



Regal Buildings, 2 Market Street, Eastleigh, SO50 5RL

13th March 2024

ISSUE 01





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This report has been compiled by Deane Austin Ltd (DAA) with all reasonable skill, care and diligence in accordance with generally accepted acoustic consultancy principles. Information contained in this document contains confidential and commercially sensitive information and shall not be disclosed to third parties.				



1.0 INTRODUCTION

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DAA Group has been appointed to carry out a Noise Impact Assessment at Regal Buildings, 2 Market Street, Eastleigh, SO50 5RL to support a Planning Application for the Conversion of former nightclub to form 4no. commercial units at ground floor and 11no. one-bedroom, 5no. two-bedroom and 2no. three-bedroom residential flats above with associated external works in accordance with:

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

The purpose of the survey is to satisfy the following condition:

“5 No works to the exterior of the building shall start until a Noise and Odour Assessment as been submitted to and approved in writing by the Local Planning Authority. This assessment shall include details of measures to protect future residential occupiers from noise and odour disturbance resulting from neighbouring uses, together with potential retail/commercial uses within the building itself. No residential units shall be occupied until these agreed measures have been installed/implemented in full and shall be maintained throughout the lifetime of the development”.

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 treatment to the separating walls and separating floors.

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 to 23:00	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 $L_{Amax,F}$ which should not be exceeded on a regular basis.

3.0 SITE SURVEYS

3.1 SITE DESCRIPTION

The application site is bounded by Market Street and Mitchell Road. 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)

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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 11/03/2024 to 12/03/2024. 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 outside the first floor windows on the front and rear facades. The monitoring location is shown in Figure 3.2.

MP2

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MP1

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	

Instrument manufacturer	Cirrus Research Plc
Model	IEC 61672-3:2013
Serial Number	G302987 – G303498
Microphone Type	MK:224
Serial Number	214457A
Cirrus CK: 675 Outdoor Kit	
Type 1 Acoustic Calibrator	

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.

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Weather Conditions – Southampton Weather station				
Time Period	Air Temp (°C)	Rainfall mm/h	Prevailing Wind Direction	Wind Speed (m/s)
11/03/2024 – 12:00 – 23:59	4 - 10	0.0	SW	0 - 7
12/03/2024 – 00:00 – 23:59	9- 14	0.1	SSW	0 - 10

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 L_{AMAX}(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 L_{AMAX}(f) reported below. These have been summarised in table 4.1 and 4.2 below.

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Measurement Data		Free Field Sound Pressure Level dB	
		MP1	
Time	L _{Aeq,T}	L _{AMAX} (f)	L ₉₀
07:00 – 23:00	59dB L _{Aeq,5}	76dB L _{AMAX,5}	47dB, L _{90,5}
23:00 – 07:00	49dB L _{Aeq,5}	66dB L _{AMAX,5}	39dB, L _{90,5}

Measurement Data		Free Field Sound Pressure Level dB	
		MP2	
Time	L _{Aeq,T}	L _{AMAX} (f)	L ₉₀
07:00 – 23:00	58dB L _{Aeq,5}	75dB L _{AMAX,5}	44dB, L _{90,5}
23:00 – 07:00	50dB L _{Aeq,5}	67dB L _{AMAX,5}	39dB, L _{90,5}

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	59	62	58	57	56	43	38	33	59
	8h	Night	49	51	49	48	45	36	27	22	49
		L _{AMax}	66	69	67	66	60	54	45	40	66

Location	T	Time	Free-Field Sound Pressure Level Leq, T dB re.20μPa								
			63Hz	125Hz	250Hz	500Hz	1kHz	2kHz	4kHz	8KHz	A
MP2	16h	Day	58	61	59	56	54	46	37	32	58
	8h	Night	50	52	50	48	47	37	28	23	50
		LAMax	73	71	65	66	62	57	49	49	67

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

4.2 EXISTING COMMERCIAL SOURCES

Where a new noise-sensitive receptor is introduced and there is extant industrial and/or commercial sound, it ought to be recognized that the industrial and/or commercial sound forms a component of the acoustic environment. In such circumstances other guidance and criteria in addition to or alternative to BS4142:2014 can also inform the appropriateness of both introducing a new noise-sensitive receptor and the extent of required noise mitigation.” The observed commercial noise sources affecting each defined assessment areas are as follows:

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To the north of the site is 4 condenser units belonging to nearby commercial units and a kitchen extraction system located approximately 15 metres away. It is understood all the plant operates during day-time only. See Figure 4.2 below.



Figure 4.2 – North elevation

	Condenser Units
	Proposed Site
	Kitchen Extraction System

For existing plant, the methods described in BS4142:2014 result in the following formula:

$$L_b = 1 - \log [10^{(L_m/10)} - 10^{(L_f/10)}]$$

where

L_b = background noise level when plant is removed

L_m = background noise measured with plant running

L_f = Specific noise of the fan

It was not possible to carry out this method due to having no control of the units and access. We have therefore used typical noise levels of the various noise sources for our calculations

6.0 BS4142:2014+A1:2019 ASSESSMENT – 1m Outside Nearest residential Window

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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.

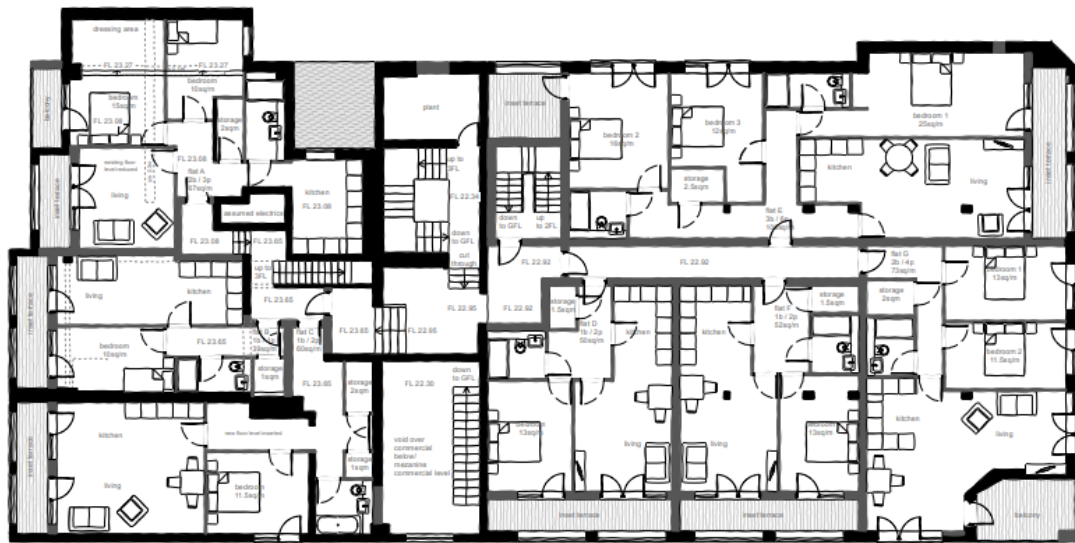
BS4142:2014 Assessment	
Source Operating Period	Existing Commercial Plant – North Elevation 07:00 – 23:00
Reference Time Interval (Tr)	15 minutes
Element	Level (dB)
Specific Sound Level	41
Representative Background Noise Level (LA90)	44
Acoustic feature correction	3
Rating Level	44
Excess of Rating over Background Sound Level	0

To the south of the site is Oishii Ramen and Bubble Tea at 46 Market Street. The opening hours are between 10:00 and 22:00.

