



AIRTIGHT & NOISECHECK LIMITED

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NOISE IMPACT ASSESSMENT FOR

THE BLACKBURN PARTNERSHIP

175 LONDON ROAD
WATERLOOVILLE
HAMPSHIRE
PO7 7RJ

SITE ADDRESS

FERNWOOD HOUSE
45 LONDON ROAD
COWPLAIN
WATERLOOVILLE
HAMPSHIRE
PO8 8DH

Acoustic Engineer:



Date: 14-15th June 2019

Michael Vine

AIRTIGHT & NOISECHECK BUILDING ACOUSTIC TESTING

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Raw Data can be sent upon request

AIRTIGHT & NOISECHECK LIMITED ACOUSTICS TESTING

Customer Name:

Date: 14-15th June 2019

The Blackburn Partnership
175 London Road
Waterlooville
Hampshire
PO7 7RJ

Site Address:

Fernwood House
45 London Road
Cowplain
Waterlooville
Hampshire
PO8 8DH

Acoustic Engineer:

Mr. Michael Vine

Equipment used:

Norsonic Environmental Analyser 121 – Serial No 29809 Calibration due July 2019

Analyser complies with the following standards:

IEC 60651 type 1
IEC 60804 type 1
IEC 61260 class 1
IEC 225
ANSI S1.4-1985 type 1
ANSI1.43 -1997 type 1
ANSI S1.11-1986 order 3type1D
DIN 45 657
Norsonic Production Standard set for the Nor121

Measurement Microphones (Gras 40AF) – Serial No 51465 & Nor 1225 – serial No 72933, - Calibration due July 2019

Acoustic Calibrator - (Type 1251) – Serial No 31652, Calibration due July 2019

Measurement Procedure:

The external ambient noise levels were recorded for a 24-hour period in two external locations between Friday 14th to Saturday 15th June 2019 to measure the existing noise levels at the Western & Eastern boundaries of the proposed site. These are the façades that faces the commercial plant (Western) and road traffic (Eastern). The only commercial activity is the roof top plant located to the rear of the building.

AIRTIGHT & NOISECHECK ACOUSTIC TESTING

Executive Summary:

Airtight & Noisecheck Ltd were instructed by The Blackburn Partnership Ltd to undertake a detailed Noise Impact Assessment (NIA) at Fernwood House, 45 London Road, Cowplain. A prior approval notice pursuant to permitted development rights has been submitted to convert the 1st floors of the building into 8 residential dwellings. There is an existing commercial restaurant/bar at ground floor.

The noise levels were measured for a 24hour period at the front (Eastern) and rear (Western) boundaries of the site.

The external noise levels were measured at the Western & Eastern façades in order to assess the vehicular traffic using London Road & the commercial plant to the rear of the development (this assessment is concerned with the commercial activity only under permitted development).

The noise levels & calculations indicate that if the mitigation measures are implemented then there is no reason to suggest that the future residents of the proposed dwellings will be adversely affected by the noise emissions created by the commercial external sources. The mitigation measures will have to be implemented to the glazing and ventilation of the proposed development and they show that the criteria for internal noise can be met. The noise levels have been measured at all noise sensitive facades.

There is no reason to suggest that the future residents of the proposed residential development will be adversely affected by the noise emissions providing the mitigation measures are implemented to the noise sensitive rooms. The detailed mitigation measures are listed within this report.

The final ventilation scheme has not been decided so a variety of options have been included within the report.

The external noise levels are higher at the front of the site for obvious reasons, the rear aspect is screened from the vehicular traffic and any street level activity. The plant is located at the rear of the building and it is clear that, even with the addition of acoustic feature corrections, suitable mitigation measures will be able to protect the future residents of the proposed scheme. Although permitted development is only related to the commercial activity (AC Units & Ground floor restaurant) the road traffic noise was also measured to ensure this could be mitigated accordingly from the other external noise sources, but the actual mitigation is for the commercial noise only.

