DOUBLE TREE BY HILTON LONDON – WEST END
92 SOUTHAMPTON ROW
BLOOMSBURY
LONDON
WC1B 4BH

24 HOUR ENVIRONMENTAL NOISE ASSESSMENT

Our Ref: CPT/191219/001/Rev02

Report prepared on behalf of

SPEK Noise Control Ltd
Unit 8/9 The Stables Business Park
Lichfield
WS13 8EX

Written By:

Cliff Tucker AMIOA

Date: 20th December 2019

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Disclaimer:

1.0 Brief

1.1 To carry out an Environmental Noise Assessment & Report in order to establish the prevailing environmental noise levels enjoyed by the site.

1.2 From these measurements and through liaison with the Local Authority we establish an acoustic design criterion (the Rating Level) 1.0 meters from the nearest acoustically critical location (the Assessment Position).

1.3 To analyse the published acoustic data for the proposed equipment in relation to the Rating Level including any proposed acoustic control hardware in order to establish compliance or otherwise.

1.4 We have excluded the following from our brief:

- Construction noise
- Any Building Regulations noise considerations
- Traffic noise/traffic count per se, although we have recorded LA10 percentiles.
- Health and safety acoustics.

2.0 Executive Summary

2.1 An Environmental Noise Assessment has been carried out at Double Tree by Hilton Hotel, 92 Southampton Row, London, WC1B 4BH.

2.2 A minimum background noise level of 44 (43.9) dB $LA_{90,\ 15mins}$ has been measured for the hours of operation of the proposed plant.

2.3 A required Rating Level is set at 10 dB below the relevant background noise levels, as per Camden Council's normal conditions.

2.4 The Rating Level is therefore 34 dB $LA_{eq,\ 15\ mins}$.

2.5 The proposed plant is to installed at the rooftop level of Block B within a redundant lift overrun room.

2.6 Air inlet and discharge will be via 300 mm deep acoustic louvres.

2.7 The theoretical specific noise level of the unit under full load at the Assessment Position is 30 dB-A.

2.8 This is 4 dB-A below the Rating Level and the Local Authority's requirements in terms of noise will therefore be met.

3.0 Works Description & Site Location

3.1 The Double Tree by Hilton Hotel London West End is an eight storey hotel located in a street of mixed commercial and residential properties within the London Borough of Camden.

3.2 The hotel is undergoing significant refurbishment and this report is in relation to Phase 4 of those works whereby the proposal is to construct an additional eleven duplex bedrooms located at Ground Floor Level.

3.3 It is proposed that new plant servicing the rooms be located on top of Block B within a redundant lift over run room.

3.4 The hotel is bounded by Southampton Row to the South West with 5 Bloomsbury Place beyond; Ormande Mansions to the North West; the rear of the properties aligning the South West side of Old Gloucester Street to the North East; and the main Hotel structure with mixed commercial/ residential property to the South East.

4.0 Instrumentation

4.1 The instrumentation employed was:

- Rion NL-32/NX-22RT Class 1 Environmental Noise Analyser
- Rion NC74 Class1 Acoustic Calibrator
- Rion 12 mm Condenser Microphone & Foam Windshield on 1,5 meter Extension Pole.
- Rion Weatherproof Security Box

4.2 The instruments carry current calibration certificates a copy of which is available from our offices upon request.

5.0 Time, Date & Environmental Conditions

5.1 The measurements were conducted from 10.04 on the 15th August 2018 through until 10.04 on the 16th August 2018.

5.2 The weather throughout the survey period was warm with clear skies, occasional light rain and light winds.

5.3 The site engineer was Cliff Tucker: the results were analysed & reported by Cliff Tucker.

6.0 Methodology.

6.1 The survey and report generally follow the procedures, method and assessments as described in BS 4142: 2014 ‘Methods for rating and assessing industrial and commercial sound’.

6.2 The standard requires a comparison between the typical measured background noise level and the equivalent continuous A-weighted sound pressure level of the proposed plant at the Assessment Position.