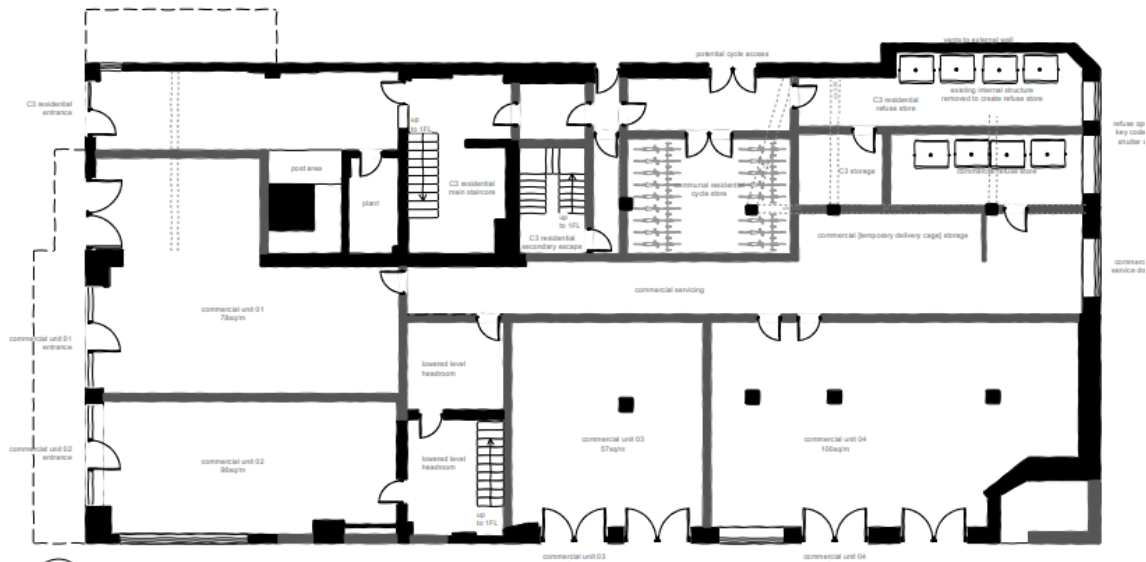
The kitchen extraction system has been designed to have a Rating level of 35dB @ 12 meters away according to the noise report accompanying their planning application. The nearest proposed window to Oishi will be approximately 8 meters away. This would therefore have a rating level of 39dB. This is 8dB below the background noise level.

5.0 PROPOSED LAYOUT DESIGN

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02 proposed first floor plan
Scale: 1:200



01 proposed ground floor plan
Scale: 1:200

Figure 5.0 - Proposed Ground and first Floor Layout



02 proposed third floor plan
Scale: 1:200



01 proposed second floor plan
Scale: 1:200

Figure 5.0.2 - Proposed Second and Third 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 exceed the World Health Organisation requirements for external noise as described by Community Noise Guidelines (1999) in Section 2.5 of this report.

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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.

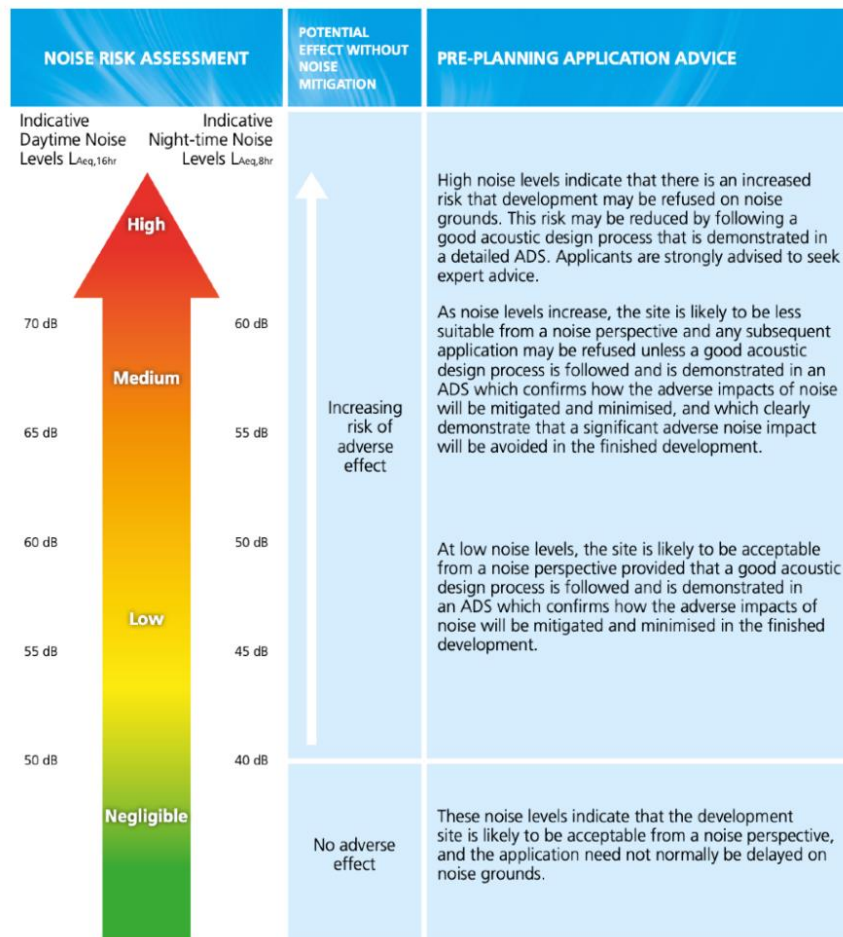


Figure 5.1 - ProPG Noise risk assessment guide

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.

MP1	Daytime LAeq, 16hr 07:00 – 23:00	Night-time LAeq, 8hr 23:00 – 07:00	Noise Exposure Category
Noise Level	59dB	49dB	B
ProPG Noise Risk	LOW	LOW	
MP2	Daytime LAeq, 16hr 07:00 – 23:00	Night-time LAeq, 8hr 23:00 – 07:00	Noise Exposure Category
Noise Level	58dB	50dB	B
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 L_{Amax,F}) have been properly identified and assessed”. On attendance, the greatest L_{Amax} events were found to be generated by vehicle movements. No other noise source was found to potentially generate comparable L_{Amax} 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.

5.2. FAÇADE SOUND INSULATION

The following section analyses the ambient sound levels incident on the development compared with the internal noise level criteria presented within BS8233:2014. Octave band levels have been compared to the appropriate Noise rating Curve (NR curve).

