greenwayarchitects

106-108 Regent's Park Road NW1 8UG

Design and Access Statement

September 2020

Document compiled by Greenway Architects

CONTENTS

1.0 Introduction

This planning statement supports an application for full planning permission submitted on behalf of Alexander Klimt in relation to the installation of Air Conditioning units at 106-108 Regent's Park Road
Specifically the application proposes the installation of following:
No. 1 new AC condenser unit to 106 Regent's Park Road
No. 2 new AC condenser units to 108 Regent's Park Road

Planning Permission for the development has been already granted under reference 2019/0194/P on the 26th of November 2019. The Planning permission has been implemented on the 16th December 2019 and construction works are in progress on site.

2.0 Proposal

The application proposes:

- 1 no. new AC Condenser Unit installed to 106 Regent's Park Road
  - One Daikin RZAG50A unit *(see picture 1 below)* will be located at LGF level under the front lightwell concrete stair as shown on the drawings in *Appendix A*. This will be serving the AC in the master bedroom

- 2 no. new AC Condenser Units installed to 108 Regent's Park Road:
  - One Daikin RZAG50A unit *(see picture 1 below)* will be located at LGF level under the front light well concrete stair as shown on the drawings in *Appendix A*. This will be serving the bedroom at 108 LGF apartment.
  - One Daikin RXYSCQ4TV1 unit *(see picture 2 below)*, will be located at LGF level to the rear shared garden under the concrete stairs as shown on the drawings in *Appendix A*. This unit will be serving the bedrooms at 2F and 3F of 108 maisonette.

The condenser units installed to front light wells will be completely invisible at Road Level and Front Gardens Level as they are located under the concrete stairs to the LGF light wells. This will minimize any visual and noise impact.
The unit installed to 108 Rear Garden will also be completely invisible to the neighbour gardens and windows. The unit will also have a louvered acoustic enclosure to provide visual screen and to minimise the noise as indicated on the drawings in Appendix A and advised in the Acoustic Report included in *Appendix B*.
The louvered doors will be Slimshield Acoustic Louvers SL 100 or similar to provide the minimum insertion losses required (see Acoustic Report in *Appendix B)*.

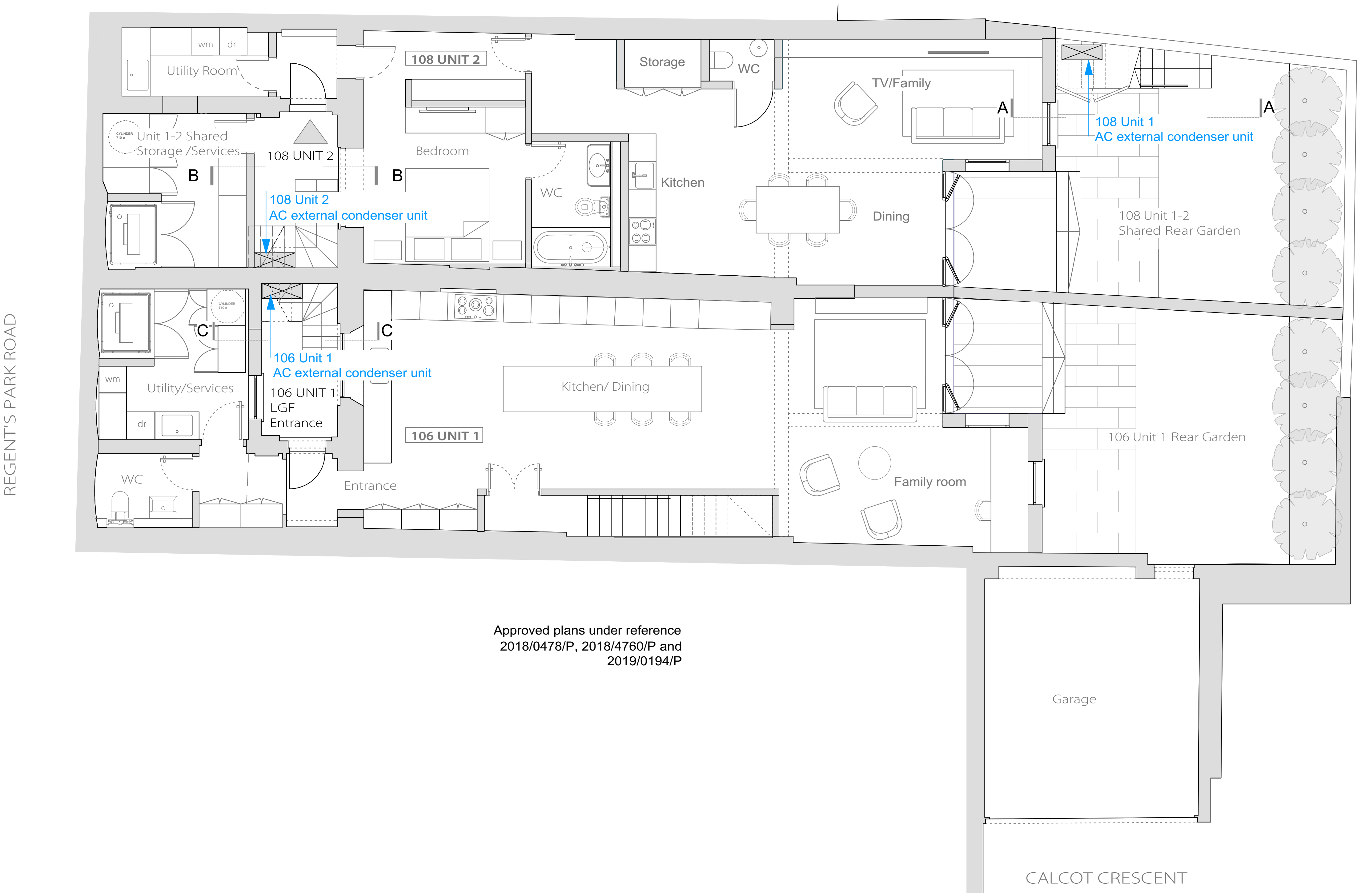
Photo: 1 Daikin RZAG50A unit 790W x 250D x 620H

Photo: 2 Daikin RXYSCQ4TV1 unit 990W x 250D x 620H

An Energy Efficiency Report has also been completed for 106 and 108 Regent's Park Road in line with Policy 10.4 of the Camden Planning Guidance Policy in support of this application, please refer to *Appendix C*.

APPENDIX A: Drawings

1939 P – 305	LGF: Proposed location of AC External Condenser Units
1939 P - 306	Elevations: Proposed location of AC External Condenser Units



Approved plans under reference
2018/0478/P, 2018/4760/P and
2019/0194/P

No.	Revision	Date

PLANNING

All dimensions must be confirmed on site and verified with the Architect. Any discrepencies on the drawing must be reported to the Architect prior to any works being carried out on site.

DO NOT SCALE OFF THIS DRAWING, only use stated dimensions for setting out purposes.