Acoustic Design Statement:

It is clear that the site is situated near to a busy area with a variety of activity to the front & side of the building and will be exposed to high external noise levels, however the client will take steps and implement robust mitigation measures to ensure the impact of the external & internal noise should not have an adverse impact on the future residential dwellings. These steps include:

1. Careful configuration of dwellings
2. A MVHR or alternative ventilation system to ventilate the dwellings thus maintaining the integrity of the façade & glazing
3. Install a robust glazing system to the building to protect the residents from the external noise emissions

The above measures are a clear indication of the steps taken by the client to reduce the potential impact of the noise sources in operation.

Although the initial risk assessment has indicated that the day time noise levels to the front fall into the medium category, the rear levels fall into the low category & the night time $L_{Aeq, 8hr}$ value for the front fall into the medium to high risk category which may indicate a risk of intrusion and a good acoustic design process should ensure that the internal criteria can be achieved. The night time levels for the rear fall into the low category indicating a suitable acoustic environment providing necessary measures are implemented.

If the mitigation measures are implemented, then there is no reason to suggest that the future occupants of the scheme cannot be adequately protected from the external noise emissions.

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Assessment Criteria:

The NPPF came into effect in March 2012 and was updated in July 2018. It replaced other documents such as PPG24. The NPPF provides a number of objectives and aims that are directed towards avoiding significant adverse impacts and reducing others on quality of life and health. This document states that:

The planning system should contribute to and enhance the natural and local environment by: preventing both new and existing development from contributing to or being put at unacceptable risk from, or being adversely affected by unacceptable levels of soil, air, water or noise pollution or land instability.

The NPSE (Noise Policy Statement for England) states the following aims with respect to noise policy:

Through the effective management and control of environmental, neighbour and neighbourhood noise within the context of the Government policy on sustainable development:

*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.*

BS8233: 2014 'Guidance of Sound Insulation and Noise Reduction for Buildings' defines a range of ambient noise levels for design purposes, in order that appropriate conditions are achieved in certain internal environments. These internal requirements are listed in the table below.

BS8233: Table 5 – Indoor Ambient noise levels in spaces when they are unoccupied.

Activity	Location	0700-2300	2300-0700
Resting	Living Rooms	35dB LAeq,16hour	-
Dining	Dining Room/Area	40dB LAeq,16hour	-
Sleeping (daytime resting)	Bedroom	35dB LAeq,16hour	30dB LAeq,8hour

Night time noise events can have a significant impact on sleep disturbance. There is no specific guidance presented in BS8233 regarding a noise limit to maximum night time noise ($L_{Amax, F}$). As part of this assessment the number of night time noise events will be considered in a qualitative manner with an internal $L_{Amax, F}$ of 45dB used as an initial screening tool to identify night-time noise events that may be of significance to sleeping conditions in bedrooms.

For the purposes of this report the relevant noise sources are those associated with the plant located at the rear of the building, including the commercial noise sources thus reference must be made to clause O.2(1)(d) of the Town & Country Planning (General Permitted Development) (Amendment) Order 2016.

Pro PG: Planning & Noise 2017 (Professional Practice Guidance on Planning & Noise) issued by ANC/IOA/CIEH has also been referenced. This document came into effect in May 2017. This document is a guidance document and not a Code of Practice or British Standard.

This document states that there is a staged approach to such schemes, with the first phase being a risk assessment undertaken at the site, followed by a detailed assessment taking into account the recommended internal values by measuring the external noise levels.

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1 Objective:

1.1 To determine the noise levels associated over a 24hour period at the proposed facades of the development. The noise levels associated with all facades were measured to ensure that the future residents of the proposed scheme will not be adversely affected by the noise emissions created in the immediate area. The site currently comprises of a vacant office building at first floor level with a restaurant at ground floor. A prior approval notice pursuant to permitted development rights has been submitted to convert the building into 8 residential dwellings all at 1st floor with the current restaurant remaining at ground floor level.

1.2 Clause O.2(1)(d) of the Town & Country Planning (General Permitted Development) (Amendment) Order 2016 states that:

'Development under Class O is permitted subject to the condition that before beginning the development, the developer must apply to the local planning authority for a determination as to whether the prior approval of the authority will be required as to—'

(d) impacts of noise from commercial premises on the intended occupiers of the development.