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The following table outlines the minimum octave band sound reduction required of the building envelope in order to achieve appropriate internal noise levels.

Measurement Period ('t')	Octave Band Levels							LAeq
	63	125	250	500	1000	2000	4000	
Noise Incident	59	62	58	54	48	43	38	59
NR30 Curve (dB)	59	48	40	34	30	27	25	35
Min Sound Reduction (Rw)	-	14	18	20	18	36	13	
Noise Incident	49	51	49	46	44	36	27	49
NR25 Curve (dB)	55	44	35	29	25	22	20	30
Min Sound Reduction (Rw)	-	7	14	17	19	14	7	

Table 5.2 - Octave band Internal Noise Level Analysis – MP1

Measurement Period ('t')	Octave Band Levels							LAeq
	63	125	250	500	1000	2000	4000	
Noise Incident	58	61	59	56	54	46	37	58
NR30 Curve (dB)	59	48	40	34	30	27	25	35
Min Sound Reduction (Rw)	-	13	19	22	24	19	12	
Noise Incident	50	52	50	47	45	37	28	50
NR25 Curve (dB)	55	44	35	29	25	22	20	30
Min Sound Reduction (Rw)	-	8	15	18	20	15	8	

Table 5.2 - Octave band Internal Noise Level Analysis – MP

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.

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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.

The minimum sound reduction index (SRI) value required for the glazed elements to be installed is shown in Table 5.3 and 5.3.1.

3mm / 14mm cavity / 4mm							
Frequency, Hz/dB					Rw	Rw + C	Rw +Ctr
125	250	500	1K	2K	32	-1	-5
19	21	27	37	43			

Table 5.3 – Required Glazing Performance – Guardian Glass.

The sound reduction performance stated above must be achieved by the glazing system as a whole in its installed condition. The specification therefore applies to both the glazing element and all seals on any openable part of the system. It should be confirmed with any supplier that the full glazing system supplied complies with the requirements stated in Table 5.3 and 5.3.1. Data has been used from Guardian Glass. (See Appendix C).

5.4 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 MP1	Calculated Internal Noise Levels	Noise Criteria
07:00 – 23:00	34dB LAeq(16hr)	35 dB
23:00 – 07:00	23 dB LAeq(8hr)	30 dB
Monitoring Period MP2	Calculated Internal Noise Levels	Noise Criteria
07:00 – 23:00	34 dB LAeq(16hr)	35 dB
23:00 – 07:00	24 dB LAeq(8hr)	30 dB

Table 5.4 –Internal Noise Levels LAeq

Monitoring Period MP1	Noise Criteria LAMAX	No. times exceeded LAMAX
07:00 – 23:00	55dB	5
23:00 – 07:00	45dB	5
Monitoring Period MP2	Noise Criteria LAMAX	No. times exceeded LAMAX
07:00 – 23:00	55dB	6
23:00 – 07:00	45dB	4

Table 5.4.1 – Noise Criteria LAMAX

6.0 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 9.0.

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 (Continuous 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 6.0 – Summary of ADF Ventilation Requirements

Where possible, natural forms of ventilation are typically preferred. However, in high noise areas, it may be necessary to recommend System 4, in order to minimise penetrations through the external building façade, which weaken the overall sound reduction performance.

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 6.0.1 – Ventilation Options

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
- A fully ducted passive or mechanical ventilation system with appropriate sound attenuation measures incorporated in the design
- Titon – HRV 2 Q Plus (MVHR) – This system is a ‘whole house’ continuous ventilation system
- Silavent HRX MVHR ‘whole house’ heat recovery unit
- Any other similar performing acoustic ventilators or ventilation system.

Any ventilation system must be designed such that the noise generated by the system itself is controlled, such that when noise from the system is combined with noise from external sources, internal noise levels do not exceed the maximum noise levels suggested in BS 8233. To ensure that noise from services does not increase internal noise levels, the following guideline internal noise criteria should be utilised:

- Bedrooms NR20
- Living Rooms NR25
- Bathrooms/kitchens NR30-35
- Corridors NR30-35

It should be noted that windows to properties should not be sealed, as this can create an overly oppressive living environment.

Furthermore, it is recommended that windows are openable for times when additional purge ventilation is required, for example the purging of fumes from burnt food when cooking or removal of fumes when painting.

To stairwells, no specific acoustic measures would be necessary and standard trickle vents would be appropriate.

7.0 PROPOSED PLANT FOR GROUND FLOOR COMMERCIAL UNIT

It is understood that commercial unit 4 on the ground floor will be a restaurant and units 1-3 will be retail. Unit 4 includes the installation of a kitchen extraction system.

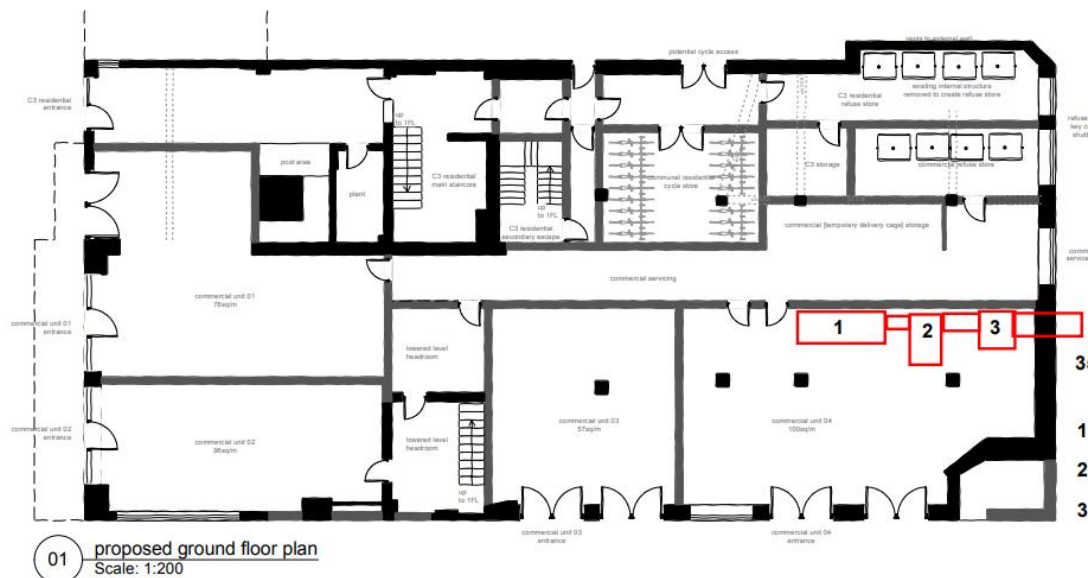


Figure 7.0 – Kitchen Extraction system – Unit 4

It is understood that the proposed plant is comprised of the following units:

It is understood that the proposed outdoor plant is comprised of the following units:

- 1 x Helios GigaBox centrifugal fan – GBW 500/4

The flue outlet location is shown below in figure 7.2

Proposed Plant	LWA (dB(A))
GBW 500/4	83

Table 7.1 – Manufacturer supplied Sound power level

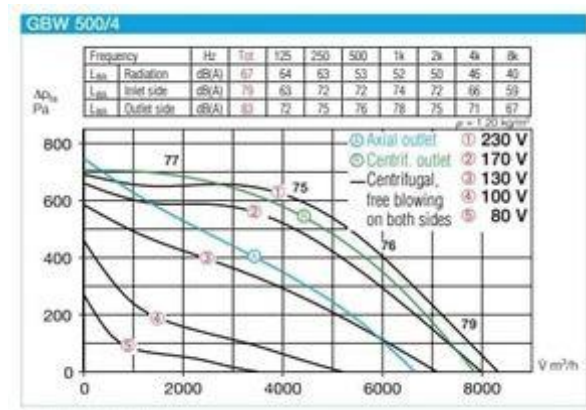


Figure 7.1.1 – Proposed Plant Data

7.2 CLOSEST NOISE SENSITIVE RECEIVER

The closest noise sensitive receiver to the installation location of the plant has been identified as being a residential window located approximately 1.2 metres away from the location of the extraction outlet as shown in Figure 7.2

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Figure 7.2 – Proposed Flue Location

	Proposed Location kitchen extraction Outlet
	Nearest Residential Noise Sensitive Window

7.3 NOISE EMISSION CRITERION

It is understood that the proposed operating hours are between 07.00 and 23:00.

It is determined that the proposed kitchen extraction system is not considered to contain tones. In addition, the proposed operation of the equipment is also unlikely to be sufficiently intermittent to attract attention at the nearest noise sensitive property.

The criteria for plant sound, to be achieved at a point 1m from the closest noise sensitive window, has been set as shown in Table 5.3 in order to comply with the Local Authority requirements.

Time Period	Noise Criterion at Nearest Residential Receiver
07.00 – 23.00	34

Table 7.3 - Proposed noise emissions criterion

7.4 BS4142 ASSESSMENT – MECHANICAL PLANT – 1m outside Nearest residential Window

BS4142:2014 Assessment	
Source	Kitchen Extract Fan
Operating Period	07.00 – 23:00
Reference Time Interval (Tr)	15 minutes
Element	Level (dB)
Specific Sound Level	28
Representative Background Noise Level (LA90)	44
Acoustic feature correction	3
Rating Level	31
Excess of Rating over Background Sound Level	-13

Detailed calculations are shown in Appendix D

7.5 MITIGATION MEASURES – KITCHEN EXTRACTION

7.5.1 – Noise Emissions

In order to achieve the specific sound level and subsequent rating level shown in the assessment above, the following mitigation measures are required.

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There are three main noise transmission paths to be considered from the fan to the receptor.

- I. Discharge duct opening.
- II. Fan casing & flexible connection noise break-out.
- III. Duct break-out noise on the fan inlet ducting.

To reduce duct breakout noise on the Helios Fan an attenuator is required to be fitted on the discharge side of the fan, similar to an Acoustica R02-5-1800 with the below insertion losses:

INSERTION LOSS (dB) – CENTRE BAND FREQUENCY								
Hz	63	125	250	500	1K	2K	4K	8K
R02-5-1800	8	13	25	44	50	50	37	24

The attenuator's acoustic media shall have to be lined with 'Melinex' to enable the kitchen extract system to be regularly steam cleaned.

The fan will be located internally.

7.5.2 – Vibration

In addition to the control of airborne noise transfer, it is important to consider the transfer of noise as vibration to adjacent properties as well as any sensitive areas of the same building. The duct should be isolated from the structure of the building using anti-vibration. The isolators shall incorporate rubber or neoprene high-frequency isolation pads. The fan should be installed with flexible connections to adjacent structures. Antivibration mounts are widely available from suppliers/installers often in pedestal rubber mountings.

Examples of these are MPO and MP1, and ISL Maxi pedestal vibration mounts. These types of anti-vibration and shock isolators are industry standard and commonplace for mechanical plant installations. They are designed to provide medium to high frequency isolation from vibration and noise via high resilience rubber.

8.0 RESIDENTIAL SOUND INSULATION REVIEW

The required sound insulation performance to meet the Part E of the Building Regulations are shown below:

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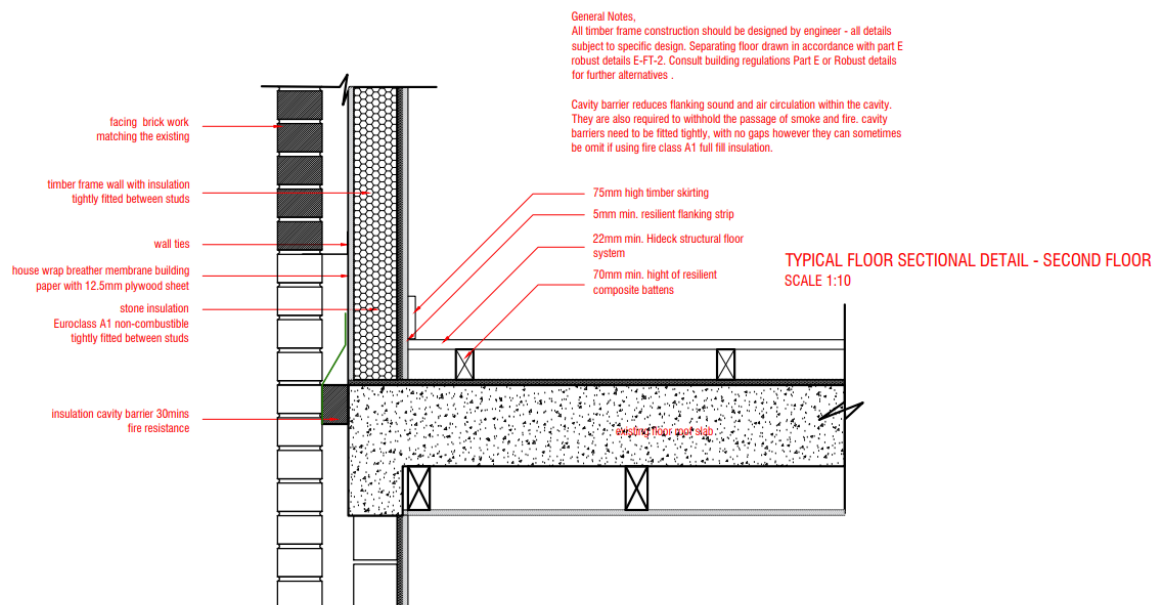
Test Type	Test Element	Condition 9 Requirement
Airborne Sound Insulation	Walls and Floors	$D_{nT,w} + C_{tr} \geq 45 \text{ dB}$
Impact Sound Insulation	Floors	$L'_{nT,w} \leq 62 \text{ dB}$

Table 8.0 – Design values for airborne and impact sound insulation

NB Higher values of $D_{nT,w} + C_{tr}$ represent better airborne sound insulation.
Lower values of $L'_{nT,w}$ represent better impact sound insulation