Project:
106 -108 Regent's Park Road
NW1 8UG

Drawing Title:
LGF :Proposed location of AC external condenser units

Drawing No.:
1939 P- 305

Date	Scale
01.09.2020	1:100 @ A3

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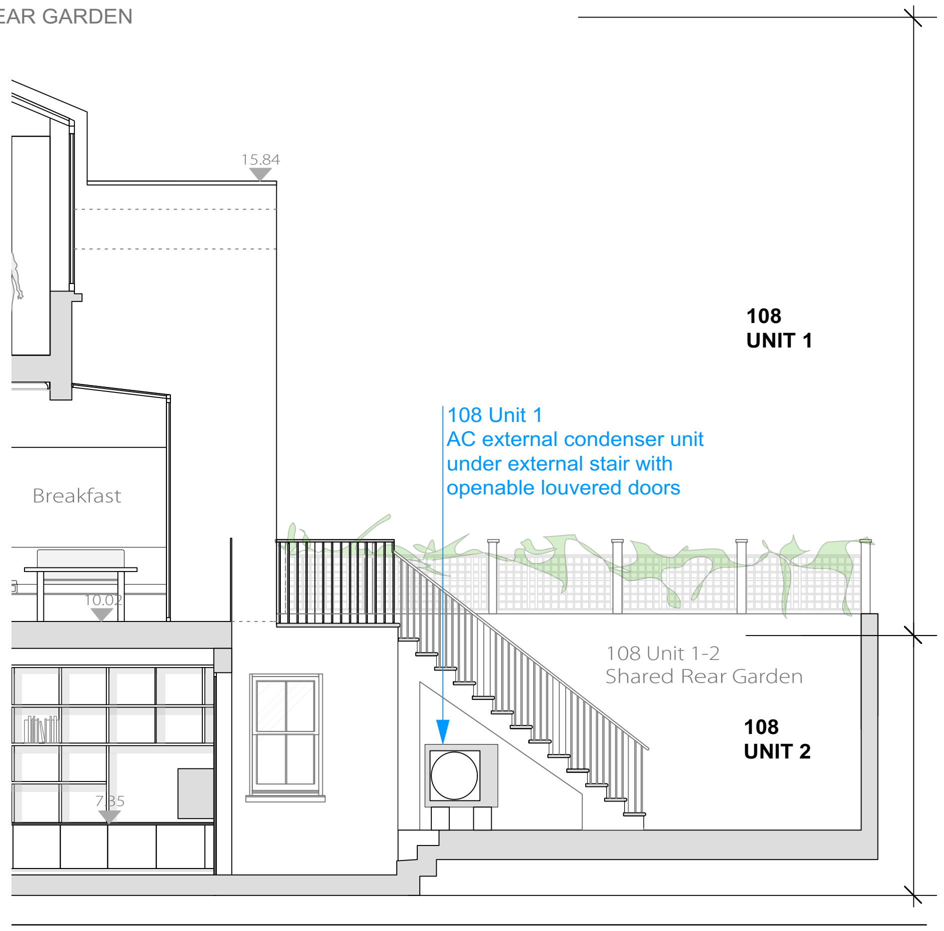
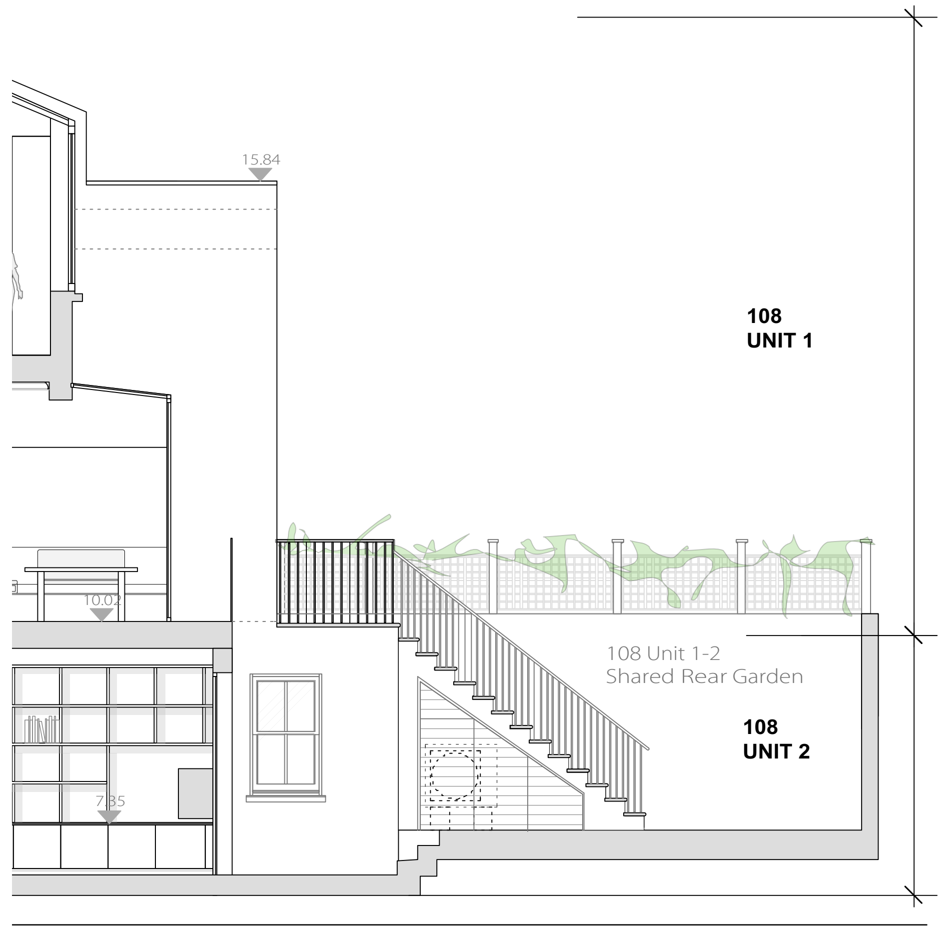
108 CONDENSER UNIT TO REAR GARDEN

Approved plans under reference 2018/0478/P, 2018/4760/P and 2019/0194/P



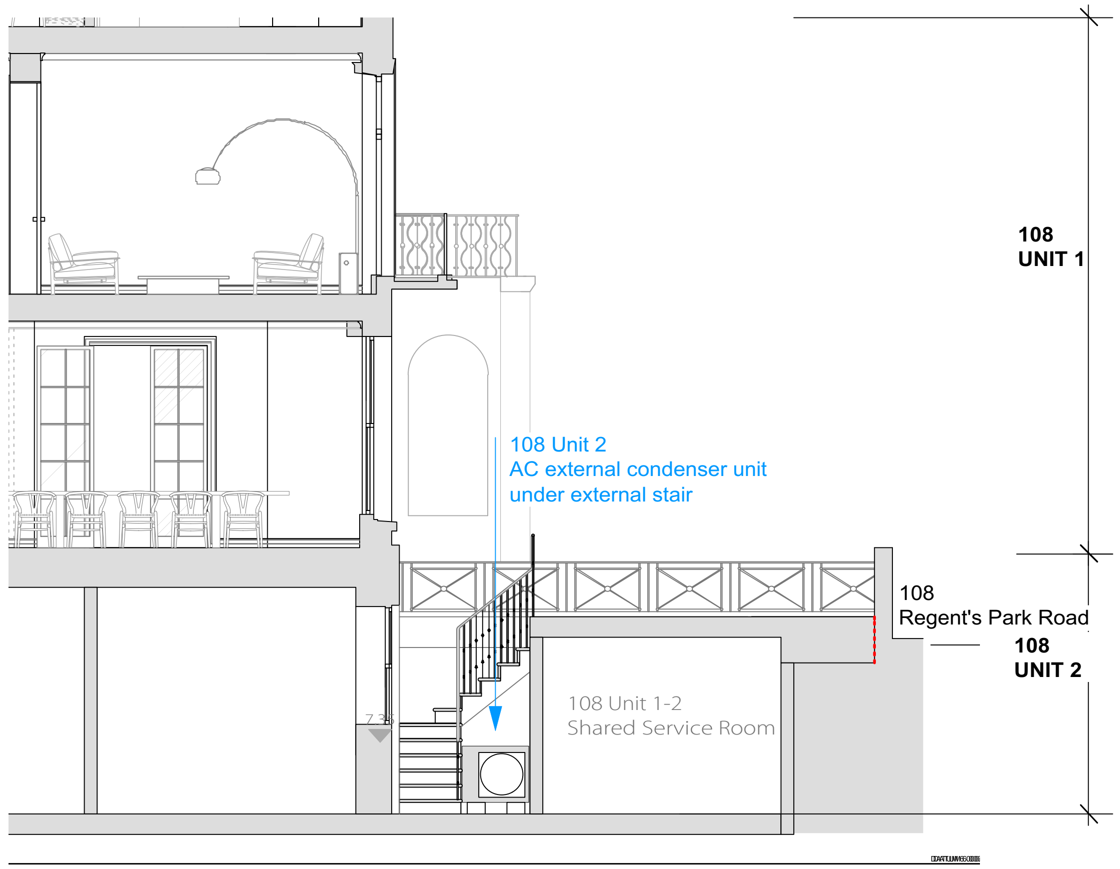
ELEVATION AA _louvered doors removed for clarity



ELEVATION AA

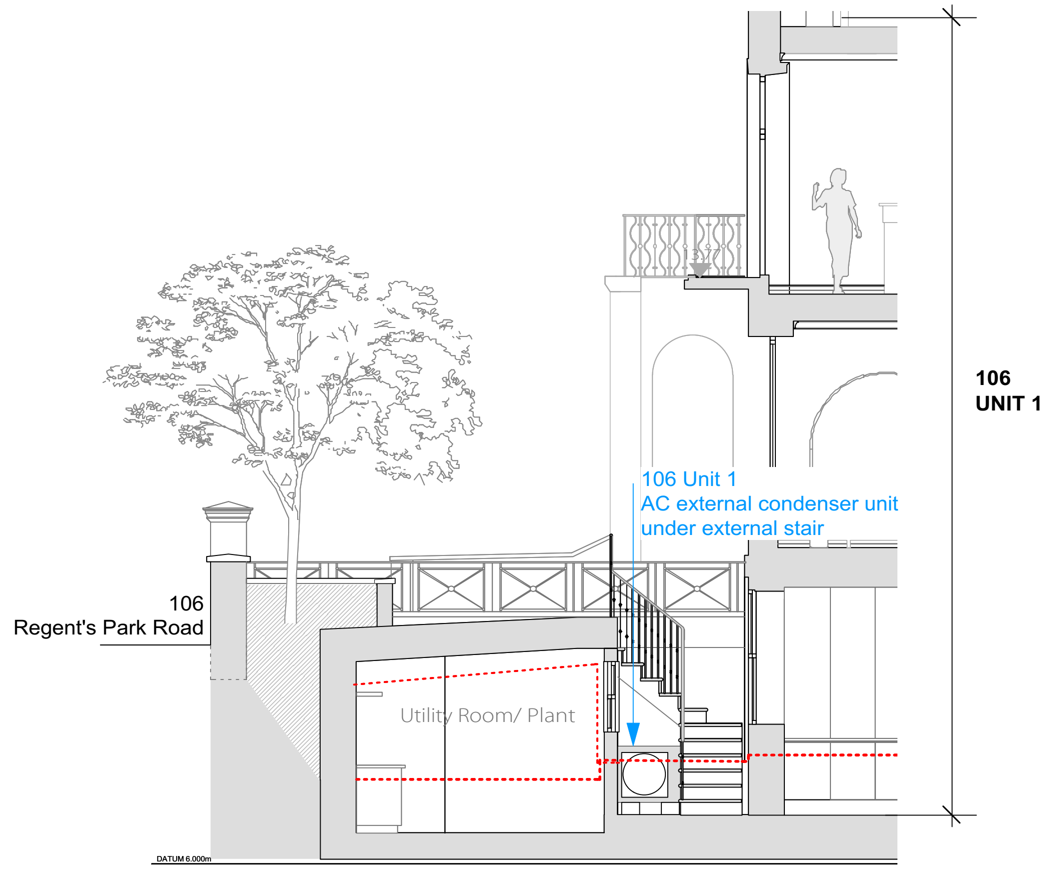
108 CONDENSER UNIT TO FRONT LIGHTWELL

Approved plans under reference 2018/0478/P, 2018/4760/P and 2019/0194/P



ELEVATION BB

106 CONDENSER UNIT TO FRONT LIGHTWELL



ELEVATION CC

0 1 2 5 m

No.	Revision	Date

PLANNING

All dimensions must be confirmed on site and verified with the Architect. Any discrepencies on the drawing must be reported to the Architect prior to any works being carried out on site.