6.3 BS4142: 2014 also requires uncertainty to be considered as part of the assessment.

- We have undertaken a 24 hour background noise survey and the data gathered has been analysed to ensure that any influences from the weather conditions have been accounted for in the assessment.
- The calibration of the sound level meter was checked before and after the survey period and no significant drift found.
- Standard acoustic theory has been applied in the noise propagation calculations.

It is therefore considered that the uncertainty associated with the assessment is minimal and the results, as stated, are therefore valid.

6.4 The Reference Time Interval used for the survey was 15 minutes.

6.5 The microphone position (the measurement position) was at the mid-point rear elevation of the rooftop of Block A of the Hotel.

6.6 The background level as measured at the microphone position is considered to be representative of the levels enjoyed at the Assessment Position.

6.7 The Assessment Position is taken to be the top floor windows in the South East facade of Ormande Mansions, a linear distance of not less than 12.5 metres from the proposed installation location.

6.8 The measurement position; assessment position; and the other relevant points of interest are shown on the plan within Appendix ‘A’.

6.9 The measured levels were the principle LA percentiles as prescribed in BS 4142.

6.10 The most significant of the measured percentiles for our purposes are as follows:

- LA_{eq}, (the mean sound pressure level corresponding to a fluctuation level across time period 't'). Used for the measurement and assessment of the Ambient Noise Level; The Specific Noise Level; The Residual Level and the Rating Level
- LA_{10} ('A' weighted level exceeded for 10% of the time) is used for traffic noise assessment.
- LA_{90}, ('A' weighted level exceeded for 90% of the time). Represents the Background Level and is often used as the target threshold against which the acoustic design criteria are set.

  We also measured the maximum and minimum levels.

6.11 You will note the basic objective is to establish a Rating Level at the Assessment Point for comparison with the specific noise level from any new plant in order to predict the likelihood of noise complaint.

6.12 Camden Council's requirements are for any new noise to be not less than 10 dB-A below the minimum background noise level for the hours of operation of the equipment.

6.13 The plant has the propensity to operate 24 hours per day, 7 days per week.

7.0 Results Summary & Assessment of Required Rating Level

7.1 The full set of measured levels are presented in Appendix B of this report

7.2 The plant has the propensity to operate 24 hours per day 7 days per week.

7.3 The minimum $LA_{90,\ 15\ mins}$ level measured was 43.9 dB LA_{90} measured through at 04.04 on the 16th August 2018.

7.4 The Rating Level is therefore set at 34 dB $LA_{eq,\ 15\ mins}$.

8.0 Analysis

8.1 Proposed Plant & Location

The proposed items of plant is:

- 1 no. Daikin REYQ20U Air Cooled Condenser.

It is to be located on the rooftop of Block B of the Hotel within a redundant lift over run room.

The direct line of sight distance to the Assessment Position is not less than 12.5 m.

Air inlet and discharge is to be via 300 mm deep acoustic louvres.

The equipment has the propensity to operate 24 hours per day 7 days per week.

The manufacturers published Sound Pressure Level spectrum at 1 m for the unit under full load is as follows:

	Octave Band Mid Frequency Hz							
	63	**125**	**250**	**500**	**1K**	**2K**	**4K**	**8K**
Lp	70	65	66	63	59	54	53	47

The plant noise has no tonal properties and being inverter driven, there is no intermittency.

8.2 Plant Analysis

	Octave Band Mid Frequency Hz							
	63	**125**	**250**	**500**	**1K**	**2K**	**4K**	**8K**
Lp	70	65	66	63	59	54	53	47
Dist Loss	22	22	22	22	22	22	22	22
Louvre Loss	6	7	10	13	17	19	13	11
Lp Ass	42	36	34	28	20	13	18	14
A-Weight	26	16	9	3	0	-1	-1	1
Lp-A Ass	16	20	25	25	20	14	19	13

This is equivalent to 30 dB-A, which is 4 dB-A below the Rating Level and the Local Authority's requirements in terms of noise will therefore be met.

8.3 Vibration

As the proposed plant is to be installed on the main building structure it should be resiliently mounted in order to prevent the transfer of structure borne noise or vibration to adjacent areas.