8.1 PARTY FLOOR/ CEILING SECOND FLOOR

The following construction is proposed:



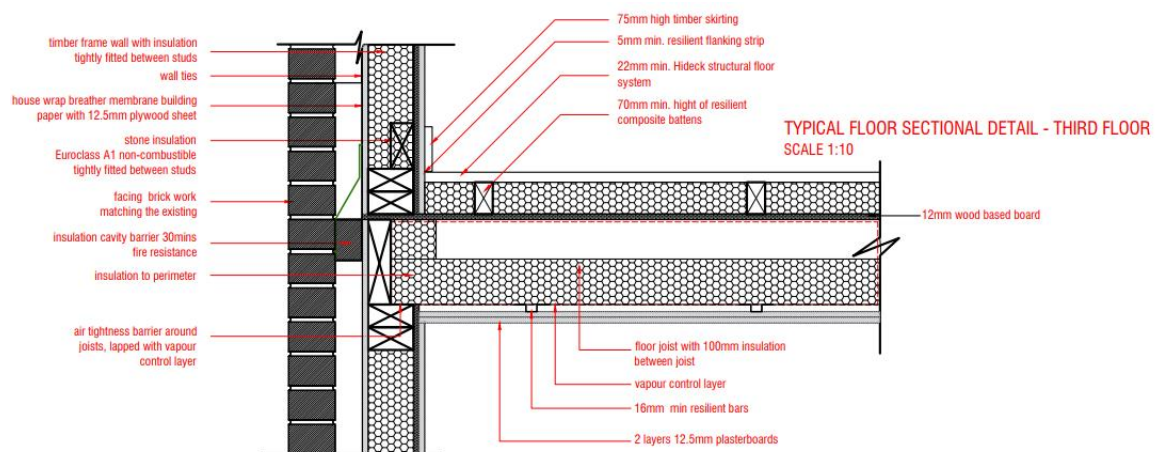
The acoustic modelling indicates that the expected performance of the proposed structure with enhancements will be as follows:

Projected Airborne Sound Performance:
52 – 54 DnTw + Ctr dB.

Projected Impact Sound Performance:
58 L'nTw dB.

8.2 PARTY FLOOR/ CEILING THIRD FLOOR

The following construction is proposed:



The acoustic modelling indicates that the expected performance of the proposed structure will be as follows:

Projected Airborne Sound Performance:
54 DnTw + Ctr dB.

Projected Impact Sound Performance:
58 L'nTw dB.

8.3 PROPOSED SEPARATING WALL CONSTRUCTION

It is understood that new build separating walls between flats is based on a twin timber stud construction and existing walls to be retained are formed from brickwork. To meet the acoustic performance targets for separating walls the following wall specifications are provided:

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Timber Stud Party Wall

- 1 x 12.5mm Gyproc Fire Line
- 1 x 15mm Gyproc Sound Bloc
- 2 x 75mm Studs
- Minimum 200mm Cavity between inner boards
- 100mm Mineral Wool Insulation, density $\geq 45\text{Kg/m}^3$
- 1 x 15mm Sound Bloc
- 1 x 12.5mm Fire Line

Acoustic Rating - 57 dB Rw + Ctr

Masonry Party Wall

- 100mm Brick/Block
- 50mm Timber Stud – Not fixed to wall
- 25mm Mineral Wool Insulation, density $\geq 45\text{Kg/m}^3$
- 1 x 12.5mm Fire Line

Acoustic Rating - 56 dB Rw + Ctr

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

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

8.8 HYDRAULIC SYSTEMS

Hydraulic systems shall be designed and installed to minimise audibility of water/waste noise within the residential areas of the apartments. The following controls shall be adopted to minimise noise emissions from hydraulic systems.

- Avoid hard grouting and chasing of water pipes in walls, particularly where walls are common with noise sensitive areas
- In noise sensitive areas, support pipes with clamps having a soft neoprene sleeve
- Route all rainwater down pipes outside the building or, alternatively, via service cupboards or risers boxed-in by means of 2x12.5mm layers of FireLine. Avoid bends and T-junctions in ceiling spaces above noise sensitive areas
- Do not support pipework from lightweight constructions

Where it is unavoidable that hydraulic systems pass through residential spaces, they must be concealed. As a minimum, bulkheads shall consist of minimum two layers of 12.5mm plasterboard with staggered and sealed joints. When concealing waste systems, the bulkhead shall also be lined internally with 50 mm mineral fibre insulation (30 – 40 kg/m³) Where pipework passes through floors, penetrations shall ensure effective acoustic sealing around the pipes. This would be achieved by initially providing all pipework with a resilient sleeve detail. Large floor openings can be in-filled using a proprietary cementitious firestopping compound to the depth of the slab, whilst smaller openings can be loosely packed with mineral fibre insulation and closed-off with plasterboard pattresses above and below the slab. If using fire-stopping compound, it must be ensured that pipework holes in the formwork are cut oversize to prevent contact with the pipes. Any gaps remaining around pipework penetrations must be sealed with a continuous bead of non-hardening mastic.

8.9 AIR VELOCITIES WITHIN DUCTWORK

Where passing through, or above habitable spaces, air velocities within ducts should be controlled to the values shown in Table 8.9, in parallel to the installation of a suitably selected silencer schedule, or via the installation of lagging as outlined in Section 8.10.

NR Criterion	NR35	NR30
Main Branch	5m/s	4m/s
Grille	2.5m/s	2m/s
Diffuser	2m/s	1.5m/s
Return air stub duct in ceiling	3m/s	2m/s

Table 8.9 Maximum airflow velocities



8.10 ACOUSTIC LAGGING OF DUCTWORK

Where lagging may be required to achieve a degree of attenuation, we would recommend the following:

Normal duty lagging

- Rockwool RockLap H&V
- Armaflex from Armacell

Heavy duty lagging

- Techwrap 2, or Techtube from Rockwool
- SuperLag Type FL from CMS-Danskin (this can also be used as a lagging for the casing of the FCU)
- MuftiLag from H&H

9.0 RESIDENTIAL SOUND INSULATION REVIEW BETWEEN COMMERCIAL AND COMMUNIAL AREAS.

The required sound insulation performance is shown below:

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Test Type	Test Element	Requirement
Airborne Sound Insulation	Walls and Floors	$D_{nT,w} + C_{tr} \geq 50 \text{ dB}$
Impact Sound Insulation	Floors	$L'_{nT,w} \leq 57 \text{ dB}$

