

Acoustic Consultancy Report

Ref: 10893

Noise Impact Assessment

Acoustic assessment concerning noise levels for the proposed residential development at 393 London Road, Reading, RG1 3PB.

Report Prepared For

JHAI
3 George Street
West Bay
Bridport
DT6 4EY

10th February 2022

Report Author

A handwritten signature in black ink, appearing to read 'Andy Keane'.

Andy Keane BSc (Hons) AMIOA
Acoustic Consultant
MSAFE Technologies Ltd
T 0333-8000-700
M 07748 655423
E andy.keane@msafe.co.uk

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SECTION 1: INTRODUCTION

MSAFE Technologies have been appointed by JHAI Ltd to carry out an acoustic assessment regarding the noise impact on the proposed four-storey residential development at 393 London Road, Reading, RG1 3PB to create 5 No. Flats.

BS 8233:2014 'Guidance on Sound Insulation and Noise Reduction for Buildings' defines a range of ambient noise levels for design purposes and is relevant to steady external noise sources such as those affecting the proposed development.

The results of the continuous noise survey show that worse case free-field daytime assessment levels were 71.1 dB $L_{Aeq}(9 \text{ hour})$ with a night-time level of 64.9 dB $L_{Aeq}(8 \text{ hour})$.

Due to the raised road traffic noise levels on the development, the level of glazing specified above is achievable by using glazing units such as 6mm /(16mm argon)/ 6.8mm Pilkington Optiphon glazing with an R_w value of 40 dB. (See Appendix). It is recommended that the entire development uses this standard of glazing.

A list of acoustic terminology used in this report is presented in the Appendix.

SECTION 2: SITE DETAILS

2.1 Site Description

The existing site comprises of a row of terrace houses. The existing building will be re-developed to create 5 No. residential flats over four floors. See Appendix.

2.2 Area Description

The site is located on the busy London Road, close to the junction with Liverpool Road and adjacent to the pedestrian traffic lights. The local vicinity is all residential properties with Palmer Park located on the opposite side of London Road.

SECTION 3: NOISE GUIDANCE

3.1 Noise Policy Statement for England

The overarching framework for national noise policy is the Noise Policy Statement for England (NPSE). The long-term vision identified in the policy is 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 aims of the policy are:

Through the effective management and control of environmental, neighbour and neighbourhood noise within the context of 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.*

3.2 National Planning Policy Framework

The concepts outlined in the NPSE are incorporated into the National Planning Policy Framework (NPPF). Paragraph 123 relates to noise:

Planning policies and decisions should aim to:

- *avoid noise from giving rise to significant adverse impacts on health and quality of life as a result of new development;*
- *mitigate and reduce to a minimum other adverse impacts on health and quality of life arising from noise from new development, including through the use of conditions;*
- *recognise 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 because of changes in nearby land uses since they were established; and*
- *identify and protect areas of tranquillity which have remained relatively undisturbed by noise and are prized for their recreational and amenity value for this reason.*

3.3 National Planning Practice Guidance

Practical guidance on how the NPPF should be applied is contained within the National Planning Practice Guidance (NPPG).

The NPPG guidance on design states:

‘Good quality design is an integral part of sustainable development. The National Planning Policy Framework recognises that design quality matters and that planning should drive up standards across all forms of development. As a core planning principle, plan-makers and decision takers should always seek to secure high quality design.’

‘Local planning authorities are required to take design into consideration and should refuse permission for development of poor design.’

It is therefore essential that developments use good acoustic design to achieve internal sound standards as far as is reasonably practicable. In order to do this successfully noise and vibration must always be considered at the initial design stage. If noise and vibration are only considered after site and building plans have been finalised (for example when specifying performance requirements of the building envelope), then the development is very unlikely to comply with the requirements of planning policy.

Good acoustic design will include:

- Location of buildings on the site to minimise noise exposure (this will include maximising separation of noise sources and sensitive receptors and use of buildings or topography to screen noise)
- Layout of habitable rooms within buildings to reduce noise exposure to more noise-sensitive rooms
- Ensuring dwellings exposed to high noise levels are dual aspect to provide each unit with access to a relatively quiet façade when possible
- Access to relatively quiet external amenity space
- Measures to reduce noise at source and/or on the transmission path where possible
- Design and insulation of the building envelope

3.4 BS 8233: 2014

BS 8233:2014 provides criteria for the assessment of internal and external noise levels for various uses including dwellings and commercial properties. Criteria for provision of suitable living conditions inside dwellings are provided in Table 4 of BS 8233:2014. The table below reproduces and presents the guidance upper limits for internal noise levels within dwellings that should not be exceeded in new developments.

