



AIRTIGHT & NOISECHECK LIMITED

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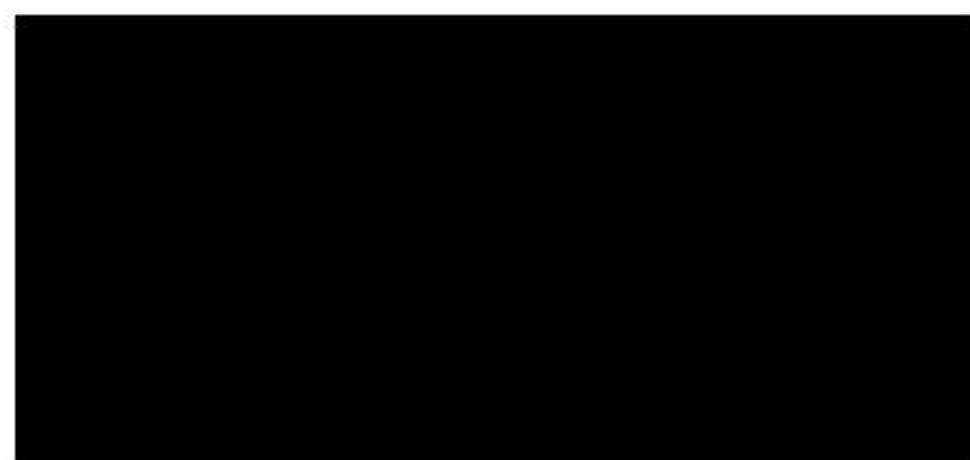
ACOUSTIC TESTING REPORT FOR

COWLKIRK LTD
120 HIGH STREET
EDGWARE
LONDON
HA8 7EL

SITE ADDRESS

CLOCK HOUSE
WATERLOOVILLE
HAMPSHIRE
PO7 7HE

Acoustic Engineer:



Michael Vine

Date: 22-23rd August 2016

AIRTIGHT & NOISECHECK BUILDING ACOUSTIC TESTING

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Raw Data can be sent upon request

Airtight & Noisecheck Ltd

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Customer Name:

Date: 22-23rd August 2016

Cowlkirk Ltd
120 High Street
Edgware
London
HA8 7EL

Site Address:

Clock House
Waterlooville
Hampshire
PO7 7HE

Acoustic Engineer:

Mr. Michael Vine

Equipment used:

Norsonic Environmental Analyser 121 – Serial No 29809 Cal due August 2017

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
ANSI 1.43 -1997 type 1
ANSI S1.11-1986 order 3 type 1D
DIN 45 657
Norsonic Production Standard set for the Nor121

Measurement Microphones (Gras 40AF) – Serial No 51465, (Nor 1225) SN 59993, - Calibration due April 2017

Acoustic Calibrator - (Type 1251) – Serial No 29212, Calibration due March 2017

Measurement Procedure:

The external ambient noise levels were recorded for a 24hour period in two locations between Monday 22nd to Tuesday 23rd August 2016 to measure the existing noise levels at the front & back of the building to measure the impact of the noise sources in operation.

Calculations for each microphone location has been used.

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Executive Summary:

Airtight & Noisecheck Ltd were instructed by Cowlkirk Ltd to undertake a detailed Noise Impact Assessment (NIA) at Clock House, Waterloooville. A planning application is to be made to convert the existing building & erect a purpose built section to the 3rd Floor into various commercial/retail units and 30 residential dwellings spread between ground – third floors.

The noise sources apparent are the various sources at the front and the rear of the site, the dominant noise source is the vehicular traffic using the local road network to the front (in particular buses & bus stops) and the various plant in operation to the rear (on all facades of the courtyard/parking area to rear). There are also other noise sources such as, car parks, vehicular traffic, police station etc.

The local authority have requested that the noise emissions at the site are mitigated accordingly:

The proposed layout of the development is:

- Ground floor commercial/retail units
- 1 x dwelling on ground floor – to rear
- 13 x dwellings on 1st floor – various facades
- 7 x dwellings on 2nd floor – various facades
- 9 x purpose built dwellings on 3rd floor

There will be noise sensitive bedrooms located on the front & rear facades.

The noise emissions were measured on the Northeast corner (front) & Southwest (rear courtyard/car park) facades of the proposed scheme in order to measure the various noise sources. The necessary mitigation measures should be implemented on all facades of the development in order to protect the residents in all noise sensitive rooms.