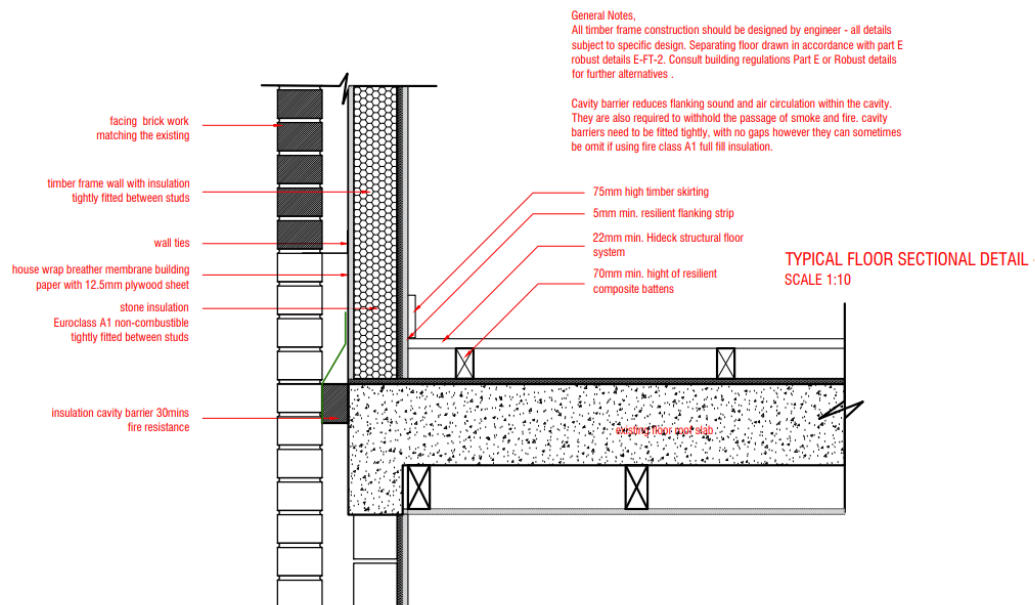
Table 9.0 – Design values for airborne and impact sound insulation

NB Higher values of $D_{nT,w} + C_{tr}$ represent better airborne sound insulation.

Lower values of $L'_{nT,w}$ represent better impact sound insulation

9.1 PARTY FLOOR/ CEILING FIRST FLOOR (BETWEEN COMMERCIAL & RESIDENTIAL)

The following construction is proposed:



The acoustic modelling indicates that the expected performance of the proposed structure will be as follows:

Projected Airborne Sound Performance:
59 – 61 $D_{nTw} + C_{tr}$ dB.

Projected Impact Sound Performance:
55 L'_{nTw} dB

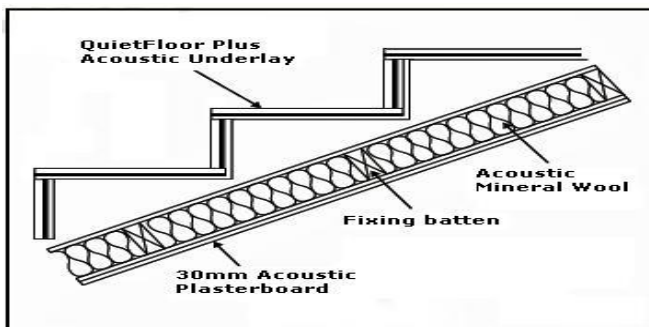
9.2 PARTY WALL DETAIL BETWEEN FLATS AND STAIRWELLS

It is understood that the proposed wall construction to be used between residences and communal areas (in area of column only) is as follows:

- 3mm plaster skim finish
- 2x12.5mm SoundBloc plasterboard
- Gypframe 'I' Stud (70 'I' 70) framework with 50mm Isover Steel
- Frame Infill Batts between studs
- 200mm RC concrete shear wall (fairfaced on staircase side) to SE design and spec

The above construction is predicted to achieve a laboratory rated performance of 64dB Rw which approximates to an on-site performance of 52 dB Dn,Tw + Ctr, based on the following

The stair treads will have Acoustilay 8 or equivalent glued to each individual tread to prevent impact noise.



9.3 REVERBERATION CONTROL IN COMMON SPACES

Approved Document E of the Building Regulations provides two methods for providing reverberation control in common spaces. Method A states that for entrance halls, corridors, and hallways, an area equal to or greater than the floor area should be covered with a Class C absorber or better.

Method B provides a methodology for calculating the required percentage area of absorption in a space based on the proposed finishes. As carpet is proposed as the walking surface in the entrance halls, corridors, and hallways, Method A would result in excess reverberation treatment being installed. Therefore, calculations have been undertaken as per Method B, with the resultant percentage areas of absorption being shown in Table 9.3

Product	Absorber Class	Ceiling Coverage %
Gyptone Line 6 or Similar	D	100% of corridors ceiling
Gyptone Quattro 41 or Similar	C	50% of the entrance hall ceiling
Gyptone Quattro 42 or Similar	D	80% of the Stairwells

Table 9.3 – Gypsum Reverberation treatment Options



10.0 SUMMARY AND CONCLUSIONS

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A baseline noise survey has been undertaken by DAA Group to establish the prevailing noise climate in the locality of Regal Buildings, 2 Market Street, Eastleigh, SO50 5RL in support of a planning application for a new mixed use development.

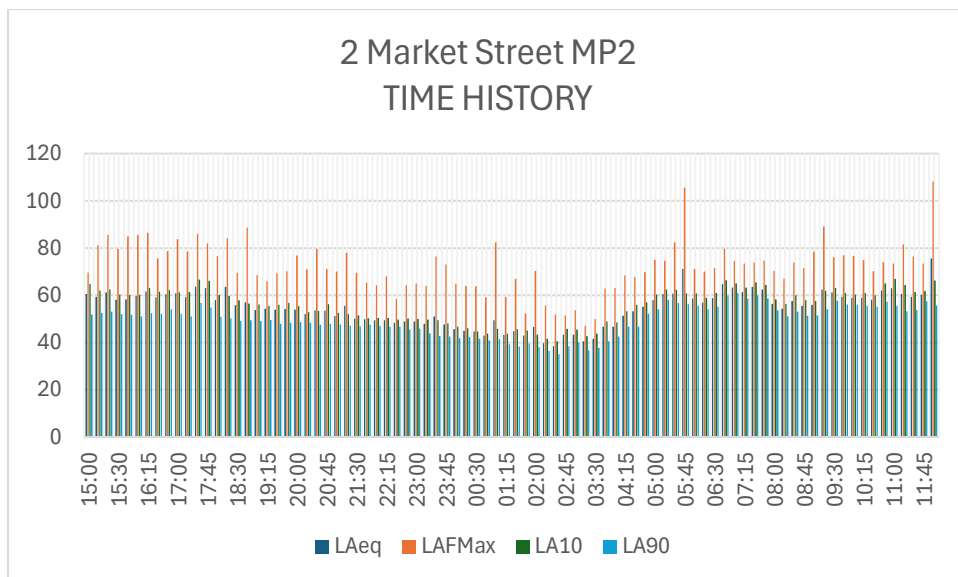
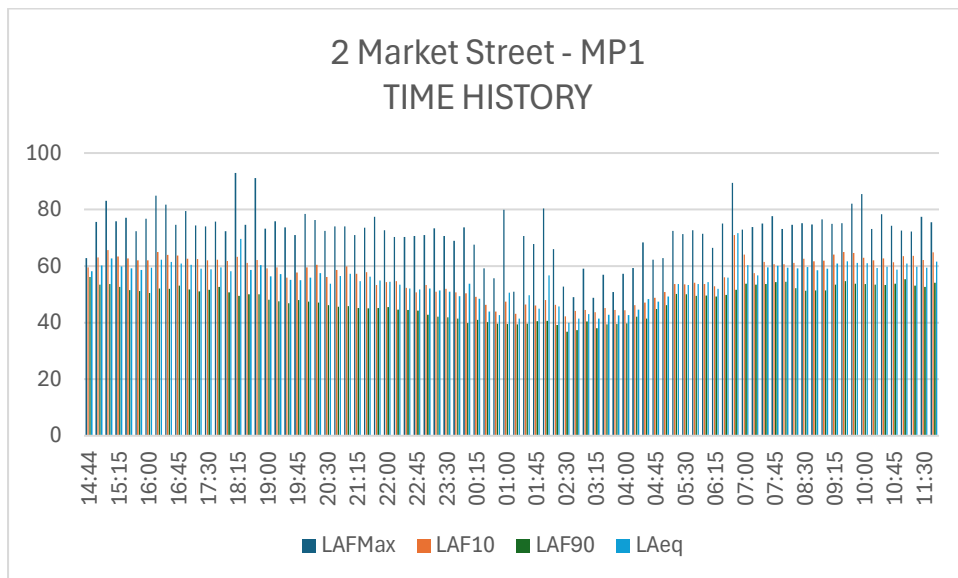
The measured levels have been assessed against currently available standards and guidance documents including The National Planning Policy Framework 2021 (NPPF), National Planning Practice Guidance (NPPG) and Local Authority requirements.