Activity	Location	Daytime	Night-Time
		07:00 - 23:00 $L_{Aeq, 16 \text{ hour}}$	23:00 - 07:00 $L_{Aeq, 8 \text{ hour}}$
Resting	Living Room	35 dB	-
Dining	Dining Room/area	40 dB	-
Sleeping (daytime resting)	Bedroom	35 dB	30 dB

The proposed development will create bedrooms & living rooms towards the south-facing façade of the proposed development with a daytime requirement of 35 dB and 30 dB during the night-time. Due to their proximity to the busy London Road, this south-facing façade has been chosen for demonstrating compliance to represent a worse-case scenario.

SECTION 4: SURVEY DETAILS

An unattended noise survey was carried out over a 17-hour period between 16:12 hrs Tuesday 1st February and 09:34 hrs Wednesday 2nd February 2022. Measurements were carried out at the south-facing façade to represent a worse-case scenario with noise levels at their highest due to the proximity of London Road.

NTi Audio: XL2 Audio & Acoustic Sound Level Meter (Serial Number: A2A-12469-E0)

Calibration Due: 25/01/2023

NTi Audio: M2230 Measurement Microphone consisting:

MA220 (Serial Number: 6429) Capsule (Serial Number: 9573)

Calibration Due: 25/01/2023

NTi CAL 200 Class 1 Acoustic Calibrator (Serial Number: 13394)

Calibration Due: 19/04/2022

Noise levels were measured by a competent person for environmental noise monitoring, in accordance with BS 7445: 1991 (Description & Measurement of Environmental Noise).

Survey carried out by Andy Keane BSc (Hons) AMIOA.

The sound level meter was programmed to record the A-weighted L_{eq} , L_{90} , L_{10} , and L_{max} for the duration of the survey with appropriate reference time intervals of 15 mins.

The sound level meter was calibrated to 94 dB before and after the survey. No significant change (± 0.1 dB) in the calibration was noted.

For the survey, the microphone was positioned at the proposed south-facing façade at first-floor level. This location was capable of measuring all noise sources from the surrounding area including the dominant London Road traffic noise.

Weather Conditions

Significant cloud cover; temperature variable 3 - 7 °C.

Wind: Slight breeze, variable direction (<3m/s) with high winds at times.

Some light precipitation.

4.1 Measured Noise Levels

	Time	Duration	L _{Aeq} (dB)	L _{AFmax} (dB)
Tuesday - Day	16:12 – 23:00	06:47:14	71.6	106.8
Tuesday - Night	23:00 – 07:00	08:00:00	64.9	87.1
Wednesday - Day	07:00 – 09:34	02:34:15	69.5	100.2

Façade level measurements were carried out 1 metre in front of the south-facing façade. In accordance with BS 8233 (2014) facade level measurements of L_{pA} are typically 1 dB to 2 dB higher than corresponding free-field measurements because of the reflection from the facade. The above measurements have therefore been adjusted by 2 dB.

The results of the continuous noise survey show that worse case free-field daytime assessment levels were 71.1 dB L_{Aeq}(9 hour) with a night-time level of 64.9 dB L_{Aeq}(8 hour).

The south-facing façade of the proposed development will comprise of living rooms and bedrooms and therefore has a BS 8233 internal noise requirement of 35 dB during the daytime and 30 dB during the night (45 dB max)

	L _{Aeq} (dB)	BS 8233 Internal Criteria (dB)
Day	71.1	35
Night	64.9	30
Night (max)	87.1	45

	Daytime Level $L_{Aeq, 16hr}$	Night-Time Level $L_{Aeq, 8hr}$	Maximum Level* L_{Amax}	Minimum Sound Reduction Required (dB)
South	71.1	64.9	85.1	40

*10th highest measured maximum noise level (L_{Amax})

The WHO ‘Guidelines for Community Noise’ offers advice with regard to setting noise criteria applicable to sleep disturbance.

“If the noise is not continuous, L_{Amax} or SEL are used to indicate the probability of noise induced awakenings. Effects have been observed at individual L_{Amax} exposures of 45 dB or less. Consequently, it is important to limit the number of noise events with a L_{Amax} exceeding 45 dB.”

