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Fountain House, Lancaster Terrace, London

Assessment of a proposed mechanical plant associated with a residential extension

Report Prepared by:
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9 April 2018

Contents

Appendices

1.0 Introduction

1.1 Sharps Gayler LLP (SGL) has been commissioned by Happy Visit Ltd to provide an acoustic assessment for the proposed mechanical plant relating to a proposed extension to Fountain House, 1 Lancaster Terrace, W2 3PF London.

1.2 An aerial view of the location is shown in Appendix A.

1.3 The proposal is to extend existing aparthotel units to the rear.

1.4 It is proposed to replace the existing heat source pumps on each unit with 15 new heat source pumps including:

- 8 x Daikin 2MXM50M9
- 7 x Daikin RXYSQ6T8V (3 on the roof of the proposed flats; 2 in the Lift motor enclosure on the roof; and 2 at basement floor level on the façade facing Lancaster Terrace

1.5 Detailed plans are supplied in Appendix B.

1.6 This report assesses the resultant noise levels from the proposed mechanical plant at the nearby receptors according to the City of Westminster Unitary Development Plan adopted 24 January 2007.

1.7 The most sensitive existing receivers are residential flats across the courtyard, between 7 and 10 metres away from proposed items of plant (depending on location).

1.8 This report details the environmental noise survey undertaken to assess the existing noise climate.

2.0 Assessment criteria

2.1 The local development plan states the following in relation to mechanical plant:

City of Westminster Unitary Development Plan adopted 24 January 2007

POLICY ENV 7: CONTROLLING NOISE FROM PLANT, MACHINERY AND INTERNAL ACTIVITY

2.2 (A) Where development is proposed, the City Council will require the applicant to demonstrate that this will be designed and operated so that any noise emitted by plant and machinery and from internal activities, including noise from amplified or unamplified music and human voices, will achieve the following standards in relation to the existing external noise level at the nearest noise sensitive properties, at the quietest time during which the plant operates or when there is internal activity at the development.

1) where the existing external noise level exceeds WHO Guideline levels of LAeq,12hrs 55dB daytime (07.00- 19.00); LAeq,4hrs 50dB evening (19.00-23.00); LAeq,8hrs 45dB night-time (23.00- 07.00):

either

(a) and where noise from the proposed development will not contain tones or be intermittent sufficient to attract attention, the maximum emission level (LAeq15min) should not exceed 10 dB below the minimum external background noise at the nearest noise sensitive properties. The background noise level should be expressed in terms of LA90,15min.

or

(b) and where noise emitted from the proposed development will contain tones, or will be intermittent sufficient to attract attention, the maximum emission level (LAeq15min) should not exceed 15 dB below the minimum external background noise at the nearest noise sensitive properties. The background noise level should be expressed in terms of LA90,15min

2.3 2) where the external background noise level does not exceed the above WHO Guideline levels, policy ENV 7(A)(1)(a) and (b) will apply except where the applicant is able to demonstrate to the City Council that the application of slightly reduced criteria of no more than 5 dB will provide sufficient protection to noise sensitive properties:

either

(a) where noise emitted from the proposed development will not contain tones or be intermittent sufficient to attract attention, the maximum emission level (LAeq15min) should not exceed 5dB below the minimum external background noise level at the nearest noise sensitive properties. The background noise levels should be expressed in terms of LA 90, 15min.

or

(b) where noise emitted from the proposed development will contain tones or will be intermittent sufficient to attract attention, the maximum emission level (LAeq15min) should not exceed 10 dB below

the minimum external background noise level at the nearest noise sensitive properties. The background noise levels should be expressed in terms of LA 90, 15min.

2.4 If the proposed development will contain tones or be intermittent sufficient to attract attention, maximum emission levels should not exceed 15 dB below the minimum external background noise at the nearest noise sensitive properties. The background level should be expressed in terms of LA90.

3.0 Noise survey

3.1 An environmental noise survey was carried out from 23rd to 24th February 2018 to determine the existing noise levels at the nearby receptors. Continuous measurements were made at a representative location to the nearby sensitive receptors.

3.2 These measurements were undertaken during day and night periods. The microphones were fitted with an integrated wet weather kit and wind-shield. These measurements were façade measurements. The measurement locations are shown on the location plan at Appendix A.

3.3 All measurements were made in 15-minute periods and were made using Norsonic 140 sound level meters. The meters used are of Class 1 type and were field checked for calibration before and after the measurements. No significant drift was noted.

3.4 The weather was generally dry with low wind speeds and meteorological conditions are not believed to have affected the measurements. The meters allow simultaneous measurements of noise levels both in overall dBA values and frequency selective octave bands over predetermined time periods, using various measurement parameters. The Leq, L90 and LMAX noise levels were recorded in overall dBA values together with octave band levels.

3.5 For information purposes it can be noted:

- dBA is the sound level in decibels (dB) measured by the sound level meter with the A-weighting.
- The A-weighting is a filter applied to the sound level meter to simulate the frequency response of the human ear, which is more sensitive to high frequency sound than low.
- Leq is the equivalent continuous noise level which is a method of averaging the varying noise level over the time period into a single figure value. The Leq has the same sound energy as the fluctuating level over that period.
- LMAX is the highest level within the measurement period.
- L90 is the noise level exceeded for 90% of the time and is referred to as the background noise level.

4.0 Survey results

4.1 The full data set is included in Appendix C. Design levels are summarised below. These detail the daytime LAeq,16Hr, and lowest night-time LA90 levels during the day and night. Measured at the nearby properties across the court yard. These are free field levels:

Table 1 Established external free field noise levels

Day 0700-2300 hours	Day 0700-2300 hours	Day 0700-2300 hours	Day (Lowest) 0700-2300 hours	Night (Lowest) 2300-0700 hours
LAeq,12hour, dB	**LAeq,4hour, dB**	**LAeq,8hour, dB**	**LA90, dB**	**LA90, dB**
61.7	60.3	59.4	54.8	51.8

4.2 The measured noise levels are above the day, evening and night time noise levels as discussed in paragraph 2.2, and the WHO guidelines.

4.3 The lowest measured background noise levels have been corrected for facade noise levels as follows:

Table 2

	Day 0700-2300 hours	Night 2300-0700 hours
Façade	**LA90, dB**	**LA90, dB**
Nearby receiver (façade noise level +3)	58	55

5.0 Fixed mechanical plant

5.1 The closest sensitive receivers to the mechanical plant are located at the nearby residential properties situated across a court yard between 7 and10 metres away from individual items of plant, depending on location. There are also receivers located at the adjacent hotel windows which have been assessed.

5.2 Due to the complexities in the relationship between each source and each receiver, and the height differences, a noise modelling program has been used to predict the noise level at each of the receivers (SoundPLAN 8.0) detailed calculation sheets are supplied in Appendix E.

5.3 The plant is located as follows (see Appendix E for locations):

- 8 x Daikin 2MXM50M9 on the Basement and ground floor facades in the courtyard
- 7 x Daikin RXYSQ6T8V - 3 on the roof of the proposed flats; 2 in the Lift motor enclosure on the roof; and 2 at basement floor level on the façade facing Lancaster Terrace

5.4 The sound pressure/power levels are attached in Appendix D. It is assumed that each of the proposed units will operate for 100% of the time, at 100% duty. This is considered a worst-case scenario and therefore a robust assessment of the resultant noise levels. In reality this situation would not occur as the likelihood of all units being used simultaneously is very low, especially during times when background levels are at a minimum (i.e. in the middle of the night)

5.5 The calculations have allowed for the following:

- Daikin 2MXM50M9 units set to "night mode" which reduces the noise levels by 3 dBA (during the night), see appendix D for manufacturers details/letter.
- Daikin RXYSQ6T8V units set to "night quiet mode – Step 1" which reduces the noise levels by 4 dBA (during the night), see appendix A for manufacturers details.

5.6 Night time is defined as 2300 to 0700 hours.

5.7 The calculated noise emission level are as follows and the individual receiver noise levels (SoundPLAN results) are shown in Appendix E:

Table 3

Receiver (worst case floor level)	Day, 0700-2300 hours – LAeqT	Night, 2300 -0700 hours – LAeqT
Above the dentist in the courtyard	47 (47.3)	44 (44.2)
Window of the adjacent hotel (Rear)	45 (44.7)	41 (40.7
Window of the adjacent hotel (Front over-looking Lancaster terrace)	33 (33.2)	29.7 (30)

5.8 The full calculation spreadsheets, produced by SoundPLAN, are supplied in Appendix D.

5.9 It is considered that the new sources, compared to the existing noise climate, are not noticeably tonal or intermittent; as the noise climate is currently dictated by existing mechanical plant.

5.10 Therefore, in accordance with the City of Westminster Unitary Development Plan (adopted 24 January 2007), the noise levels from the proposed plant level must be 10dBA below the measured background noise level LA90.

5.11 The policy of the City of Westminster Unitary Development Plan is that noise levels should be 10 dB below the background noise level. Therefore, the condition limit is as follows:

Table 4

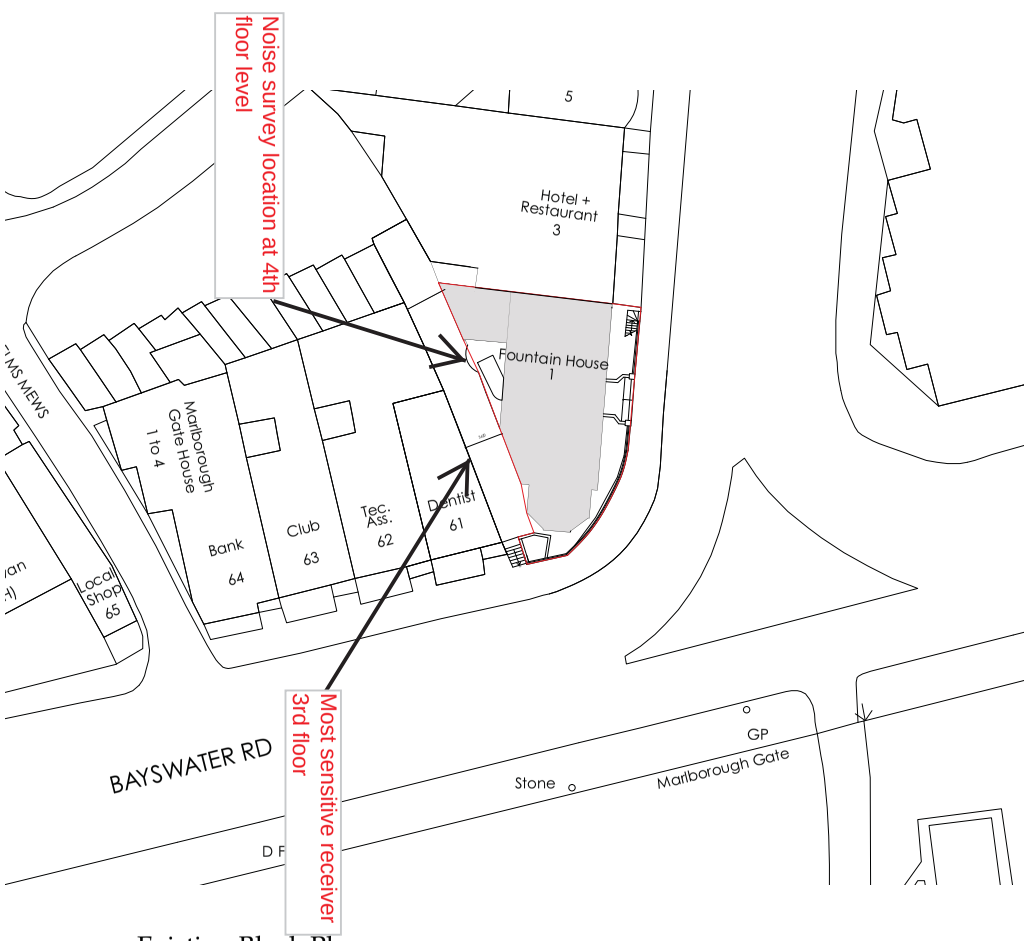
	Day 0700-2300 hours	**Night 2300-0700 hours**
Façade	**Criteria**	**Criteria**
Nearby receiver	48	45

5.12 Comparison of the calculated results in Table 3 with the criteria set out in Table 4 shows that the proposed plant will comply with the Westminster UDP requirements at all times.

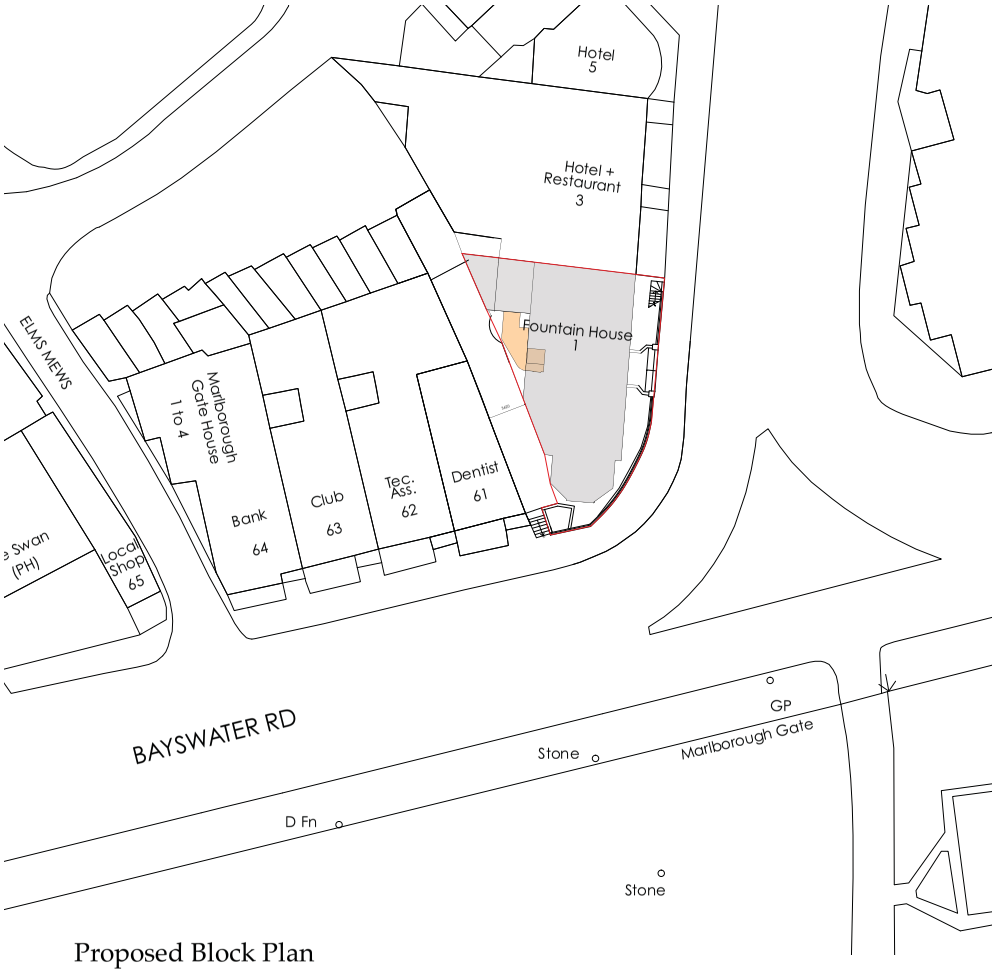
6.0 Conclusions

6.1 In conclusion, noise emissions from the proposed plant will meet the requirements of the conditions set by the City of Westminster Unitary Development Plan.

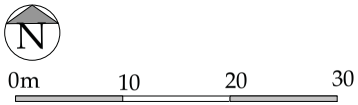
Appendix A: Location plan



Existing Block Plan



Proposed Block Plan



Do not scale from this drawing except for planning purposes.
Contractor to take and check all dimensions on site before work commences.
Discrepancies to be reported to the architect.
Subcontractor to verify all dimensions on site before making a shop drawing or commencing manufacture.

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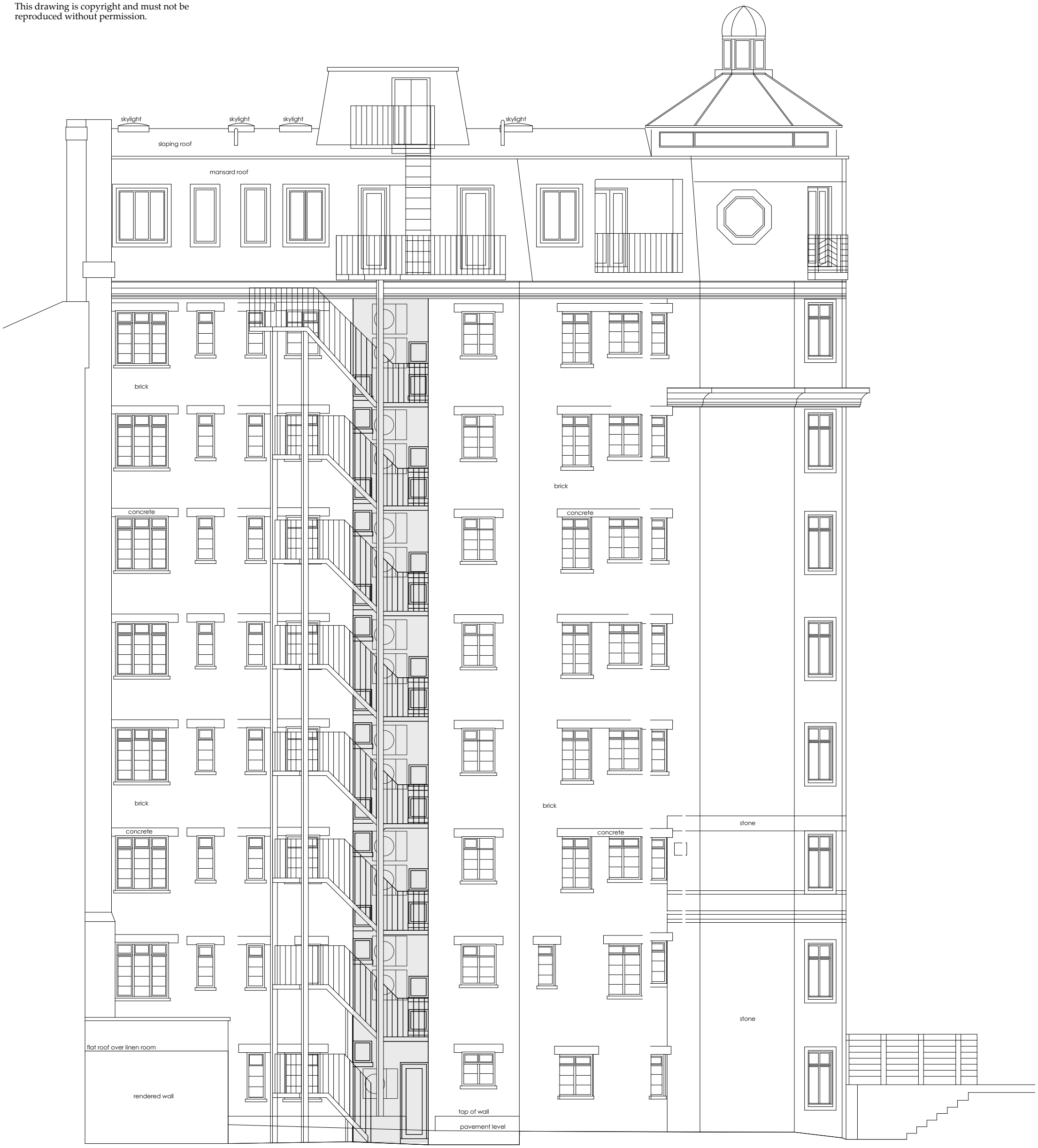
Project: Fountain House - proposed
2nd lift and relocated fire escape stair
For: Happy Visit Ltd
Drawing: Existing and Proposed Block Plans
Scale: 1 : 500 @ A3
Date: November 2017
Drawing No. 1715/ 21



Existing Rear Elevation

0m 2 4 6 8

A 20.2.18 Existing heat pumps added.