Therefore, this report relates to the commercial noise associated with the plant located to the rear of the building & the activity at Ground Floor. This noise is the only commercial noise sources that may impact in future occupiers of the proposed scheme and therefore mitigated against accordingly.

2 Calibration:

2.1 The measurement microphones were calibrated before and after testing in each measurement location and there were no drifts recorded during the assessments.

3 Site Layout & Microphone Position:

3.1 The proposed site is located on the corner of London Road to the East & Kings Road to the North, with these roads being a main through fare for traffic in Cowplain. It is a very busy road network with numerous mixed-use buildings apparent.

3.2 The ground floor is currently used as a restaurant, the anticipated noise levels within such a venue would be between 75dBA. The plant associated with the building is located to the rear of the site. The area is very busy with high levels of people and vehicles using the immediate area. The immediate area is predominantly of mixed-use buildings, although the dominant noise source in this location is the high levels of vehicular traffic using the local road network.

3.3 The proposed residential layout is shown later in the report. The microphones were located:

- 1- Western façade (front) of the site with the microphone approximately 6metres from ground floor level. It was positioned circa 1m from the façade so a -3dB reduction has been applied for reflection.
- 2- Eastern façade (side) of the building with the microphone approximately 6m from the ground & 10m from the Centre of London Road. It was circa 1m from the building façade so a -3dB correction has been applied for reflection.

4 Weather Conditions:

4.1 The weather was predominantly dry during the measurement procedures, the temperatures ranged between 4 - 10degrees. There was no wind and a little rain during the measurement procedure.

AIRTIGHT & NOISECHECK LIMITED ACOUSTICS TESTING**5 External Results:**

5.1 The purpose of this measurement procedure was to calculate the noise levels apparent at the noise sensitive facades and ensure suitable mitigation measures are implemented so that the requirements of BS8233 & WHO can be met. The night time L_{Amax} values have also been derived so that they can be mitigated against.

Table 1 - LAeq & LAmax Values – Front & Rear of building:

Mic Location	LAeq 16hour Value	Reduction needed for BS8233 compliance	LAeq 8hour Value	Reduction for BS8233 compliance	LAmax value – night time	Reduction for WHO compliance
ML 1 – Eastern Façade	56dBA	21dB	51dBA	21dB	69dBA	24dBA
ML 2 – Western Façade	67dBA	32dB	59dBA	29dB	75dBA	30dBA

The above results include the -3dB acoustic feature correction for reflection from the façade.

6 Results Conclusion:

6.1 The levels of reduction apparent for the road traffic noise & plant noise is listed in the table above.

6.2 The WHO guidelines for community noise - 2000 state that the internal L_{Amax} level (night time) should not exceed 45dB(A). If it exceeds this level on a regular basis then sleep disturbance may be caused. This is the internal level that should be achieved. The Pro PG document states that the internal level of 45dB should not be exceeded more than 10 times a night. This is the value listed above.

6.3 The plant noise was measured whilst in operation and thus the levels are a fair representation of the apparent noise at each façade, however the following acoustic feature corrections will be applied to the levels.

6.4 Section G1 of BS8233 allows for a +5dB correction to the LAeq values to take into account the possible errors in simple calculation methods. Therefore if we apply these values to the LAeq values listed above the required sound reduction is **26dB during the day for the Western façade, 37dBA for the Eastern facade & 26dB during the night for the Western façade and 34dB for the Eastern facade therefore this level of sound reduction can be applied to all relevant facades/glazing.**

6.5 A further +3dB will be applied to the levels at the rear to take into account that the plant will be distinguishable and a further +2dBA for tonality, meaning that the total level of reduction required for the rear glazing will be **31dBA for the Western façade (Rear)**. These acoustic feature corrections will ensure the plant is adequately mitigated.

6.5 The levels were measured over a Friday evening when the ground floor restaurant/bar is open until 0000hrs and therefore this assessment assumed worst case scenario for the acoustic criteria. It is apparent that suitable mitigation measures can be applied to ensure the internal criteria is achieved.

AIRTIGHT & NOISECHECK LIMITED ACOUSTICS TESTING**8 Building Specifications:**

8.1 Some possible building specifications are listed below, including, façade, glazing, roof & ventilation. Due to the status of the building the final ventilation scheme is unknown so various options have been included.

8.2 All of the rooms can be ventilated either by using an MVHR whole house system, such a system could ventilate the rooms accordingly. The unit can be stored in a suitable location and vented through the roof/facade at the rear as this is not exposed to high levels of noise, then a duct is run into each room to ensure that the rooms can be adequately ventilated without having to open a window and thus diminishing the integrity of the facade/glazing specification.

8.3 The detailed calculations for each façade are listed later in this report and these calculations may show a slightly different sound reduction value is applicable due to the variety of specifications.

Make	Model	Type
Vent-Axia	Sentinel Kinetic Plus	Whole House Ventilation

8.4 If an MVHR system is to be installed then it will have to be located in a location that will not impact on the noise sensitive bedrooms. It could be located in the loft area above a communal staircase for instance. It will need regular maintenance, so an access panel will be required. It is recommended that the system is located away from the noise sensitive bedrooms and situated above or inside a purpose-built area within the communal area.

8.5 There are alternative solutions, and these could include a Passive Stack Ventilation system, a natural ventilation heat recovery (NVHR) system or one of the products listed below.

Location	Product	Sound Reduction - open	Sound reduction - closed
All windows	RW Simon Acoustic EHA trickle vent	36dB	38dB
All windows	RW Simon Acoustic EHAS trickle vent	38dB	41dB

9 Façade Detail – The proposed façade is believed to be something similar to: - cavity brick wall construction. This system should achieve a sound reduction of between 50-52dB DnT,w + Ctr 'Code of Practice BS8233: 2014, Page 60 – Table E.1B – Airborne sound insulation of walls and partitions'.

10 Roof Detail – The proposed roof detail is believed to be similar to: Flat roof construction, with a minimum of 150mm insulation placed on top of rafters, an independent internal plasterboard ceiling. Such a systems should achieve a sound reduction in excess of 45dB 'Table 8 – The sound insulation of roofs, Page 41 – BS8233: 2014'

11 Windows - The proposed windows to be used is unknown. The specifications listed below should ensure a sound reduction of 37dBA to the North, South & East & 32-33dBA to the West.

Possible Units	Thickness	125Hz	250Hz	500Hz	1KHz	2KHz	4KHz	Overall reduction (DnT,w + Ctr)
SG Solaglass 10-12-10.4	32.4mm	28	30	39	43	48	58	42-5=37dB
SG Solaglass 8-20-11.8	39.8mm	26	32	41	45	43	54	42-5=37dB
SG 6-12-10	28mm	27	26	33	39	39	47	36-3=33dB
SG solaglass 4-6-8.4	18.4mm	27	26	29	39	45	46	36-4=32dB

11.1 This glazing specification could easily be installed throughout the site. There are many other suitable products and the client will have to show compliance for the windows before installation, the manufacturer will have the acoustic data for the windows.

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12 Results Summary - External:

12.1 Although this report is concerned with the commercial activity located to the rear & at ground floor, the results indicate that the noise emissions produced at the front & side of the site are the dominant source, mitigation measures can be applied to all facades of the building (windows and ventilation) to protect the future residents from noise break in.

12.2 The mitigation measures listed within this report are very robust and comprehensive. If they are implemented throughout the site then the future residents should be able to enjoy a reasonable standard of living. Upon implementation of the comprehensive mitigation measures, the internal criteria of BS8233: 2014 should be met within the noise sensitive bedrooms at the proposed development.

12.3 It is clear that the noise emissions associated with the front & side of the development is the dominant noise source. However, if the necessary mitigation measures are implemented to the building fabric then there is no reason to suggest that the future residents will be adversely affected by the external noise emissions. It is also clear to see that the noise emissions to the rear of the building are a lot less than those at the front, however suitable acoustic feature corrections have been applied to the rear façade also.

12.4 Planning Pro PG states that a good acoustic design process is a vital part of new developments. The client has taken great steps to ensure that the future occupants are protected from the dominant noise source, these steps include:

1. **Careful planning of bedrooms location (where possible) so that the noise sensitive rooms face the quieter facades**
2. **Provide ventilation via alternative methods rather than opening windows**
3. **Implement mitigation measures to the facades and glazing to ensure an adequate internal acoustic criterion**

12.5 The above-named document also states that the internal L_{Amax} value of 45dB should not be exceeded more than 10 times per night, and this criterion has been used for the site.