‘For a good sleep, it is believed that indoor sound pressure levels should not exceed approximately 45 dB L_{Amax} more than 10–15 times per night.’

This assessment has utilised the 10th highest measured maximum noise level (L_{Amax}) from each of the night-time periods and allows for an assessment of a typical maximum noise level in determining façade sound insulation performance.

“At night, sound pressure levels at the outside façades of the living spaces should not exceed 45 dB L_{Aeq} and 60 dB L_{Amax} so that people may sleep with bedroom windows open. These values have been obtained by assuming that the noise reduction from outside to inside with the window partly open is 15 dB.” The sound insulation performance of 15 dB for a façade containing a partially open window accords with the guidance offered in BS 8233 (2014).

The windows and any trickle ventilators are usually the acoustic weak point of a brick and block façade. In relation to acoustically treated ventilation, the World Health Organisation (WHO) considers that “it should be possible to sleep with a bedroom window slightly open (a reduction from outside to inside of 15 dB).” The implication of this statement is that if external L_{Aeq} night-time levels exceed 45 dB (30 dB internal level plus 15 dB

reduction for a partially open window), or if daytime average levels exceed L_{Aeq} 50 dB, then an alternative ventilation strategy is required.

The above results indicate that the required internal criteria will not be met with partially open windows at the facades of the proposed residential development. Noise break-in calculations have been carried out in accordance with *BS 12354:2000 Building acoustics – Estimation of acoustic performance of buildings* performance of elements to determine the minimum required sound insulation performances of façade elements.

Component	Sound Reduction Index (dB) Octave Band Frequency								R_w (C_{tr}) Value (dB)	Products
	63	125	250	500	1k	2k	4k	8k		
External Wall (R)	30	40	44	45	51	56	56	56	51 (-1)	Brick/Block Cavity
Glazing (R)	21	21	28	37	48	48	54	54	40 (-6)	6mm/ (16mm) /6.8mm Optiphon
Ventilator ($D_{n,e}$)	31	31	35	40	39	31	31	31	36 (-1)	Trickle Vent

Naturally if windows are opened to provide over and above background ventilation the internal noise levels would expectedly increase, and generally temperature versus noise comfort levels would be based on the resident's preference. However, it should be noted that when considering additional ventilation to combat overheating or purge ventilation used to remove odours etc, there are no specific requirements for acoustic criteria as these instances are rare and are at the resident's discretion.

Due to the raised road traffic noise levels on the development, the level of glazing specified above is achievable by using glazing units such as 6mm /(16mm argon)/ 6.8mm Pilkington Optiphon glazing with an R_w value of 40 dB. (See Appendix). It is recommended that the entire development uses this standard of glazing.

SECTION 5: ACOUSTIC TERMINOLOGY

Decibel (dB): a unit of level derived from the logarithm of the ratio between the value of a quantity and a reference value. It is used to describe the level of many different quantities. For sound pressure level the reference quantity is 20 Pa, the threshold of normal hearing is in the region of 0 dB, and 140 dB is the threshold of pain. A change of 1 dB is only perceptible under controlled conditions.

dB(A): decibels measured on a sound level meter incorporating a frequency weighting (A weighting) which differentiates between sounds of different frequency (pitch) in a similar way to the human ear. Measurements in dB(A) broadly agree with people's assessment of loudness. A change of 3 dB(A) is the minimum perceptible under normal conditions, and a change of 10 dB(A) corresponds roughly to halving or doubling the loudness of a sound. The background noise level in a living room may be about 30 dB(A); normal conversation about 60 dB(A) at 1 metre; heavy road traffic about 80 dB(A) at 10 metres; the level near a pneumatic drill about 100 dB(A).

$L_{Aeq,T}$: the equivalent continuous sound level -the sound level of a notionally steady sound having the same energy as a fluctuating sound over a specified measurement period (T). $L_{Aeq,T}$ is used to describe many types of noise and can be measured directly with an integrating sound level meter.

R_w : The single figure rating method is the rating used for laboratory airborne sound insulation tests. The figure indicates the amount of sound energy being stopped by a separating building element when tested in isolation in the absence of any flanking paths. (The higher the figure the better the sound insulation).