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 treatment to the separating walls and separating floors.

It is concluded that, the impact of noise 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)

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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, LAeq. 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 L_{A90} 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 L_{A10} , dB L_{A90} , dB. etc. The reference time (T) is normally included, e.g. L_{A10} , (5min), & L_{A90} , (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.



Acoustic Performance

Glazing Configuration

3mm Float Glass
14mm Cavity
4mm Float Glass

Sound Reduction Indices

Frequency, Hz / dB						Rw	C	Ctr	OITC	STC
125	250	500	1000	2000	4000	32	-1	-5	25	31
19	21	27	37	43	23					

Disclaimer: The acoustic performance data provided in the reports is based on a test protocol or an estimation and may be used if user actual glazing is identical to input data described herein. Acoustic performance data herein is only applicable for glazing dimensions 1,23 m x 1,48 m (as per testing standard). Estimation of acoustic performance is based on component-similarity assumptions which are derived from measured data and interpolation to expand the database of values from test protocols. Due to inherent variations in acoustic performance when testing in accordance with EN ISO 10140-3/EN ISO 10140-2, some variation in the calculated performance can also be expected. As such, the weighted performance, R_w , and adaptation terms, C and Ctr, should typically be considered to be accurate within ± 2 dB. However, wider deviations can occur. Actual performance may vary according to the glazing dimensions, frame system, noise sources and many other parameters. The acoustic performance data herein should not be used as a substitute for tests of actual glazing. For more information, please consult Assumptions and Terminology section in Guardian Acoustic Assistant. By accessing this calculator, you agree not to alter or modify the generated report data and information, by any means. Any manual alteration will be your own responsibility and will annul all the content of the report.

Thursday, March 21, 2024 | Acoustic database 20210629

APPENDIX D – CALCULATIONS

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		49.0	51.0	49.0	48.0	45.0	36.0	27.0	22.0 49.1 dBA
Composite SRI									
Facade Width (m)	3.0								
Facade Height (m)	4.0								
Main Element - External Wall									
SRI	-	41.0	43.0	48.0	50.0	55.0	55.0	-	Rw 51
Window Width (m)	2.0								
Window Height (m)	3.0								
No. of Windows (no)	1.0								
Glazed Element - 32rw									
SRI	-	19.0	21.0	27.0	37.0	43.0	23.0	-	Rw 32
	-	-21.98	-23.98	-29.98	-39.80	-45.74	-26.01	-	
10 log (S/A)									
Internal Receiver - BR									
	-	0.2	0.2	0.2	0.2	0.2	0.2	-	
+3									
	-	3.0	3.0	3.0	3.0	3.0	3.0	-	
Internal Receiver Noise									
Internal Receiver Noise - BR									
Reverberant Field, LPrev	-	32.2	28.2	21.2	8.4	-6.6	4.1	-	23.1 dBA

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		59.0	62.0	58.0	57.0	56.0	43.0	38.0	33.0 59 dBA
Composite SRI									
Facade Width (m)	5.0								
Facade Height (m)	4.0								
Main Element - External Wall									
SRI		-	41.0	43.0	48.0	50.0	55.0	55.0	- Rw 51
Window Width (m)	2.0								
Window Height (m)	3.0								
No. of Windows (no)	2.0								
Glazed Element - 32rw									
SRI		-	19.0	21.0	27.0	37.0	43.0	23.0	- Rw 32
		-	-21.20	-23.20	-29.20	-39.08	-45.04	-25.22	-
10 log (S/A)									
Internal Receiver - LR									
		-	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 - LR									
Reverberant Field, LPrev		-	44.9	38.9	31.9	21.0	2.1	16.9	- 34.4 dBA

Calculation Sheet

MP2 07:00 - 23:00 to LR

2 | 44

		Octave Band Centre Frequency (Hz)							
		63	125	250	500	1k	2k	4k	8k
Noise Source									
Noise Source - MP2 07:00 - 23:00									
Noise Levels		58.0	61.0	59.0	56.0	54.0	46.0	37.0	32.0 58.1 dBA
Composite SRI									
Facade Width (m)	5.0								
Facade Height (m)	4.0								
Main Element - External Wall									
SRI		-	41.0	43.0	48.0	50.0	55.0	55.0	- Rw 51
Window Width (m)	2.0								
Window Height (m)	3.0								
No. of Windows (no)	2.0								
Glazed Element - 32rw									
SRI		-	19.0	21.0	27.0	37.0	43.0	23.0	- Rw 32
		-	-21.20	-23.20	-29.20	-39.08	-45.04	-25.22	-
10 log (S/A)									
Internal Receiver - LR									
		-	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 - LR									
Reverberant Field, LPrev		-	43.9	39.9	30.9	19.0	5.1	15.9	- 34.3 dBA