If the mitigation measures are implemented then there is no reason to suggest that the future residents of the proposed residential scheme will be adversely affected by the noise emissions created by the external sources. The mitigation measures have been implemented to the glazing & ventilation of the proposed development and they show that the criteria for internal noise can be met. The noise levels have been measured on each of the facades facing the noise sources.

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, which are situated on all exposed facades. 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 noise sources apparent at the site are vehicular traffic using the local road network & the various plant systems in operation to the rear of the building. It must be noted that there is plant on the roof but this is enclosed in a plant room and the facades of which will be upgraded to ensure no sound transmission through the separating walls.

There will be dwellings facing both the front & rear of the development so the mitigation measures will depend on the dwelling location in relation to the noise sources apparent at the site.

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Assessment Criteria:

The NPPF came into effect in March 2012 and 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 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.

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1 Objective:

1.1 To determine the noise levels associated over a 24hour period at the two facades of the site that face the road network & plant/AC units to the rear. The noise levels associated with these facades was measured to ensure that the future residents of the proposed scheme should not be adversely affected by the noise emissions created in the immediate area. The site currently comprises of a mixed-use building situated over 3 floors. A planning application is to be made to create a purpose built floor at 3rd floor level and convert parts of the existing building into residential dwellings. The residential dwellings will be located on various facades of the building.

1.2 The objective of the testing is to ensure that the future residents of the proposed scheme will be protected from the external noise emissions produced at the site, which are located at the front & rear of the building. It must also be mentioned that as part of the proposal some existing commercial units will be replaced with the residential units so the noise criteria may change upon implementation and completion of this scheme.

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 a large U shaped mixed use building with commercial units located on the ground floor and residential/offices located on 1st & 2nd floors. The building is located in the centre of Waterloooville, so the front of the proposed development will faced the bus routes through the town and the pedestrian area of the town. There are local roads located to the North, South & West with other commercial units & a supermarket located to the East.

3.2 A proposed site layout has been attached to this report and it clearly shows the location of the noise sensitive rooms. The microphones were located:

- 1- Southwest corner, microphone approximately 10metres from ground floor level and facing the majority of the plant located to the rear of the building.
- 2- Northeast corner of the site, microphone approximately 10metres from ground floor level.

4 Weather Conditions:

4.1 The weather was dry during the measurement procedures, the temperatures ranged between 10-22degrees. There was some wind during the measurement procedure but no rain.

AIRTIGHT & NOISECHECK LIMITED ACOUSTICS TESTING**5 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 $L_{A_{max}}$ values have also been derived so that they can be mitigated against also.

LAeq 16hour & 8hour Values:

Mic Location	LAeq 16hour Value	Reduction needed for BS8233 compliance	LAeq 8hour Value	Reduction for BS8233 compliance	L _{Amax} 1hour value – night time	Reduction for WHO compliance
ML 1 – Rear facades	56dBA	21dB	50dBA	20dB	74dBA	29dB
ML 2 – Front Facades	60dBA	30dB	53dBA	23dBA	78dBA	33dB

6 Results Conclusion:

6.1 The levels of reduction apparent for each of the façades are listed in the table above. It is clear that the level of mitigation required at the front of the development is 33dB and 29dB at the rear. If this level of mitigation is met for each facade then the future residents should be adequately protected from external noise emissions.

6.2 The WHO guidelines for community noise - 2000 state that the internal $L_{A_{max}}$ 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 average noise levels measured require a lower reduction so if this level is achieved then the average internal noise criteria will also be met.

6.2 The noise levels measured within this report offer a fair reflection of the noise levels apparent at the site. The measurement period encapsulated the noise sources apparent during the 24hours so it is a fair reflection of the typical noise emissions associated with the site.

6.3 If the above levels of mitigation is met then the requirements of BS8233: 2014 & World Health Organisation – guidelines for community noise should be met.

6.4 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 or side elevation as this is not a noise sensitive facade, 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. The windows can be opened during the day as sleep disturbance will not be an issue during this time. A suitable product is listed in the table below.

6.5 The microphone was located in the rear location due to security, but also as this was the aspect that will be closest (and face) the majority of the plant located at the rear. It is clear that there are dwellings proposed in various locations at the rear, but it is a fair assumption to make that the microphone location used offers a fair reflection of the noise emissions in this location thus it should ensure all dwellings in this location are adequately protected from external noise emissions.

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

6.6 There are alternative solutions and these could include a Passive Stack Ventilation system or a natural ventilation heat recovery (NVHR) system but specialist advice should be sought on the most appropriate unit to be installed.