L_{AFmax} : A-weighted, fast, maximum sound level

SECTION 6: APPENDIX

This report has been prepared by MSAFE Technologies Limited (MSAFE) with all reasonable skill, care and diligence in accordance with generally accepted acoustic consultancy principles and the purposes and terms agreed between MSAFE and our Client. Any information provided by third parties and referred to herein may not have been checked or verified by MSAFE unless expressly stated otherwise. This document contains confidential and commercially sensitive information and shall not be disclosed to third parties. Any third party relies upon this document at their own risk.

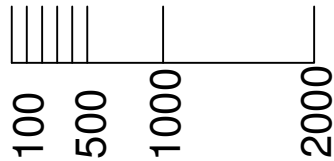
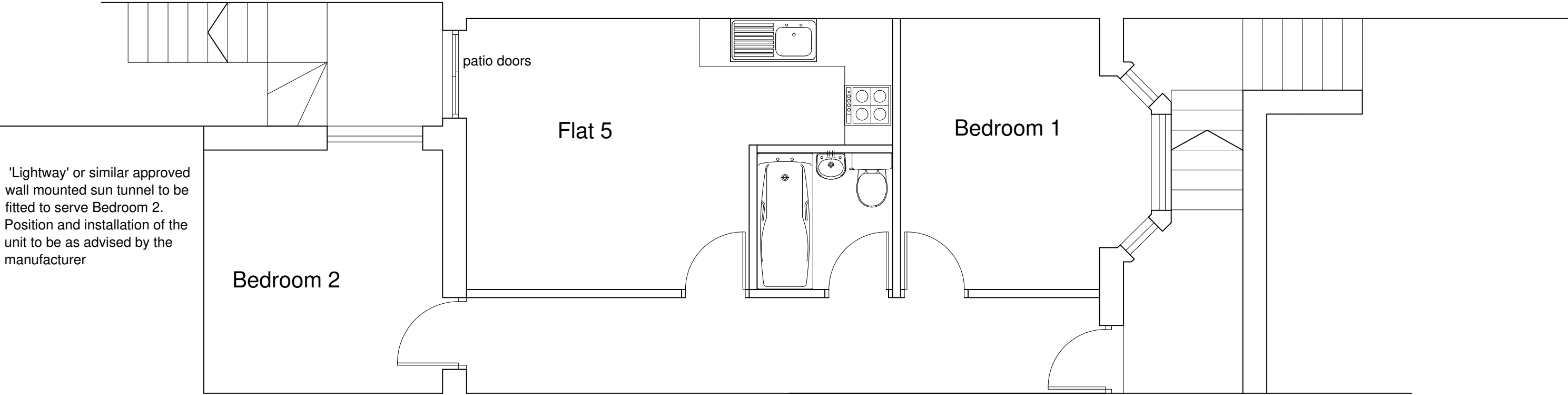
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all works to be carried out in accordance with current health and safety regulations.

contractor to check all dimensions on site prior to commencement of works.

'Scale Bar' added Sept 2018
Basement amendment/ sun tunnel added, June 2019



client:

project: 393 London Road, Reading

drawing: Proposed Basement

scale: 1/50 date: May 2019

drawing no.: MAY Sketch on Basement

abacus architectural

21 union street
ramsbottom
lancashire
bl0 9an

tel: 01706 824 777
email: mail@abacusarchitectural.com

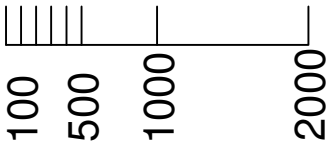
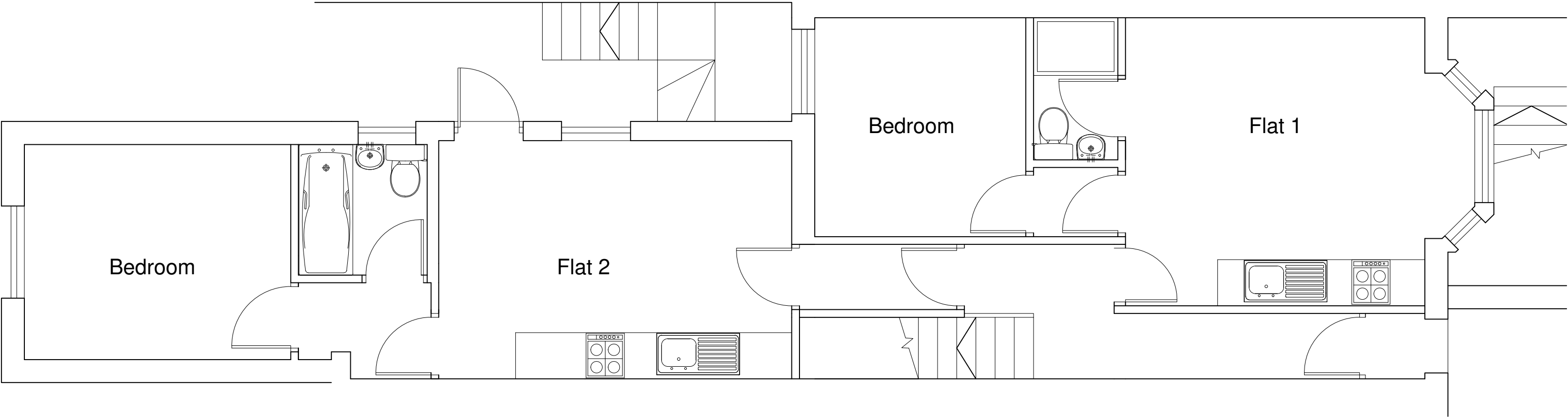
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all works to be carried out in accordance with current health and safety regulations.

contractor to check all dimensions on site prior to commencement of works.

'Scale Bar' added, September '18



client:

project: 393 London Road, Reading

drawing: Sketch on the Ground Floor

scale: 1/50 date: June 2018

drawing no.: 17-128-10

abacus architectural limited

21 union street
ramsbottom
lancashire
bl0 9an

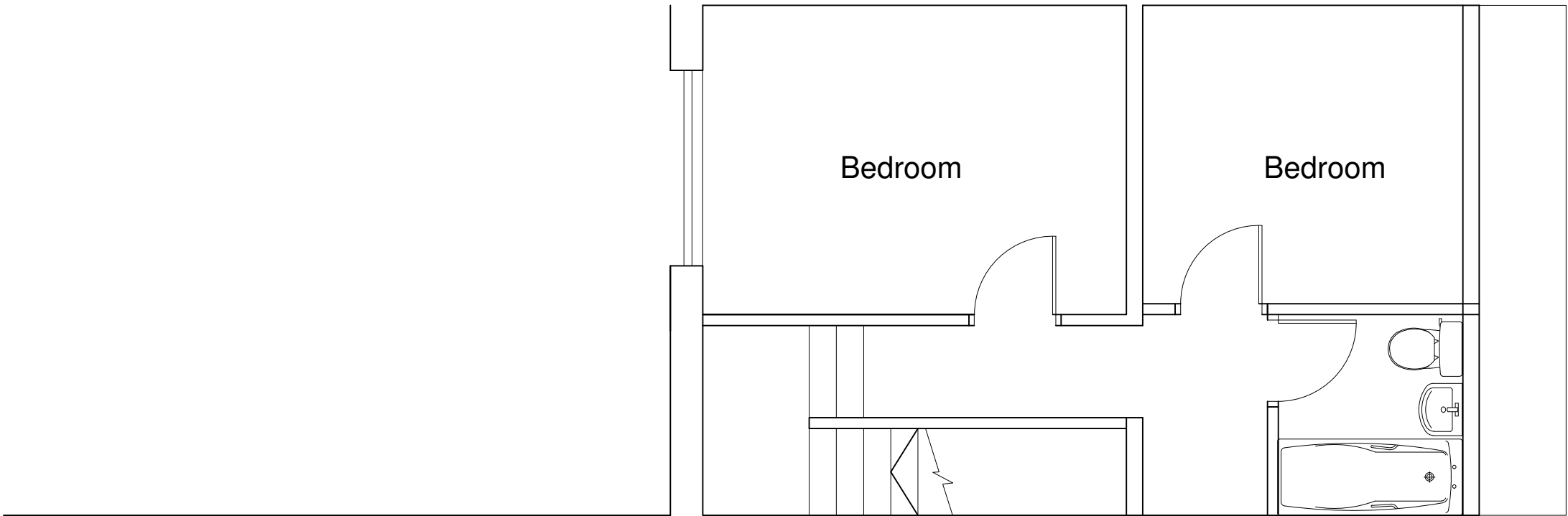
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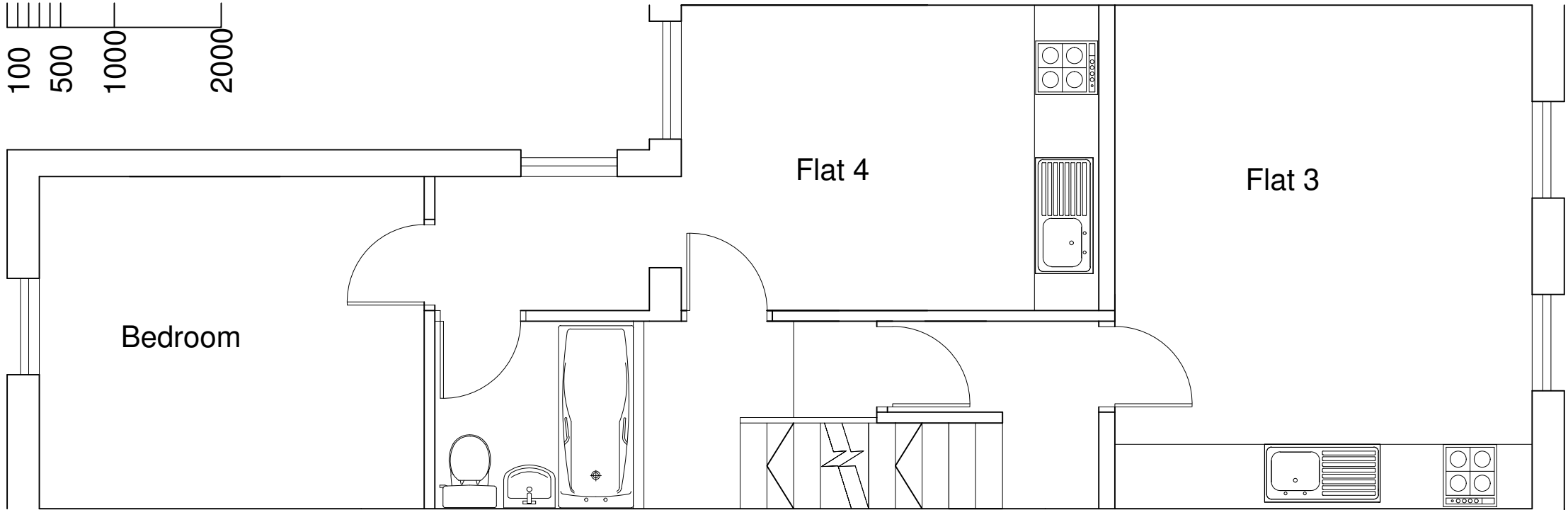
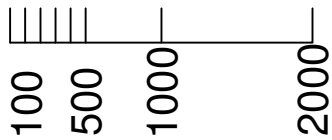
all works to be carried out in accordance with current health and safety regulations.

contractor to check all dimensions on site prior to commencement of works.



Second Floor

- A 'Scale Bar' added, September '18
- B Rear window amended, March '19



First Floor

client:
project: 393 London Road, Reading
drawing: Sketch on First and Second Floors
scale: 1/50 date: May 2018
drawing no.: 17-128-11A

abacus architectural limited
21 union street
ramsbottom
lancashire
bl0 9an
tel: 01706 824 777
email: mail@abacusarchitectural.com

Sound insulation data for Pilkington **Optiphon™**

Glass	Sound reduction index (dB)									
	Octaveband Centre Frequency (Hz)						R _w (C; C _{tr})	R _w	R _w + C	R _w + C _{tr}
	125	250	500	1000	2000	4000				
Single glazing										
6.8 mm Pilkington Optiphon [™]	22	26	31	37	40	40	36 (-1; -4)	36	35	32
8.8 mm Pilkington Optiphon [™]	27	29	34	38	40	43	37 (0; -2)	37	37	35
10.8 mm Pilkington Optiphon [™]	26	30	35	39	40	46	38 (-1; -3)	38	37	35
12.8 mm Pilkington Optiphon [™]	29	32	36	41	42	51	40 (-1; -3)	40	39	37
16.8 mm Pilkington Optiphon [™]	31	33	38	41	43	54	41 (-1; -3)	41	40	38
Insulating glass units										
6 mm / 16 mm argon / 6.8 mm Pilkington Optiphon [™]	21	28	37	48	48	54	40 (-2; -6)	40	38	34
6 mm / 16 mm argon / 8.8 mm Pilkington Optiphon [™]	25	27	38	48	47	55	41 (-2; -6)	41	39	35
8 mm / 16 mm argon / 8.8 mm Pilkington Optiphon [™]	21	30	39	47	50	55	42 (-3; -8)	42	39	34
10 mm / 16 mm argon / 8.8 mm Pilkington Optiphon [™]	28	31	42	45	50	58	44 (-2; -6)	44	42	38
10 mm / 20 mm argon / 8.8 mm Pilkington Optiphon [™]	28	36	43	47	49	58	46 (-2; -6)	46	44	40
8.8 mm Pilkington Optiphon [™] / 16 mm argon / 12.8 mm Pilkington Optiphon [™]	28	36	45	53	56	64	48 (-2; -7)	48	46	41
10.8 mm Pilkington Optiphon [™] / 24 mm argon / 16.8 mm Pilkington Optiphon [™]	35	41	48	53	55	65	52 (-2; -6)	52	50	46
12.8 mm Pilkington Optiphon [™] / 20 mm argon / 16.8 mm Pilkington Optiphon [™]	35	45	49	50	54	65	51 (-1; -4)	51	50	47

Measurements undertaken in accordance with BS EN ISO 10140 and R_w (C; C_{tr}) determined in accordance with BS EN ISO 717-1.

For insulating glass units, there is little difference in the sound insulation for cavity widths in the range 6 to 16 mm.

To calculate performance data for Pilkington products, please use our Spectrum online calculator at <https://spectrum.pilkington.com/>

For glass combinations to achieve an R_w value higher than 52 dB, please contact us for more details.



Sound insulation data for standard products

Glass	Sound reduction index (dB)									
	Octaveband Centre Frequency (Hz)						R _w (C; C _{tr})	R _w	R _w + C	R _w + C _{tr}
	125	250	500	1000	2000	4000				
Single glazing										
4 mm Float Glass	17	20	26	32	33	26	29 (-2; -3)	29	27	26
6 mm Float Glass	18	23	30	35	27	32	31 (-2; -3)	31	29	28
8 mm Float Glass	20	24	29	34	29	37	32 (-2; -3)	32	30	29
10 mm Float Glass	23	26	32	31	32	39	33 (-2; -3)	33	31	30
12 mm Float Glass	27	29	31	32	38	47	33 (0; -2)	34	34	32
6 mm Laminated Glass	20	23	29	34	32	38	32 (-1; -3)	32	31	29
8 mm Laminated Glass	20	25	32	35	34	42	33 (-1; -3)	33	32	30
10 mm Laminated Glass	24	26	33	33	35	44	34 (-1; -3)	34	33	31
12 mm Laminated Glass	24	27	33	32	37	46	35 (-1; -3)	35	34	32
16 mm Laminated Glass	26	31	30	35	43	51	36 (-1; -3)	36	35	33
Insulating glass units										
4 mm / (6 - 16 mm) / 4 mm	21	17	25	35	37	31	29 (-1; -4)	29	28	25
6 mm / (6 - 16 mm) / 4 mm	21	20	26	38	37	39	32 (-2; -4)	32	30	28
6 mm / (6 - 16 mm) / 6 mm	20	18	28	38	34	38	31 (-1; -4)	31	30	27
8 mm / (6 - 16 mm) / 4 mm	22	21	28	38	40	47	33 (-1; -4)	33	32	29
8 mm / (6 - 16 mm) / 6 mm	20	21	33	40	36	48	35 (-2; -6)	35	33	29
10 mm / (6 - 16 mm) / 4 mm	24	21	32	37	42	43	35 (-2; -5)	35	33	30
10 mm / (6 - 16 mm) / 6 mm	24	24	32	37	37	44	35 (-1; -3)	35	34	32
6 mm / (6 - 16 mm) / 6 mm Laminated	20	19	30	39	37	46	33 (-2; -5)	33	31	38
6 mm / (6 - 16 mm) / 10 mm Laminated	24	25	33	39	40	49	37 (-1; -5)	37	36	32

The above are generally accepted values for generic products taken from EN 12758. They are conservative values that can be used in the absence of measured data. Data for laminated glass is based on pvb interlayers (excluding acoustic pvb interlayers). Glass thickness for laminated glass excludes interlayer thickness. Data can be adopted for air or argon gas-filled cavities