12.6 Careful implementation of this scheme and control of the site should ensure that the future residents of the proposed scheme will be adequately protected from the external noise sources in operation at the front and rear of the site.

AIRTIGHT & NOISECHECK LIMITED ACOUSTICS TESTING**13 Internal Separating Floor:**

13.1 The ground floor is a predominantly food led restaurant and bar serving food and craft beers, there is no amplified music in operation or live music. There may be some background music in operation. The exact ceiling detail is unknown, but the venue is believed to have a suspended ceiling installed below the concrete soffit.

13.2 The current separating floor between the ground floor office and 1st floor residential is circa 200mm concrete floor and a suspended ceiling. This type of floor detail should ensure a sound reduction of in excess of 45dB. The typical internal noise levels for a restaurant of this type is circa 75dBA with people talking (the source used for this assessment had an internal level of 77dBA). The attenuation values for the ceiling have been taken from page 393 of Table 8.2 'Representative values of airborne sound transmission loss for some common structures and materials' of *'Engineering noise control Theory & Practice, David H Bies & Colin H Hansen'* and they included only the separating values for the concrete element so in all likelihood the separating detail will perform better than this. In addition, the internal levels used have been taken from a bar of a similar size to the ground floor unit and the bar that was measured was very busy for the measurement period.

Frequency	63	125	250	500	1000	2000	4000	8000	L _{Aeq}
Internal (Leq)	68	68	70	76	73	68	62	51	77dBA
Attenuation of floor	34	34	39	46	53	59	64	65	
Dwelling Leq values	34	34	31	30	20	9	-2	-14	NC24
Calculated NC Curve	NC24								
Criteria Met	Yes								

13.3 The above table indicate an internal criterion of NC24 which is a very low level of internal noise. Many local authorities are requesting an internal value of <NC25 for residential dwellings above a commercial restaurant. Please Note – The above attenuation levels are only assuming there is a concrete slab apparent as the separating detail, but it is anticipated that the restaurant has a suspended ceiling of some description which will increase the sound attenuation of the floor further and thus reduce the internal level inside the proposed dwellings.