DO NOT SCALE OFF THIS DRAWING, only use stated dimensions for setting out purposes.

Project:
106 -108 Regent's Park Road
NW1 8UG

Drawing Title:
Elevations: Proposed location of AC external condenser units

Drawing No.:
1939 P- 306

Date	Scale
01.09.2020	1:100 @ A3

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APPENDIX B: Acoustic Report

Report VA3190.200702.NIA1.2

106-108 Regent's Park Road, London

Noise Impact Assessment

02 July 2020

Mr Alexander Klimt
and
Mrs & Mr Lorna and Peter Klimt

VENTA ACOUSTICS

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Contents

Attachments

VA3190/SP1	Indicative Site Plan
VA3190/TH1-TH2	Environmental Noise Time Histories
Appendix A	Acoustic Terminology
Appendix B	Acoustic Calculations

1. Introduction

It is proposed to install three new condensers, one to service 106 and two to service 108 Regent's Park Road, London.

Venta Acoustics has been commissioned by Mr Alexander Klimt and Mrs & Mr Lorna and Peter Klimt to undertake an assessment of the potential noise impact of these proposals in support of an application for planning permission.

An environmental noise survey has been undertaken to determine the background noise levels at the most affected noise sensitive receptors. These levels are used to undertake an assessment of the likely impact with reference to the planning requirements of Camden Council.

2. Design Criterion and Assessment Methodology

2.1 Camden Council Requirements

Camden Council's Local Plan (adopted June 2017), Appendix 3, provides the following guidance regarding noise from Industrial and Commercial Noise Sources

> *A relevant standard or guidance document should be referenced when determining values for LOAEL and SOAEL for non-anonymous noise. Where appropriate and within the scope of the document it is expected that British Standard 4142:2014 'Methods for rating and assessing industrial and commercial sound' (BS 4142) will be used. For such cases a 'Rating Level' of 10 dB below background (15dB if tonal components are present) should be considered as the design criterion).*

Existing Noise sensitive receiver	Assessment Location	Design Period	LOAEL (Green)	LOAEL to SOAEL (Amber)	SOAL (Red)
Dwellings**	Garden used for main amenity (free field) and Outside living or dining or bedroom window (façade)	Day	'Rating level' 10dB* below background	'Rating level' between 9dB below and 5dB above background	'Rating level' greater than 5dB above background
Dwellings**	Outside bedroom window (façade)	Night	'Rating level' 10dB* below background and no events exceeding 57dBL_{Amax}	'Rating level' between 9dB below and 5dB above background or noise events between 57dB and 88dB L_{Amax}	'Rating level' greater than 5dB above background and/or events exceeding 88dBL_{Amax}

**10dB should be increased to 15dB if the noise contains audible tonal elements. (day and night). However, if it can be demonstrated that there is no significant difference in the character of the residual background noise and the specific noise from the proposed development then this reduction may not be required.*

In addition, a frequency analysis (to include, the use of Noise Rating (NR) curves or other criteria curves) for the assessment of tonal or low frequency noise may be required.

***levels given are for dwellings, however, levels are use specific and different levels will apply dependent on the use of the premises.*

The periods in Table C correspond to 0700 hours to 2300 hours for the day and 2300 hours to 0700 hours for the night. The Council will take into account the likely times of occupation for types of development and will be amended according to the times of operation of the establishment under consideration.

There are certain smaller pieces of equipment on commercial premises, such as extract ventilation, air conditioning units and condensers, where achievement of the rating levels (ordinarily determined by a BS:4142 assessment) may not afford the necessary protection. In these cases, the Council will generally also require a NR curve specification of NR35 or below, dependant on the room (based upon measured or predicted $L_{eq,5mins}$ noise levels in octave bands) 1 metre from the façade of affected premises, where the noise sensitive premise is located in a quiet background area.

2.2 BS8233:2014

BS8233 *Guidance on sound insulation and noise reduction for buildings* provides guidance as to suitable internal noise levels for different areas within residential buildings.

The relevant section of the standard is shown below in Table 2.1.

Activity	Location	07:00 to 23:00	23:00 to 07:00
Resting	Living Room	35 dB $L_{Aeq, 16 hour}$	-
Dining	Dining Room	40 dB $L_{Aeq, 16 hour}$	-
Sleeping (daytime resting)	Bedroom	35 dB $L_{Aeq, 16 hour}$	30 dB $L_{Aeq, 8 hour}$

Table 2.1 - Excerpt from BS8233: 2014 **[dB ref. 20µPa]**

3. Site Description

As illustrated on attached site plan VA3190/SP1, the building is located in a terrace of residential houses.

The most affected noise sensitive receivers are expected to be 104 and 110 Regents Park Road.

4. Environmental Noise Survey

4.1 Survey Procedure & Equipment

In order to establish the existing background noise levels at the site, a noise survey was carried out between Tuesday 10th and Thursday 12th March 2020 at the location shown in site plan VA3190/SP1. This location was chosen to be representative of the background noise level at the most affected noise sensitive receivers.

Continuous 5-minute samples of the L_{Aeq}, L_{Amax}, L_{A10} and L_{A90} sound pressure levels were undertaken at the measurement location.

The weather during the survey period was generally dry with light winds. The background noise data is not considered to have been compromised by these conditions.

Measurements were made generally in accordance with ISO 1996 2:2017 *Acoustics - Description, measurement and assessment of environmental noise – Part 2: Determination of sound pressure levels*.

The following equipment was used in the course of the survey:

Manufacturer	Model Type	Serial No	Calibration	
			Certificate No.	Date
NTi Class 1 Integrating SLM	XL2	A2A-11586-E0	UCRT18/1582	7/6/18
Larson Davis calibrator	CAL200	13049	UCRT19/1501	18/4/19

The calibration of the sound level meter was verified before and after use with no significant calibration drift observed.

4.2 Results

The measured sound levels are shown as time-history plots on the attached charts VA3190/TH1-2.

The background noise level is determined by road traffic noise in the surrounding streets.

The typical background noise levels measured were:

Monitoring Period	Minimum $L_{A90,5min}$
07:00 – 23:00 hours	40 dB
23:00 – 07:00 hours	32 dB

Table 4.1 – Minimum background noise levels **[dB ref. 20 µPa]**

4.3 Plant Noise Emission Limits

On the basis of the measured noise levels and the planning requirements of the Local Authority, and considering that it is not expected that tonal noise will be generated by the proposed plant units, the following plant specific sound levels should not be exceeded at the most affected noise sensitive receivers:

Monitoring Period	Design Criterion (L_{Aeq})
07:00 – 23:00 hours	30 dB
23:00 – 07:00 hours	22 dB

Table 4.2 – Specific sound pressure levels not to be exceeded at most affected noise sensitive receivers

5. Predicted Noise Impact

5.1 Proposed plant

The following plant is proposed for installation at lower ground floor level at the locations indicated on site plan VA3190/SP1.

Plant Item	Quantity	Proposed Model	Notes
Condensers	1	Daikin RXYSCQ4TV1	To rear of 108 at lower ground floor level under stairs
Condensers	2	Daikin RZAG50A	Lower ground floor at front of houses under stairs

Table 5.1 – Indicative plant selections assumed for this assessment.

Consulting the manufacturer's datasheets, the following noise emissions levels are attributed to the proposed plant items:

Plant Item	Octave Band Centre Frequency (Hz) Sound Pressure, L_p@1m (dB)								dB(A)
	63	125	250	500	1k	2k	4k	8k	
Daikin RXYSCQ4TV1	49	53	49	52	47	40	33	25	52
Daikin RZAG50A	48	53	52	47	43	37	31	24	49

Table 5.2 – Advised plant noise data used for the assessment.

5.2 Recommended Mitigation Measures

The unit in the rear garden of 108 (RXYSCQ4TV1) is to be installed under the ground floor stairs down to the garden. The door to the plant area is understood to be louvered. The louver will need to provided the minimum insertion losses shown in Table 5.3.

Attenuation Component	Octave Band Centre Frequency (Hz) Insertion Loss (dB)							
	63	125	250	500	1k	2k	4k	8k
Louvre	5	4	5	6	9	13	14	13

Table 5.3 – Minimum enclosure loss

All plant and ductwork should be fitted with anti-vibration mounts in accordance with the manufacturer guidelines. This is expected to control structureborne noise to the building to acceptable levels.

Please note that the above recommendations relate to acoustic issues only. It is recommended that professional advice confirming the suitability of these measures be sought from others with regards to issues such as airflow, structural stability and visual impact.

5.3 Predicted noise levels

The cumulative noise level at the most affected noise sensitive receivers has been calculated on the basis of the above information and assuming the recommended mitigation measures, with reference to the guidelines set out in ISO 9613-2:1996 *Attenuation of sound during propagation outdoors - Part 2: General method of calculation.*

A summary of the calculations to the most affected receivers are shown in Appendix B.

Description	Predicted noise Level 1m outside window	Plant noise criterion
104 Regent's Park Road, Front	19 dB(A)	22 dB(A)
104 Regent's Park Road, Rear	21 dB(A)	
110 Regent's Park Road, Front	19 dB(A)	
106 Regent's Park Road, Rear	21 dB(A)	

Table 5.4 – Predicted noise and level and design criteria at noise sensitive location

5.4 Comparison to NR35 Curve

As can been seen from the following comparison in Table 5.5, the predicted noise levels at 1m from the most affected receiver are comfortably below the NR35 curve.

Frequency (Hz)	63	125	250	500	1k	2k	4k	8k
NR35	63	52	45	39	35	35	30	28
104 Regent's Park Road, Front	23	26	22	16	12	6	0	0
104 Regent's Park Road, Rear	22	26	19	20	11	0	0	0
110 Regent's Park Road, Front	23	26	22	16	12	6	0	0
106 Regent's Park Road, Rear	20	25	20	22	14	3	0	0

Table 5.5 – Comparison of predicted noise levels against the NR35 criterion

5.4.2 Structureborne Noise

All plant and ductwork should be fitted with anti-vibration mounts in accordance with the manufacturer guidelines.

The above measures are to control structureborne noise and re-radiated noise to other areas of the building to considerably below current internal noise levels and hence would be considered acceptable.

5.5 Comparison to BS8233:2014 Criteria

BS8233 assumes a loss of approximately 15dB for a partially open window. The external noise level shown in Table 5.4 would result in internal noise levels that achieve the guidelines shown in Table 2.1.

6. Conclusion

A baseline noise survey has been undertaken by Venta Acoustics to establish the background noise climate in the locality of Regent's Park Road, London in support of a planning application for the proposed introduction of new building services plant.

This has enabled noise emission limits to be set at the most affected noise sensitive receiver such that the proposed installation meets the requirements of Camden Council.

The cumulative noise emission levels from the proposed plant have been assessed to be compliant with the plant noise emission limits, with necessary mitigation measures specified.

The proposed scheme is not expected to have a significant adverse noise impact and the relevant planning requirements have been shown to be met.

Jamie Duncan MIOA


Proposed New Plant Location (rear)
Proposed New Plant Location (front)
Noise monitoring location
Most Affected Receivers
Regent's Park Rd
© 2020 Google
Google Earth

Regent’s Park Road, London

Environmental Noise Time History: 1

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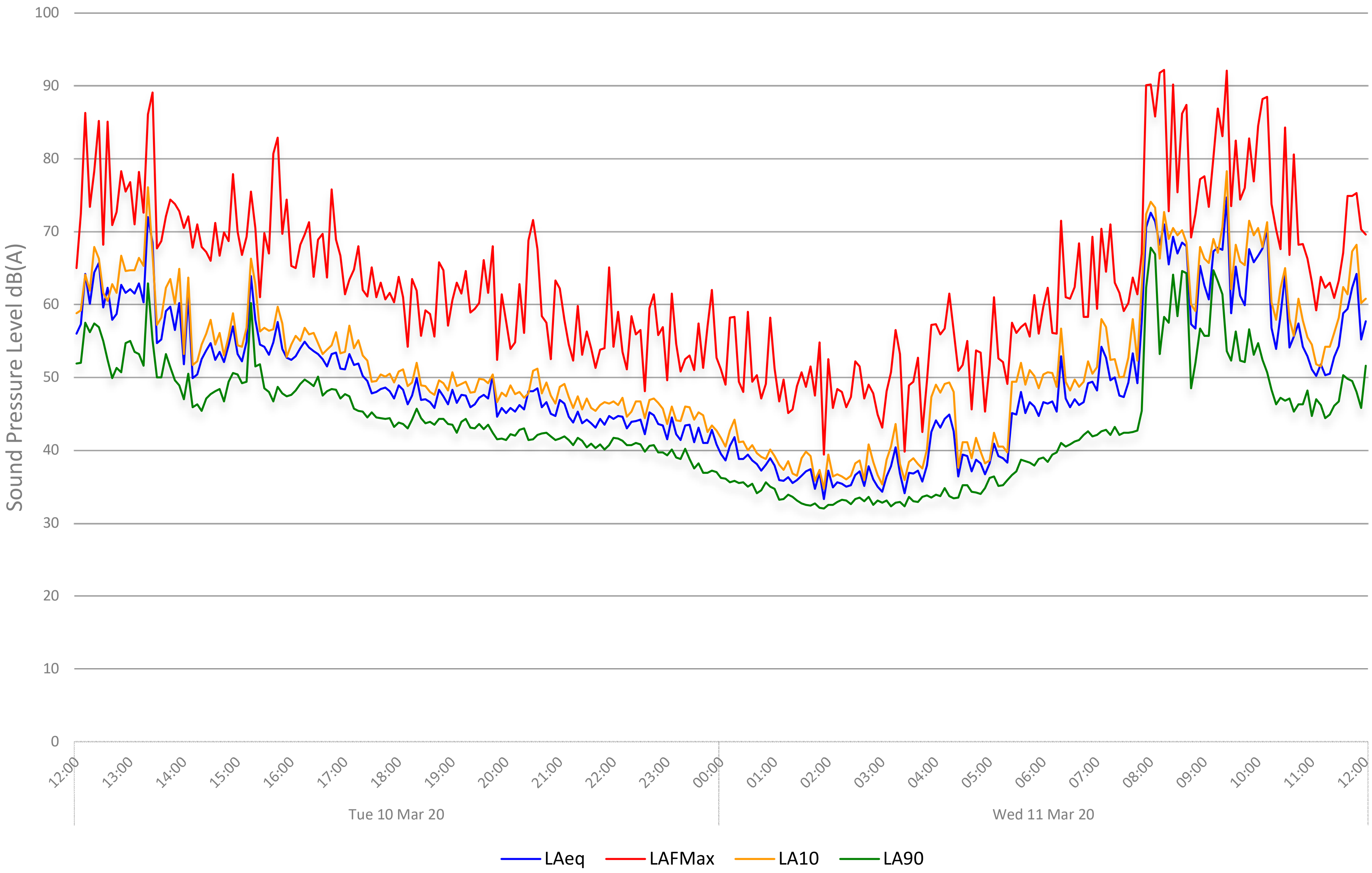
Figure VA3190/TH1