Project: Fountain House - proposed
2nd lift and relocated fire escape stair

For: Happy Visit Ltd

Drawing: Existing Rear Elevation

Scale: 1 : 100 @ A3

Date: November 2017

Drawing No. 1715/ 49 A

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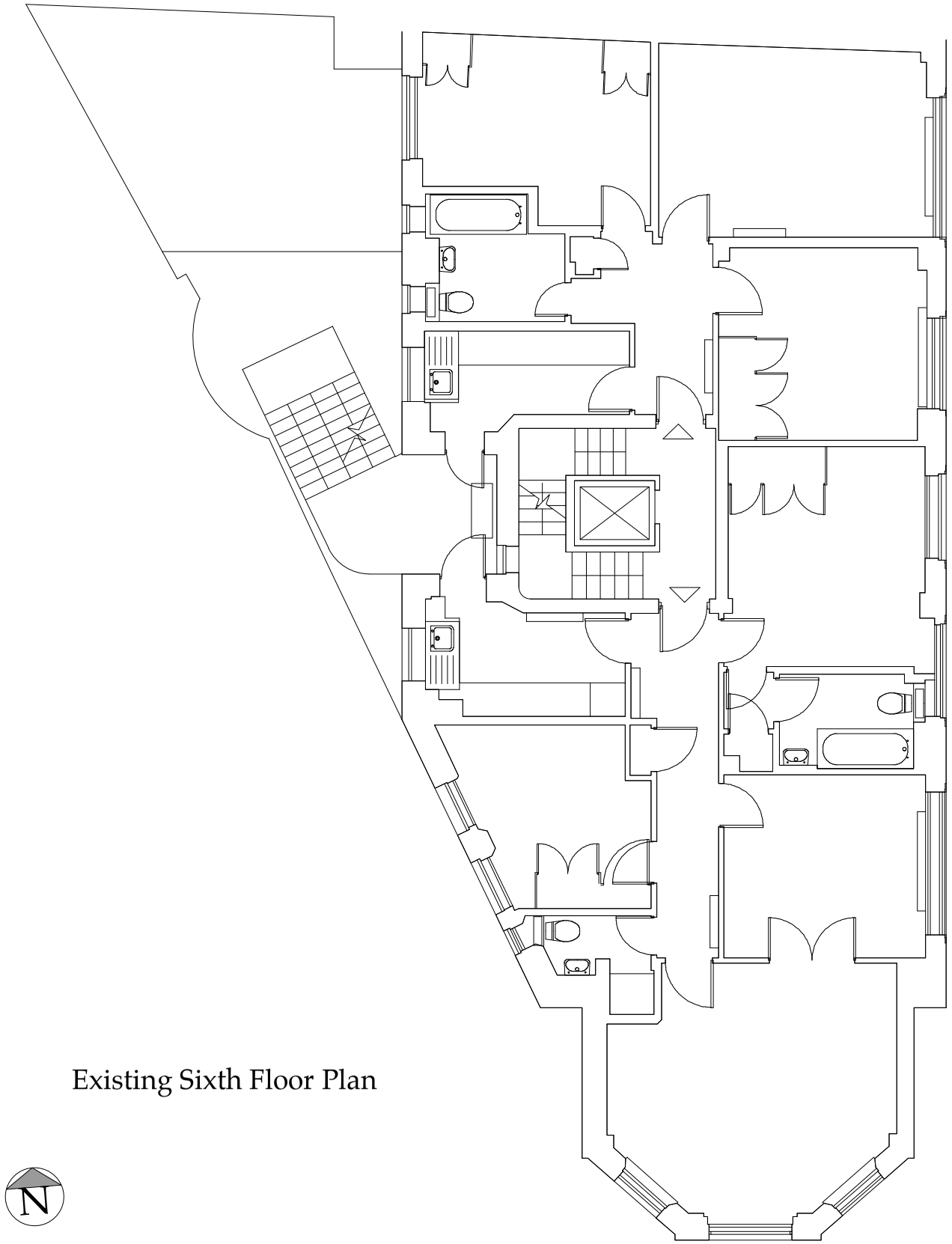
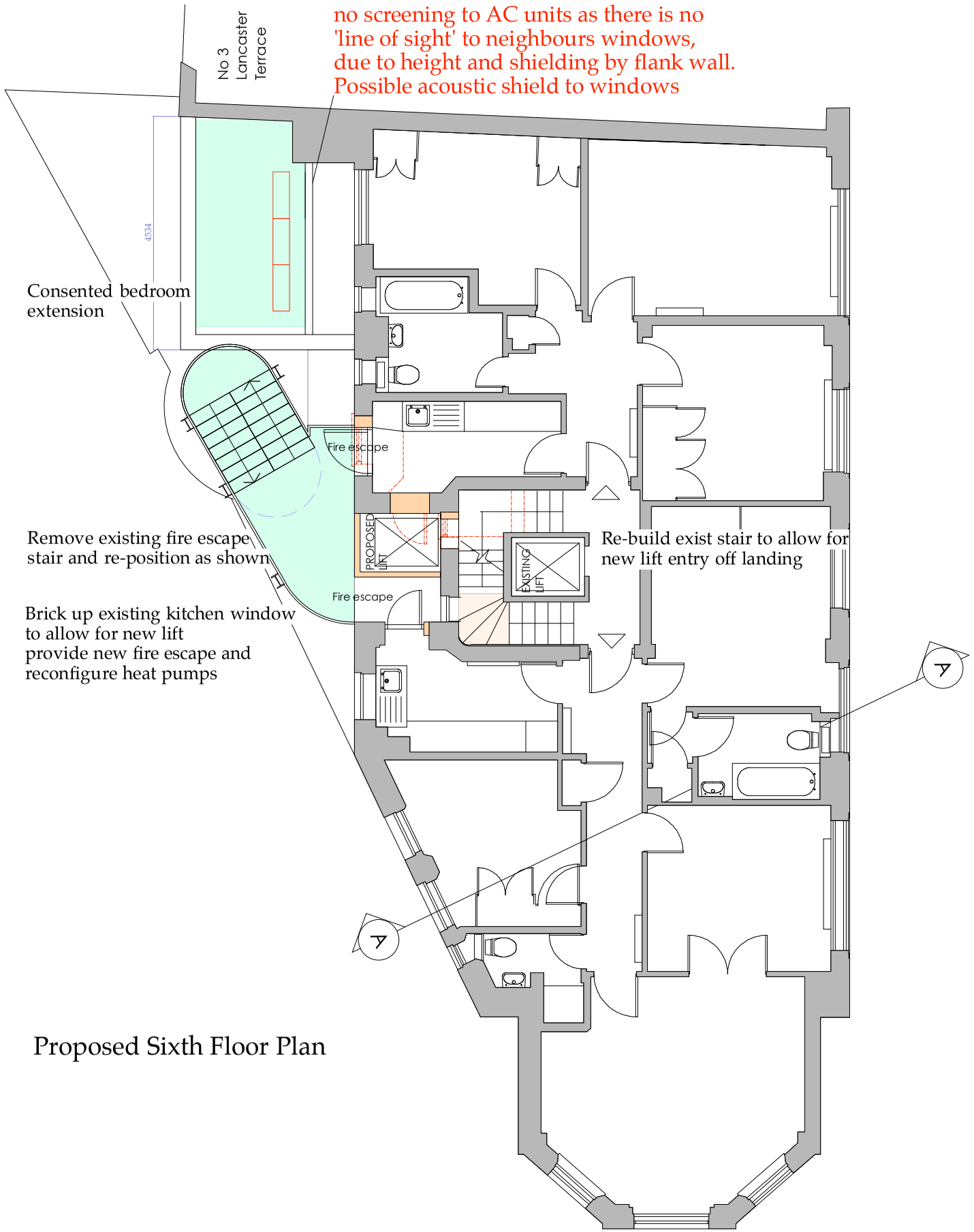
Appendix B: Proposed Plans



Existing Sixth Floor Plan



Proposed Sixth Floor Plan

N

0m 2 4 6 8

Do not scale from this drawing except for planning purposes.
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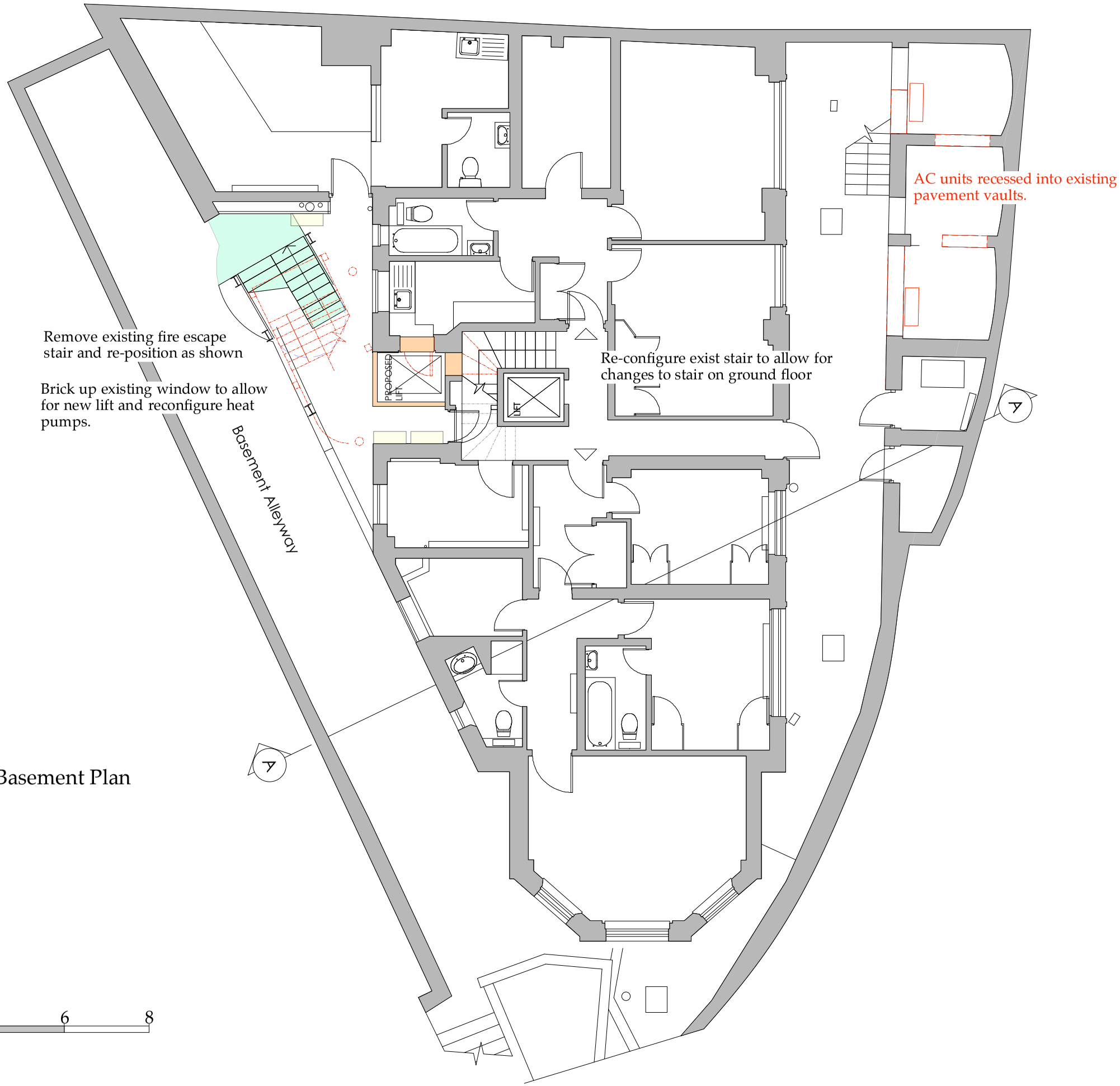
C. 4.4.18 previous AC units above GF omitted
B. 30.3.18 AC units added on roof.
A. 20.2.18 Existing and replacement heat pumps added.

Project: Fountain House - proposed 2nd lift and relocated fire escape stair
For: Happy Visit Ltd
Drawing: Existing and Proposed 6th Floor Plans
Scale: 1 : 100 @ A3
Date: November 2017
Drawing No. 1715/ 38C



Basement Plan

N

0m 2 4 6 8

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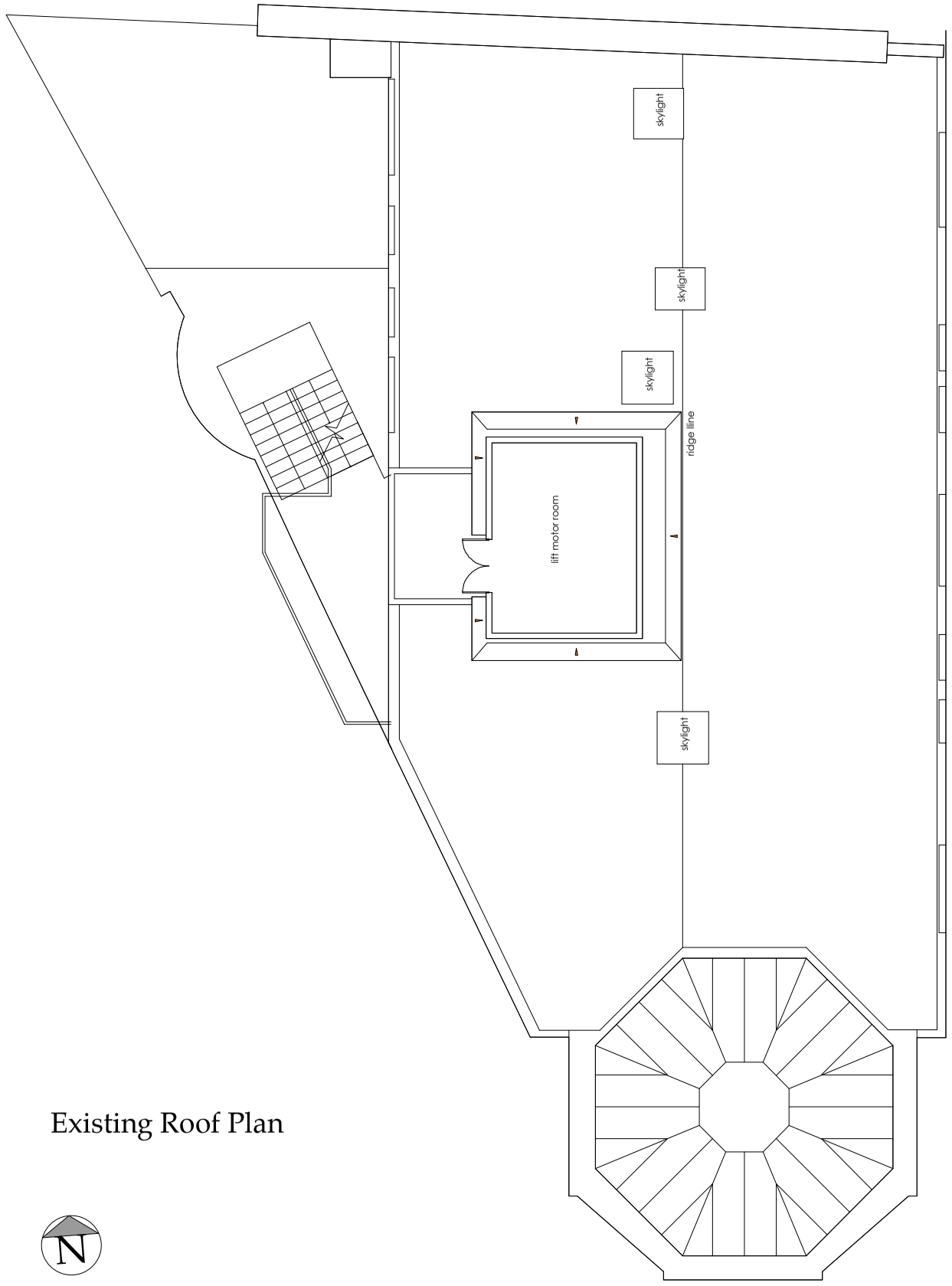
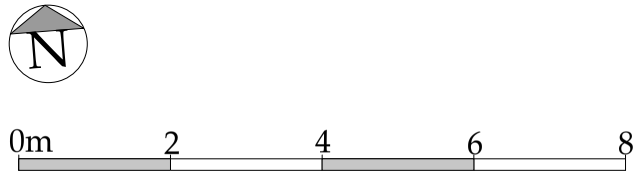
D. 24.4.18 AC note changed
C. 23.4.18 AC units recessed into pavement vaults
B. 30.3.18 AC units added to road side
A. 23.2.18 proposed AC units added

Project: Fountain House - proposed
2nd lift and relocated fire escape stair
For: Happy Visit Ltd
Drawing: Proposed Basement Plan
Scale: 1 : 100 @ A3
Date: November 2017
Drawing No. 1715/ 31 D



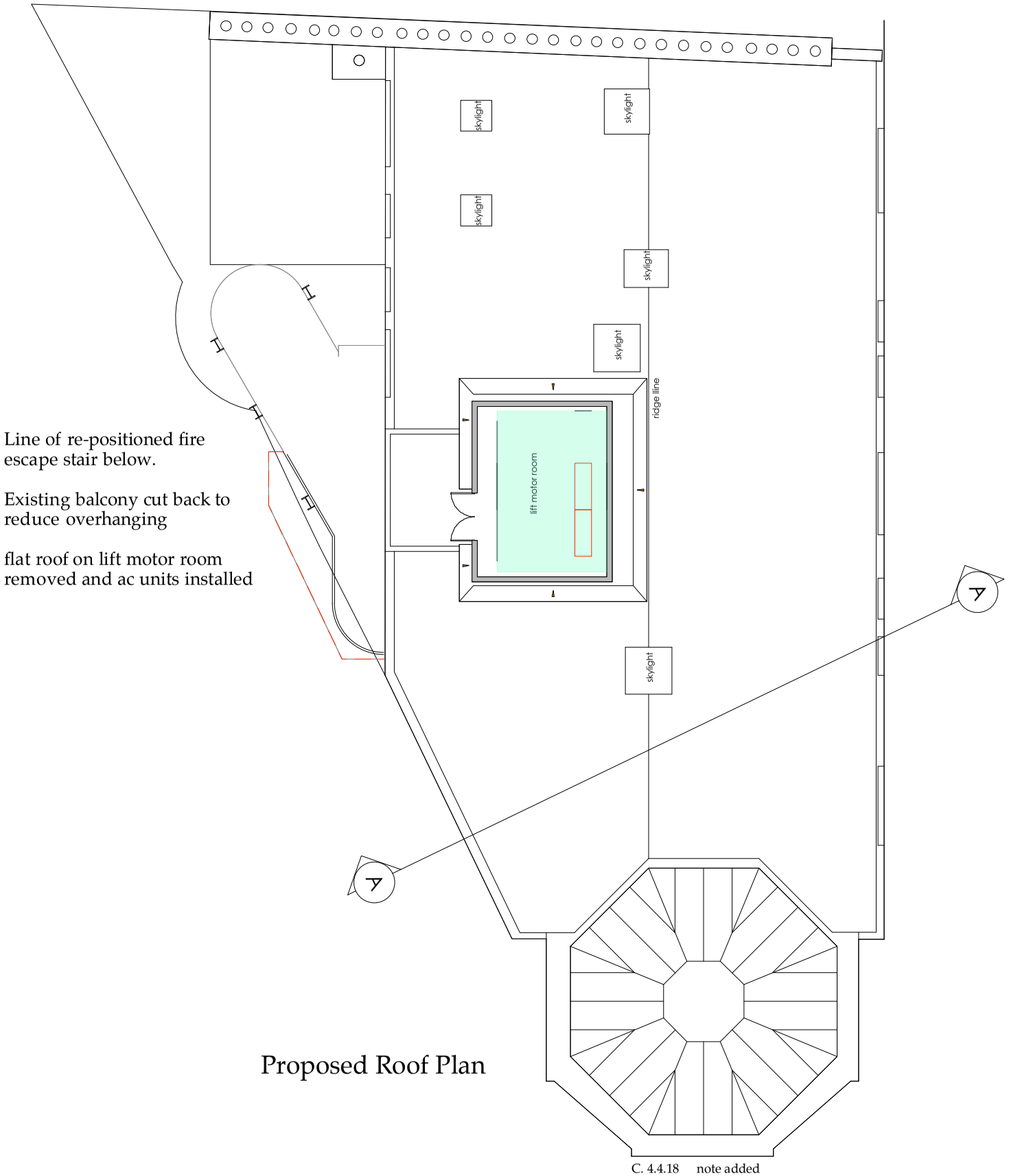
Existing Roof Plan



Line of re-positioned fire escape stair below.

Existing balcony cut back to reduce overhanging

flat roof on lift motor room removed and ac units installed



Proposed Roof Plan

C. 4.4.18	note added
B 30.3.18	ac units added in lift motor room.
A 14.3.18	existing roof plan added, and alterations to reduce overhanging balcony shown.

Project: Fountain House - proposed 2nd lift and relocated fire escape stair

For: Happy Visit Ltd

Drawing: Roof Plans

Scale: 1 : 100 @ A3

Date: November 2017

Drawing No. 1715/ 40 C

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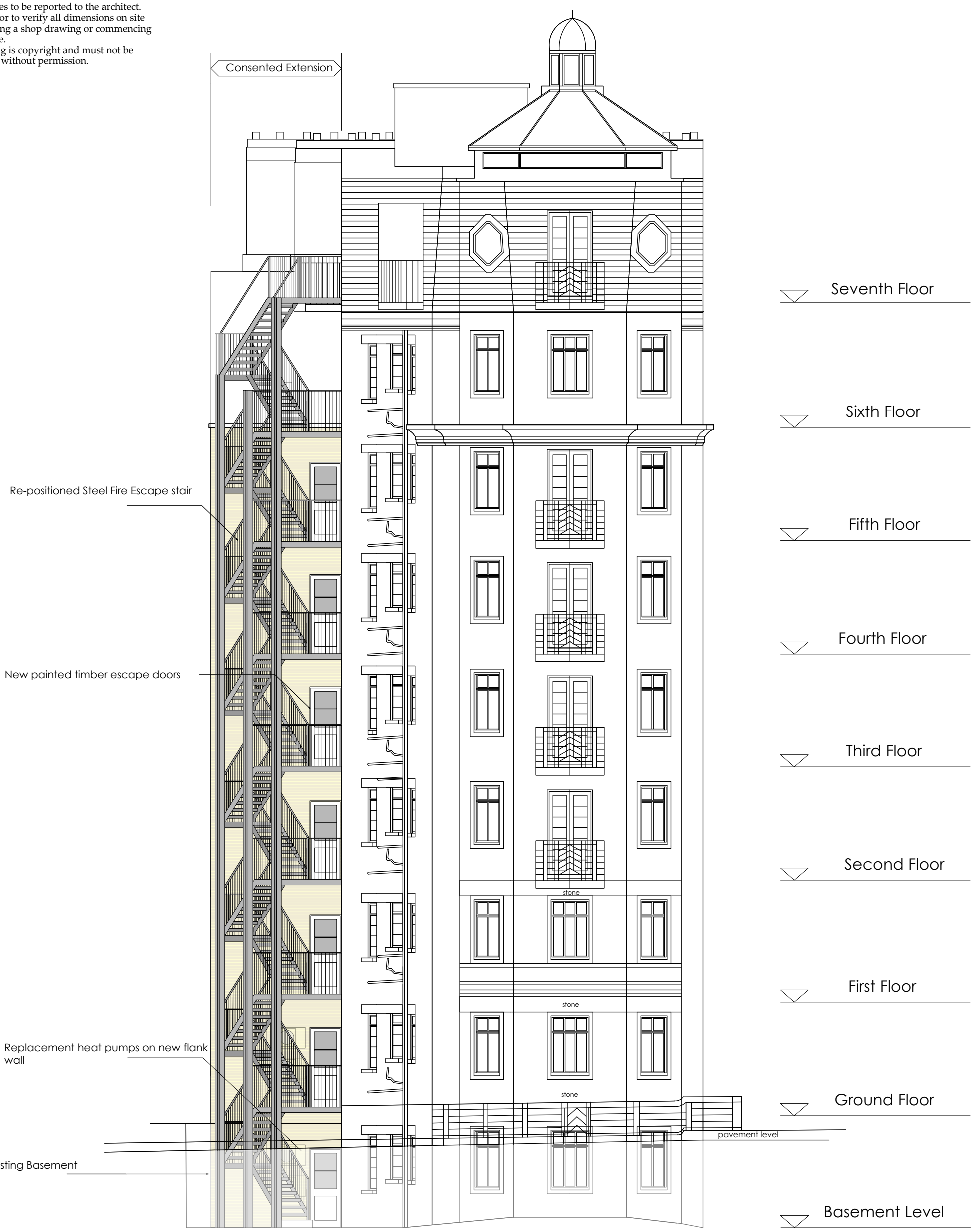

Existing Side Elevation Looking Along Alleyway

0m 2 4 6 8

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D. 4.4.18 previous AC above GF units omitted
C 14.3.18 heat pump positions adjusted.
B 20.2.18 Replacement heat pumps shown on flank wall of ext. Escape landings raised to floor levels.

Revision: A 18.12.17 Stanchions brought forward, add escape door note

Project: Fountain House - proposed
2nd lift and relocated fire escape stair

For: Happy Visit Ltd

Drawing: Proposed Side Elevation- along alleyway

Scale: 1 : 100 @ A3

Date: November 2017

Drawing No. 1715/ 42 D

existing with p.c. concrete coping.

P.C. concrete lintols over new windows to match existing

White powder coated Crittall steel windows to match existing.

roof removed from lift motor room, and AC units installed inside enclosure.

Slate Finish

Consented Bedroom Extension

skylight
skylight
skylight
skylight

sloping roof

mansard roof

new AC units set back from edge of roof by 1800 to eliminate direct line of sight from adjacent flats and shielded from windows to North by flank wall

brick
brick
brick
brick
brick

concrete
concrete

Facing Brick Finish

height of building opposite

Replacement heat pumps in alcove

Replacement heat pumps on new flank wall

Existing Basement

top of wall
pavement level

Proposed Relocated Steel Fire Escape Stair

Proposed New Lift in Steel Frame with facing brick infill panels

3 LANCASTER TERRACE

FOUNTAIN HOUSE

Proposed Street Elevation to Bayswater Road

0m 2 4 6 8

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C 4.4.18	previous AC above GF units omitted new units added on extension roof
B 14.3.18	heat pump positions adjusted.
A 20.2.18	Replacement heat pumps shown on flank wall of ext. and in alcove. Escape landings raised to floor levels.

Project: Fountain House - proposed
2nd lift and relocated fire escape stair

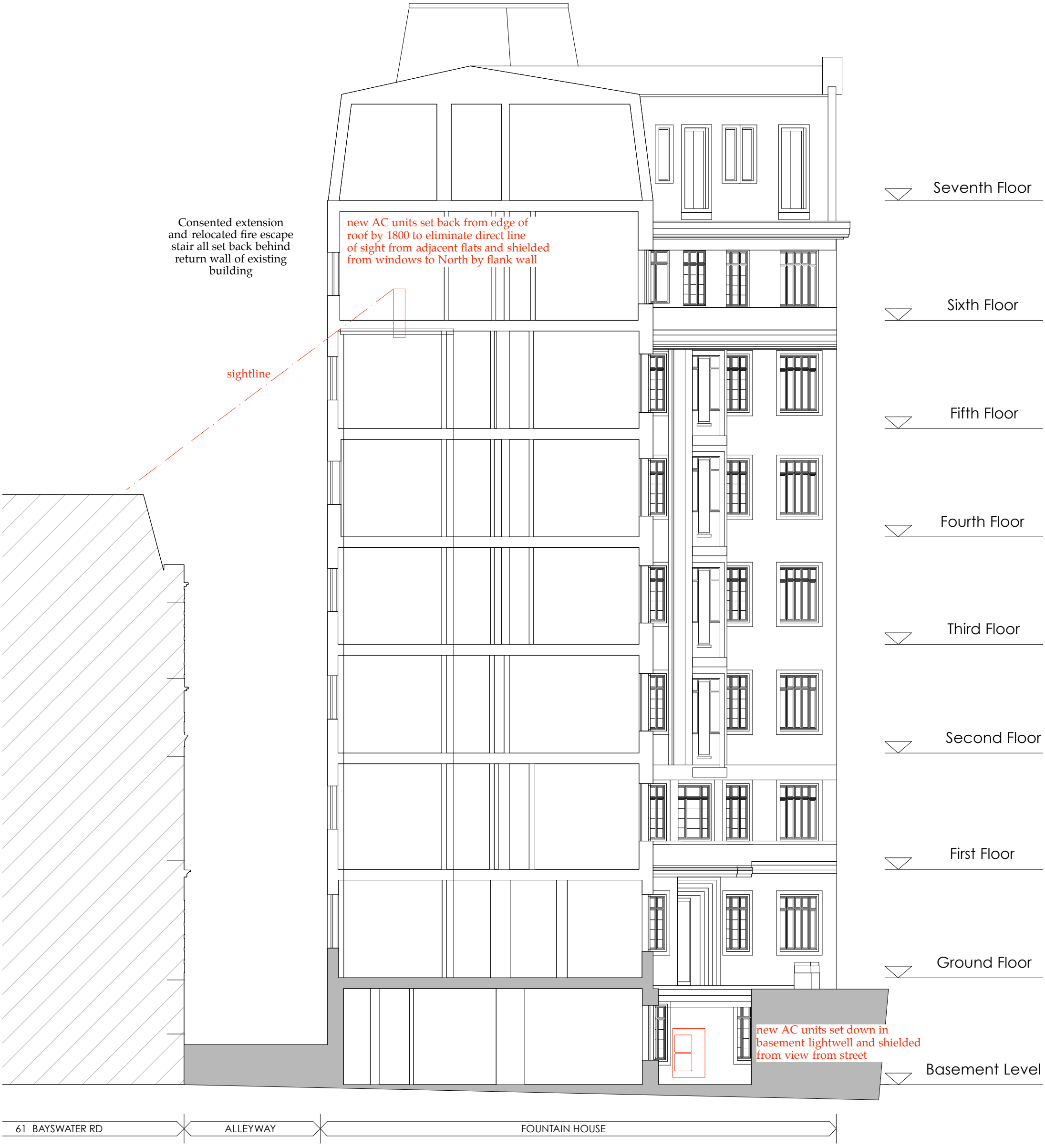
For: Happy Visit Ltd

Drawing: Proposed Rear Elevation

Scale: 1 : 100 @ A3

Date: November 2017

Drawing No. 1715/ 50 C



Section A-A

0m 2 4 6 8

A.	4.4.18	revised AC units

Project: Fountain House - proposed
2nd lift and relocated fire escape stair

For: Happy Visit Ltd

Drawing: Section AA

Scale: 1 : 100 @ A3

Date: November 2017

Drawing No. 1715/ 45A

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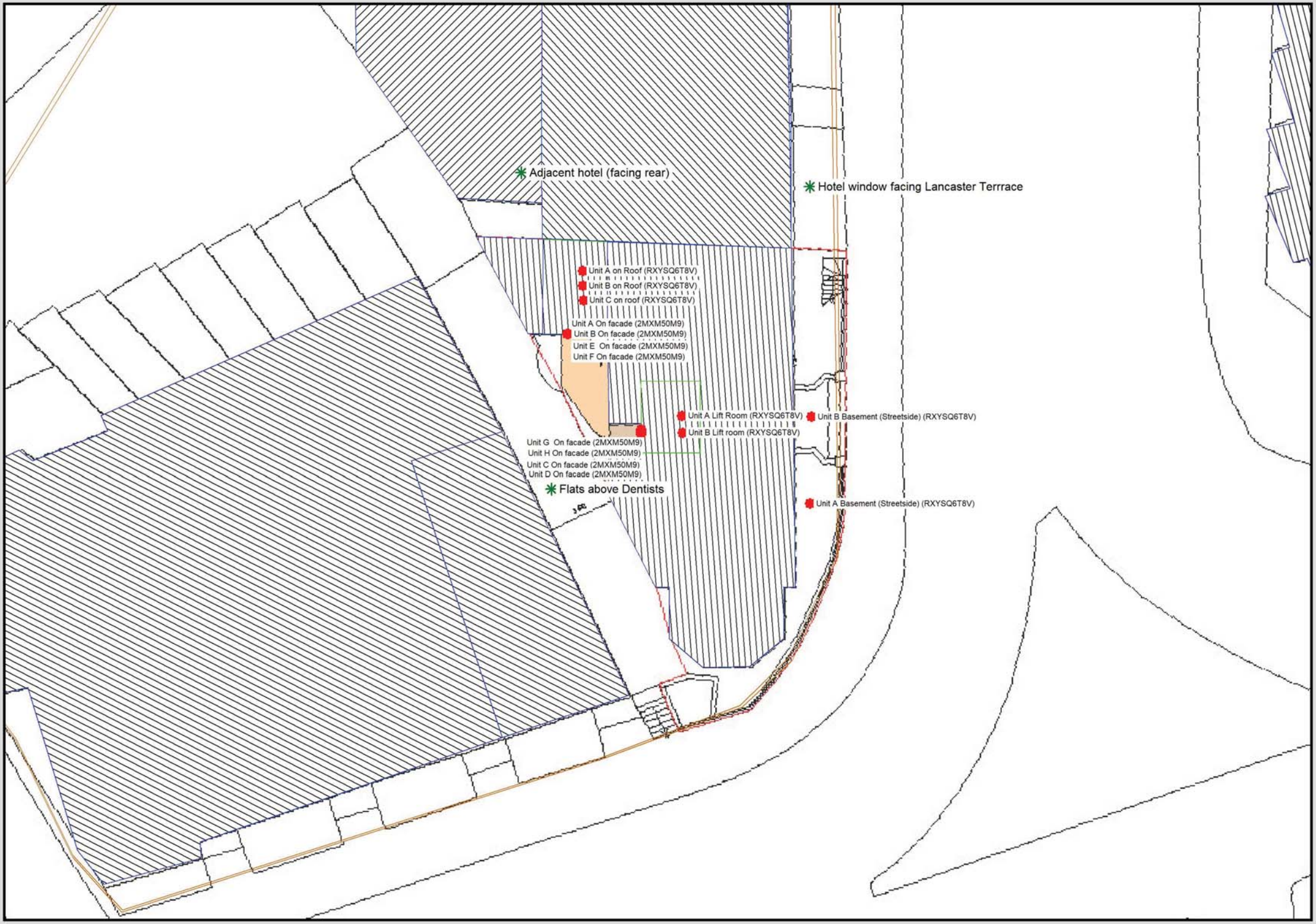

Adjacent hotel (facing rear)
Hotel window facing Lancaster Terrrace
Unit A on Roof (RXYSQ6T8V)
Unit B on Roof (RXYSQ6T8V)
Unit C on roof (RXYSQ6T8V)
Unit A On facade (2MXM50M9)
Unit B On facade (2MXM50M9)
Unit E On facade (2MXM50M9)
Unit F On facade (2MXM50M9)
Unit A Lift Room (RXYSQ6T8V)
Unit B Lift room (RXYSQ6T8V)
Unit B Basement (Streetside) (RXYSQ6T8V)
Unit G On facade (2MXM50M9)
Unit H On facade (2MXM50M9)
Unit C On facade (2MXM50M9)
Unit D On facade (2MXM50M9)
Flats above Dentists
Unit A Basement (Streetside) (RXYSQ6T8V)

Appendix C: Noise Survey Results

Noise survey - Fountain House, Lancaster Terrace, London

Equipment: Norsonic 140 + wet weather Kit
Location: See Appendix A
Weather: Clear and dry with no decernable wind. Temperture range -3 to 7 degrees

Calibration			
Thursday, February 22, 2018	11:57:02 AM	(0:0:6.0)	113.9
Friday, February 23, 2018	12:20:50 PM	(0:0:6.0)	114.0

Date	Date	Duration	LAeq	LAFmax	LA90
Thursday, February 22, 2018	12:15:01 PM	(0:14:58.0)	59.3	71.4	55.4
Thursday, February 22, 2018	12:30:01 PM	(0:14:58.0)	59.7	72.4	55.6
Thursday, February 22, 2018	12:45:02 PM	(0:14:57.0)	60.4	74.4	56.1
Thursday, February 22, 2018	1:00:01 PM	(0:14:58.0)	60.2	78.9	56.2
Thursday, February 22, 2018	1:15:01 PM	(0:14:58.0)	61.9	84.9	56.3
Thursday, February 22, 2018	1:30:01 PM	(0:14:58.0)	59.4	74.3	55.6
Thursday, February 22, 2018	1:45:01 PM	(0:14:58.0)	60.8	87.3	56.0
Thursday, February 22, 2018	2:00:01 PM	(0:14:58.0)	61.8	85.9	55.7
Thursday, February 22, 2018	2:15:01 PM	(0:14:58.0)	59.6	76.3	56.1
Thursday, February 22, 2018	2:30:01 PM	(0:14:58.0)	63.6	92.9	56.0
Thursday, February 22, 2018	2:45:01 PM	(0:14:58.0)	59.3	72.9	55.8
Thursday, February 22, 2018	3:00:01 PM	(0:14:58.0)	60.3	74.4	56.4
Thursday, February 22, 2018	3:15:02 PM	(0:14:57.0)	65.1	89.8	55.7
Thursday, February 22, 2018	3:30:02 PM	(0:14:57.0)	59.6	76.8	54.9
Thursday, February 22, 2018	3:45:02 PM	(0:14:57.0)	59.7	73.8	54.9
Thursday, February 22, 2018	4:00:02 PM	(0:14:57.0)	60.5	77.4	55.4
Thursday, February 22, 2018	4:15:02 PM	(0:14:58.0)	58.8	74.0	54.9
Thursday, February 22, 2018	4:30:02 PM	(0:14:57.0)	59.9	80.1	54.8
Thursday, February 22, 2018	4:45:02 PM	(0:14:57.0)	60.0	74.3	55.3
Thursday, February 22, 2018	5:00:01 PM	(0:14:58.0)	59.9	80.1	55.1
Thursday, February 22, 2018	5:15:02 PM	(0:14:57.0)	65.8	86.1	58.1
Thursday, February 22, 2018	5:30:02 PM	(0:14:57.0)	61.8	83.4	57.6
Thursday, February 22, 2018	5:45:02 PM	(0:14:57.0)	64.5	94.6	56.8
Thursday, February 22, 2018	6:00:01 PM	(0:14:58.0)	62.8	84.3	57.5
Thursday, February 22, 2018	6:15:02 PM	(0:14:57.0)	61.6	74.6	59.2
Thursday, February 22, 2018	6:30:02 PM	(0:14:57.0)	60.8	74.2	56.5
Thursday, February 22, 2018	6:45:02 PM	(0:14:57.0)	62.6	82.0	57.5
Thursday, February 22, 2018	7:00:02 PM	(0:14:57.0)	60.6	74.6	56.6
Thursday, February 22, 2018	7:15:02 PM	(0:14:57.0)	60.3	74.4	56.5
Thursday, February 22, 2018	7:30:02 PM	(0:14:57.0)	60.5	72.2	57.1
Thursday, February 22, 2018	7:45:02 PM	(0:14:57.0)	60.6	70.9	56.5
Thursday, February 22, 2018	8:00:02 PM	(0:14:57.0)	60.1	79.2	55.9
Thursday, February 22, 2018	8:15:02 PM	(0:14:57.0)	59.7	70.1	55.6
Thursday, February 22, 2018	8:30:02 PM	(0:14:57.0)	59.5	70.3	55.5
Thursday, February 22, 2018	8:45:02 PM	(0:14:57.0)	60.3	77.2	55.1
Thursday, February 22, 2018	9:00:02 PM	(0:14:57.0)	60.0	72.0	55.3
Thursday, February 22, 2018	9:15:02 PM	(0:14:57.0)	60.4	76.5	56.3
Thursday, February 22, 2018	9:30:02 PM	(0:14:57.0)	60.5	74.3	57.1
Thursday, February 22, 2018	9:45:02 PM	(0:14:57.0)	60.4	78.1	57.0
Thursday, February 22, 2018	10:00:02 PM	(0:14:57.0)	62.2	87.7	56.6
Thursday, February 22, 2018	10:15:02 PM	(0:14:57.0)	59.8	73.1	55.9
Thursday, February 22, 2018	10:30:02 PM	(0:14:57.0)	59.9	76.1	55.4
Thursday, February 22, 2018	10:45:02 PM	(0:14:57.0)	60.0	71.1	56.2
Thursday, February 22, 2018	11:00:02 PM	(0:14:57.0)	62.0	85.5	55.9
Thursday, February 22, 2018	11:15:02 PM	(0:14:57.0)	60.6	74.3	55.6
Thursday, February 22, 2018	11:30:02 PM	(0:14:57.0)	60.1	67.1	57.1
Thursday, February 22, 2018	11:45:02 PM	(0:14:57.0)	60.7	83.4	56.0
Friday, February 23, 2018	12:00:02 AM	(0:14:57.0)	59.8	69.1	55.6
Friday, February 23, 2018	12:15:01 AM	(0:14:58.0)	59.3	69.4	55.2
Friday, February 23, 2018	12:30:01 AM	(0:14:58.0)	59.5	69.9	55.0
Friday, February 23, 2018	12:45:01 AM	(0:14:58.0)	59.6	79.9	54.5
Friday, February 23, 2018	1:00:01 AM	(0:14:58.0)	59.4	70.9	54.3
Friday, February 23, 2018	1:15:01 AM	(0:14:58.0)	58.9	70.6	54.0
Friday, February 23, 2018	1:30:01 AM	(0:14:58.0)	59.0	66.8	54.1
Friday, February 23, 2018	1:45:01 AM	(0:14:58.0)	58.9	80.5	52.2

Noise survey - Fountain House, Lancaster Terrace, London

Equipment: Norsonic 140 + wet weather Kit
Location: See Appendix A
Weather: Clear and dry with no decernable wind. Temperture range -3 to 7 degrees

Calibration			
Thursday, February 22, 2018	11:57:02 AM	(0:0:6.0)	113.9
Friday, February 23, 2018	12:20:50 PM	(0:0:6.0)	114.0

Date	Date	Duration	LAeq	LAFmax	LA90
Friday, February 23, 2018	2:00:01 AM	(0:14:58.0)	58.7	68.4	55.1
Friday, February 23, 2018	2:15:01 AM	(0:14:58.0)	58.3	70.7	54.4
Friday, February 23, 2018	2:30:01 AM	(0:14:58.0)	58.6	68.5	54.4
Friday, February 23, 2018	2:45:01 AM	(0:14:58.0)	58.8	70.5	53.8
Friday, February 23, 2018	3:00:01 AM	(0:14:58.0)	59.4	77.3	54.0
Friday, February 23, 2018	3:15:01 AM	(0:14:58.0)	58.2	66.8	51.8
Friday, February 23, 2018	3:30:01 AM	(0:14:58.0)	59.1	69.0	52.6
Friday, February 23, 2018	3:45:01 AM	(0:14:58.0)	58.3	66.0	53.9
Friday, February 23, 2018	4:00:02 AM	(0:14:57.0)	58.5	72.1	53.3
Friday, February 23, 2018	4:15:02 AM	(0:14:57.0)	58.0	68.4	53.6
Friday, February 23, 2018	4:30:01 AM	(0:14:58.0)	58.4	67.3	53.9
Friday, February 23, 2018	4:45:01 AM	(0:14:58.0)	58.3	70.2	54.3
Friday, February 23, 2018	5:00:01 AM	(0:14:58.0)	58.4	68.8	53.4
Friday, February 23, 2018	5:15:02 AM	(0:14:58.0)	59.3	74.3	54.9
Friday, February 23, 2018	5:30:02 AM	(0:14:57.0)	59.0	69.5	54.0
Friday, February 23, 2018	5:45:01 AM	(0:14:58.0)	59.4	72.0	54.3
Friday, February 23, 2018	6:00:02 AM	(0:14:57.0)	58.9	69.9	53.0
Friday, February 23, 2018	6:15:02 AM	(0:14:57.0)	59.1	69.1	54.7
Friday, February 23, 2018	6:30:02 AM	(0:14:57.0)	60.4	78.5	55.2
Friday, February 23, 2018	6:45:02 AM	(0:14:57.0)	61.2	72.3	57.1
Friday, February 23, 2018	7:00:02 AM	(0:14:57.0)	61.0	73.0	56.4
Friday, February 23, 2018	7:15:02 AM	(0:14:57.0)	61.6	74.7	56.8
Friday, February 23, 2018	7:30:02 AM	(0:14:57.0)	63.2	89.9	55.9
Friday, February 23, 2018	7:45:02 AM	(0:14:57.0)	61.1	75.7	57.4
Friday, February 23, 2018	8:00:02 AM	(0:14:57.0)	61.5	77.1	57.1
Friday, February 23, 2018	8:15:02 AM	(0:14:57.0)	61.6	80.3	57.1
Friday, February 23, 2018	8:30:02 AM	(0:14:57.0)	62.4	75.6	59.0
Friday, February 23, 2018	8:45:02 AM	(0:14:57.0)	61.2	73.4	57.7
Friday, February 23, 2018	9:00:02 AM	(0:14:57.0)	61.7	78.4	58.0
Friday, February 23, 2018	9:15:02 AM	(0:14:57.0)	61.0	76.6	56.9
Friday, February 23, 2018	9:30:02 AM	(0:14:57.0)	62.0	77.5	58.9
Friday, February 23, 2018	9:45:02 AM	(0:14:57.0)	61.4	76.0	57.2
Friday, February 23, 2018	10:00:02 AM	(0:14:57.0)	61.4	78.6	56.4
Friday, February 23, 2018	10:15:02 AM	(0:14:57.0)	65.3	92.0	59.3
Friday, February 23, 2018	10:30:02 AM	(0:14:57.0)	61.7	74.5	59.5
Friday, February 23, 2018	10:45:02 AM	(0:14:57.0)	61.2	73.3	59.3
Friday, February 23, 2018	11:00:02 AM	(0:14:57.0)	61.2	68.3	58.7
Friday, February 23, 2018	11:15:02 AM	(0:14:57.0)	60.7	71.2	56.8
Friday, February 23, 2018	11:30:02 AM	(0:14:57.0)	60.9	70.1	56.8
Friday, February 23, 2018	11:45:02 AM	(0:14:57.0)	61.4	78.0	56.8
Friday, February 23, 2018	12:00:02 PM	(0:14:57.0)	61.8	88.1	57.9
Friday, February 23, 2018	12:15:02 PM	(0:5:21.0)	61.2	76.6	58.4

Appendix D: Manufacturers data

Date: 13th March 2018

Fountain House, Lancaster Gate – AC Equipment Noise Levels

Following your request for noise information on the selected units for this project, l can confirm that our nominal noise level for the 2MXM50M9 units is 46 dba at 1m. Please see the unit extract below from our General Product Catalogues:

R-32 BLUEVOLUTION

MXM-M / M9 / N

Multi Series Inverters

Replacement Technology

Outdoor Units			2MXM50M9
Capacity	Nominal Cooling	kW	5.0
	Nominal Heating	kW	5.7
Dimensions	Height x Width x Depth	mm	550 x 765 x 285
Weight		kg	41
Electrical Details	Power Supply	Phase	1ph
		Hz	50
		V	220-240
	Starting Current	amps	6.3
	Fuse Rating	amps	16
Refrigerant Circuit	Refrigerant Type		R32
	Refrigerant Charge	kg	1.15
Sound Pressure (Cooling)	Nom	dBA	46
Sound Power (Cooling)			60
Piping Limits	Max. Length (OU- IU)	m	20
	Max. Level Difference (IU- IU)	m	7.5
	Max. Level Difference (IU- OU)	m	15
	Total piping length (Actual)	m	30
Piping Connections	Liquid	inches (mm)	2x 1/4 (6.4)
	Gas	inches (mm)	3/8 (9.5)
Operating range (Cooling)	Min / Max	°CDB	-10 / 46
Operating range (Cooling)	Min / Max	°CWB	-15 / 18
Number of Connected Indoor Units			2
Air Flow Rate (Cooling)	Nom	m^3/sec	0.566

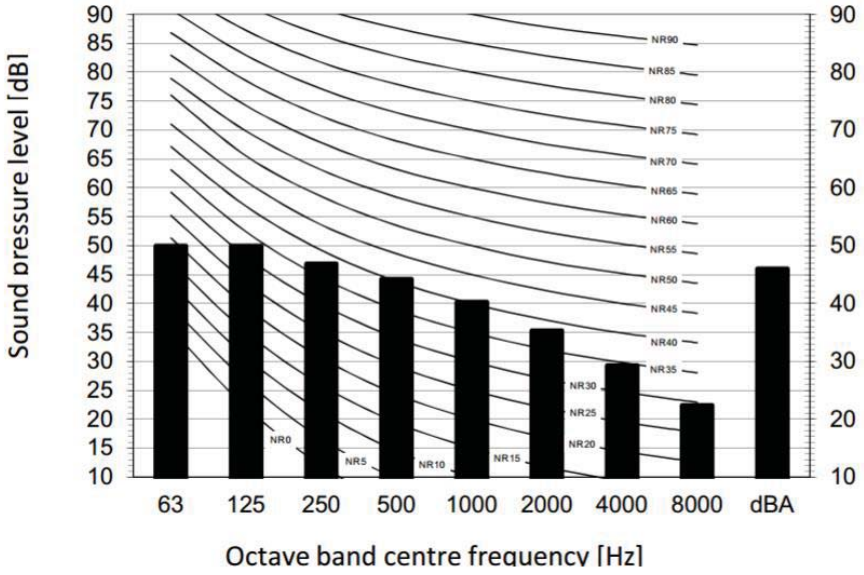
This unit also comes with Night quiet mode as a standard feature which automatically reduces the operation sound of the outdoor unit by 3dBA during night-time. We unfortunately do not have a revised spectrum to reflect the noise spectrum with the 3 dba reduction but l have on the following page shown the standard sound pressure spectrum for the 5MXM50M9, from which this noise quiet mode reduction can be applied.

The Heights
Brooklands
Weybridge
Surrey
KT13 ONY

T 01932 879000
F 01932 879119
E sales@daikin.co.uk

VAT Number: 372 6068 45
Registered Number: 04616794

2MXM-M9



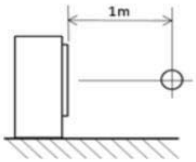
Legend

dBA = A-weighted sound pressure level (A scale according to IEC).

A Scale

B Fan speed: High

Location of microphone



Total dB

A	B
dBA	46

Notes

1. Background noise already taken into account.
2. Operating conditions: power source 220-240 V/220 V 50/60 Hz; JIS standard
3. Operating noise varies depending on operation and ambient conditions.
4. The operation noise measuring method is in accordance with JISC 9612.
5. Measuring location: anechoic chamber

Yours sincerely

Bal Padda
Specification Solutions Specialist Engineer
Daikin Airconditioning UK Ltd

DAIKIN

Air Conditioning Technical Data

RXYSQ-T8V

> RXYSQ4T8VB
> RXYSQ5T8VB
> RXYSQ6T8VB

1 Features

Space saving solution without compromising on efficiency

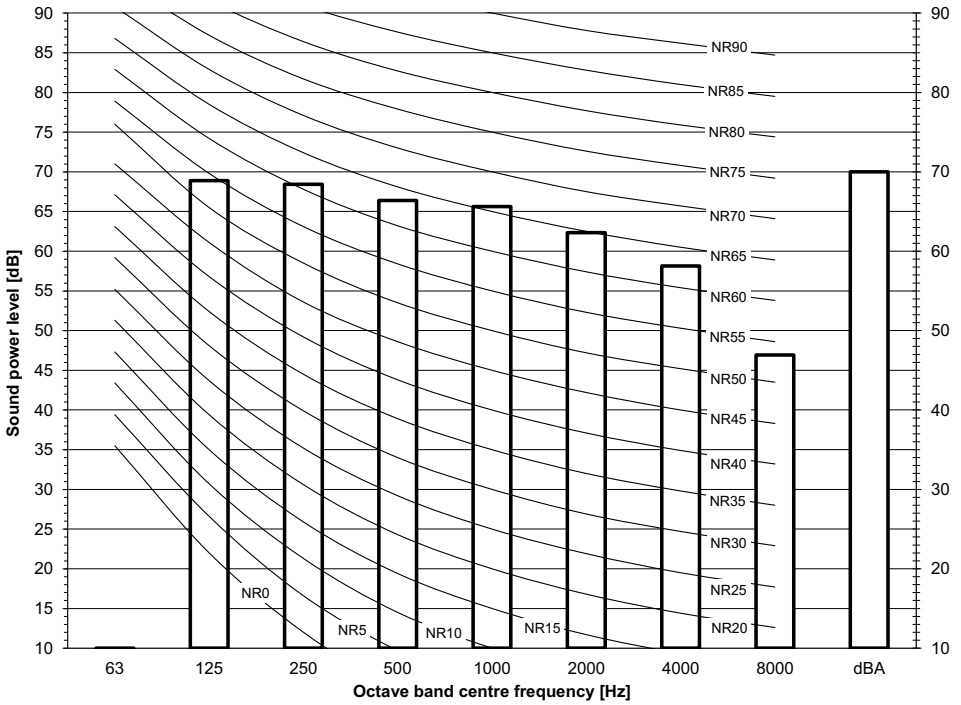
- Space saving trunk design for flexible installation
- Covers all thermal needs of a building via a single point of contact: accurate temperature control, ventilation, air handling units and Biddle air cutains
- Wide range of indoor units: either connect VRV or stylish indoor units such as Daikin Emura, Nexura ...
- Incorporates VRV IV standards & technologies: Variable Refrigerant Temperature and full inverter compressors
- Customize your VRV for best seasonal efficiency & comfort with the weather dependant Variable Refrigerant Temperature function. Increased seasonal efficiency with up to 28%. No more cold draft by supply of high outblow temperatures
- VRV configurator software for the fastest and most accurate commissioning, configuration and customisation
- 3 steps in night quiet mode: step 1: 47dBA, step 2: 44 dBA, step 3: 41 dBA
- Possibility to limit peak power consumption between 30 and 80%, for example during periods with high power demand
- Connectable to all VRV control systems
- Keep your system in top condition via our i-Net service: 24/7 monitoring for maximum efficiency, extended lifetime, immediate service support thanks to failure prediction and a clear understanding of operability and usage

Inverter

11 Sound data

11 - 1 Sound Level Data

RXYSQ6T8V



Notes
- dBA = A-weighted sound power level (A scale according to IEC).
- Reference acoustic intensity 0dB = ·10E-6μW/m²·
- Measured according to ISO 3744

3D098214

Appendix E: SoundPLAN results (single receiver)

Legend

Source		Source name
Time slice		Name of time slice
Source type		Type of source (point, line, area)
L'w	dB(A)	Sound power level per m, m²
Lw	dB(A)	Sound power level per unit
Ko	dB	Correction for propagation in limited spacial angle
S	m	Distance source - receiver
Adiv	dB	Mean attenuation due to geometrical spreading
Agr	dB	Mean attenuation due to ground effect
Abar	dB	Mean attenuation due to screening
Aatm	dB	Mean attenuation due to air absorption
dLrefl	dB	Level increase due to reflections
Ls	dB(A)	Unassessed sound pressure level at receiver Ls=Lw+Ko+ADI+Adiv+Agr+Abar+Aatm+Afol_site_house+Awind+dLrefl
dLw	dB	Correction due to source operation
Lr	dB(A)	Assessed level of time slice

Source	Time slice	Source type	L'w dB(A)	Lw dB(A)	Ko dB	S m	Adiv dB	Agr dB	Abar dB	Aatm dB	dLrefl dB	Ls dB(A)	dLw dB	Lr dB(A)
Receiver Adjacent hotel (facing rear) Receiver height 13.50 m LeqDay 33.2 dB(A) LeqNight 29.7 dB(A)														
Unit A Basement (Streetside) (RXYSQ6T8V)	LrD	Point	69.9	69.9	3	25.91	-39.3	0.6	-23.9	-0.2	0.0	10.2	0.0	10.2
Unit A Basement (Streetside) (RXYSQ6T8V)	LrN	Point	69.9	69.9	3	25.91	-39.3	0.6	-23.9	-0.2	0.0	10.2	-4.0	6.2
Unit A Lift Room (RXYSQ6T8V)	LrD	Point	69.9	69.9	3	16.97	-35.6	1.5	-22.5	-0.1	3.2	19.5	0.0	19.5
Unit A Lift Room (RXYSQ6T8V)	LrN	Point	69.9	69.9	3	16.97	-35.6	1.5	-22.5	-0.1	3.2	19.5	-4.0	15.5
Unit A On facade (2MXM50M9)	LrD	Point	59.3	59.3	3	14.68	-34.3	1.2	-18.0	0.0	8.8	19.9	0.0	19.9
Unit A On facade (2MXM50M9)	LrN	Point	59.3	59.3	3	14.68	-34.3	1.2	-18.0	0.0	8.8	19.9	-3.0	16.9
Unit A on Roof (RXYSQ6T8V)	LrD	Point	69.9	69.9	0	8.02	-29.1	1.5	-19.0	0.0	1.2	24.5	0.0	24.5
Unit A on Roof (RXYSQ6T8V)	LrN	Point	69.9	69.9	0	8.02	-29.1	1.5	-19.0	0.0	1.2	24.5	-4.0	20.5
Unit B Basement (Streetside) (RXYSQ6T8V)	LrD	Point	69.9	69.9	3	23.39	-38.4	0.7	-24.0	-0.2	0.7	11.7	0.0	11.7
Unit B Basement (Streetside) (RXYSQ6T8V)	LrN	Point	69.9	69.9	3	23.39	-38.4	0.7	-24.0	-0.2	0.7	11.7	-4.0	7.7
Unit B Lift room (RXYSQ6T8V)	LrD	Point	69.9	69.9	3	17.61	-35.9	1.5	-22.5	-0.1	3.4	19.2	0.0	19.2
Unit B Lift room (RXYSQ6T8V)	LrN	Point	69.9	69.9	3	17.61	-35.9	1.5	-22.5	-0.1	3.4	19.2	-4.0	15.2
Unit B On facade (2MXM50M9)	LrD	Point	59.3	59.3	3	13.88	-33.8	1.4	-14.7	0.0	5.5	20.6	0.0	20.6
Unit B On facade (2MXM50M9)	LrN	Point	59.3	59.3	3	13.88	-33.8	1.4	-14.7	0.0	5.5	20.6	-3.0	17.6
Unit B on Roof (RXYSQ6T8V)	LrD	Point	69.9	69.9	0	8.50	-29.6	1.5	-17.4	0.0	0.9	25.2	0.0	25.2
Unit B on Roof (RXYSQ6T8V)	LrN	Point	69.9	69.9	0	8.50	-29.6	1.5	-17.4	0.0	0.9	25.2	-4.0	21.2
Unit C On facade (2MXM50M9)	LrD	Point	59.3	59.3	3	18.70	-36.4	1.1	-15.7	0.0	5.5	16.7	0.0	16.7
Unit C On facade (2MXM50M9)	LrN	Point	59.3	59.3	3	18.70	-36.4	1.1	-15.7	0.0	5.5	16.7	-3.0	13.7
Unit C on roof (RXYSQ6T8V)	LrD	Point	69.9	69.9	0	9.02	-30.1	1.5	-17.1	0.0	0.7	24.9	0.0	24.9
Unit C on roof (RXYSQ6T8V)	LrN	Point	69.9	69.9	0	9.02	-30.1	1.5	-17.1	0.0	0.7	24.9	-4.0	20.9
Unit D On facade (2MXM50M9)	LrD	Point	59.3	59.3	3	18.11	-36.2	1.3	-15.7	0.0	5.4	17.1	0.0	17.1
Unit D On facade (2MXM50M9)	LrN	Point	59.3	59.3	3	18.11	-36.2	1.3	-15.7	0.0	5.4	17.1	-3.0	14.1
Unit E On facade (2MXM50M9)	LrD	Point	59.3	59.3	3	12.43	-32.9	1.5	-14.2	0.0	4.6	21.2	0.0	21.2
Unit E On facade (2MXM50M9)	LrN	Point	59.3	59.3	3	12.43	-32.9	1.5	-14.2	0.0	4.6	21.2	-3.0	18.2
Unit F On facade (2MXM50M9)	LrD	Point	59.3	59.3	3	11.78	-32.4	1.5	-14.7	0.0	4.8	21.4	0.0	21.4
Unit F On facade (2MXM50M9)	LrN	Point	59.3	59.3	3	11.78	-32.4	1.5	-14.7	0.0	4.8	21.4	-3.0	18.4
Unit G On facade (2MXM50M9)	LrD	Point	59.3	59.3	3	16.88	-35.5	1.4	-16.1	0.0	4.9	16.9	0.0	16.9
Unit G On facade (2MXM50M9)	LrN	Point	59.3	59.3	3	16.88	-35.5	1.4	-16.1	0.0	4.9	16.9	-3.0	13.9
Unit H On facade (2MXM50M9)	LrD	Point	59.3	59.3	3	16.56	-35.4	1.5	-15.8	0.0	12.9	25.5	0.0	25.5
Unit H On facade (2MXM50M9)	LrN	Point	59.3	59.3	3	16.56	-35.4	1.5	-15.8	0.0	12.9	25.5	-3.0	22.5

Source	Time slice	Source type	L'w dB(A)	Lw dB(A)	Ko dB	S m	Adiv dB	Agr dB	Abar dB	Aatm dB	dLrefl dB	Ls dB(A)	dLw dB	Lr dB(A)
Receiver Flats above Dentists Receiver height 7.50 m LeqDay 47.3 dB(A) LeqNight 44.2 dB(A)														
Unit A Basement (Streetside) (RXYSQ6T8V)	LrD	Point	69.9	69.9	3	15.05	-34.5	0.9	-23.6	-0.1	2.6	18.2	0.0	18.2
Unit A Basement (Streetside) (RXYSQ6T8V)	LrN	Point	69.9	69.9	3	15.05	-34.5	0.9	-23.6	-0.1	2.6	18.2	-4.0	14.2
Unit A Lift Room (RXYSQ6T8V)	LrD	Point	69.9	69.9	3	16.34	-35.3	1.5	-21.6	-0.1	5.3	22.7	0.0	22.7
Unit A Lift Room (RXYSQ6T8V)	LrN	Point	69.9	69.9	3	16.34	-35.3	1.5	-21.6	-0.1	5.3	22.7	-4.0	18.7
Unit A On facade (2MXM50M9)	LrD	Point	59.3	59.3	3	9.87	-30.9	1.3	0.0	0.0	5.9	38.5	0.0	38.5
Unit A On facade (2MXM50M9)	LrN	Point	59.3	59.3	3	9.87	-30.9	1.3	0.0	0.0	5.9	38.5	-3.0	35.5
Unit A on Roof (RXYSQ6T8V)	LrD	Point	69.9	69.9	0	15.99	-35.1	1.5	-14.3	-0.1	6.9	28.9	0.0	28.9
Unit A on Roof (RXYSQ6T8V)	LrN	Point	69.9	69.9	0	15.99	-35.1	1.5	-14.3	-0.1	6.9	28.9	-4.0	24.9
Unit B Basement (Streetside) (RXYSQ6T8V)	LrD	Point	69.9	69.9	3	15.53	-34.8	0.9	-23.9	-0.1	1.8	16.8	0.0	16.8
Unit B Basement (Streetside) (RXYSQ6T8V)	LrN	Point	69.9	69.9	3	15.53	-34.8	0.9	-23.9	-0.1	1.8	16.8	-4.0	12.8
Unit B Lift room (RXYSQ6T8V)	LrD	Point	69.9	69.9	3	16.18	-35.2	1.5	-21.6	-0.1	4.4	22.0	0.0	22.0
Unit B Lift room (RXYSQ6T8V)	LrN	Point	69.9	69.9	3	16.18	-35.2	1.5	-21.6	-0.1	4.4	22.0	-4.0	18.0
Unit B On facade (2MXM50M9)	LrD	Point	59.3	59.3	3	9.30	-30.4	1.4	0.0	0.0	5.8	39.1	0.0	39.1
Unit B On facade (2MXM50M9)	LrN	Point	59.3	59.3	3	9.30	-30.4	1.4	0.0	0.0	5.8	39.1	-3.0	36.1
Unit B on Roof (RXYSQ6T8V)	LrD	Point	69.9	69.9	0	15.48	-34.8	1.5	-12.6	-0.1	7.1	31.1	0.0	31.1
Unit B on Roof (RXYSQ6T8V)	LrN	Point	69.9	69.9	0	15.48	-34.8	1.5	-12.6	-0.1	7.1	31.1	-4.0	27.1
Unit C On facade (2MXM50M9)	LrD	Point	59.3	59.3	3	8.05	-29.1	1.3	-8.0	0.0	8.2	34.6	0.0	34.6
Unit C On facade (2MXM50M9)	LrN	Point	59.3	59.3	3	8.05	-29.1	1.3	-8.0	0.0	8.2	34.6	-3.0	31.6
Unit C on roof (RXYSQ6T8V)	LrD	Point	69.9	69.9	0	15.01	-34.5	1.5	-9.8	-0.1	7.6	34.6	0.0	34.6
Unit C on roof (RXYSQ6T8V)	LrN	Point	69.9	69.9	0	15.01	-34.5	1.5	-9.8	-0.1	7.6	34.6	-4.0	30.6
Unit D On facade (2MXM50M9)	LrD	Point	59.3	59.3	3	7.31	-28.3	1.4	-8.4	0.0	6.5	33.5	0.0	33.5
Unit D On facade (2MXM50M9)	LrN	Point	59.3	59.3	3	7.31	-28.3	1.4	-8.4	0.0	6.5	33.5	-3.0	30.5
Unit E On facade (2MXM50M9)	LrD	Point	59.3	59.3	3	8.44	-29.5	1.5	0.0	0.0	5.7	39.9	0.0	39.9
Unit E On facade (2MXM50M9)	LrN	Point	59.3	59.3	3	8.44	-29.5	1.5	0.0	0.0	5.7	39.9	-3.0	36.9
Unit F On facade (2MXM50M9)	LrD	Point	59.3	59.3	3	8.17	-29.2	1.5	0.0	0.0	6.3	40.8	0.0	40.8
Unit F On facade (2MXM50M9)	LrN	Point	59.3	59.3	3	8.17	-29.2	1.5	0.0	0.0	6.3	40.8	-3.0	37.8
Unit G On facade (2MXM50M9)	LrD	Point	59.3	59.3	3	6.18	-26.8	1.5	-8.2	0.0	8.1	36.8	0.0	36.8
Unit G On facade (2MXM50M9)	LrN	Point	59.3	59.3	3	6.18	-26.8	1.5	-8.2	0.0	8.1	36.8	-3.0	33.8
Unit H On facade (2MXM50M9)	LrD	Point	59.3	59.3	3	5.65	-26.0	1.5	-9.5	0.0	4.0	32.2	0.0	32.2
Unit H On facade (2MXM50M9)	LrN	Point	59.3	59.3	3	5.65	-26.0	1.5	-9.5	0.0	4.0	32.2	-3.0	29.2

Source	Time slice	Source type	L'w dB(A)	Lw dB(A)	Ko dB	S m	Adiv dB	Agr dB	Abar dB	Aatm dB	dLrefl dB	Ls dB(A)	dLw dB	Lr dB(A)
Receiver Hotel window facing Lancaster Terrrace Receiver height 7.50 m LeqDay 44.7 dB(A) LeqNight 40.7 dB(A)														
Unit A Basement (Streetside) (RXYSQ6T8V)	LrD	Point	69.9	69.9	3	17.63	-35.9	0.8	0.0	-0.1	2.5	40.2	0.0	40.2
Unit A Basement (Streetside) (RXYSQ6T8V)	LrN	Point	69.9	69.9	3	17.63	-35.9	0.8	0.0	-0.1	2.5	40.2	-4.0	36.2
Unit A Lift Room (RXYSQ6T8V)	LrD	Point	69.9	69.9	3	19.63	-36.8	1.5	-24.2	-0.1	2.5	15.7	0.0	15.7
Unit A Lift Room (RXYSQ6T8V)	LrN	Point	69.9	69.9	3	19.63	-36.8	1.5	-24.2	-0.1	2.5	15.7	-4.0	11.7
Unit A On facade (2MXM50M9)	LrD	Point	59.3	59.3	3	15.53	-34.8	1.1	-24.1	-0.1	0.9	5.3	0.0	5.3
Unit A On facade (2MXM50M9)	LrN	Point	59.3	59.3	3	15.53	-34.8	1.1	-24.1	-0.1	0.9	5.3	-3.0	2.3
Unit A on Roof (RXYSQ6T8V)	LrD	Point	69.9	69.9	0	16.77	-35.5	1.5	-23.8	-0.1	1.0	13.0	0.0	13.0
Unit A on Roof (RXYSQ6T8V)	LrN	Point	69.9	69.9	0	16.77	-35.5	1.5	-23.8	-0.1	1.0	13.0	-4.0	9.0
Unit B Basement (Streetside) (RXYSQ6T8V)	LrD	Point	69.9	69.9	3	13.81	-33.8	1.0	0.0	-0.1	2.8	42.7	0.0	42.7
Unit B Basement (Streetside) (RXYSQ6T8V)	LrN	Point	69.9	69.9	3	13.81	-33.8	1.0	0.0	-0.1	2.8	42.7	-4.0	38.7
Unit B Lift room (RXYSQ6T8V)	LrD	Point	69.9	69.9	3	20.14	-37.1	1.5	-24.3	-0.1	4.0	16.9	0.0	16.9
Unit B Lift room (RXYSQ6T8V)	LrN	Point	69.9	69.9	3	20.14	-37.1	1.5	-24.3	-0.1	4.0	16.9	-4.0	12.9
Unit B On facade (2MXM50M9)	LrD	Point	59.3	59.3	3	15.14	-34.6	1.3	-24.1	-0.1	0.9	5.8	0.0	5.8
Unit B On facade (2MXM50M9)	LrN	Point	59.3	59.3	3	15.14	-34.6	1.3	-24.1	-0.1	0.9	5.8	-3.0	2.8
Unit B on Roof (RXYSQ6T8V)	LrD	Point	69.9	69.9	0	16.98	-35.6	1.5	-23.8	-0.1	1.0	12.9	0.0	12.9
Unit B on Roof (RXYSQ6T8V)	LrN	Point	69.9	69.9	0	16.98	-35.6	1.5	-23.8	-0.1	1.0	12.9	-4.0	8.9
Unit C On facade (2MXM50M9)	LrD	Point	59.3	59.3	3	16.14	-35.2	1.1	-23.9	-0.1	2.1	6.3	0.0	6.3
Unit C On facade (2MXM50M9)	LrN	Point	59.3	59.3	3	16.14	-35.2	1.1	-23.9	-0.1	2.1	6.3	-3.0	3.3
Unit C on roof (RXYSQ6T8V)	LrD	Point	69.9	69.9	0	17.19	-35.7	1.5	-23.9	-0.1	1.5	13.2	0.0	13.2
Unit C on roof (RXYSQ6T8V)	LrN	Point	69.9	69.9	0	17.19	-35.7	1.5	-23.9	-0.1	1.5	13.2	-4.0	9.2
Unit D On facade (2MXM50M9)	LrD	Point	59.3	59.3	3	15.83	-35.0	1.3	-23.9	-0.1	2.1	6.8	0.0	6.8
Unit D On facade (2MXM50M9)	LrN	Point	59.3	59.3	3	15.83	-35.0	1.3	-23.9	-0.1	2.1	6.8	-3.0	3.8
Unit E On facade (2MXM50M9)	LrD	Point	59.3	59.3	3	14.29	-34.1	1.4	-23.9	-0.1	0.9	6.5	0.0	6.5
Unit E On facade (2MXM50M9)	LrN	Point	59.3	59.3	3	14.29	-34.1	1.4	-23.9	-0.1	0.9	6.5	-3.0	3.5
Unit F On facade (2MXM50M9)	LrD	Point	59.3	59.3	3	13.94	-33.9	1.5	-23.9	-0.1	0.1	6.0	0.0	6.0
Unit F On facade (2MXM50M9)	LrN	Point	59.3	59.3	3	13.94	-33.9	1.5	-23.9	-0.1	0.1	6.0	-3.0	3.0
Unit G On facade (2MXM50M9)	LrD	Point	59.3	59.3	3	15.22	-34.6	1.4	-23.9	-0.1	2.1	7.2	0.0	7.2
Unit G On facade (2MXM50M9)	LrN	Point	59.3	59.3	3	15.22	-34.6	1.4	-23.9	-0.1	2.1	7.2	-3.0	4.2
Unit H On facade (2MXM50M9)	LrD	Point	59.3	59.3	3	15.24	-34.7	1.5	-23.9	-0.1	1.8	6.9	0.0	6.9
Unit H On facade (2MXM50M9)	LrN	Point	59.3	59.3	3	15.24	-34.7	1.5	-23.9	-0.1	1.8	6.9	-3.0	3.9