Location	Product	Sound Reduction - Open	Sound Reduction - Closed
All	Simon Acoustic SL	33dB	39dB

The above products is an example of an acoustic trickle vent that could be installed to all façades, there are alternative products/vents that could be installed if required.

<http://www.rwsimon.co.uk/wp-content/uploads/2015/02/Simon-acoustic-NEW-STYLE-red.pdf>

7 Façade Detail – The exact façade detail is unknown, but it is believed to be something similar to: A dense cavity wall system, in excess of 300mm thick. Based on similar wall details listed in **BS8233: 2014, page 60 – Table E.1B Field Airborne sound insulation of walls and partitions** it is anticipated that this façade system should offer a sound reduction value in excess of 53dB.

8 Roof Detail – The existing roof detail is unknown, believed to be similar to: 100mm flat concrete roof (230 kg/m³). This system will offer a sound reduction of 52dB (Code of practice BS 8233: 2014, page 41). This system should satisfy the requirements. This level should be adequate due to the orientation of the roof in relation to the noise sources.

9 Windows - The proposed windows to be used is unknown but standard double glazed systems offer a sound reduction of between 30-35dB so this should be adequate for the average values but not the L_{Amax} values. The windows to be installed to the bedrooms facing London Road (front) need to achieve a sound reduction value in excess of 33dBA and for the bedrooms facing the rear need to achieve 29dBA. The specifications below offers these levels of reduction but the exact proposed specification is unknown and it is recommended that the window manufacturer provide the necessary documentation upon installation to ensure the correct materials have been used.

Possible Units	Thickness	125Hz	250Hz	500Hz	1KHz	2KHz	4KHz	Overall reduction (R_w)
SG Solaglass 4-10-4	18mm	23	20	24	35	41	36	29dB
SG Solaglass 4-12-5	21mm	24	21	30	39	38	35	33dB

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.

AIRTIGHT & NOISECHECK LIMITED ACOUSTICS TESTING**10 Results Summary:**

10.1 The various mitigation measures will apply to various facades of the development. The site plan below indicates which measures apply to which facades:

- Green – Rear facades/measures
- Blue – Front facades/measures
- Magenta – Plant room – upgraded separating walls

The site is relatively quiet, with the plant being the dominant noise to the rear and the vehicular traffic using the local road network being the dominant source to the front. Waterloo ville is not a very large town and with little vehicular movement throughout the town (except for buses). In addition to this there is not a lot of pedestrian movement throughout the town so the noise levels at the proposed site are relatively quiet, it is located away from the busy roads that run around the town thus the noise levels are less than at other locations. There are other purpose built developments being erected closer to noisier sources than the proposed development, and there are existing residential dwellings located at 2nd floor of Clock House.



10.3 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 at Clock House, Waterloo ville.

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Upgrading of separating walls to plant room:

It is understood that there will be residential dwellings sharing a party wall with the plant room thus the party wall will need to meet the required standards of Approved Document E – The resistance to the passage of sound, 2003.

The proposed party wall detail is unknown at present but if something similar to the below is installed then the necessary requirements should be met.

- Render & set
- Dense 100mm concrete block
- Cavity
- Dense 100mm concrete block
- Render & Set

This system has been tested on numerous occasions and should offer a sound reduction in excess of 55dB $D_{nT,w}$. It offers high levels of mass and isolation, the density of the blocks is essential in this system and the dense blocks are recommended. All lightweight blocks should be avoided.

The preferred system is unknown at this time, but an alternative to the above could be a dry lined system, comprising of something similar to:

- Plaster Finish
- 2 x 15mm acoustic/fire plasterboards
- 100mm timber/metal stud
- 60kg/m³ mineral wool slab in between studs
- OSB board to inner face of stud
- Cavity
- OSB board to inner face of stud
- 100mm timber/metal stud
- 60kg/m³ mineral wool slab in between studs
- 2 x 15mm acoustic/fire plasterboards
- Plaster Finish

If this system is preferred then there should be no sockets placed on the separating wall. If there are to be any sockets placed on this wall then the OSB board will help to isolate the holes but an acoustic backing (putty pads) or similar should be used.

Whilst performing the noise assessment the noise from the plant room was not audible, but it recommended that the separating walls are upgraded to meet the necessary requirements of Approved Document E – The resistance to the passage of sound, 2003.

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11 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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12 Google Earth:

