NOISE IMPACT ASSESSMENT

19-37 HIGHGATE ROAD, KENTISH TOWN

GM LONDON

FEBRUARY 2023

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19-37 HIGHGATE ROAD, KENTISH TOWN

Our Ref: **5608_001R_2-0_MG**

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REVISION HISTORY

Version	Comments	Date	Changes made by	Approved by
1.0	First issued version	17/03/2022	MG	JB
2.0	Replacement of winter gardens with balconies	28/02/2023	MG	PS

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APPENDICES

1 INTRODUCTION

A part 5, part 7 storey mixed-use development, comprising 42 residential units and a commercial space at ground floor level, at 19-37 Highgate Road, Kentish Town, London NW5 1JY, was granted planning permission in 2014 by London Borough of Camden (LBC) Council (reference 2013/5947/P).

GM London is seeking a S73 variation to the above planning permission. The current proposal is for a mixed-use development comprising 48 residential units, a basement and a social enterprise space at ground floor level.

An ambient noise survey and NIA for the development was carried out in 2013 [1]. However, the noise environment could have significantly changed since then, as well as the industry standards the assessment was based upon. It was therefore deemed necessary to re-establish baseline conditions and carry out a new NIA.

Anderson Acoustics Ltd has been commissioned by GM London to carry out a Noise Impact Assessment (NIA) to assist in discharging condition 11 of the decision notice dated 18/06/2014 (please see Section 3.1 for the condition details). The results of the Assessment are summarised in report ref. 5608_001R_1-0_MG dated 17/03/2022.

Since the above assessment, a change to the design has been proposed to replace winter gardens with balconies. This report has been updated to reflect such change.

A brief description of the site is given in Section 2. The noise criteria relevant to the assessment are presented and briefly discussed in Section 3. Section 4 provides an assessment of the proposed design. The report is summarised in Section 5.

Appendix A contains noise survey details, detailed calculations can be found in Appendix B, example drawings in Appendix C and noise units and acoustic terminology in Appendix D.

2 SITE DESCRIPTION

The site is located at 19-37 Highgate Road, Kentish Town, London NW5 1JY. The site is bound by the mixed-use development Linton House to the north, AA Self Storage to the west, Christ Apostolic Church to the south, and residential properties at the other side of B518 Highgate Road to the east.

Figure 2.1: Site location plan

The building will comprise a basement, a social enterprise space on the ground floor and residential apartments between ground and sixth floors. All apartments will be mechanically ventilated with an individual MVHR unit serving each apartment. On this basis, windows can be assumed to be closed for the purposes of the assessment. Windows will be openable for purge ventilation during which noise criteria do not apply.

Example drawings of the floor layouts are presented in Appendix C.

3 ASSESSMENT CRITERIA

3.1 Planning Condition 11

Planning condition 11 is reproduced below:

> 11 No work shall commence on the Highgate Road Residential Building until a detailed scheme for noise insulation and/or mitigation has first been submitted to and approved in writing by the local planning in respect of the following:
>
> a) a scheme of sound insulation and attenuated ventilation so as to ensure that noise from external sources shall not exceed 30dB(A) LAeq (23:00-07:00 hours) in any habitable room
>
> b) sound mitigation measures to be incorporated to terraces and balconies such that the external noise climate does not exceed 55dB LAeq,t
>
> The buildings shall not be occupied until completed fully in accordance with such scheme(s) as will have been approved.
>
> Reason: To safeguard the premises against the transmission of external noise in accordance with the requirements of policy CS5 of the London Borough of Camden Local Development Framework Core Strategy and policies DP26 and DP28 of the London Borough of Camden Local Development Framework Development Policies.

3.2 BS 8233:2014 – Guidance on sound insulation and noise reduction in buildings

Although condition 11 does not apply to the social enterprise space on the ground floor, for robustness, it has been deemed necessary to assess noise ingress to the proposed space. Table 2 from the BS8223:2014 [2] sets desirable indoor ambient noise levels for commercial spaces as follows:

Table 2 **Indoor ambient noise levels in spaces when they are unoccupied and privacy is also important**

Objective	Typical situations	Design range $L_{Aeq,T}$ dB
Typical noise levels for acoustic privacy in shared spaces	Restaurant	40 – 55
	Open plan office	45 – 50
	Night club, public house	40 – 45
	Ballroom, banqueting hall	35 – 40
	Living room	35 – 40

In line with the above, the indoor ambient noise level criterion for the social enterprise space at ground floor is set to 45 dB $L_{Aeq,8h}$ (09:00 - 17:00).

4 EXISTING NOISE ENVIRONMENT

The prevailing noise conditions in the area were determined by a detailed environmental noise survey undertaken over a 7-day period at two measurement locations, between Tuesday 2nd and Tuesday 9th November 2021. Full details of the survey can be found in Appendix A.

Noise monitoring locations are presented in Figure 4.1 below, with results of the survey presented in Table 4.1.

Figure 4.1: Noise monitoring Locations

Table 4.1: Measured noise levels summary

Location	Period, metric [dB]		
	Days 07:00-23:00 $L_{Aeq,16h}$	Nights 23:00-07:00 $L_{Aeq,8h}$	Office hours 09:00-17:00 $L_{Aeq,8h}$
NM1	67	60	67
NM2	63	54	n/a

Note 1: Presented levels are façade values for NM1 and free-field values for NM2

5 NOISE ASSESSMENT

5.1 Façade Sound Reduction Performance

Noise break-in calculations in accordance with BS EN ISO 12354-3:2017 [3] have been carried out in order to assess required sound reduction performance of glazing needed to achieve the Internal Ambient Noise Levels (IANLs) required by planning condition 11, as described in Section 3.1. Detailed calculations can be found in Appendix B. The following sections present a summary of the assessment.

5.1.1 Assumptions

The assessment is based on following drawings:
- HR-AHR-B1-00-DR-A-20-100 C4 – Ground floor plan
- HR-AHR-B1-(01-07)-DR-A-20-(101-107) C2 – 1st to 7th floor plans
- HR-AHR-B1-ZZ-DR-A-20-(221-224) C4 – Elevation drawings
- HR-AHR-B1-ZZ-DR-A-20-(311-312) C2 – Sections

Noise levels measured at location NM1 have been considered representative for the East façade, overlooking Highgate Road. Noise levels measured at location NM2 have been considered representative for all other façades.

All flats are to be mechanically ventilated with an MVHR unit serving each apartment. No vents are to be located in the façades below the suspended ceiling line.

External walls have been assumed to be constructed of Ytong blockwork, providing 50 (-3) R_w (C_{tr}) sound reduction performance.