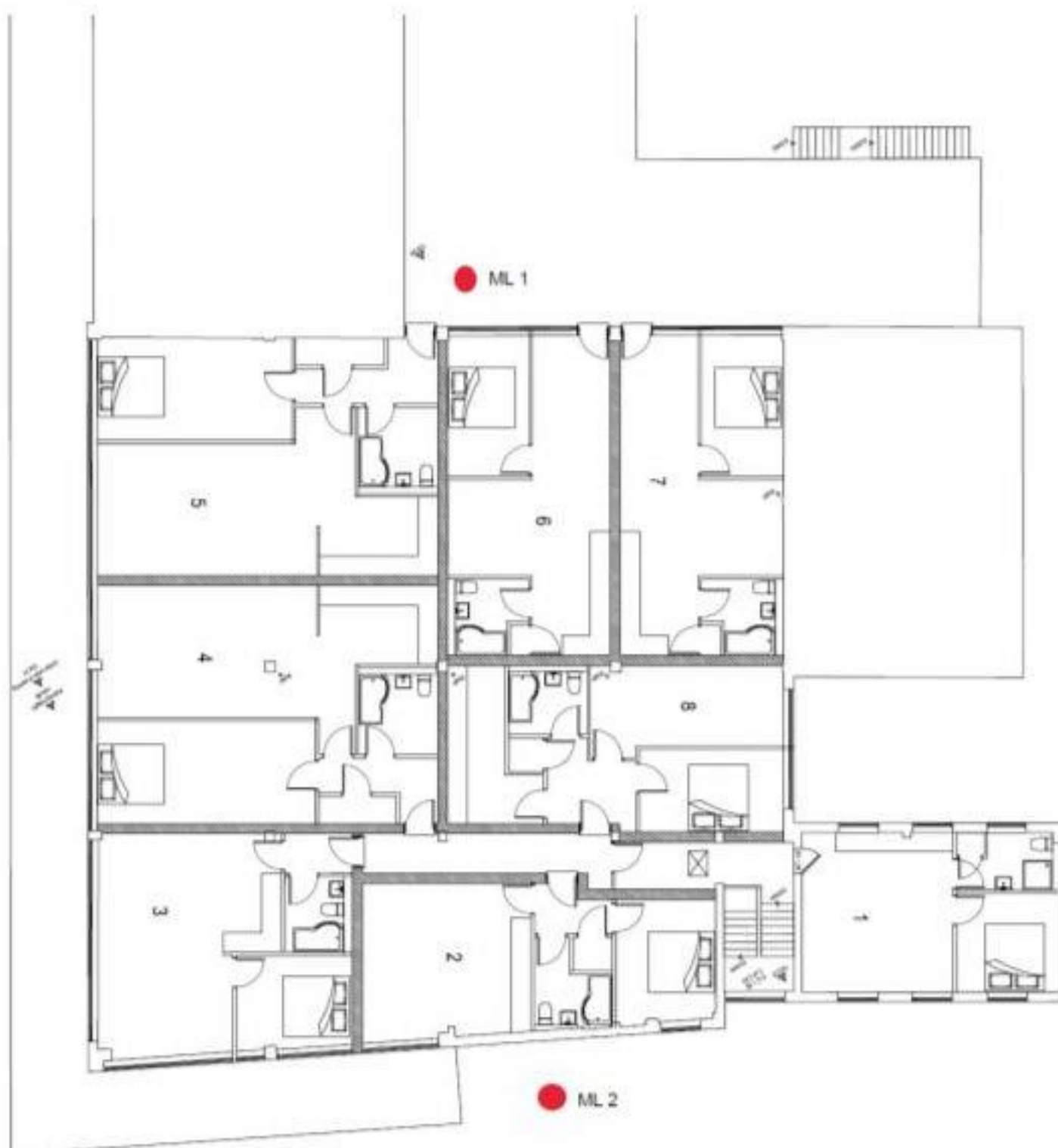
13.4 Based on the calculations listed above it is anticipated that the ground floor commercial office will not have an adverse impact on the residential dwellings and the criteria of BS8233: 2014 can be achieved.

13.5 The calculations listed above indicate that the commercial noise associated with the ground floor venue should not have an adverse impact on the 1st floor dwellings. No sound insulation tests have been performed on the separating floor as the dwellings have not been formed, but the floor in its current format should offer the sound attenuation listed above and thus ensure no adverse impact. The restaurant is a food led venue with no music in operation.

13.6 In addition to the above treatment to the separating floor, an acoustic matt will be installed at first floor level to further enhance the sound attenuation offered by the separating floor. This matting, combined with the ceiling detail at ground floor should further enhance the sound attenuation levels listed within the table above as those levels are purely for the concrete slab only.

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14 Site Plans:



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APPENDIX

Continuous equivalent noise level, LAeq — The steady noise level (usually in dBA) which, over the period of time under consideration, contains the same amount of sound energy as the time varying noise.

L_{Amax} - The maximum value that the A-weighted sound pressure level reaches during a measurement period.

dB (A) — The A-weighted sound pressure level.

Decibel (dB) — A unit used for many acoustic qualities to indicate the level of sound with respect to a reference level.

A-weighting — A frequency weighting that relates to the response of the human ear.

Background noise level — Prevailing noise level in a specified environment measured in the absence of the noise being studied.

Habitable Room – A room used for sleeping or recreation/relaxation

D_{ne,w} Weighted element normalised level difference – A single-number quantity which characterises the airborne sound insulation of a small building elements.

EPU – Environmental Protection Unit

R_w Weighted sound reduction index – A single-number quantity which characterises the airborne sound insulation of a material or building element measured in the laboratory.

LA₁₀ – The A-weighted noise level exceeded for 10% of the measurement duration.

LA₉₀ - The A-weighted noise level exceeded for 90% of the measurement duration.

British Standards & associated documents:

Code of Practice: BS8233: 2014 - Sound Insulation and noise reduction for buildings.

World Health Organization (WHO) - Guidelines for Community Noise.

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15 Google Earth:

