant Field, LPrev		**-**	**16.0**	**19.3**	**12.1**	**8.8**	**-0.5**	**0.4**	**-**	**14.9 dBA**

Calculation Sheet

MP1 LAMAX to BR

		Octave Band Centre Frequency (Hz)								
		63	125	250	500	1k	2k	4k	8k	
Noise Source										
Noise Source - MP1 LAMAX										
Noise Levels		**56.0**	**63.0**	**61.0**	**58.0**	**54.0**	**50.0**	**45.0**	**40.0**	**59.8 dBA**
Composite SRI										
Facade Width (m)	3.0									
Facade Height (m)	3.0									
Main Element - External Wall										
SRI		-	41	43	48	50	55	55	-	Rw 51
Window Width (m)	0.7									
Window Height (m)	1.2									
No. of Windows (no)	2.0									
Glazed Element - 29Rw										
SRI		-	14	19	24	31	41	21	-	Rw 29
No. of Vents (no)	2.0									
Vent - Standard Vents										
Dne		36	36	38	36	32	37	39	48	Dnew 36
		-	*-20.9*	*-25.6*	*-28.8*	*-28.1*	*-33.4*	*-27.5*	-	
10 log (S/A)										
Internal Receiver - BR										
		-	*-1.1*	*-1.1*	*-1.1*	*-1.1*	*-1.1*	*-1.1*	-	
+3										
		-	*3.0*	*3.0*	*3.0*	*3.0*	*3.0*	*3.0*	-	
Internal Receiver Noise										
Internal Receiver Noise - BR										
Reverberant Field, LPrev		**-**	**44.0**	**37.3**	**31.1**	**27.8**	**18.5**	**19.4**	**-**	**34.4 dBA**