Calculation Sheet

MP1 LAMAX to BR

age | 45

		Octave Band Centre Frequency (Hz)							
		63	125	250	500	1k	2k	4k	8k
Noise Source									
Noise Source - MP1 LAMAX									
Noise Levels		66.0	69.0	67.0	66.0	60.0	54.0	45.0	40.0 66.2 dBA
Composite SRI									
Facade Width (m)	3.0								
Facade Height (m)	4.0								
Main Element - External Wall									
SRI		-	41.0	43.0	48.0	50.0	55.0	55.0	- Rw 51
Window Width (m)	2.0								
Window Height (m)	3.0								
No. of Windows (no)	1.0								
Glazed Element - 32rw									
SRI		-	19.0	21.0	27.0	37.0	43.0	23.0	- Rw 32
		-	-21.98	-23.98	-29.98	-39.80	-45.74	-26.01	-
10 log (S/A)									
Internal Receiver - BR									
		-	0.2	0.2	0.2	0.2	0.2	0.2	-
+3									
		-	3.0	3.0	3.0	3.0	3.0	3.0	-
Internal Receiver Noise									
Internal Receiver Noise - BR									
Reverberant Field, LPrev		-	50.2	46.2	39.2	23.4	11.4	22.1	- 41 dBA

Calculation Sheet

MP2 23:00 - 07:00 to BR

16

		Octave Band Centre Frequency (Hz)							
		63	125	250	500	1k	2k	4k	8k
Noise Source									
Noise Source - MP2 23:00 - 07:00									
Noise Levels		50.0	52.0	50.0	48.0	47.0	37.0	28.0	23.0 50.2 dBA
Composite SRI									
Facade Width (m)	3.0								
Facade Height (m)	4.0								
Main Element - External Wall									
SRI		-	41.0	43.0	48.0	50.0	55.0	55.0	- Rw 51
Window Width (m)	2.0								
Window Height (m)	3.0								
No. of Windows (no)	1.0								
Glazed Element - 32rw									
SRI		-	19.0	21.0	27.0	37.0	43.0	23.0	- Rw 32
		-	-21.98	-23.98	-29.98	-39.80	-45.74	-26.01	-
10 log (S/A)									
Internal Receiver - BR									
		-	0.2	0.2	0.2	0.2	0.2	0.2	-
+3									
		-	3.0	3.0	3.0	3.0	3.0	3.0	-
Internal Receiver Noise									
Internal Receiver Noise - BR									
Reverberant Field, LPrev		-	33.2	29.2	21.2	10.4	-5.6	5.1	- 23.9 dBA



Calculation Sheet

MP2 LAMAX to BR

		Octave Band Centre Frequency (Hz)							
		63	125	250	500	1k	2k	4k	8k
Noise Source									
Noise Source - MP2 LAMAX									
Noise Levels		73.0	71.0	65.0	66.0	62.0	57.0	49.0	49.0 67.1 dBA
Composite SRI									
Facade Width (m)	3.0								
Facade Height (m)	4.0								
Main Element - External Wall									
SRI		-	41.0	43.0	48.0	50.0	55.0	55.0	- Rw 51
Window Width (m)	2.0								
Window Height (m)	3.0								
No. of Windows (no)	1.0								
Glazed Element - 32rw									
SRI		-	19.0	21.0	27.0	37.0	43.0	23.0	- Rw 32
		-	-21.98	-23.98	-29.98	-39.80	-45.74	-26.01	-
10 log (S/A)									
Internal Receiver - BR									
		-	0.2	0.2	0.2	0.2	0.2	0.2	-
+3									
		-	3.0	3.0	3.0	3.0	3.0	3.0	-
Internal Receiver Noise									
Internal Receiver Noise - BR									
Reverberant Field, LPrev		-	52.2	44.2	39.2	25.4	14.4	26.1	- 41 dBA

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	+	54	55	52	69	69	66	62	56	65
4														
5														
6	Revised Spl:	1	Spl	dB	+	54	55	52	69	69	66	62	56	65
7														
8														
9														
10														
11	Distance to nearest receptor Metres:	15		dB	-	-24	-24	-24	-24	-24	-24	-24	-24	-24
12	SPL=L1-20log ₁₀ (r2/r1)	1												
13														
14														
15														
16	Spl at receptor			dB	+	30	31	28	45	45	42	38	32	41
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	44
24	(1m outside noise sensitive window)													
25	Lowest Background Noise Levels:(L _{A90})													
26	Day time (07:00 - 23:00)													44
27	Difference: (Assessment level)			dB	-									0
28	E&OE													

Kitchen Extract System.														
NOISE EMISSION CALCULATION														
ITEM	PARAMETER				HZ	63	125	250	500	1K	2K	4K	8K	dBA
1	Schedule of Plant		Qty											
2	Helios Gigabox													
3	Model: GBW 500/4		1	Swl	dB +	72	72	75	76	78	75	71	67	83
4	Ductwork natural losses		Lot	IL	dB -	15	10	3	2	6	8	8	9	
5	Discharge Attenuator Model: R02-5-1800	Primary	1	IL	dB -	8	13	25	44	50	50	37	24	
6														
7														
8														
9														
10														
11	Revised Sound Power Level:		1	Swl	dB +	49	49	47	30	22	17	26	34	41
12														
13														
14														
15	Distance to nearest receptor Metres:	r	1.2	dB -		13	13	13	13	13	13	13	13	13
16	SPL=SWL -20log(r) + 10log(Q) -11 dB.		Q	1										
17														
18														
19														
20	Spl at receptor			dB +		36	36	34	17	9	4	13	21	28
21														
22														
23	Façade correction		3	dB +		3	3	3	3	3	3	3	3	3
24														
25														
26														
27	Specific noise level at receptor			dB +		39	39	37	20	12	7	16	24	31
28	(1m outside noise sensitive window)													
29	Lowest Background Noise Levels: (L _{A90})													
30	Proposed Hours (07:00-23:00)			dB +										44
31	Difference: (Daytime Assessment level)			dB -										-13
32														
33														
34														
35														
36														
	E&OE													

Kitchen Extract System.														
NOISE EMISSION CALCULATION														
ITEM	PARAMETER				HZ	63	125	250	500	1K	2K	4K	8K	dBA
1	Schedule of Plant		Qty											
2	Helios Gigabox													
3	Model: GBW 500/4		1	Swl	dB +	72	72	75	76	78	75	71	67	83
4	Ductwork natural losses		Lot	IL	dB -	15	10	3	2	6	8	8	9	
5	Discharge Attenuator Model: R02-5-1200	Primary	1	IL	dB -	5	9	18	32	40	39	28	19	
6														
7														
8														
9														
10														
11	Revised Sound Power Level:		1	Swl	dB +	52	53	54	42	32	28	35	39	48
12														
13														
14														
15	Distance to nearest receptor Metres:	r	2		dB -	17	17	17	17	17	17	17	17	17
16	SPL=SWL -20log(r) + 10log(Q) -11 dB.		Q	1										
17														
18														
19														
20	Spl at receptor				dB +	35	36	37	25	15	11	18	22	31
21														
22														
23	Façade correction		3		dB +	3	3	3	3	3	3	3	3	3
24														
25														
26														
27	Specific noise level at receptor				dB +	38	39	40	28	18	14	21	25	34
28	(1m outside noise sensitive window)													
29	Lowest Background Noise Levels: (L _{A90})													
30	Proposed Hours (07:00-23:00)				dB +									44
31	Difference: (Daytime Assessment level)				dB -									-10
32														
33														
34														
35														
36														
	E&OE													