Regent’s Park Road, London

Environmental Noise Time History: 2

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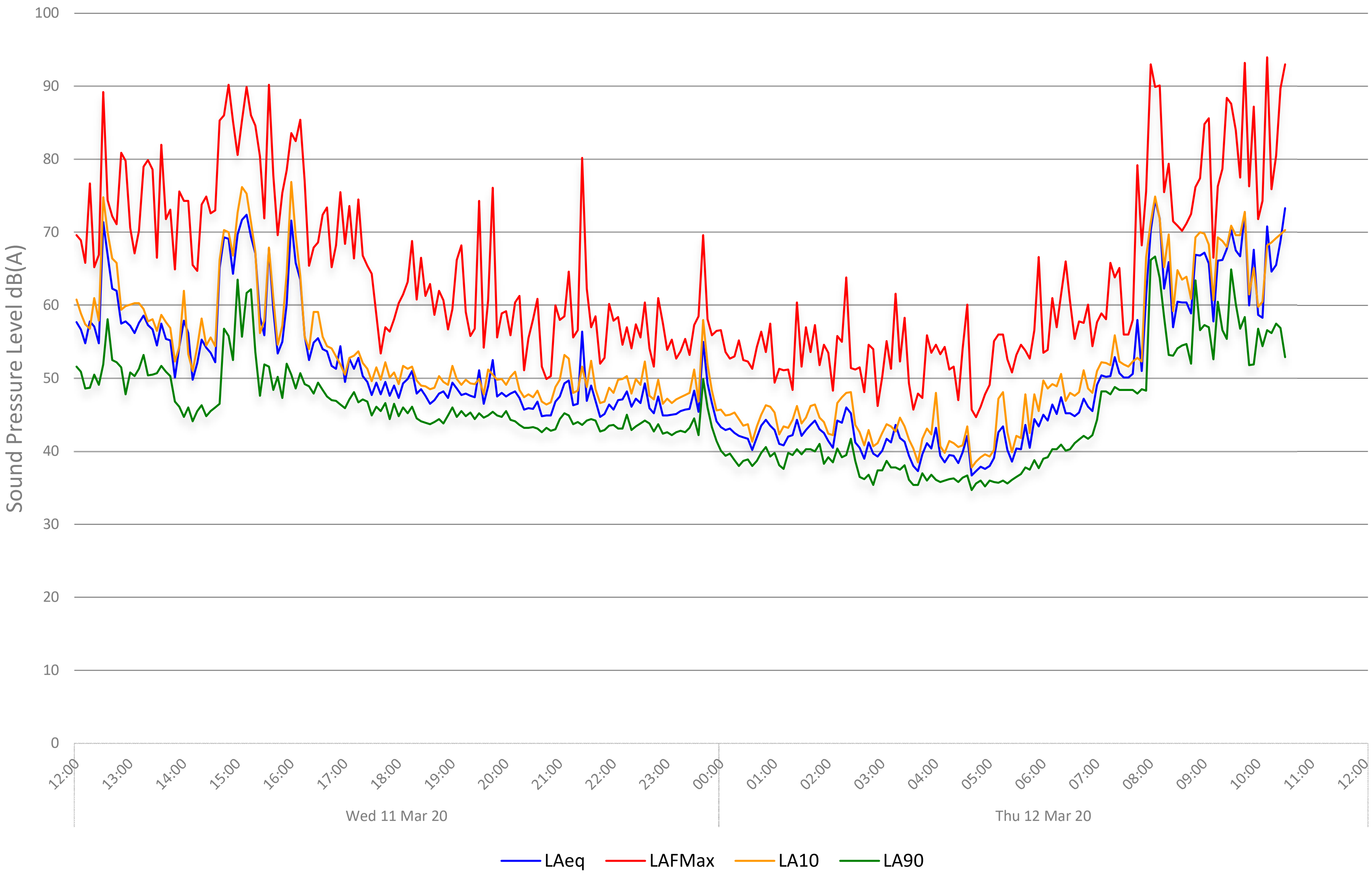
Figure VA3190/TH2



APPENDIX A

Acoustic Terminology & Human Response to Broadband Sound

1.1 Acoustic Terminology

The human impact of sounds is dependent upon many complex interrelated factors such as 'loudness', its frequency (or pitch) and variation in level. In order to have some objective measure of the annoyance, scales have been derived to allow for these subjective factors.

Sound	Vibrations propagating through a medium (air, water, etc.) that are detectable by the auditory system.
Noise	Sound that is unwanted by or disturbing to the perceiver.
Frequency	The rate per second of vibration constituting a wave, measured in Hertz (Hz), where 1Hz = 1 vibration cycle per second. The human hearing can generally detect sound having frequencies in the range 20Hz to 20kHz. Frequency corresponds to the perception of 'pitch', with low frequencies producing low 'notes' and higher frequencies producing high 'notes'.
dB(A):	Human hearing is more susceptible to mid-frequency sounds than those at high and low frequencies. To take account of this in measurements and predictions, the 'A' weighting scale is used so that the level of sound corresponds roughly to the level as it is typically discerned by humans. The measured or calculated 'A' weighted sound level is designated as dB(A) or L_A.
L_{eq} :	A notional steady sound level which, over a stated period of time, would contain the same amount of acoustical energy as the actual, fluctuating sound measured over that period (e.g. 8 hour, 1 hour, etc). The concept of L_{eq} (equivalent continuous sound level) has primarily been used in assessing noise from industry, although its use is becoming more widespread in defining many other types of sounds, such as from amplified music and environmental sources such as aircraft and construction. Because L_{eq} is effectively a summation of a number of events, it does not in itself limit the magnitude of any individual event, and this is frequently used in conjunction with an absolute sound limit.
L_{10} & L_{90} :	Statistical L_n indices are used to describe the level and the degree of fluctuation of non-steady sound. The term refers to the level exceeded for n% of the time. Hence, L_{10} is the level exceeded for 10% of the time and as such can be regarded as a typical maximum level. Similarly, L_{90} is the typical minimum level and is often used to describe background noise. It is common practice to use the L_{10} index to describe noise from traffic as, being a high average, it takes into account the increased annoyance that results from the non-steady nature of traffic flow.
R	*Sound Reduction Index.* Effectively the *Level Difference* of a building element when measured in an accredited laboratory test suite in accordance with the procedures laid down in BS EN ISO 10140-2:2010 and corrected for its size and the reverberant characteristics of the receive room.

1.2 Octave Band Frequencies

In order to determine the way in which the energy of sound is distributed across the frequency range, the International Standards Organisation has agreed on "preferred" bands of frequency for sound measurement and analysis. The widest and most commonly used band for frequency measurement and analysis is the Octave Band. In these bands, the upper frequency limit is twice the lower frequency limit, with the band being described by its "centre frequency" which is the average (geometric mean) of the upper and lower limits, e.g. 250 Hz octave band extends from 176 Hz to 353 Hz. The most commonly used octave bands are:

Octave Band Centre Frequency Hz	63	125	250	500	1000	2000	4000	8000

1.3 Human Perception of Broadband Noise

APPENDIX A

Acoustic Terminology & Human Response to Broadband Sound

Because of the logarithmic nature of the decibel scale, it should be borne in mind that sound levels in dB(A) do not have a simple linear relationship. For example, 100dB(A) sound level is not twice as loud as 50dB(A). It has been found experimentally that changes in the average level of fluctuating sound, such as from traffic, need to be of the order of 3dB before becoming definitely perceptible to the human ear. Data from other experiments have indicated that a change in sound level of 10dB is perceived by the average listener as a doubling or halving of loudness. Using this information, a guide to the subjective interpretation of changes in environmental sound level can be given.

Change in Sound Level dB	Subjective Impression	Human Response
0 to 2	Imperceptible change in loudness	Marginal
3 to 5	Perceptible change in loudness	Noticeable
6 to 10	Up to a doubling or halving of loudness	Significant
11 to 15	More than a doubling or halving of loudness	Substantial
16 to 20	Up to a quadrupling or quartering of loudness	Substantial
21 or more	More than a quadrupling or quartering of loudness	Very Substantial

1.4 Earth Bunds and Barriers - Effective Screen Height

When considering the reduction in sound level of a source provided by a barrier, it is necessary to establish the "effective screen height". For example if a tall barrier exists between a sound source and a listener, with the barrier close to the listener, the listener will perceive the sound as being louder if he climbs up a ladder (and is closer to the top of the barrier) than if he were standing at ground level. Equally if he sat on the ground the sound would seem quieter than if he were standing. This is explained by the fact that the "effective screen height" is changing with the three cases above. In general, the greater the effective screen height, the greater the perceived reduction in sound level.

Similarly, the attenuation provided by a barrier will be greater where it is aligned close to either the source or the listener than where the barrier is midway between the two.

APPENDIX B

VA3190 - Regent's Park Road, London

Noise Impact Assessment - 106 Regent's Park Road, Rear

		63 Hz	125 Hz	250 Hz	500 Hz	1 kHz	2 kHz	4 kHz	8 kHz	dB(A)
Daikin RXYSCQ4TV1 (108)	Lp @ 1m	49	53	49	52	47	40	33	25	**52**
Distance Loss	To 9m	-19	-19	-19	-19	-19	-19	-19	-19	
Louvre Loss		-5	-4	-5	-6	-9	-13	-14	-13	
Line of Sight Loss		-5	-5	-5	-5	-5	-5	-5	-5	
Level at receiver		**20**	**25**	**20**	**22**	**14**	**3**	**-5**	**-12**	**21**

Cumulative level at receiver 21 dB(A)

Noise Impact Assessment - 104 Regent's Park Road, Front

		63 Hz	125 Hz	250 Hz	500 Hz	1 kHz	2 kHz	4 kHz	8 kHz	dB(A)
Daikin RZAG50A (108)	Lp @ 1m	48	53	52	47	43	37	31	24	**49**
Distance Loss	To 7m	-17	-17	-17	-17	-17	-17	-17	-17	
Screening loss*		-12	-14	-17	-18	-18	-18	-18	-18	
Level at receiver		**19**	**22**	**18**	**12**	**8**	**2**	**-4**	**-11**	**15**

* Screening loss limited to 18dB

		63 Hz	125 Hz	250 Hz	500 Hz	1 kHz	2 kHz	4 kHz	8 kHz	dB(A)
Daikin RZAG50A (106)	Lp @ 1m	48	53	52	47	43	37	31	24	**49**
Distance Loss	To 6m	-16	-16	-16	-16	-16	-16	-16	-16	
Screening loss*		-12	-14	-17	-18	-18	-18	-18	-18	
Level at receiver		**21**	**23**	**20**	**13**	**9**	**3**	**-3**	**-10**	**16**

* Screening loss limited to 18dB

Cumulative level at receiver 19 dB(A)

Noise Impact Assessment - 110 Regent's Park Road, Rear

		63 Hz	125 Hz	250 Hz	500 Hz	1 kHz	2 kHz	4 kHz	8 kHz	dB(A)
Daikin RXYSCQ4TV1 (108)	Lp @ 1m	49	53	49	52	47	40	33	25	**52**
Distance Loss	To 3m	-10	-10	-10	-10	-10	-10	-10	-10	
Screening loss*		-7	-8	-10	-12	-15	-18	-18	-18	
Louvre Loss		-6	-6	-8	-10	-14	-18	-16	-15	
Level at receiver		**27**	**29**	**21**	**20**	**8**	**-5**	**-11**	**-18**	**20**

* Screening loss limited to 18dB

Cumulative level at receiver 20 dB(A)

Noise Impact Assessment - 110 Regent's Park Road, Front

		63 Hz	125 Hz	250 Hz	500 Hz	1 kHz	2 kHz	4 kHz	8 kHz	dB(A)
Daikin RZAG50A (108)	Lp @ 1m	48	53	52	47	43	37	31	24	**49**
Distance Loss	To 6m	-16	-16	-16	-16	-16	-16	-16	-16	
Screening loss*		-12	-14	-17	-18	-18	-18	-18	-18	
Level at receiver		**21**	**23**	**20**	**13**	**9**	**3**	**-3**	**-10**	**16**

* Screening loss limited to 18dB

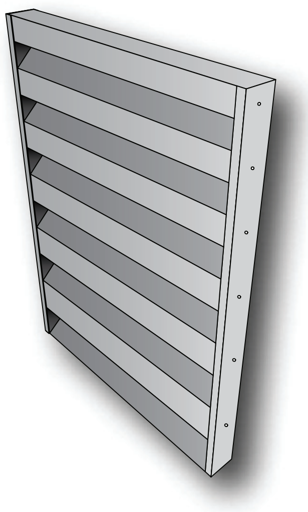
		63 Hz	125 Hz	250 Hz	500 Hz	1 kHz	2 kHz	4 kHz	8 kHz	dB(A)
Daikin RZAG50A (106)	Lp @ 1m	48	53	52	47	43	37	31	24	**49**
Distance Loss	To 7m	-17	-17	-17	-17	-17	-17	-17	-17	
Screening loss*		-12	-14	-17	-18	-18	-18	-18	-18	
Level at receiver		**19**	**22**	**18**	**12**	**8**	**2**	**-4**	**-11**	**15**

* Screening loss limited to 18dB

Cumulative level at receiver 19 dB(A)

Slimshield™ Acoustic Louvres

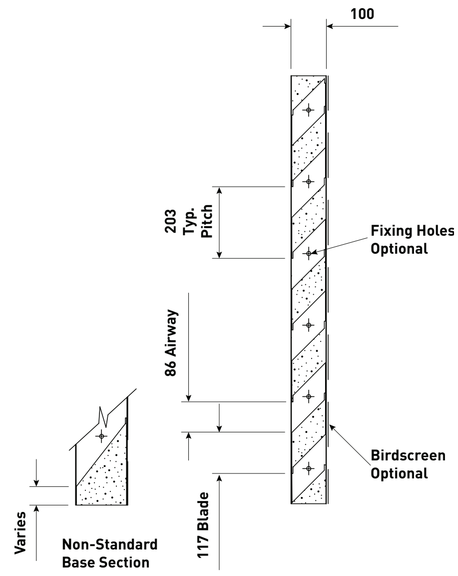
SL-100



Weight
20kg/m²

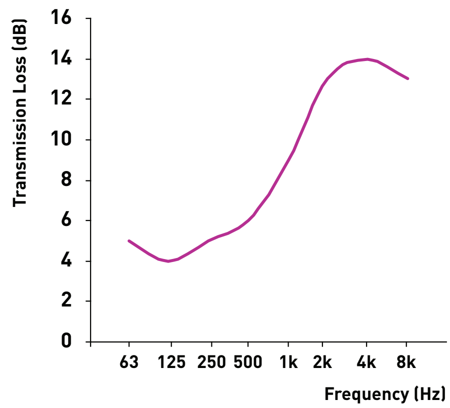
Module Width
300 - 1800mm

Standard Module Height
400mm minimum,
(increasing increments of 203mm)
Intermediate heights are available



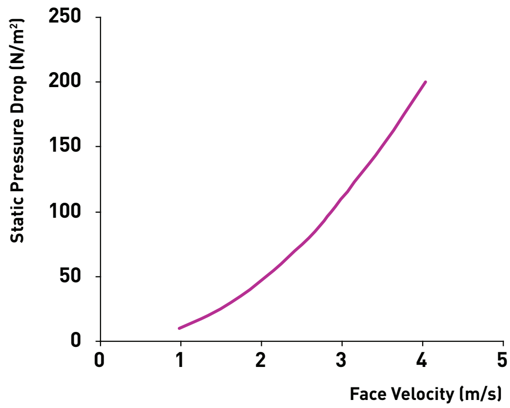
Acoustic Performance

Octave Band Centre Frequency (Hz)	63	125	250	500	1k	2k	4k	8k
Transmission Loss (dB)	5	4	5	6	9	13	14	13
Acoustic Rating	R_w10dB / D_{new}16dB							
For noise reduction, add 6dB to the above values								



Aerodynamic Performance

Static Pressure Drop (N/m²)	10	20	30	40	50	60	70	80	90	100
Face Velocity (m/s)	0.92	1.30	1.59	1.84	2.05	2.25	2.43	2.61	2.76	2.90
Nominal Free Area	42%*					* Average over louvre depth				
Cd	0.225									



Acoustic Louvred Doors

- Single and double doors are available in the SL-100 louvre range
- See page 24 for further details

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APPENDIX C: Energy Efficiency Report

REPORT ON 106 and 108 REGENTS PARK ROAD

OVERHEATING ANALYSIS

108 REGENTS PARK ROAD
LONDON NW1 8UG

Date: September 2nd, 2020
Rev: -
Status: For Planning

BSE3D Limited
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BSE3D QA SYSTEM

Revision No: -
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Client Name: Mr Alexander Klimt and Mrs Lorna and Mr Peter Klimt
Client Contact: Licia De Angelis
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Authorisation By: David Gomm

ISSUE RECORD:

Date Issued	Issue Status	Revision	Checked/ Authorised
02/09/20	For Planning	-	David Gomm

CONTENTS

1 INTRODUCTION

This report reviews the level of overheating experienced in the bedroom spaces of number 106 and 108 Regents Park Road, that have currently been designated as areas that need comfort cooling.

The report will be produced in line with Policy 10.4 of the Camden Planning Guidance Policy and will utilise the energy hierarchy to demonstrate whether comfort cooling will be required or not in the property. The building was modelled for overheating in accordance with CIBSE TM59.

A Dynamic Thermal Model has been created of the geometry of the building with proposed layouts provided by Greenway Architects.

There are key spaces that have large expanses of glazing and therefore solar gain will be the most contributable factor to overheating within these areas. There are a number of strategies that can be employed to reduce the overheating affect, and these are namely: -

- Improved solar glazing
- Natural ventilation provision
- Internal and or external shading
- Mechanical ventilation
- Air conditioning

1.1 Dynamic Thermal Modelling

BSE3D have used Environmental Design Solutions Limited (EDSL) TAS modelling software version 9.5.0. Tas is a building modelling and simulation tool that provides hourly dynamic thermal simulation for any building type. The 3D geometry was constructed from base level drawings provided by Greenway Architects.

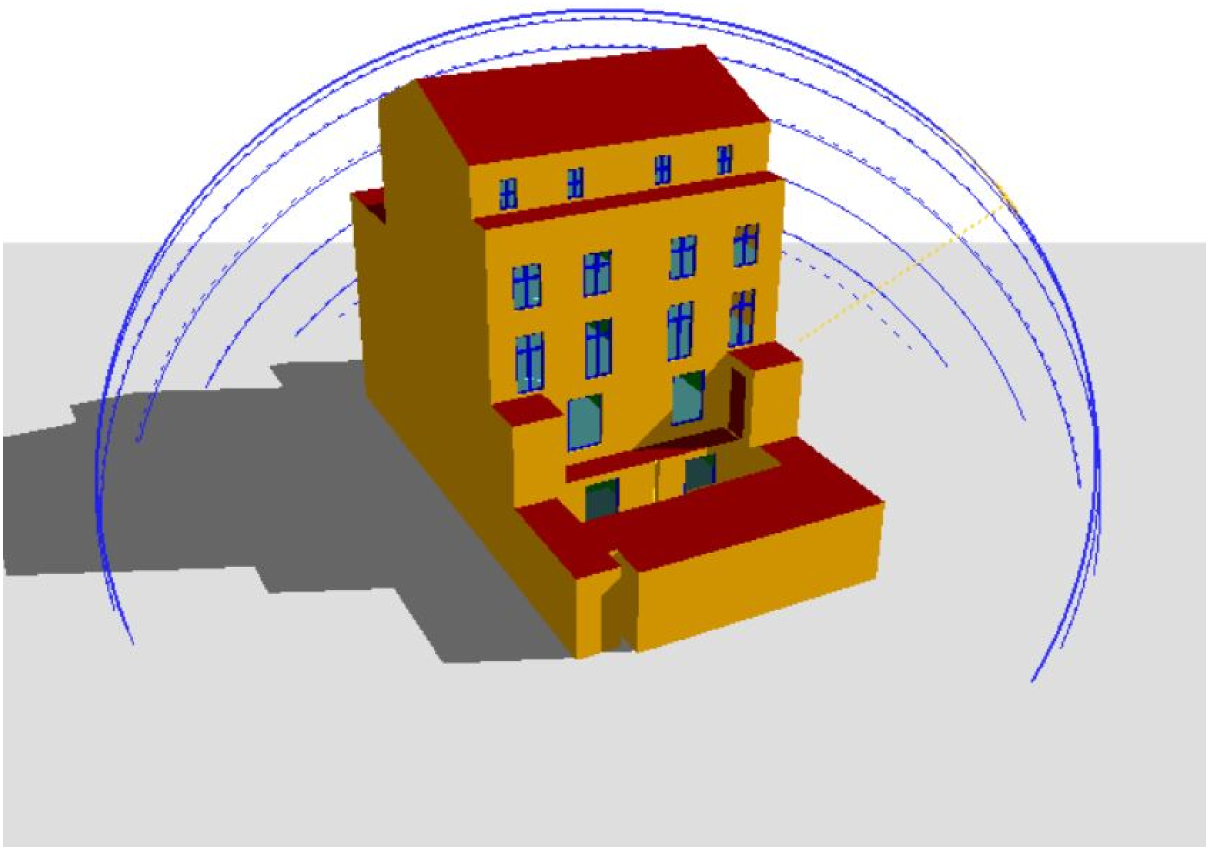

Fig 1: 3D Tas Rendered Image of the building

1.2 Existing Site

The existing site faces North East and the building consists of two dwellings, number 106 and 108. The building is deep plan with no windows on the East or West facades. The buildings date back approximately 200 years and consists of a Basement and Ground to Third floors of residential accommodation.

1.3 Data Inputs

Orientation:

301° North

Weather File:

London DSY 1 (Design Summer Year) 2020's High emissions 50% percentile scenario

Construction Elements:

All Construction elements have been provided by Greenway Architects and the build ups inputted into TAS. The Architect shall confirm all U values when they have finalised the constructions.

New Building Elements	U Value (W/m^{2}K)
Cavity Wall	0.19
Lower Ground Floor	0.19
Pitched Roof	1.6
Flat Roof	0.18
Windows (Double Glazed)	1.6 (0.67 G Value)

Table 1: Construction U Values

Renovated Building Elements	U Value (W/m^{2}K)
Cavity Wall	0.29 & 0.41 (Refer to Architects Details)

Table 2: Renovated Construction U Values

Infiltration:

0.55 ACH (CIBSE Guide A)

Internal Gains:

Occupancy

Guidance has been sought from CIBSE TM59 when determining figures to use for occupancy gains in the thermal model. Table 3 shows the maximum occupancy figures based on data provided by CIBSE TM59.

Area	Sensible Gain	Latent Gain	Schedule
Double Bedroom	75W/Adult	55W/Adult	2 people at 70% gains from 11 pm to 8 am 2 people at full gains from 8 am to 9 am and from 10 pm to 11 pm 1 person at full gains in the bedroom from 9 am to 10 pm

Table 3: Occupancy Gains

Guidance has been sought from CIBSE TM59 when determining figures to use for occupancy gains in the thermal model.

Lighting and Equipment

Area	Gains	Schedule
Bedroom	Lighting Gain - 2W/m^2 Equipment Gain - 80W	From 6pm to 11pm Peak load of 80 W from 8 am to 11 pm Base load of 10 W during the sleeping hours

Table 4: Ancillary Gains

Natural Ventilation Openings

All openable windows have been modelled in a separate simulation and modelled as open when both the internal dry bulb temperature exceeds 22 °C and the room is occupied. The existing building does not lend itself to an efficient natural ventilation strategy as there is only single sided ventilation possible and no means of providing cross ventilation. Another issue is that the windows will have to be assumed to be closed at night as it is directly below a busy road so noise is an issue and closed curtains will also affect the airflow into the space.

Internal doors have been included and left open in the model in the daytime but assumed to be closed when occupants are sleeping.

Internal blinds reduce the solar gain by directly blocking out the sun. they are also a good measure of reducing glare inside the building and control the intensity of the sun during the day.

The internal blinds have been modelled utilising internal shades on the windows and doors. The performance of the blinds in question is detailed below:

Material Type		Transparent Layer
Name		blind\15
Description		translucent dark, closed
Thickness (mm)		1.0
Conductivity (W/m·°C)		1.0
Vapour Diffusion Factor		1
Solar Transmittance		0.4
Solar Reflectance	External	0.3
	Internal	0.3
Light Transmittance		0.4
Light Reflectance	External	0.3
	Internal	0.3
Emissivity	External	0.85
	Internal	0.85
Blind?		☑

Table 5: Blind Thermal Properties

Mechanical Ventilation and Air Conditioning

Mechanical ventilation has currently been excluded from the analysis. The planning guidance has stated that "All new external work shall be carried out in materials that resemble, as closely as possible, in colour and texture those of the existing building, unless otherwise specified in the approved application."

Given the number of bedrooms separate intake and exhaust louvres would be required to penetrate through the external façade. The building is constrained via its layout, floor to ceiling heights and limited exposed facades, therefore louvres would have to be exposed on both frontages of the house. Looking to extend the routes to potentially discharge at roof level would require significant amounts more ducting, fan power energy and builders work to make this work.

1.4 Cooling Hierarchy Requirements

1. Minimise internal heat generation through energy efficient design, considering the following:

- Layout and uses: locate any spaces that need to be kept cool or that generate heat on cooler sides of developments. ***[Design Team Response: cooling has been localised to the bedroom areas only given the building constraints]***
- Reducing heat gains e.g. including low energy lighting. ***[Design Team Response: All lighting is low energy LED. All appliances are to be (at least) A rated for energy efficiency]***
- Seal/ insulate heat generating processes. ***[Design Team Response: All pipework and heat generation equipment shall be insulated to the manufacturer' s guidelines. Heat generating plant will be located in dedicated plantrooms away from occupied spaces]***
- Reduce the distance heat needs to travel and insulate pipework. ***[Design Team Response: All pipework is insulated, and the pipework is run the most direct route practical to minimise heat losses]***
- Design layouts to promote natural ventilation e.g. shallow floor plans and high floor to ceiling heights. ***[Design Team Response: Layouts have been amended as much as practical given this is an existing building to promote daylight and reduce cooling where possible]***
- Consider evaporation cooling which cools air through the evaporation of water. ***[Design Team Response: Portable evaporative coolers will be used to supplement the cooling]***
- Consider 'free cooling' or 'night cooling', which uses the cooling capacity of ambient air to directly cool the space. ***[Design Team Response: Air conditioning is used in the bedrooms only. Windows will be opened in the daytime, but since each room only has windows facing one direction there is will be no cross ventilation. There are pollution constraints in both terms of air pollution and noise that emanates from the road directly below the bedrooms. Even if the windows are opened at night then curtains and blinds would block most of the airflow]***

2. Reduce the amount of heat entering a building in summer:

- Consider the angle of the sun and optimum daylight and solar gain balance. ***[Design Team Response: This is constrained by the existing building; however, floor plans have been optimised to maximise daylight where possible]***
- Orientate and recess windows and openings to avoid excessive solar gain. ***[Design Team Response: This is constrained by the existing building; however existing glazing sizes and specifications have been optimised to maximise daylight and avoid excessive solar gain where possible]***
- Consider low g-values and the proportion, size, and location of windows. ***[Design Team Response: Location and size is constrained by the existing building; however, the***

replacement glazing has been specified to allow a reduction in solar gain whilst still optimising daylight penetration]

- Make use of shadowing from other buildings. ***[Design Team Response: This is constrained by the existing building's location and proximity to surrounding buildings]***
- Include adequate insulation. ***[Design Team Response: All building elements have been specified in line with Part L requirements]***
- Design in shading: e.g. include internal courtyards, large shade-providing trees and vegetation, balconies, louvers, internal or external blinds, and shutters. ***[Design Team Response: Internal blinds have been modelled in the report and surrounding buildings have been modelled. Trees have been omitted in case they are ever removed in the future]***
- Make use of the albedo effect (use light coloured or reflective materials to reflect the sun's rays). ***[Design Team Response: The façade is painted light colours which will reduce the solar gain. Planning requires that the roof of this building is grey slate]***
- Include green infrastructure e.g. green wall, green/blue roofs, and landscaping, to regulate temperatures. ***[Design Team Response: This would need to be approved by the Local Authority]***

3. Manage the heat within the building through exposed internal thermal mass and high ceilings, (see 'Thermal performance' Chapter 3 of this CPG).

[Design Team Response: The existing thermal mass of the building has been modelled in this report to maximise the effect of the concrete absorbing the retaining the heat produced by the sun]

4. Passive ventilation:

- Natural ventilation, openable windows, the 'stack effect' system (see Chapter 3 of this guidance). ***[Design Team Response: the existing fenestration opening are singles sided only and the team are constrained via the existing opening sizes]***
- Design layouts to promote natural ventilation e.g. shallow floor plans and high floor to ceiling heights. ***[Design Team Response: This is constrained via the existing building form and layout]***
- Consider evaporation cooling which cools air through the evaporation of water. Portable evaporative coolers will be used as the primary method of cooling. However evaporative cooling does not work on humid days so refrigerant based air conditioning will sometimes be needed. ***[Design Team Response: Potable evaporative coolers will be used as the primary method of cooling. However evaporative cooling is not as effective on humid days so the installed refrigerant-based cooling system will be installed to provide dehumidification along with future proofing the building for more extreme weather events]***

5. Mechanical ventilation:

- Ensuring the most efficient system possible.
- Consider mechanical ventilation with heat recovery. ***[Design Team Response: As discussed in this report mechanical ventilation is constrained by having to sue the exposed facades to get air in and out from which would affect the aesthetic of the demise]***

6. Active cooling:

- Ensuring they are the lowest carbon options. ***[Design Team Response: Comfort cooling will be supplied by a Daikin inverter-controlled system with a very high seasonal energy efficiency rating of 5.4]***
- Water based cooling systems also reduce the need for air conditioning by running cold water through pipes in the floor and/or ceiling to cool the air. ***[Design Team Response: The proposed refrigerant based cooling system has a seasonal energy efficiency rating equal to that of a water-based system. Given the amount of overheating being experienced a refrigerant based system is the most efficient in ensuring comfortable conditions are experienced by the occupants for today and in the future]***

1.5 Modelling Calculation Methodologies

Within the space of the farm area CIBSE TM59 has been employed as the methodology for assessing the overheating criteria within an occupied space. The CIBSE TM59 guidance uses the calculation methodology employed in CIBSE TM52. This methodology is described in the next section.

CIBSE TM52

The latest guidance from CIBSE (Chartered Institute of Building Services Engineers) on the subject of overheating is CIBSE Technical Memorandum 52 (TM52). This sets requirements for modelling overheating in buildings, based on the CIBSE Design Summer Year (DSY) which simulates a typical "hot" year.

TM52 (2013) provides a methodology to assess 'Adaptive Thermal Comfort'. It is based on the comparison between the predicted room temperature and a maximum acceptable room temperature calculated from the 'running mean' of the outdoor temperature (Trm). The running mean places greater weight on the temperature for days closer to the present as these have more influence on a person's comfort levels. This means that the overheating threshold is dynamic and is based on the weather file utilised.

TM52 is based on the latest research into the rate at which people adapt to changes in climate. As a result, the temperature criteria vary through time. During a cool spell of weather, the overheating temperature reduces, whereas in a hotter period, when people are acclimatised, warmer internal temperatures are permitted. The internal target temperature is based on the previous few days of weather.

TM52 sets out three criteria, with a 'pass' dependent on meeting two out of the following three criteria:

Criterion 1 - Hours of Exceedance (He):

The number of hours the predicted operative temperature exceeds the upper limit of the range of acceptable operative temperatures (Tmax) by 1K, or more, does not exceed 40 hours, during the five summer months (May-September).

Criterion 2 - Weighted Exceedance (We):

The sum of the weighted exceedance for each degree Kelvin above Tmax (1K, 2K and 3K) is ≤ 6, where:

We = ΣHe (1, 2, 3) *(ΔT) (1, 2, 3) and

ΔT = (Top – Tmax), rounded to a whole number i.e. [0 °C < 0.5 °C ≥ 1 °C].

Therefore, the severity of the instances overheating must be limited with worse instances of overheating occurring much less frequently than minor instances.

Criterion 3 - Threshold/Upper Limit Temperature (Tupp):

The measured/predicted operative temperature should not exceed the Tmax by 4K or more at any time, where Tmax + 4K is called the upper limit (Tupp). This means that the temperature shall never be significantly higher than the current expected discomfort temperature.

2 RESULTS

2.1 106 & 108 Regents Park Assessment

Three simulations have been run:

Simulation 1 – Windows Closed

Simulation 2 – Windows Open

Simulation 3 – Windows Open & Blinds

Domestic Overheating (CIBSE TM59)

Project Details

Building Designer File (.tbd):	Regents Park_London DSY 2020 HE 50th Percentile.tbd
Simulation Results File (.tsd):	Regents Park_London DSY 2020 HE 50th Percentile.tsd
Date:	22 July 2020
Building Category:	Category II

Simulation 1 Natural Ventilation Overheating Results

Zone Name	Room Use	Occupied Summer Hours	Max. Exceedable Hours	Criterion 1: #Hours Exceeding Comfort Range	Annual Night Occupied Hours for Bedroom	Max Exceedable Night Hours	Criterion 2: Number of Night Hours Exceeding 26 °C for Bedrooms.	Result
106-First-Master Bedroom	Bedroom	3672	110	3672	3285	32	2442	Fail
106-Second-Bedroom 1	Bedroom	3672	110	3672	3285	32	2595	Fail
106-Second-Bedroom 2	Bedroom	3672	110	3672	3285	32	3278	Fail
106-Third-Bedroom 3	Bedroom	3672	110	3672	3285	32	3257	Fail
106-Third-Bedroom 4	Bedroom	3672	110	3672	3285	32	3285	Fail

108-LGF-Bedroom	Bedroom	3672	110	3672	3285	32	2874	Fail
108-Second-Master Bathroom	Bedroom	3672	110	3672	3285	32	3278	Fail
108-Second-Master Bedroom	Bedroom	3672	110	3672	3285	32	2701	Fail
108-Third-Bedroom 1	Bedroom	3672	110	3672	3285	32	3285	Fail
108-Third-Bedroom 2	Bedroom	3672	110	3672	3285	32	3285	Fail
108-Third-Bedroom 3	Bedroom	3672	110	3672	3285	32	3285	Fail

Simulation 2 Natural Ventilation Overheating Results

Zone Name	Room Use	Occupied Summer Hours	Max. Exceedable Hours	Criterion 1: #Hours Exceeding Comfort Range	Annual Night Occupied Hours for Bedroom	Max Exceedable Night Hours	Criterion 2: Number of Night Hours Exceeding 26 °C for Bedrooms.	Result
106-First-Master Bedroom	Bedroom	3672	110	3672	3285	32	2395	Fail
106-Second-Bedroom 1	Bedroom	3672	110	3672	3285	32	2481	Fail
106-Second-Bedroom 2	Bedroom	3672	110	3672	3285	32	3179	Fail
106-Third-Bedroom 3	Bedroom	3672	110	3672	3285	32	3222	Fail
106-Third-Bedroom 4	Bedroom	3672	110	3672	3285	32	3212	Fail
108-LGF-Bedroom	Bedroom	3672	110	3672	3285	32	2693	Fail
108-Second-Master Bathroom	Bedroom	3672	110	3672	3285	32	3251	Fail

108-Second-Master Bedroom	Bedroom	3672	110	3672	3285	32	2497	Fail
108-Third-Bedroom 1	Bedroom	3672	110	3672	3285	32	3285	Fail
108-Third-Bedroom 2	Bedroom	3672	110	3672	3285	32	3285	Fail
108-Third-Bedroom 3	Bedroom	3672	110	3672	3285	32	3285	Fail

Simulation 3 - Natural Ventilation Overheating Results								
Zone Name	Room Use	Occupied Summer Hours	Max. Exceedable Hours	Criterion 1: #Hours Exceeding Comfort Range	Annual Night Occupied Hours for Bedroom	Max Exceedable Night Hours	Criterion 2: Number of Night Hours Exceeding 26 °C for Bedrooms.	Result
106-First-Master Bedroom	Bedroom	3672	110	3672	3285	32	2215	Fail
106-Second-Bedroom 1	Bedroom	3672	110	3672	3285	32	2298	Fail
106-Second-Bedroom 2	Bedroom	3672	110	3672	3285	32	3033	Fail
106-Third-Bedroom 3	Bedroom	3672	110	3672	3285	32	3111	Fail
106-Third-Bedroom 4	Bedroom	3672	110	3672	3285	32	3100	Fail
108-LGF-Bedroom	Bedroom	3672	110	3672	3285	32	2542	Fail
108-Second-Master Bathroom	Bedroom	3672	110	3672	3285	32	3156	Fail
108-Second-	Bedroom	3672	110	3672	3285	32	2328	Fail

Master Bedroom								
108-Third-Bedroom 1	Bedroom	3672	110	3672	3285	32	3154	Fail
108-Third-Bedroom 2	Bedroom	3672	110	3672	3285	32	3156	Fail
108-Third-Bedroom 3	Bedroom	3672	110	3672	3285	32	3174	Fail

Table 6,7&8: Regents Park Road Overheating Results

The results show that all the bedrooms fail the criteria blinds and window openings provide a marginal benefit, however given the site's location and building layout there is no means of achieving a suitable natural ventilation strategy given the single sided layout and existing window openings. In order to achieve compliance with the overheating criteria, via passive measures, the entire building form would need to be significantly altered to achieve the required reduction in overheating.

3 CONCLUSIONS

The results show that the bedrooms fail the overheating criteria in accordance with CIBSE TM59. The existing building does not lend itself to be able to passively cool these areas without significant alteration to the exterior façade and existing internal plan layouts. The design team have understood these constraints and have put in place low energy portable coolers to be used for the majority of the time when the weather is hot, to avoid using the installed system and only employ the installed service when it is needed. The refrigerant based system will only be used in excessively high temperatures and also to future proof the development for future more extreme climatic events.

The design options give the client flexibility in managing the energy use of the buildings by providing localised cooling only when it is necessary.