5.1.2 Required glazing performance

Table 5.1: Sound reduction performance of selected glazed elements

Façade element	R_w [dB]	R_w+C_{tr} [dB]	Example glazing configuration (Based on BS EN ISO 12354-3:2017)
Bedroom windows/balcony doors along East façade	36	32	Standard 10 mm lam. / (6 – 16 mm) / 6 mm float double glazing
Living room windows/balcony doors along East façade	35	29	Standard 8 mm / (6 – 16 mm) / 6 mm double glazing
Bedroom windows/balcony doors along other façades	33	29	Standard 8 mm / (6 – 16 mm) / 4 mm double glazing
Living room windows/balcony doors along other façades	33	29	
Social enterprise glazing at ground floor	29	25	Standard 4 mm / (6 – 16 mm) / 4 mm double glazing

Please note the above requirements apply for the whole system, i.e. glass and a frame, not glass in isolation.

5.2 Outdoor amenity areas

5.2.1 Proposed change to the design

In line with the approved design, glazed winter gardens were proposed in all apartments along the South, East and North elevations. Currently, these are proposed to be replaced with open balconies.

5.2.2 Noise impact

The LBC limit for ambient noise levels in terraces and balconies is 55 dB $L_{Aeq,T}$, which is derived from guidance within BS8233: 2014 *Guidance on Sound Insulation and Noise Insulations for Buildings – Code of Practice* and WHO *Guidelines for Community Noise* [4]. Both these standards are also referred to in the Professional

Planning Guidance on Planning & Noise (ProPG): New Residential Development [5], which is the main guidance document for designing new residential developments exposed to transportation noise.

Results of the baseline noise survey carried out by AA in November 2021 show daytime ambient noise levels along the East façade of the building facing Highgate Rd of 67 dB $L_{Aeq,16h}$. It is expected similar levels of noise will be experienced on the balconies facing Highgate Rd.

To mitigate the above localised exceedances in private balconies, residents will have access to two communal outdoor spaces that form an integral part of the development: a 93 m^2 terrace on the 5th floor and a 178 m^2 space on the rooftop level.

Noise levels in these spaces were modelled for the Noise Impact Assessment and are 45 dB $L_{Aeq,T}$ at the 5th floor terrace at and 52 dB $L_{Aeq,T}$ at the rooftop space (predicted in the middle of these areas; noise levels can be higher locally, i.e. close to the plant enclosure or at the edge of the building, directly overlooking traffic).

ProPG suggests 4 alternatives to alleviate the potential impact of noisy external amenity areas in developments located in busy, urban areas such as this one. The Stage 2 - Element 3 of the ProPG guidance document states that:

- *3(v) Where, despite following a good acoustic design process, significant adverse noise impacts remain on any private external amenity space (e.g. garden or balcony) then that impact may be partially off-set if the residents are provided, through the design of the development or the planning process, with access to:*
    - *a relatively quiet facade (containing openable windows to habitable rooms) or a relatively quiet externally ventilated space (i.e. an enclosed balcony) as part of their dwelling; and/or*
    - *a relatively quiet alternative or additional external amenity space for sole use by a household, e.g. a garden, roof garden or large open balcony in a different, protected, location); and/or*
    - ***a relatively quiet, protected, nearby, external amenity space for sole use by a limited group of residents as part of the amenity of their dwellings; and/or***
    - *a relatively quiet, protected, publically accessible, external amenity space (e.g. a public park or a local green space designated because of its tranquillity) that is nearby (e.g. within a 5 minutes walking distance). The local planning authority could link such provision to the definition and management of Quiet Areas under the Environmental Noise Regulations.*

The provision of the communal external amenity areas at 5th floor and roof levels will certainly provide most residents a quieter, protected, alternative communal space compliant with the 55 dB L_{Aeq} guidance level. It is generally accepted that most residents prefer having a slightly noisier balcony; with access to alternative communal spaces.

Further to the above, BS8233 also acknowledges that the recommended guideline values may not be "*achievable in all circumstances where development might be desirable*", and that "*…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*". This statement indicates that a balance is needed between the provision of private external amenity areas for enjoyment of residents and the acceptance of periodically noisier balconies; where development is desirable. It is likely that most residents would prefer a balcony, regardless of the external noise levels it is exposed to, rather than no balcony at all.

Bearing in mind all the above, the provision of the communal terrace areas to residents with balconies exposed to ambient noise levels above 55 dB $L_{Aeq,16h}$ will partially offset the noise impact on such balconies. It is therefore considered that external noise levels in suitable communal amenity areas of the development will be compliant with LBC's guidance.

5.3 Control of noise transfer from the social enterprise space

As the social enterprise space is likely to be limited to daytime operation (07:00-23:00) and is not expected to have music or noise-generating activities, we recommend the separating floor between the community space and the flats above to achieve a minimum airborne sound insulation performance of 50 dB $D_{nT,w}+C_{tr}$. This is 5 dB over the minimum requirements stated in the Building Regulations Approved Document E [6] for separating walls and floors between dwellings. Should the operation of the social enterprise space include background music or any relatively noisy activities (i.e. typical internal ambient noise levels around 80 dB L_{Aeq}), this target should be increased to 55 dB $D_{nT,w}+C_{tr}$.

It is understood that the floor construction between the ground floor communal area and first floor flats will consist of a 750 mm reinforced concrete slab with a 100 mm screed based floor finish on top. This floor build-up is expected to comfortably exceed the 50 dB $D_{nT,w} + C_{tr}$ target performance outlined above.

6 CONCLUSIONS

Anderson Acoustics Ltd has undertaken a noise assessment to assist in discharging a condition 11 of Planning Application reference 2013/5947/P for the development at 19-37 Highgate Road, Kentish Town, London NW5 1JY.

The assessment gives required sound reduction performance for glazed elements of the façade in order to sufficiently control external noise break-in to habitable rooms and ground floor social enterprise space, summarised in Table 5.1.

In terms of outdoor amenity areas, the assessment showed that noise levels in the community gardens at 5th and 7th floor will be within the limit of 55 dBA required by the condition 11.

The above spaces will provide quiet outdoor amenity spaces for residents of flats where balconies will experience high levels of noise from Highgate Rd. This will mitigate the effect of changing winter gardens to balconies.

In addition, separating floor construction between social enterprise and flats above has been analysed and found robust enough to control noise transfer from the commercial to residential spaces.

Based on our assessment and on the recommendations set out in this report, the scheme should achieve compliance with the requirements of Planning Condition 11 and the condition should therefore be discharged.

7 REFERENCES

1 Resource & Environmental Consultants Ltd. *Noise Impact Assessment*. *Greenwood Place and Highgate Road Site: Community Resource Centre, Centre for Independent Living and Residential Units.* REC Report 90225r7. 9th September 2013.

2 British Standard BS 8233:2014. *Guidance on sound insulation and noise reduction in buildings*.

3 British Standard BS EN ISO 12354-3:2017. *Building acoustics. Estimation of acoustic performance of buildings from the performance of elements. Airborne sound insulation against outdoor sound*.

4 WHO. *Guidelines for Community Noise*. 2000

5 ProPG: Planning and Noise. *Professional Planning Guidance on Planning & Noise. New Residential Development.* May 2017

6 Building Regulations: *Approved Document E: Resistance to sound*. March 2015.

7 British Standards Institution. BS61672: 2003: Electroacoustics. Sound level meters. Part 1 Specifications.

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APPENDIX A

NOISE SURVEY DETAILS

A.1 - Instrumentation

All noise measurements were undertaken by a consultant certified as competent in noise monitoring. All acoustic measurement equipment used during the noise survey conformed to Type 1 specification of British Standard 61672 [7]. A full inventory of this equipment is shown in Table A.1 below. All equipment calibration certificates are available on request.

Table A.1 Inventory of Measurement Equipment

Equipment ID	Item	Make and Model	Serial Number	Calibration	
				Certificate number	Expiry Date
1 (NM1)	Sound Level Meter	01 dB DUO	10667	1500295-1	30/04/2023
	Preamplifier	Integrated	-		
	Microphone	01 dB MCE212	39854		
2 (NM2)	Sound Level Meter	01 dB DUO	10927	1500966-2	29/09/2023
	Preamplifier	Integrated	-		
	Microphone	GRAS 40CD	136961		
3	Calibrator	Rion NC-74	34304643	1500367-1	24/05/2022
4	Calibrator	Rion NC-74	34625646	UCRT21/1138	29/01/2022

The noise measurement equipment used during the survey was calibrated at the start and end of each measurement, using a Rion NC-74 sound calibrator to generate a calibration level of 94.0 dB at 1 kHz. No significant drift in calibration was found to have occurred.

The calibrators used have themself been calibrated by a UKAS accredited calibration laboratory within the twelve months preceding the measurements.

A.2 - Unattended Noise Survey NM1

Measurements were obtained using the 'F' time weighting and A-weighting frequency network. Consecutive 125 ms measurements of $L_{Aeq,T}$, $L_{Amax,F}$ and $L_{A90,T}$ noise levels were obtained between 12:15 hrs on Tuesday 2nd November and 10:20 hrs on Tuesday 9th November 2021.

A microphone fitted with a protective windshield was mounted on a pole attached to a tree, 2 m above ground level and approximately 1.5 metres from the façade of the existing building, on the Highgate Road side. Noise levels monitored at this position were façade levels. The location of the measurement position is identified in Figure 4.1 in the report.

A.3 - Unattended Noise Survey MP2

Measurements were obtained using the 'F' time weighting and A-weighting frequency network. Consecutive 125 ms measurements of $L_{Aeq,T}$, $L_{Amax,F}$ and $L_{A90,T}$ noise levels were obtained between 13:00 hrs on Tuesday 2nd November and 10:35 hrs on Tuesday 9th November 2021.

A microphone fitted with a protective windshield was mounted on a pole attached to a tree, approximately 4 m above ground level attached to a site fence, in the south-east corner of the site. Noise levels monitored at this position were free-field levels. The location of the measurement position is identified in Figure 4.1 in the report.

A.3 - Weather Conditions

Weather conditions during the survey period were obtained from internet sources www.wunderground.com (weather station at Holloway, ID ILONDO328), which indicated that the weather conditions for the measurement period were mostly dry and with moderate winds, no greater than 5 m/s. It is then considered that weather conditions have not significantly affected the noise survey.

Figure A.1: Photograph of Location NM1

Figure A.2: Photograph of Location NM2

Figure A.3: Measurement Time History – NM1

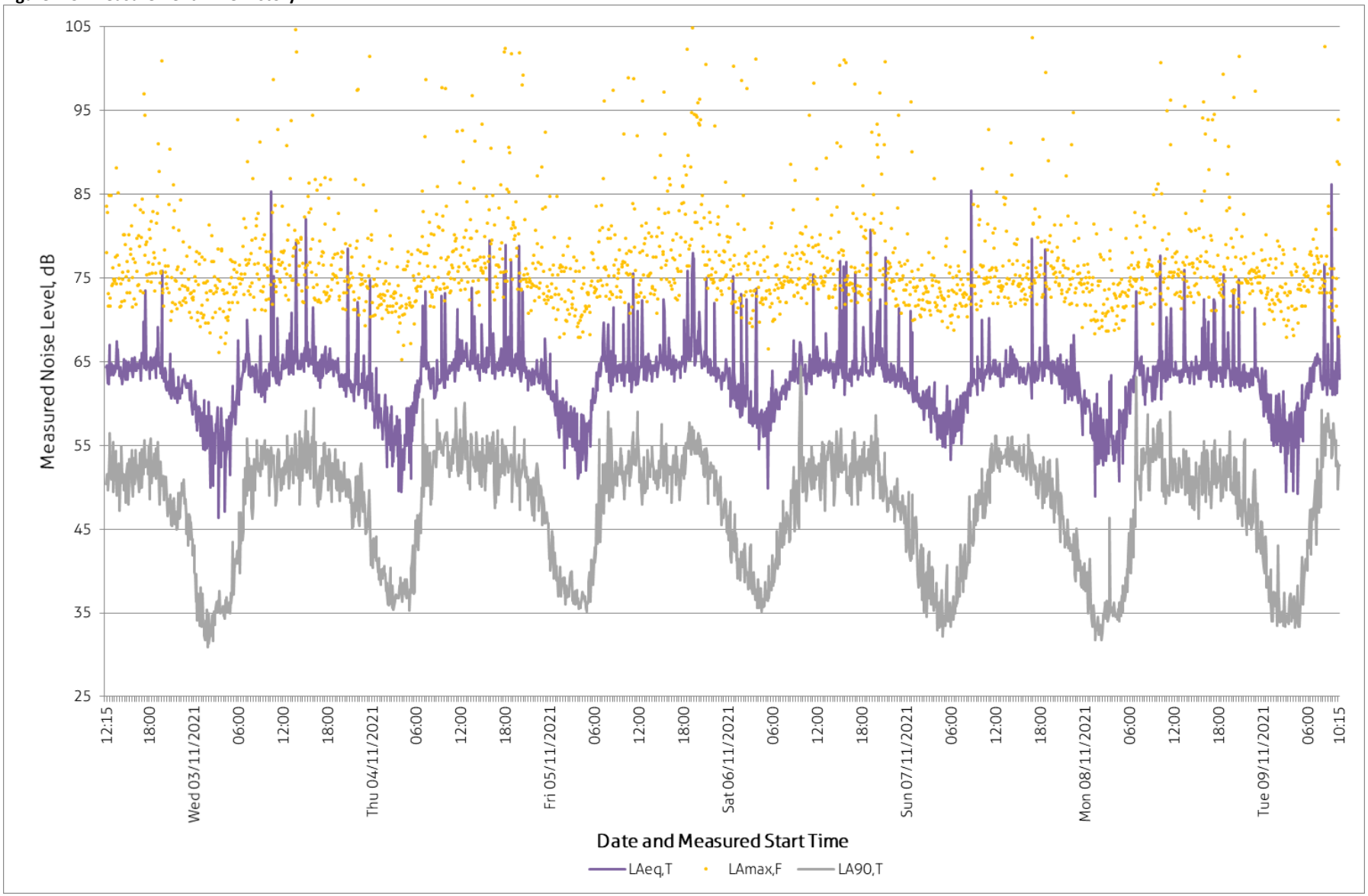
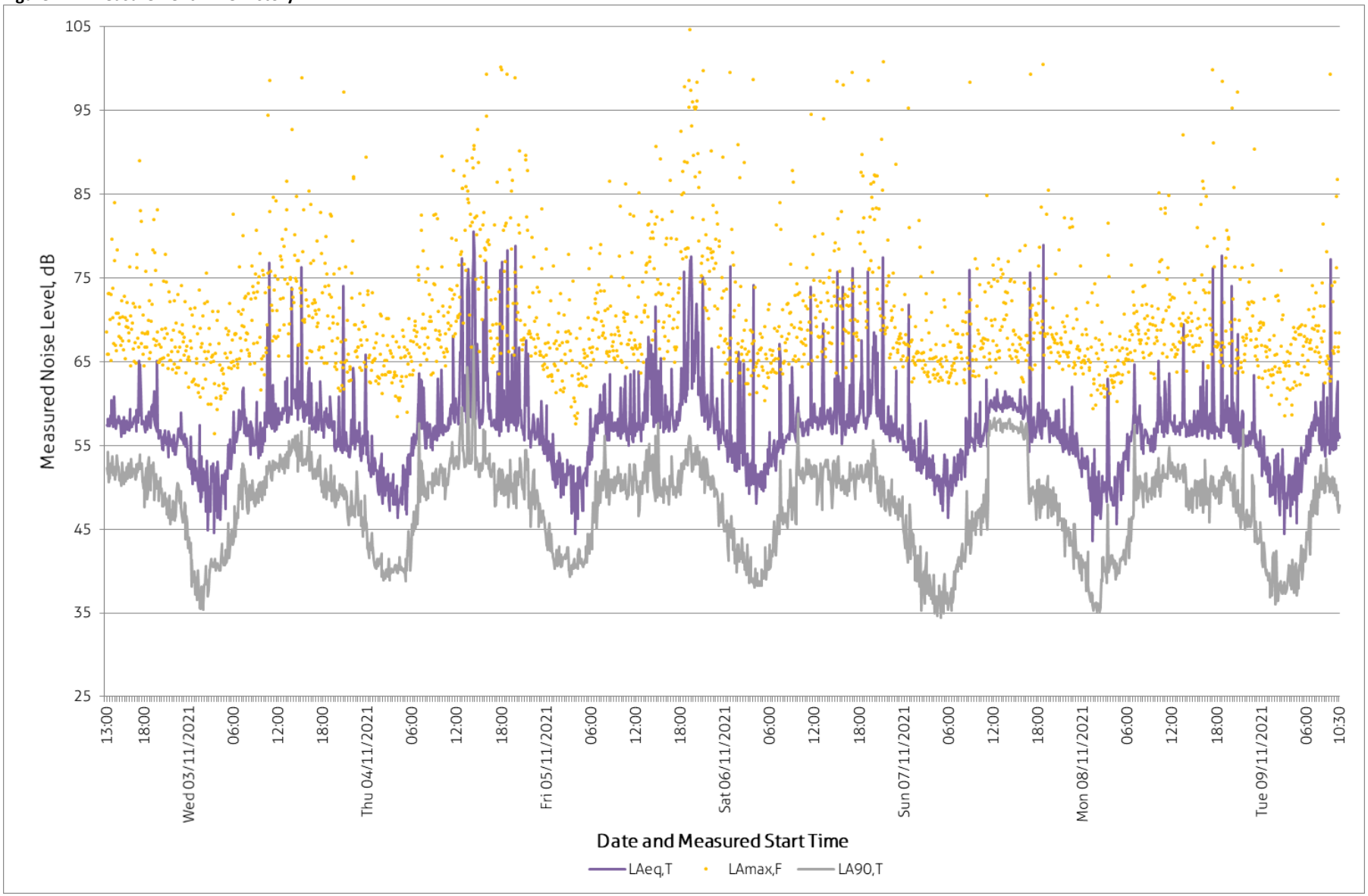


Figure A.4: Measurement Time History – NM2



APPENDIX B

DETAILED CALCULATIONS

Table B.1: IANL Calculation for worst case bedroom on the East façade

Job name:	19-37 Highgate Rd, Kentish Town			**RESULT SUMMARY:**	LAeq Night							**RESULT SUMMARY:**	LAmax Night											
Job no.:	5608			Predicted Internal Level:	**22**	dB $L_{A\ eq,T}$						Predicted Internal Level:	**44**	dB $L_{A\ eq,T}$										
Façade:	East			Criterion:	30	dB $L_{A\ eq,T}$						Criterion:	45	dB $L_{A\ eq,T}$										
				Difference:	**-8**	dB $L_{A\ eq,T}$						Difference:	**-1**	dB $L_{A\ eq,T}$										
SOUND INSULATION BY ELEMENT																								
Formula	**Description**	**Data**	**Units**	**Octave band centre frequency, Hz**								**Octave band centre frequency, Hz**												
				125	**250**	**500**	**1000**	**2000**	**4000**	**dB(A)**		**125**	**250**	**500**	**1000**	**2000**	**4000**	**dB(A)**						
	Reverberation Time	0.5	s	0.5	0.5	0.5	0.5	0.5	0.5			0.5	0.5	0.5	0.5	0.5	0.5							
	Receiver Room Volume	36.5	m^3																					
Element 1				Façade								Façade												
L1	Wall (user data)	Leq		57	56	55	57	53	48	60		83	78	75	76	72	68	80						
-R	Ytong blocks Option 2			43	44	41	51	63	74			43	44	41	51	63	74							
+10logS	Element Area	5.3	m^2	7	7	7	7	7	7			7	7	7	7	7	7							
-10logA	where A=0.16V/T			11	11	11	11	11	11			11	11	11	11	11	11							
+0				0	0	0	0	0	0			0	0	0	0	0	0							
=L2				11	9	11	3	-13	-30	**9**		36	31	31	21	6	-10	**30**						
L2tot	Running total			11	9	11	3	-13	-30	9		36	31	31	21	6	-10	30						
Element 2																								
L1	Window (database)	Leq		57	56	55	57	53	48			83	78	75	76	72	68							
-R	6-(6-16)-10+2			24	25	33	39	40	49	**36 Rw**	**32 Rw+Ctr**	24	25	33	39	40	49							
+10logS	Element Area	4.4	m^2	6	6	6	6	6	6			6	6	6	6	6	6							
-10logA	where A=0.16V/T			11	11	11	11	11	11			11	11	11	11	11	11							
+0				0	0	0	0	0	0			0	0	0	0	0	0							
=L2				29	27	18	14	9	-6	**22**		55	49	38	33	28	14	**44**						
L2tot	Running total			29	27	19	14	9	-6	22		55	49	39	33	28	14	44						

Table B.2: IANL Calculation for worst case bedroom on the other façades

Job name:	19-37 Highgate Rd, Kentish Town			**RESULT SUMMARY:**	LAeq Night							**RESULT SUMMARY:**	LAmax Night											
Job no.:	5608			Predicted Internal Level:	**23**	dB $L_{A\ eq,T}$						Predicted Internal Level:	**41**	dB $L_{A\ eq,T}$										
Façade:	West			Criterion:	30	dB $L_{A\ eq,T}$						Criterion:	45	dB $L_{A\ eq,T}$										
				Difference:	**-7**	dB $L_{A\ eq,T}$						Difference:	**-4**	dB $L_{A\ eq,T}$										
SOUND INSULATION BY ELEMENT																								
Formula	**Description**	**Data**	**Units**	**Octave band centre frequency, Hz**								**Octave band centre frequency, Hz**												
				125	**250**	**500**	**1000**	**2000**	**4000**	**dB(A)**		**125**	**250**	**500**	**1000**	**2000**	**4000**	**dB(A)**						
	Reverberation Time	0.5	s	0.5	0.5	0.5	0.5	0.5	0.5			0.5	0.5	0.5	0.5	0.5	0.5							
	Receiver Room Volume	23.8	m^3																					
Element 1				Free-field								Free-field												
L1	Wall (user data)	Leq		54	51	49	51	46	37	54		70	68	68	70	66	60	73						
-R	Ytong blocks Option 2			43	44	41	51	63	74			43	44	41	51	63	74							
+10logS	Element Area	3.4	m^2	5	5	5	5	5	5			5	5	5	5	5	5							
-10logA	where A=0.16V/T			9	9	9	9	9	9			9	9	9	9	9	9							
+3				3	3	3	3	3	3			3	3	3	3	3	3							
=L2				11	6	8	-1	-17	-37	**7**		27	23	26	18	2	-15	**25**						
L2tot	Running total			11	6	8	-1	-17	-37	7		27	23	26	18	2	-15	25						
Element 2																								
L1	Window (database)	Leq		54	51	49	51	46	37			70	68	68	70	66	60							
-R	8-(6-16)-42			22	21	28	38	40	47	**33 Rw**	**28 Rw+Ctr**	22	21	28	38	40	47							
+10logS	Element Area	3.2	m^2	5	5	5	5	5	5			5	5	5	5	5	5							
-10logA	where A=0.16V/T			9	9	9	9	9	9			9	9	9	9	9	9							
+3				3	3	3	3	3	3			3	3	3	3	3	3							
=L2				31	29	20	12	6	-11	**23**		48	46	39	31	25	12	**41**						
L2tot	Running total			31	29	21	12	6	-11	23		48	46	39	31	25	12	41						

Table B.3: IANL Calculation for worst case living room on the East façade

Job name:	19-37 Highgate Rd, Kentish Town			**RESULT SUMMARY:**	LAeq Night						
Job no.:	5608				Predicted Internal Level:	**27**	**dB $L_{A\ eq,T}$**				
Façade:	East				Criterion:	30	**dB $L_{A\ eq,T}$**				
					Difference:	**-3**	**dB $L_{A\ eq,T}$**				
SOUND INSULATION BY ELEMENT											
Formula	**Description**	**Data**	**Units**	**Octave band centre frequency, Hz**							
				125	**250**	**500**	**1000**	**2000**	**4000**	**dB(A)**	
	Reverberation Time	0.8	s	0.8	0.8	0.8	0.8	0.8	0.8		
	Receiver Room Volume	79.8	m^3								
Element 1				Façade							
L1	Wall (user data)	Leq		57	56	55	57	53	48	60	
-R	Ytong blocks Option 2			43	44	41	51	63	74		
+10logS	Element Area	6.2	m^2	8	8	8	8	8	8		
-10logA	where A=0.16V/T			12	12	12	12	12	12		
+0				0	0	0	0	0	0		
=L2				10	8	10	2	-14	-31	**9**	
L2tot	Running total			10	8	10	2	-14	-31	9	
Element 2											
L1	Window (database)	Leq		57	56	55	57	53	48		
-R	8-(6-16)-62			20	21	33	40	36	48	**34 Rw**	
+10logS	Element Area	10.8	m^2	10	10	10	10	10	10		
-10logA	where A=0.16V/T			12	12	12	12	12	12		
+0				0	0	0	0	0	0		
=L2				36	33	20	15	16	-2	**27**	
L2tot	Running total			36	33	21	16	16	-2	27	

Table B.4: IANL Calculation for worst case living room on the other façades

Job name:	19-37 Highgate Rd, Kentish Town			**RESULT SUMMARY:**	LAeq Night						
Job no.:	5608				Predicted Internal Level:	**26**	**dB $L_{A\ eq,T}$**				
Façade:	West				Criterion:	30	**dB $L_{A\ eq,T}$**				
					Difference:	**-4**	**dB $L_{A\ eq,T}$**				
SOUND INSULATION BY ELEMENT											
Formula	**Description**	**Data**	**Units**	**Octave band centre frequency, Hz**							
				125	**250**	**500**	**1000**	**2000**	**4000**	**dB(A)**	
	Reverberation Time	0.8	s	0.8	0.8	0.8	0.8	0.8	0.8		
	Receiver Room Volume	63.8	m^3								
Element 1				Free-field							
L1	Wall (user data)	Leq		54	51	49	51	46	37	54	
-R	Ytong blocks Option 2			43	44	41	51	63	74		
+10logS	Element Area	12.1	m^2	11	11	11	11	11	11		
-10logA	where A=0.16V/T			11	11	11	11	11	11		
+3				3	3	3	3	3	3		
=L2				14	9	11	3	-14	-34	**10**	
L2tot	Running total			14	9	11	3	-14	-34	10	
Element 2											
L1	Window (database)	Leq		54	51	49	51	46	37		
-R	8-(6-16)-42			22	21	28	38	40	47	**33 Rw**	
+10logS	Element Area	10.6	m^2	10	10	10	10	10	10		
-10logA	where A=0.16V/T			11	11	11	11	11	11		
+3				3	3	3	3	3	3		
=L2				34	32	23	15	9	-8	**26**	
L2tot	Running total			34	32	24	15	9	-8	26	

Table B.5: IANL Calculation for the social enterprise space

Job name:	19-37 Highgate Rd, Kentish Town			**RESULT SUMMARY:**	LAeq Day						
Job no.:	5608				Predicted Internal Level:	**39**	**dB $L_{A\ eq,T}$**				
Façade:	East				Criterion:	45	**dB $L_{A\ eq,T}$**				
					Difference:	**-6**	**dB $L_{A\ eq,T}$**				
SOUND INSULATION BY ELEMENT											
Formula	**Description**	**Data**	**Units**	**Octave band centre frequency, Hz**							
				125	**250**	**500**	**1000**	**2000**	**4000**	**dB(A)**	
	Reverberation Time	1.2	s	1.2	1.2	1.2	1.2	1.2	1.2		
	Receiver Room Volume	243.0	m^3								
Element 1				Façade							
L1	Wall (user data)	Leq		63	62	60	63	62	53	67	
-R	Ytong blocks Option 2			43	44	41	51	63	74	**49 Rw**	
+10logS	Element Area	19.1	m^2	13	13	13	13	13	13		
-10logA	where A=0.16V/T			15	15	15	15	15	15		
+0				0	0	0	0	0	0		
=L2				18	16	17	9	-4	-23	**16**	
L2tot	Running total			18	16	17	9	-4	-23	16	
Element 2											
L1	Window (database)	Leq		63	62	60	63	62	53		
-R	4-(6-16)-42			21	17	25	35	37	31	**29 Rw**	
+10logS	Element Area	34.9	m^2	15	15	15	15	15	15		
-10logA	where A=0.16V/T			15	15	15	15	15	15		
+0				0	0	0	0	0	0		
=L2				43	45	36	28	25	23	**39**	
L2tot	Running total			43	45	36	28	25	23	39	

APPENDIX C

DRAWINGS

Figure C.1: Ground floor layout

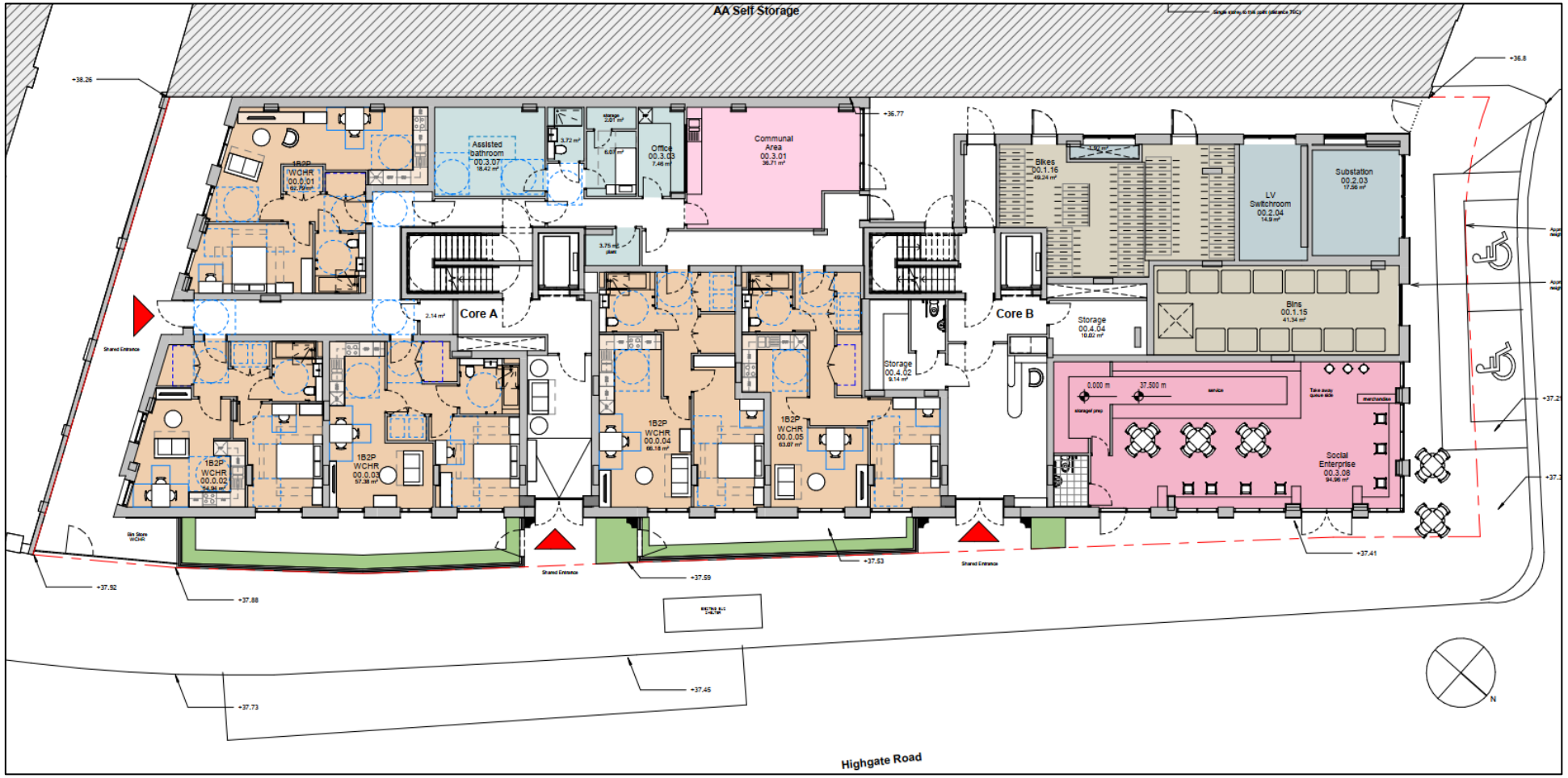


Figure C.2: 5th floor layout

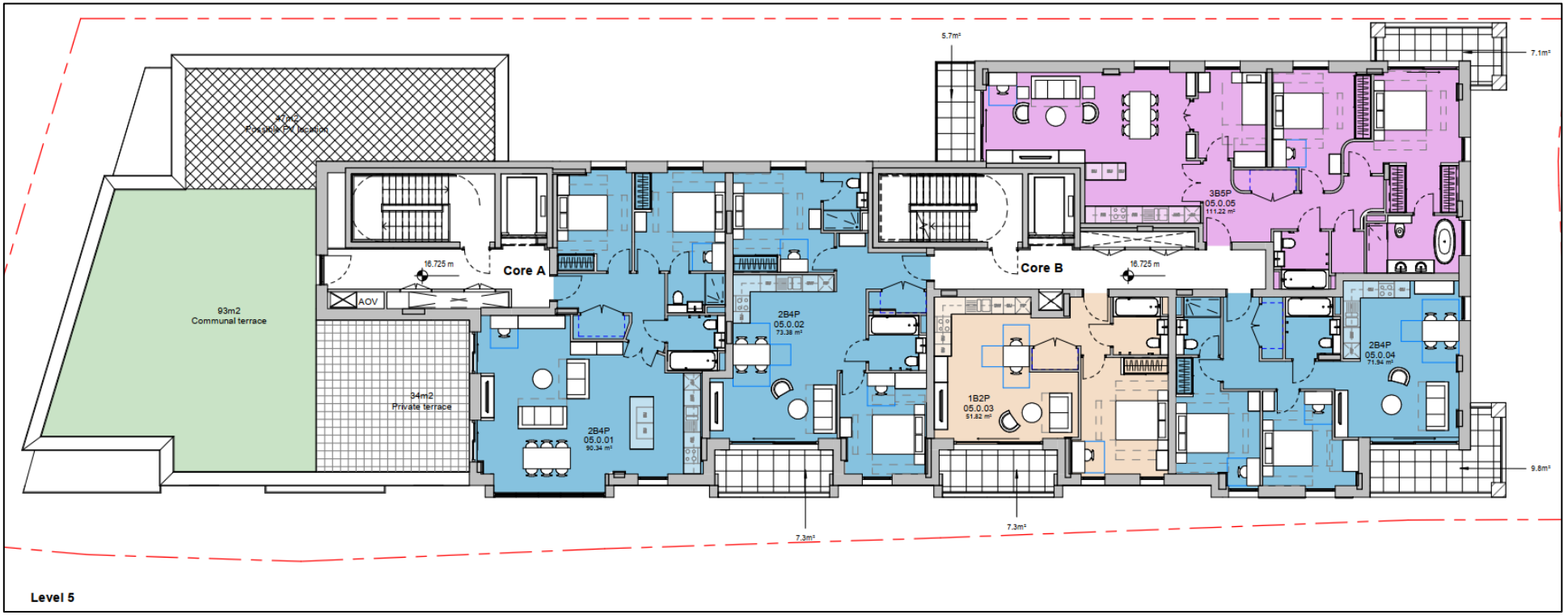


Figure C.3: 7th floor layout (rooftop)

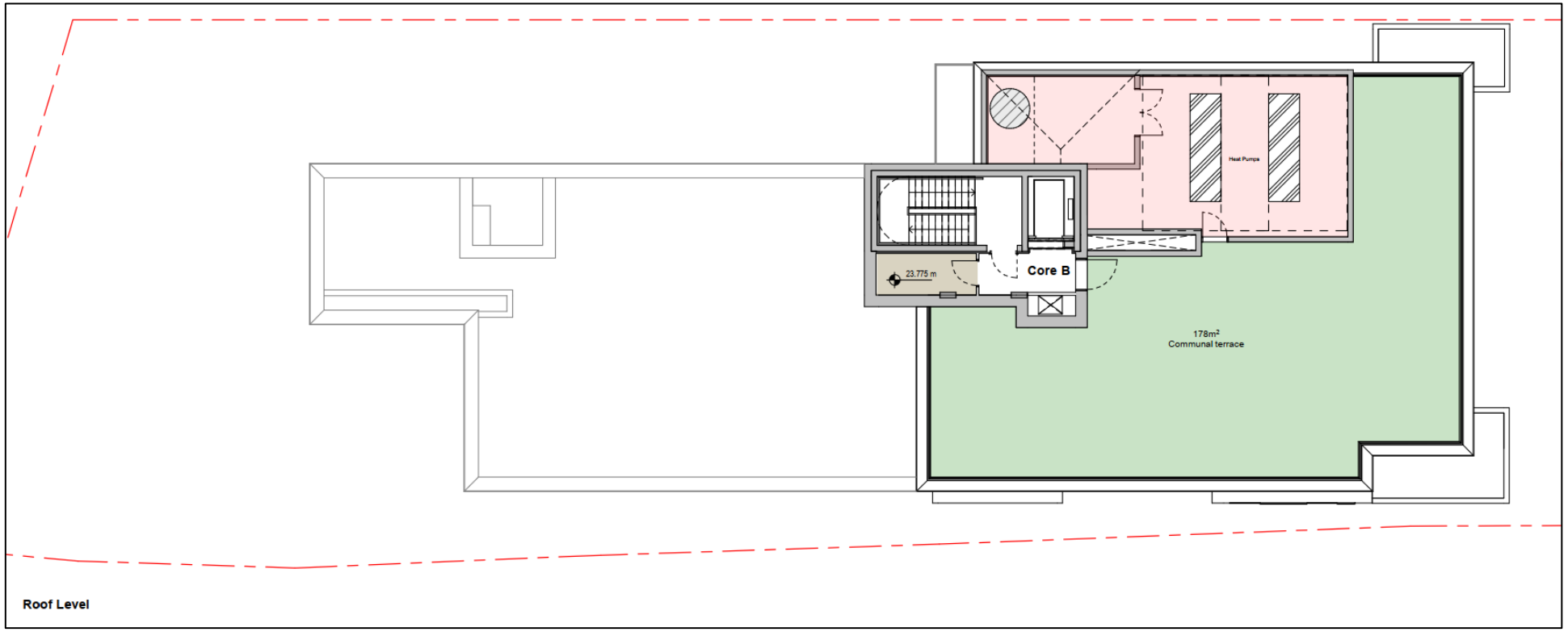
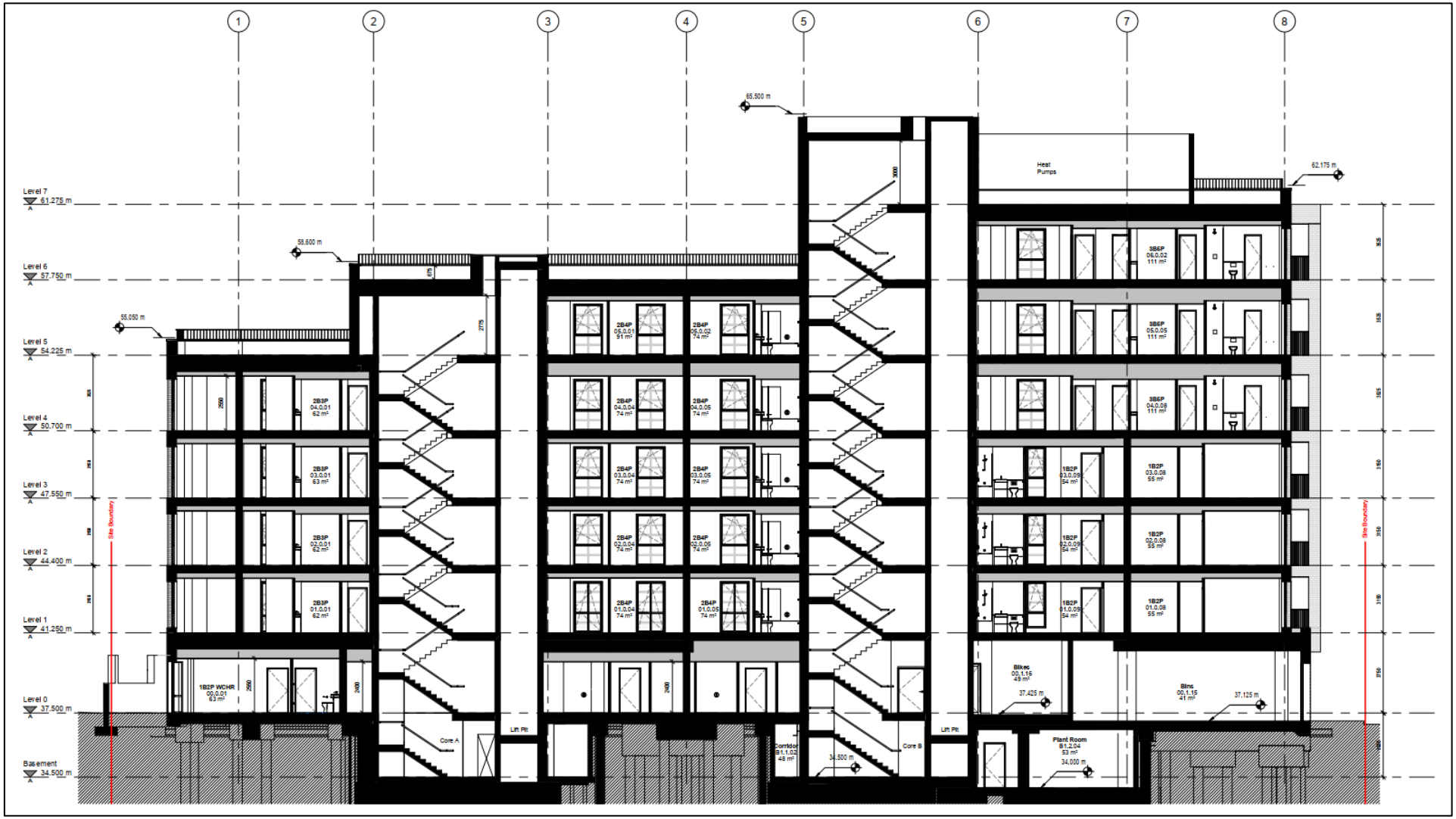


Figure C.4: Section A-A



APPENDIX D

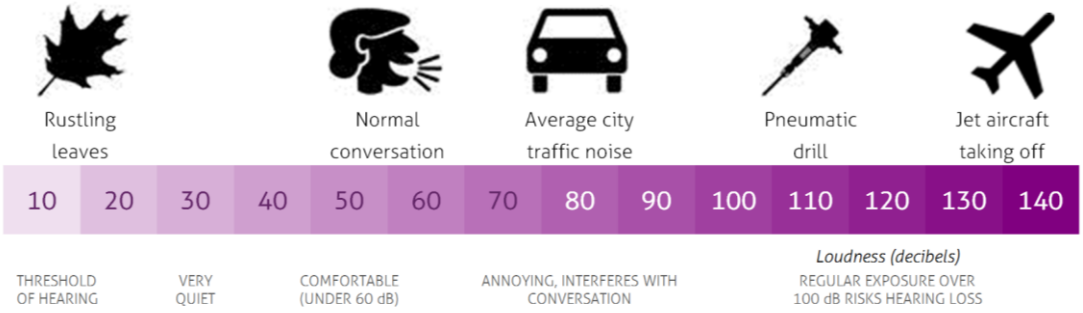
NOISE UNITS AND ACOUSTIC TERMINOLOGY

Noise is measured using a logarithmic scale, to account for a wide range, called the decibel (dB). Noise is defined as unwanted sound and the range of audible sound varies from around 0 dB to 140 dB.

The human ear is capable of detecting sound over a range of frequencies from around 20 Hz to 20 kHz, however its response varies depending on the frequency and is most sensitive to sounds in the mid frequency range of 1 kHz to 5 kHz. Instrumentation used to measure noise is therefore weighted across the frequency bands to represent the sensitivity of the ear. This is called 'A weighting' and is represented as dB(A).

It is generally accepted that under normal conditions humans are capable of detecting changes in steady noise levels of 3 dB, whilst a change of 10 dB is perceived as a doubling or halving of the noise level. An indication of the range of noise levels commonly found in the environment is given below.

Figure D.1: Typical noise levels



A number of different indices are used to describe the fluctuations in noise level over certain time periods. The main indices include:

$L_{Aeq,T}$ This is the "equivalent continuous A weighted sound pressure level" and is the level of a notional steady sound which has the same acoustic energy as the fluctuating sound over a specified time period. It is often used for measuring all sources of noise in the environment, which can be referred to as the ambient noise.

With regard to sound insulation metrics, the following metrics are relevant to this report:

R_w Weighted sound reduction index. This is a single-number quantity which characterises the laboratory airborne sound insulation performance of a separating building element (such as walls, floors, doors and windows) over a range of frequencies. There is no flanking (indirect) transmission loss, so only the element under test needs is considered.

C / C_{tr} A-weighted spectrum adaptation term, taking account of pink noise or road traffic, respectively. This is term is added to single-number ratings (i.e. R_w or $D_{nT,w}$) to take account of characteristics of a particular sound spectra (C for pink, C_{tr} for traffic noise).