REPORT

FAÇADE NOISE EXPOSURE ASSESSMENT

SITE ADDRESS

33 BRIGHTON ROAD, CROYDON, SURREY CR2 6EB

REFERENCE

HA/AE917/V1

HEALTHY ABODE ACOUSTICS
BUILDING ACOUSTICIANS & ENVIRONMENTAL NOISE CONSULTANTS

Our Ref	HA/AE917/V1
Site Address	33 Brighton Road, Croydon, Surrey CR2 6EB
For	Maker Property Investments Ltd c/o Planning Consent UK Ltd
Client Address	Planning consent UK Ltd, 155 Parkside Avenue, Bexleyheath, London DA7 6NP
Date of Report	20 March 2023
Author	Miss Josie Nixon MSc BA (Hons) MIOA
Checked by	Mark Speed BSc(Hons) MIOA MInstP MIEnvSc

Healthy Abode Ltd t/a HA Acoustics
Company No. 07429355 (England & Wales)
Office Address: HA Acoustics, Office F9, Allen House Business Centre, The Maltings, Station Road, Sawbridgeworth, Essex
CM21 9JX
Registered Business Address: Abacus House. 68a North Street, Romford, London, RM1 1DA
E-mail: info@HA-acoustics.co.uk
Website: www.HA-acoustics.co.uk
Telephone: (Chelmsford) 01245 206 250

EXECUTIVE SUMMARY

- Maker Property Investments Ltd c/o Planning Consent UK Ltd instructed Healthy Abode Ltd t/a as HA Acoustics to undertake a noise impact assessment for proposed residential premises to be located at 33 Brighton Road, Croydon, Surrey CR2 6EB.

- HA Acoustics has undertaken an environmental noise survey and assessment at the site in line with the guidance contained in British Standard (BS) 8233:2014. The environmental noise survey was undertaken in order to determine prevailing ambient, background and maximum noise levels that are representative of the residential premises, measurements being taken over continuous 5-minute periods.

- An unattended survey was conducted between Thursday 9th February 2023 and Tuesday 14th February 2023 at two fixed secure monitoring positions deemed representative of the worst affected façades of the proposed site.

- The results of the noise survey are considered reasonable given the location of the measurement position and the existing noise sources in the local vicinity. The representative time-averaged ambient and night-time maximum noise levels have been calculated at:
    - Position 1: 73 dB $L_{Aeq\ daytime}$, 70 dB $L_{Aeq\ night\ time,}$ and 85 dB $L_{Amax,F,NNE}$,
    - Position 2: 58 dB $L_{Aeq\ daytime}$, 55 dB $L_{Aeq\ night\ time,}$ and 71 dB $L_{Amax,F,NNE}$

- The assessment has indicated that internal noise levels within the proposed development are predicted to meet the guideline noise criteria contained in BS 8233:2014 provided the identified appropriate minimum specified glazing, ventilation and façade materials are installed to a good manner of workmanship.

- At the time of composing the report the exact specifications of the construction/build of the proposal have not been finalised. Recommendations provided in respect to sound insulation of the building have been proposed based on achieving the desired internal noise levels in BS 8233:2014.

TABLE OF CONTENTS

APPENDICES

1. INTRODUCTION

1.1. It is proposed to convert an existing office block and introduce new residential premises at 33 Brighton Road, Croydon, Surrey CR2 6EB. The existing ambient noise climate could have the potential to affect the premises.

1.2. The purposes of this report are:

1.2.1. To determine and assess prevailing ambient, background and maximum noise levels affecting the proposal due to nearby noise sources (e.g. air and road traffic);

1.2.2. To present desired internal noise levels to be achieved within the residential premises in accordance with BS 8233:2014, and

1.2.3. To detail appropriate sound insulation requirements for the purposes of mitigating noise caused by prevailing and potential noise sources such that internal noise levels are achieved.

2. SITE DESCRIPTION AND OBSERVATIONS

2.1. 33 Brighton Road, Croydon, Surrey CR2 6EB is hereafter referred to as 'the site'. The site currently comprises a 3 storey commercial block, which is proposed to undergo a change of use to residential premises. The proposal is to utilize the existing façade and to construct 7 flats.

2.2. The site is located within an urban area and is predominantly surrounded by commercial and residential premises. The site fronts onto the A235, which runs along the western façade. Located opposite the site to the west is Whitgift Academy of Visual and Performing Arts, sports field, with the educational buildings located further to the west. South Croydon station is located to the north-east at a distance of approximately 330m.

2.3. The noise survey was unmanned; therefore, a subjective assessment of background and ambient noise sources could not be undertaken for the whole monitoring duration. However, during installation and collection of the monitoring equipment, the dominant noise source emanated from road traffic on Brighton Road - the A235. These noise sources are considered normal to the site location. No significant abnormal noise source(s) were identifiable.

3. NOISE EMISSION GUIDANCE AND CRITERIA

3.1. National Planning Policy Framework (2021)

3.2. In March 2012, the National Planning Policy Framework (NPPF) came into force and was revised in 2019 and 2021. This document replaces a great many planning guidance documents, which previously informed the planning system in England.

3.3. The NPPF (2021) sets out the Government's economic, environmental and social planning policies for England and these policies articulate the Government's vision of sustainable development.

3.4. The Noise Policy Statement for England (NPSE) published 2010 applies to *'all forms of noise, including environmental noise, neighbour noise and neighbourhood noise'*.

3.5. Paragraph 185 of the NPPF (2021) considers noise, stating:

> *"Planning policies and decisions should also ensure that new development is appropriate for its location taking into account the likely effects (including cumulative effects) of pollution on health, living conditions and the natural environment, as well as the potential sensitivity of the site or the wider area to impacts that could arise from the development. In doing so they should:*
>
> - *a) mitigate and reduce to a minimum potential adverse impacts resulting from noise from new development – and avoid noise giving rise to significant adverse impacts on health and the quality of life;*
> - *b) identify and protect tranquil areas which have remained relatively undisturbed by noise and are prized for their recreational and amenity value for this reason; and*
> - *c) limit the impact of light pollution from artificial light on local amenity, intrinsically dark landscapes and nature conservation."*

3.6. National Planning Policy is guided by the NPPF. With regard to noise, the terms 'significant adverse impact' and 'other adverse impacts' are defined in the explanatory notes of the 'Noise Policy Statement for England' (NPSE). These state that there are two established concepts from toxicology that are currently being applied to noise impacts, for example, by the World Health Organisation. They are:

- 'NOEL – No Observed Effect Level, 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, and

- LOAEL – Lowest Observed Adverse Effect Level. This is the level above which adverse effects on health and quality of life can be detected.

3.7. Extending these concepts for the purpose of this NPSE leads to the concept of SOAEL - significant observed adverse effect level. This is the level above which significant adverse effects on health and quality of life occur'. However, no specific noise limits for LOAEL and SOAEL have been defined. Therefore, guidance from other acoustic standards must be employed to determine suitable levels within the overall principal of the National Planning Policy Framework; such as BS 8233:2014.

3.8. **BS8233:2014**

3.9. Local Authorities usually stipulate internal noise criteria for new build residential uses based on British Standard 8233:2014 'Guidance on Sound Insulation and Noise Reduction for Buildings'.

3.10. BS 8233:2014 provides references and guideline values for desirable indoor ambient noise levels for dwellings as shown in Table 3.1 below.

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 $L_{Aeq,8hour}$

Table 3.1 BS 8233:2014 Desirable Internal Ambient Noise Levels for Dwellings

3.11. The table is noted to apply to external noise as it affects the internal acoustic environment from sources without a specific character. The above internal ambient noise levels are therefore considered appropriate within this assessment.

3.12. BS 8233:2014 states that 'for traditional external areas that are used for amenity space, such as gardens and patios, it is desirable that the external noise level does not exceed an upper guideline value of 55dB L_{Aeq}, which would be acceptable in noisier environments. However, it is also recognized that these guideline values are not achievable in all circumstances…in higher noise areas, such as city centres or urban areas adjoining the strategic transport network, a compromise between elevated noise levels and other factors, such as the convenience of living in these locations or making efficient use of land resources to ensure development needs can be met, might be warranted. In such a situation, development should be designed to achieve the lowest practicable levels in these external amenity spaces but should not be prohibited'.

4. ENVIRONMENTAL NOISE SURVEY METHODOLOGY

4.1. An unmanned environmental noise survey was undertaken at two secure single measurement locations (see appendix A). The surveys were undertaken between 11:50 hours on Thursday 9 February 2023 and 10:40 on Thursday 14 February 2023.

4.2. Ambient, background and maximum sound pressure level measurements (L_{Aeq}, L_{A90} and $L_{Amax,F}$ respectively) were measured throughout the noise survey with continuous recorded 5 minute periods. The measurement position is indicated in **orange** in Appendix A.

4.3. The sound level meter's (SLM's) were mounted to the front and rear façade at first floor height. The position is considered to be in 'free-field' conditions so a façade correction has not been applied to the data. The positions were chosen to gain representative noise levels from any noise sources as well as for monitoring equipment security reasons.

4.4. The equipment used for the noise survey is summarised in Table 3.1.

Equipment	Description	Quantity	Serial Number
Svantek 977	Class 1 automated logging sound level meter	1	69506
ACO Pacific 7052E	Class 1 ½" microphone	1	68191
Svantek 977	Class 1 automated logging sound level meter	1	69297
ACO Pacific 7052E	Class 1 ½" microphone	1	69364
Larson Davis CAL200	Class 1 Calibrator	1	20159
Svantek SV 36	Class 1 Calibrator	1	109944

Table 3.1 Description of Equipment used for Noise Survey

4.5. The noise survey and measurements were conducted, in accordance with BS7445-1:2003 '*Description and measurement of environmental noise. Guide to quantities and procedures'*. Measurements were made generally in accordance with ISO 1996-2:2017 '*Acoustics – Description, measurement and assessment of environmental noise – Part 2: Determination of environmental noise levels*'.

4.6. The noise monitoring equipment used was calibrated before and after the noise survey period. No significant drift was recorded. Equipment calibration certificates can be provided upon request.

4.7. **Weather Conditions**

4.8. Weather conditions were noted to be:

4.8.1. during installation - cold (approx. 6° Celsius), dry, with cloudy skies (<10% cloud cover) and a light wind (<5m/s).

4.8.2. during collection - cold (approx. 10° Celsius), dry, with clear to cloudy skies (50% cloud cover) and a light wind (<5m/s).

4.8.3. throughout the entire noise survey period - predominantly cold (0° to 13° Celsius), generally dry, with clear to cloudy skies (10-100% cloud cover) and a light wind (<5m/s).

4.9. These weather conditions were checked against and confirmed by the use of the Met Office mobile application available on smart phone technology. These conditions were generally maintained throughout the whole survey period and are considered reasonable for undertaking environmental noise measurements.

5. NOISE SURVEY RESULTS

5.1. The average-ambient and maximum noise levels at the measurement position during the survey have been based on an analysis of the monitoring data and are summarised in Table 5.1. A time history of the noise monitoring data is provided in Appendix B.

Monitoring Position	Period	Measured External Sound Pressure Level, dB
Position 1 (Front Façade)	Daytime (07:00 - 23:00)	73 $L_{Aeq,T}$
	Night-time (23:00 - 07:00)	70 $L_{Aeq,T}$
	Night-time (23:00 - 07:00)	*85 $L_{Amax,F,NNE}$
Position 2 (Rear Façade)	Daytime (07:00 - 23:00)	58 $L_{Aeq,T}$
	Night-time (23:00 - 07:00)	55 $L_{Aeq,T}$
	Night-time (23:00 - 07:00)	**71 $L_{Amax,F,NNE}$

*8th and **10th highest measured noise level

Table 5.1 Noise Survey Results

5.2. BS 8233:2014 does not provide specific guidance on night time $L_{Amax,F}$ criteria therefore maximum levels are based on World Health Organisation (WHO) 'Guideline for Community Noise' (2009) and WHO 'Environmental Noise Guidelines for the European Region' (2018) guidance and ProPG: 2017 guidance.

5.3. It is stated that for suitable sleeping conditions, 45dB $L_{Amax,F}$ should not be exceeded by more than 10-15 times a night within a bedroom. For robustness, the $L_{Amax,F,NNE}$ noise levels presented above is the not normally exceeded (NNE) 8th and 10th highest measured between 23:00 and 07:00 hours. This $L_{Amax,F,NNE}$ noise level then needs to be reduced to 45dB internally to comply with the night time internal noise level.

6. BUILDING FACADES SUITABILITY

6.1. Sound reduction performance calculations have been undertaken to determine the internal noise levels and performance of the glazed and non-glazed elements as outlined in section 7. The specification has been adopted to achieve the night-time level (23:00 – 07:00 hours) for bedrooms, 30dB $L_{Aeq\ 8hour}$ and for the daytime (07:00 – 23:00) for living rooms, 35dB $L_{Aeq\ 16hour.}$ Values of the night-time period have been also applied to the calculated sound reduction index of the glazed element to confirm the limit of 45 $L_{Amax,F,}$ is also achieved for single events during the night.

6.2. Suggested glazing units and building element specifications other than those provided below may be suitable but should be checked before purchase or installation. The analysis is provided to demonstrate that a design solution is feasible at the site for the purposes of meeting the requirements of the Local Authority.

6.3. **Non-Glazed Elements**

6.4. It is understood that the non-glazed elements of the building will use the existing façade and is constructed from brick and block work and internally drylined. This construction would be anticipated to provide a sound reduction performance of at least the figures shown in Table 6.1 when tested in accordance with BS EN ISO, 140-3:1995.

Element	Octave band centre frequency SRI, dB					
	125Hz	250Hz	500Hz	1kHz	2kHz	4kHz
Non-glazed element brick/block cavity wall SRI	41	43	48	50	55	55
Non-glazed element brick/block cavity wall with internal lining*	54	54	58	66	68	77

Table 6.1 Non-glazed elements assumed sound reduction performance

*** For internal lining details see section 6.6**

6.5. The below example of construction provides guidance to a typical wall build which should attenuate external noise such that the internal noise levels are achieved.

- BS 8233 Table E.1A (50-54dB R_W sound insulation) (d) details construction of “Brick laid frogs up, wall nominal 200 mm thickness, weight (including plaster) not less than 380 kg/m^2. Plaster or dry-lined finish both sides. Brickwork joints well filled”.

6.6. Due to the high noise levels from the road, internal wall linings of 12.5mm dense plasterboard (nominal mass 840 kg/m^3) on a minimum 50mm battened linings will be required to the external walls of all rooms facing the road.

6.7. Given the typical extensive build and construction of external walls in accordance with the Building Regulations it is predicted that this element would provide significant attenuation to achieve the internal noise levels.

6.8. **Roofs**

6.9. Roofs generally have a lower SRI than masonry façade walls but they are required to reduce noise from external sources. Typical construction and sound insulation values of roofs can be gained from BS 8233:2014, for example a traditional pitched roof with tiles on felt with 100mm mineral wool on plasterboard ceiling has an SRI of approximately 43dB R_w.

6.10. Given the typical extensive build and construction of roofs it is predicted that these elements would provide sufficient attenuation to achieve the internal noise levels.

6.11. **Glazed Elements**

6.12. Calculations (Appendix C) show that based on monitoring data, façade materials, room sizes and volumes, a minimum of 47dB R_w noise reduction is required for all glazed elements facing the road to be installed. A reduced requirement of 34dB R_w can be used for the rear of the building where noise from the road is sufficiently screened. The performance is specified for the whole window unit, including the frame and other design features such as the inclusion of trickle vents. Sole glass performance data would not demonstrate compliance with this specification. Window performance calculations have been based on the measured L_{Aeq} noise levels as recommended by BS 8233:2014.

6.13. The reference reverberation time of 0.5 second is utilised, as stated in BS8233: 2014 and assumes that the dwelling shall have carpeted, fully furnished, occupied bedroom(s).

6.14. Typical' thermal double-glazing required by the Building Regulations provide approximately 31dB R_W sound insulation therefore this enhanced window specification should ensure that the thermal requirements and internal noise levels are achieved.

6.15. The glazing window requirements are listed below in table 7.2. These specifications and their acoustic data on octave band frequencies are provided in Appendix C.

	Required Overall Sound Reduction Performance, R_w	Glazing and Ventilation Type – Indicative Only
Front Façade + Flat 3 Bedrooms Flat 7 Reception / Kitchen	47 dB	R_w 47dB Secondary Glazing System (6m Glass – 150mm air gap – 4mm Secondary Glass)
		Mechanical Ventilation
Rear Façade*	34 dB	R_w 34dB Double Glazing System
		Mechanical Ventilation

**based on approximate room sizes*

+ With wall treatment linings – see section 6.6

Table 7.2 Required Window Specifications.

6.16. **Ventilation**

6.17. In addition to the glazing requirements, internal noise levels should be considered in the context of room ventilation requirements. Mechanical ventilation has been proposed for the building, which would work in combination with the specified window spectrals.

6.18. **Detailed Design Stage Notes:**

6.19. The analysis is provided to demonstrate that a design solution is feasible at the site for the purposes of meeting the requirements of the Local Authority local policy and British Standard internal design criteria and therefore to produce a noise impact assessment to be supplied in support of the planning application.

6.20. Following planning consent, then it is usual that the architect will produce full building regulation drawings. At which time, structural chartered engineers, thermal engineers, M+E and acoustic engineers will be engaged to input on the detailed design. As part of this detailed design stage, it is strongly recommended that further acoustic analysis of the individual specified components and if necessary further recommendations, specifications be undertaken.

6.21. Acoustic calculations to determine the glazing and ventilation strategy should also be re-run should the room sizes and percentage of glazing differ from that assumed above.

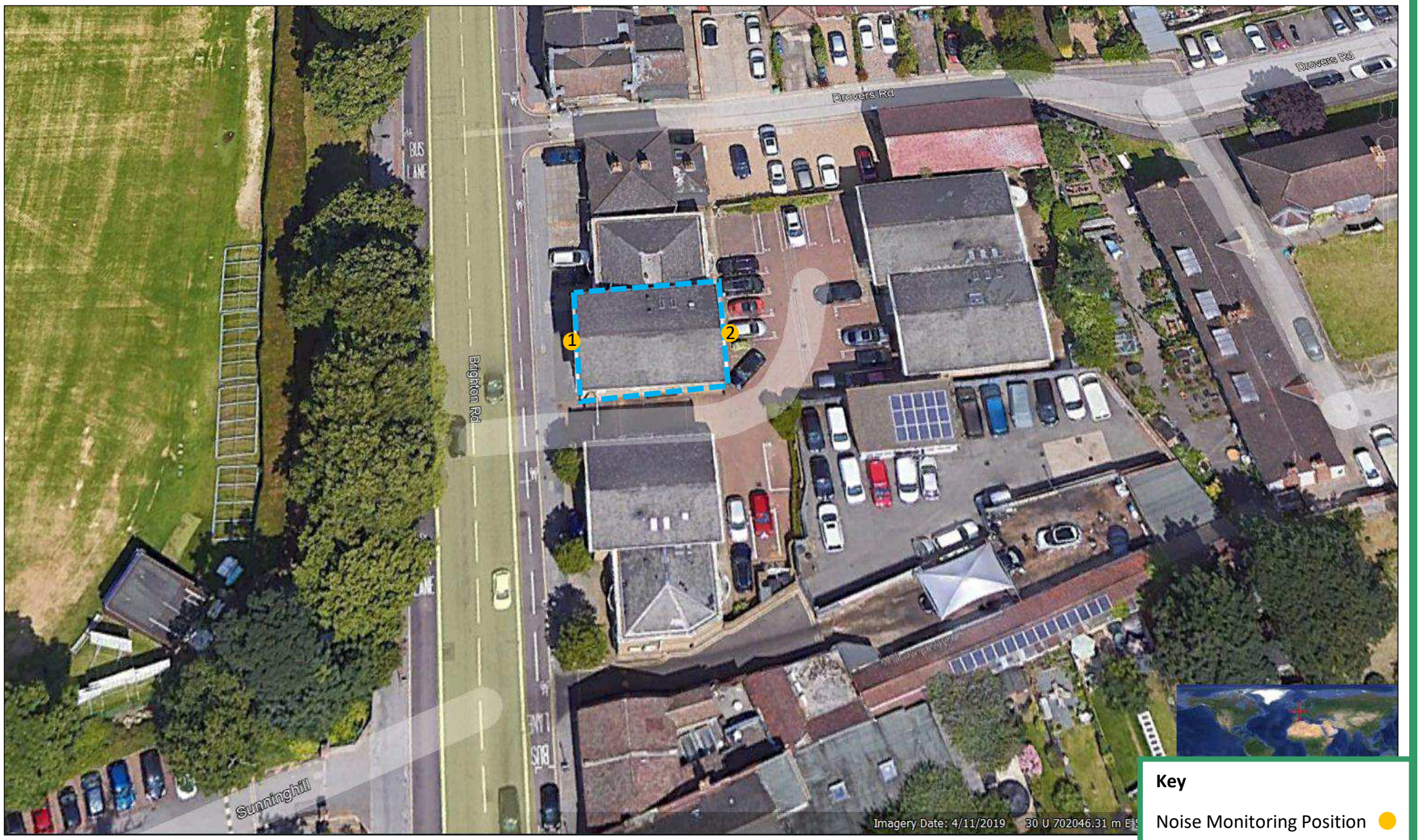
7. CONCLUSION

7.1. A new residential development is proposed at 33 Brighton Road, Croydon, Surrey CR2 6EB. A noise survey and assessment has been undertaken for the proposed development. Existing noise levels at the site have been measured and compared to relevant standards and guidance.

7.2. In conjunction with a mechanical ventilation strategy and internal wall linings as detailed herein, a minimum of 47dB R_w noise reduction is required for glazed elements overlooking the road. A reduced specification of 34dB R_w can be used in the rear facing facades. Window calculations have been carried out and the requirements identified.

7.3. With appropriate façade sound insulation, window measures and building construction as exampled within this report the proposed residential premises is more than capable of achieving the guideline internal noise criteria contained in BS 8233:2014.

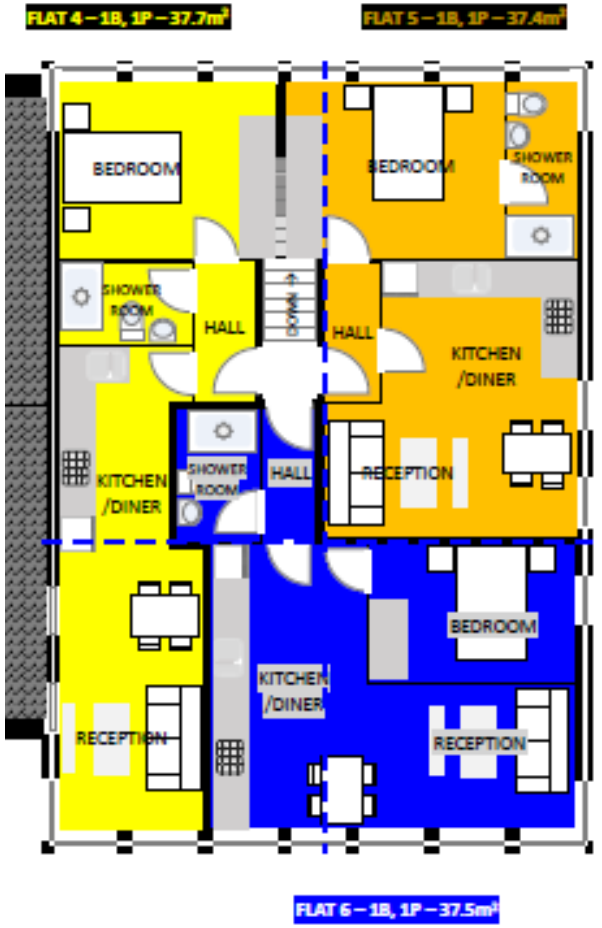
Appendix A – Site Plan (SP1)



Appendix A – Site Plan (SP2)

Proposed Ground Floor

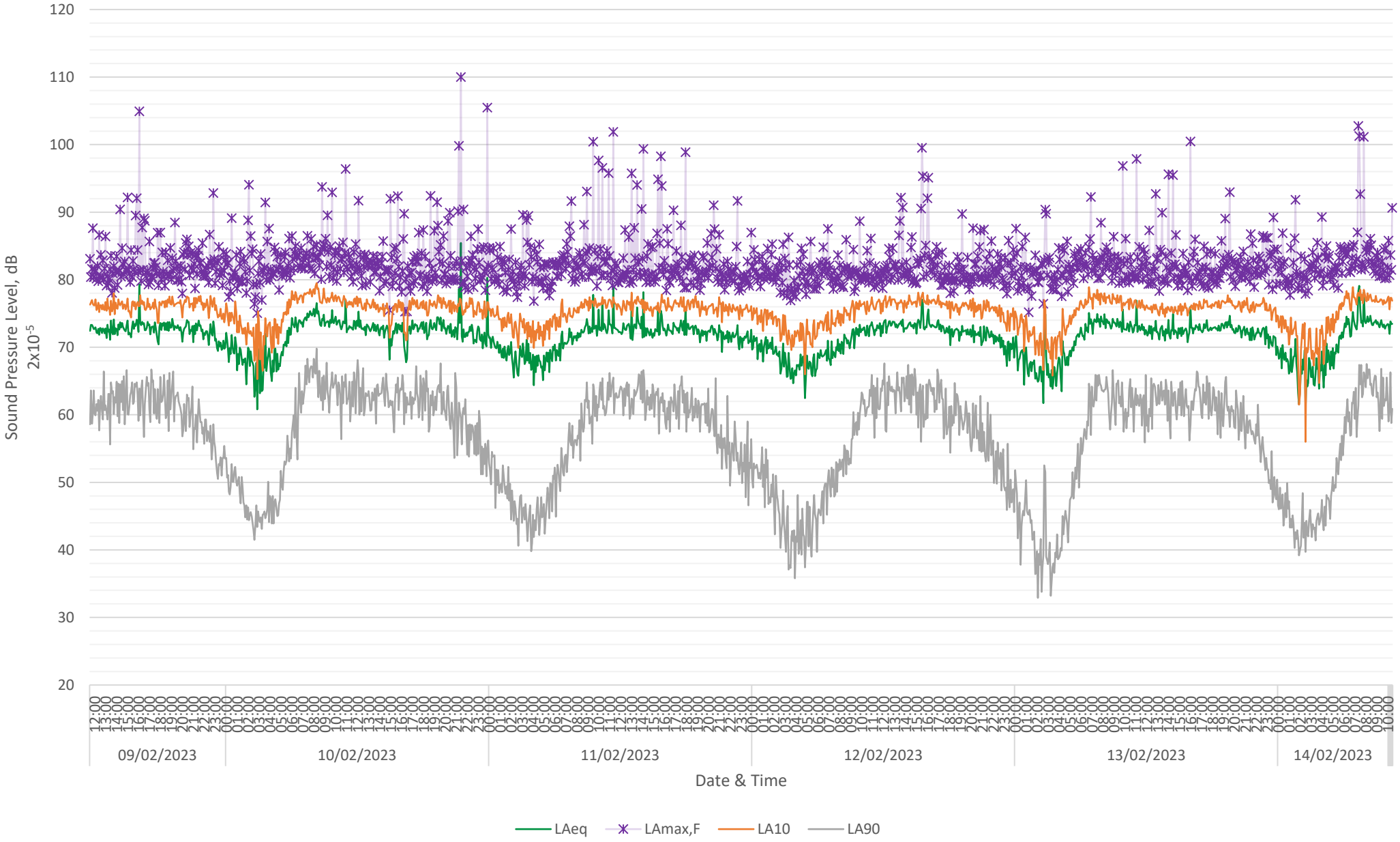
Proposed First Floor



Proposed Second Floor

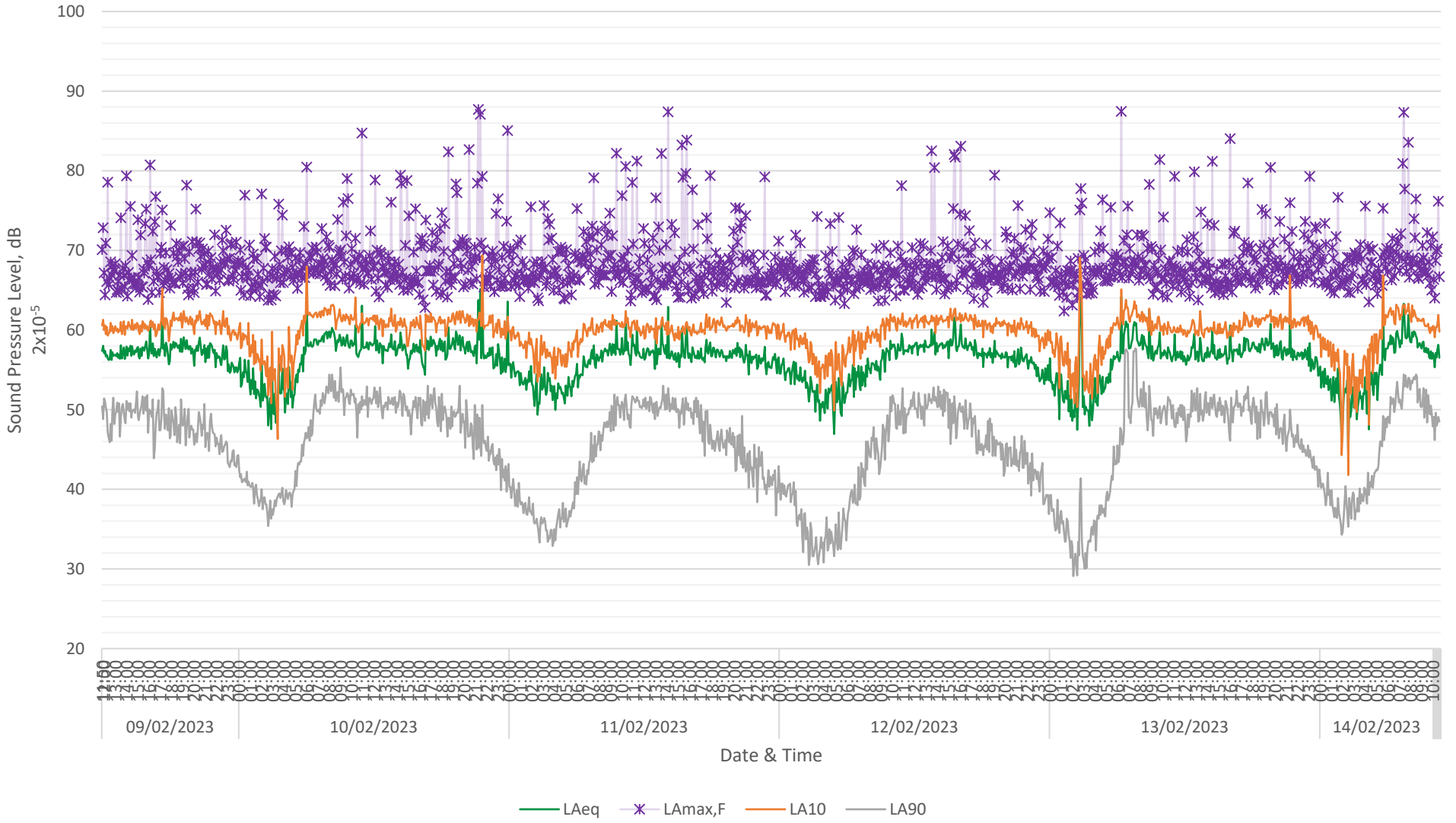
Appendix B - Time History 1 (TH1)

33 Brighton Road, Croydon
Noise Measurement Position 1
Thursday 9 February 2023 - Tuesday 14 February 2023



Appendix B - Time History 2 (TH2)

33 Brighton Road, Croydon
Noise Measurement Position 2
Thursday 9 February 2023 - Tuesday 14 February 2023



Appendix C1

33 Brighton Road, South Croydon
Flat 2 Bedroom 1

BS EN 12354-3 Calculation to determine glazing specification

**Based on approximate measured room sizes*

Habitable room data variables

Type of habitable room	Bedroom	
Volume	29	cubic metres
Total area - external façade(s	10	square metres
Total area - window(s)	1.2	square metres
L(k)	3	
Lmax (K)	3	
Trickle Ventilator(s)	5	
Solid Façade (exc. windows)	8.8	square metres
Reverberation Time	0.5	seconds

External noise level

	1:1 Octave Bands Centre Frequency (Hz)							
	63	125	250	500	1000	2000	4000	dB(A)
Logged Log average daytime Leq	74	66	67	66	71	66	56	**73**
Logged Log average night-time Leq	69	61	62	62	67	63	52	**70**
Logged Lmax for duration of survey	87	79	78	78	81	79	68	**85**

Sound reduction of building fabric

	1:1 Octave Band Centre Frequency (Hz)							Rw /
	63	125	250	500	1000	2000	4000	Dn,e,W
47 Rw - Pilk 6/150/4mm secondary	27	29	35	45	56	52	50	**47**
**Standard Masonry from Template Re	39	41	43	48	50	55	55	
100 Dn,e,w - Mechanical Ventilation	98	100	100	100	100	100	100	**0**

	1:1 Octave Band Centre Frequency (Hz)						
	63	*125*	*250*	*500*	*1000*	*2000*	*4000*
Reduction from façade	-31.3	-33.3	-37.6	-44.2	-47.1	-51.2	-50.7
Addition for Ctr	5.0	5.0	5.0	5.0	5.0	5.0	5.0

Resultant internal noise level

	1:1 Octave Band Centre Frequency (Hz)							
	63	125	250	500	1000	2000	4000	dB(A)
Daytime internal Leq	47	38	34	27	29	20	10	**32**
Night-time internal Leq	43	33	30	23	25	17	6	**29**
Night-time internal Lmax	56	46	41	33	34	28	17	**39**

Based on BS8233:2014 - Daytime Design Criterion:	LAeq	35
Based on BS8233:2014 - Night Design Criterion:	LAeq	30
Based on BS8233: 1999 Night LAmax levels	LAmax	45

Appendix C2

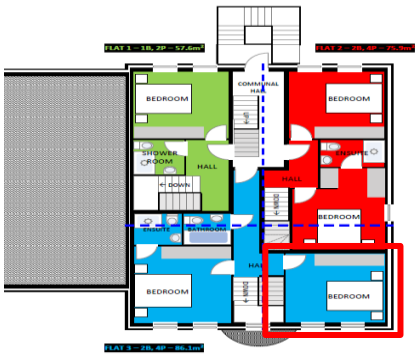
33 Brighton Road, South Croydon
Flat 3 Bedroom 1

BS EN 12354-3 Calculation to determine glazing specification

**Based on approximate measured room sizes*

Habitable room data variables

Type of habitable room	Bedroom	
Volume	29	cubic metres
Total area - external façade(s	17	square metres
Total area - window(s)	2.2	square metres
L(k)	6	
Lmax (K)	6	
Trickle Ventilator(s)	1	
Solid Façade (exc. windows)	14.8	square metres
Reverberation Time	0.5	seconds



External noise level

	1:1 Octave Bands Centre Frequency (Hz)							
	63	125	250	500	1000	2000	4000	dB(A)
Logged Log average daytime Leq	74	66	67	66	71	66	56	**73**
Logged Log average night-time Leq	69	61	62	62	67	63	52	**70**
Logged Lmax for duration of survey	87	79	78	78	81	79	68	**85**

Sound reduction of building fabric

	1:1 Octave Band Centre Frequency (Hz)							Rw /
	63	125	250	500	1000	2000	4000	Dn,e,W
47 Rw - Pilk 6/150/4mm secondary	27	29	35	45	56	52	50	**47**
User Input	41	54	54	58	66	68	77	
100 Dn,e,w - Mechanical Ventilation	98	100	100	100	100	100	100	**0**

	1:1 Octave Band Centre Frequency (Hz)						
	63	*125*	*250*	*500*	*1000*	*2000*	*4000*
Reduction from façade	-26.2	-29.2	-34.9	-44.0	-54.0	-51.6	-50.2
Addition for Ctr	5.0	5.0	5.0	5.0	5.0	5.0	5.0

Resultant internal noise level

	1:1 Octave Band Centre Frequency (Hz)							
	63	125	250	500	1000	2000	4000	dB(A)
Daytime internal Leq	52	42	37	27	22	20	11	**33**
Night-time internal Leq	48	37	32	23	18	16	7	**29**
Night-time internal Lmax	61	50	43	34	27	28	18	**40**

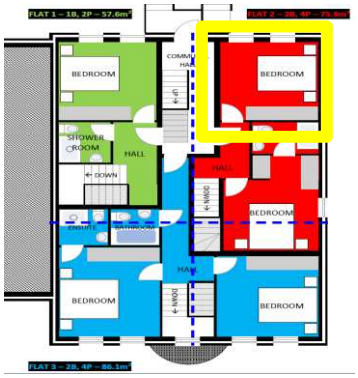
Based on BS8233:2014 - Daytime Design Criterion:	LAeq	35
Based on BS8233:2014 - Night Design Criterion:	LAeq	30
Based on BS8233: 1999 Night LAmax levels	LAmax	45

Appendix C3

33 Brighton Road, South Croydon
Flat 2 Bedroom 2 (Rear)

BS EN 12354-3 Calculation to determine glazing specification

**Based on approximate measured room sizes*



Habitable room data variables

Type of habitable room	Bedroom	
Volume	29	cubic metres
Total area - external façade(s	10	square metres
Total area - window(s)	2.4	square metres
L(k)	6	
Lmax (K)	6	
Trickle Ventilator(s)	5	
Solid Façade (exc. windows)	7.6	square metres
Reverberation Time	0.5	seconds

External noise level

	1:1 Octave Bands Centre Frequency (Hz)							
	63	125	250	500	1000	2000	4000	dB(A)
Logged Log average daytime Leq	62	55	55	53	55	50	41	**58**
Logged Log average night-time Leq	57	50	51	50	52	47	36	**55**
Logged Lmax for duration of survey	74	69	67	65	67	64	55	**71**

Sound reduction of building fabric

	1:1 Octave Band Centre Frequency (Hz)							Rw /
	63	125	250	500	1000	2000	4000	Dn,e,W
34 Rw - 8-(6-16)-62	18	20	21	33	40	36	48	**34**
**Standard Masonry from Template Repo	39	41	43	48	50	55	55	
100 Dn,e,w - Mechanical Ventilation	98	100	100	100	100	100	100	**0**

	1:1 Octave Band Centre Frequency (Hz)						
	63	*125*	*250*	*500*	*1000*	*2000*	*4000*
Reduction from façade	-17.8	-19.8	-20.8	-32.5	-38.7	-35.7	-45.8
Addition for Ctr	5.0	5.0	5.0	5.0	5.0	5.0	5.0

Resultant internal noise level

	1:1 Octave Band Centre Frequency (Hz)							
	63	125	250	500	1000	2000	4000	dB(A)
Daytime internal Leq	49	40	39	25	21	19	0	**33**
Night-time internal Leq	44	36	35	22	18	16	-4	**29**
Night-time internal Lmax	57	49	46	33	29	28	9	**41**

Based on BS8233:2014 - Daytime Design Criterion:	LAeq	35
Based on BS8233:2014 - Night Design Criterion:	LAeq	30
Based on BS8233: 1999 Night LAmax levels	LAmax	45

Appendix C4

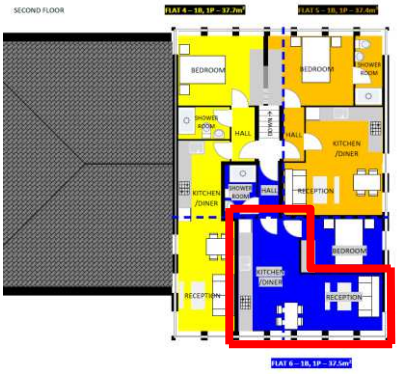
33 Brighton Road, South Croydon
Flat 6 Reception

BS EN 12354-3 Calculation to determine glazing specification

**Based on approximate measured room sizes*

Habitable room data variables

Type of habitable room	Living Room	
Volume	66	cubic metres
Total area - external façade(s	16	square metres
Total area - window(s)	10	square metres
L(k)	6	
Lmax (K)	6	
Trickle Ventilator(s)	10	
Solid Façade (exc. windows)	6	square metres
Reverberation Time	0.5	seconds



External noise level

	1:1 Octave Bands Centre Frequency (Hz)							
	63	125	250	500	1000	2000	4000	dB(A)
Logged Log average daytime Leq	74	66	67	66	71	66	56	**73**
Logged Log average night-time Leq	69	61	62	62	67	63	52	**70**
Logged Lmax for duration of survey	87	79	78	78	81	79	68	**85**

Sound reduction of building fabric

	1:1 Octave Band Centre Frequency (Hz)							Rw /
	63	125	250	500	1000	2000	4000	Dn,e,W
47 Rw - Pilk 6/150/4mm secondary	27	29	35	45	56	52	50	**47**
User Input	41	54	54	58	66	68	77	
100 Dn,e,w - Mechanical Ventilation	98	100	100	100	100	100	100	**0**

	1:1 Octave Band Centre Frequency (Hz)						
	63	*125*	*250*	*500*	*1000*	*2000*	*4000*
Reduction from façade	-24.2	-26.3	-32.2	-42.1	-53.0	-49.2	-47.3
Addition for Ctr	5.0	5.0	5.0	5.0	5.0	5.0	5.0

Resultant internal noise level

	1:1 Octave Band Centre Frequency (Hz)							
	63	125	250	500	1000	2000	4000	dB(A)
Daytime internal Leq	54	45	39	29	23	22	14	**35**
Night-time internal Leq	50	40	35	25	19	19	10	**31**
Night-time internal Lmax	63	53	46	35	28	30	21	**43**

Based on BS8233:2014 - Daytime Design Criterion: LAeq 35

Appendix C5

33 Brighton Road, South Croydon
Flat 3 Reception

BS EN 12354-3 Calculation to determine glazing specification

**Based on approximate measured room sizes*

Habitable room data variables

Type of habitable room	Living Room	
Volume	30	cubic metres
Total area - external façade(s	17	square metres
Total area - window(s)	2.4	square metres
L(k)	6	
Lmax (K)	6	
Trickle Ventilator(s)	10	
Solid Façade (exc. windows)	14.6	square metres
Reverberation Time	0.5	seconds

External noise level

	1:1 Octave Bands Centre Frequency (Hz)							
	63	125	250	500	1000	2000	4000	dB(A)
Logged Log average daytime Leq	74	66	67	66	71	66	56	**73**
Logged Log average night-time Leq	69	61	62	62	67	63	52	**70**
Logged Lmax for duration of survey	87	79	78	78	81	79	68	**85**

Sound reduction of building fabric

	1:1 Octave Band Centre Frequency (Hz)							Rw /
	63	125	250	500	1000	2000	4000	Dn,e,W
47 Rw - Pilk 6/150/4mm secondary	27	29	35	45	56	52	50	**47**
User Input	41	54	54	58	66	68	77	
100 Dn,e,w - Mechanical Ventilation	98	100	100	100	100	100	100	**0**

	1:1 Octave Band Centre Frequency (Hz)						
	63	*125*	*250*	*500*	*1000*	*2000*	*4000*
Reduction from façade	-26.1	-29.0	-34.7	-43.9	-54.0	-51.4	-50.0
Addition for Ctr	5.0	5.0	5.0	5.0	5.0	5.0	5.0

Resultant internal noise level

	1:1 Octave Band Centre Frequency (Hz)							
	63	125	250	500	1000	2000	4000	dB(A)
Daytime internal Leq	52	42	37	27	22	20	11	**33**
Night-time internal Leq	48	37	32	23	18	17	7	**29**
Night-time internal Lmax	61	50	44	34	27	28	18	**41**

Based on BS8233:2014 - Daytime Design Criterion: LAeq 35

HEALTHY ABODE ACOUSTICS

BUILDING ACOUSTICIANS & ENVIRONMENTAL NOISE CONSULTANTS

PHONE

EAST ANGLIA 01245 206 250

LONDON & NATIONAL 0203 371 980

SOUTH-WEST 01752 426 118

WEB WWW.HA-ACOUSTICS.CO.UK

EMAIL INFO@HA-ACOUSTICS.CO.UK

HEAD OFFICE

HA ACOUSTICS, OFFICE F9, ALLEN HOUSE,

THE MALTINGS, STATION ROAD, SAWBRIDGEWORTH CM21 9JX

MEMBER OF THE FEDERATION OF SMALL BUSINESSES

UKAS TESTING

10263

UKAS accredited laboratory for Sound Insulation Testing