Additionally the associated gas and liquid lines should be fixed over the pipe insulation to ensure no metal to metal contact.

9.0 Conclusion

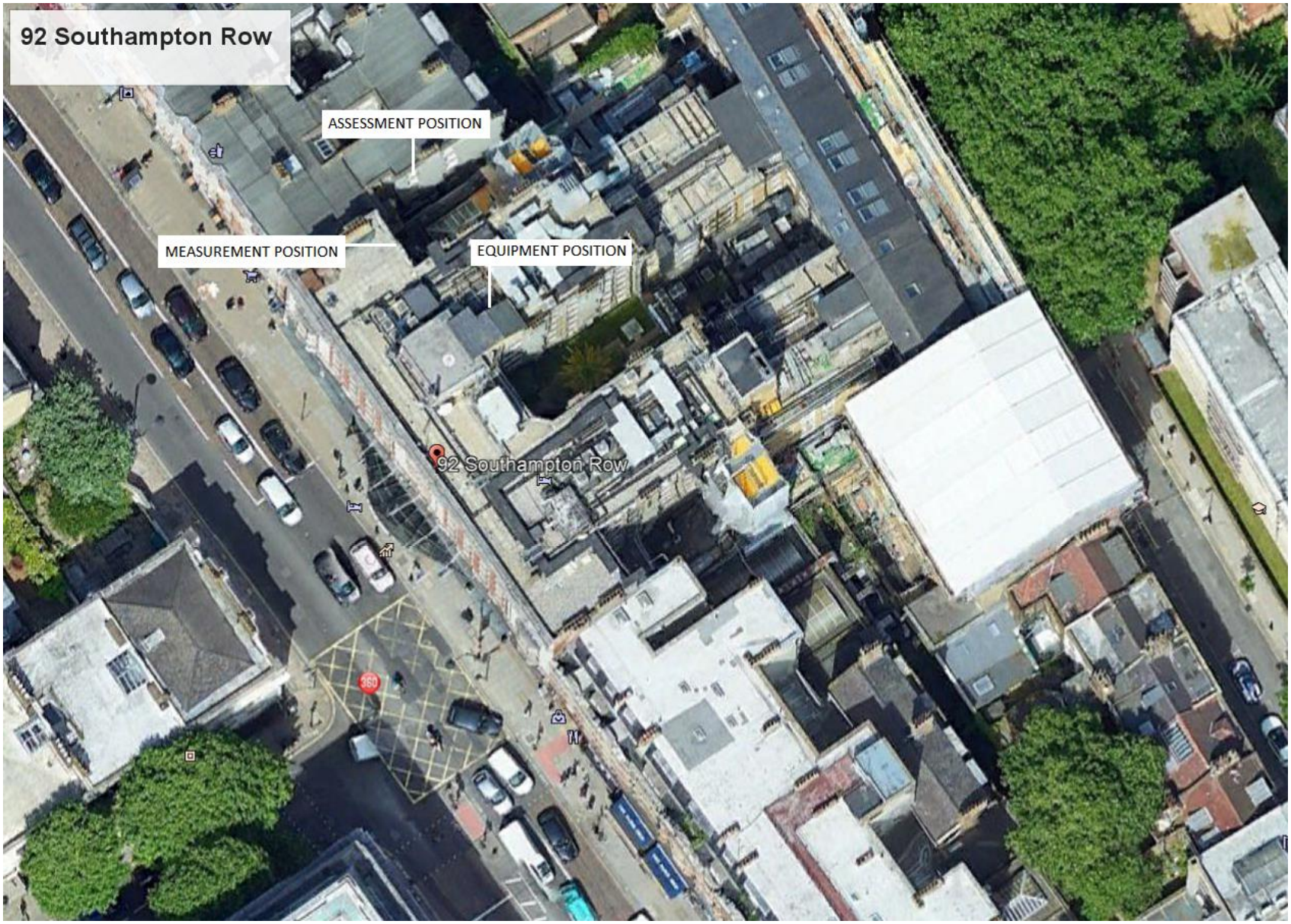
The new plant that is to be installed should be designed, selected, located and acoustically treated as detailed within this report.

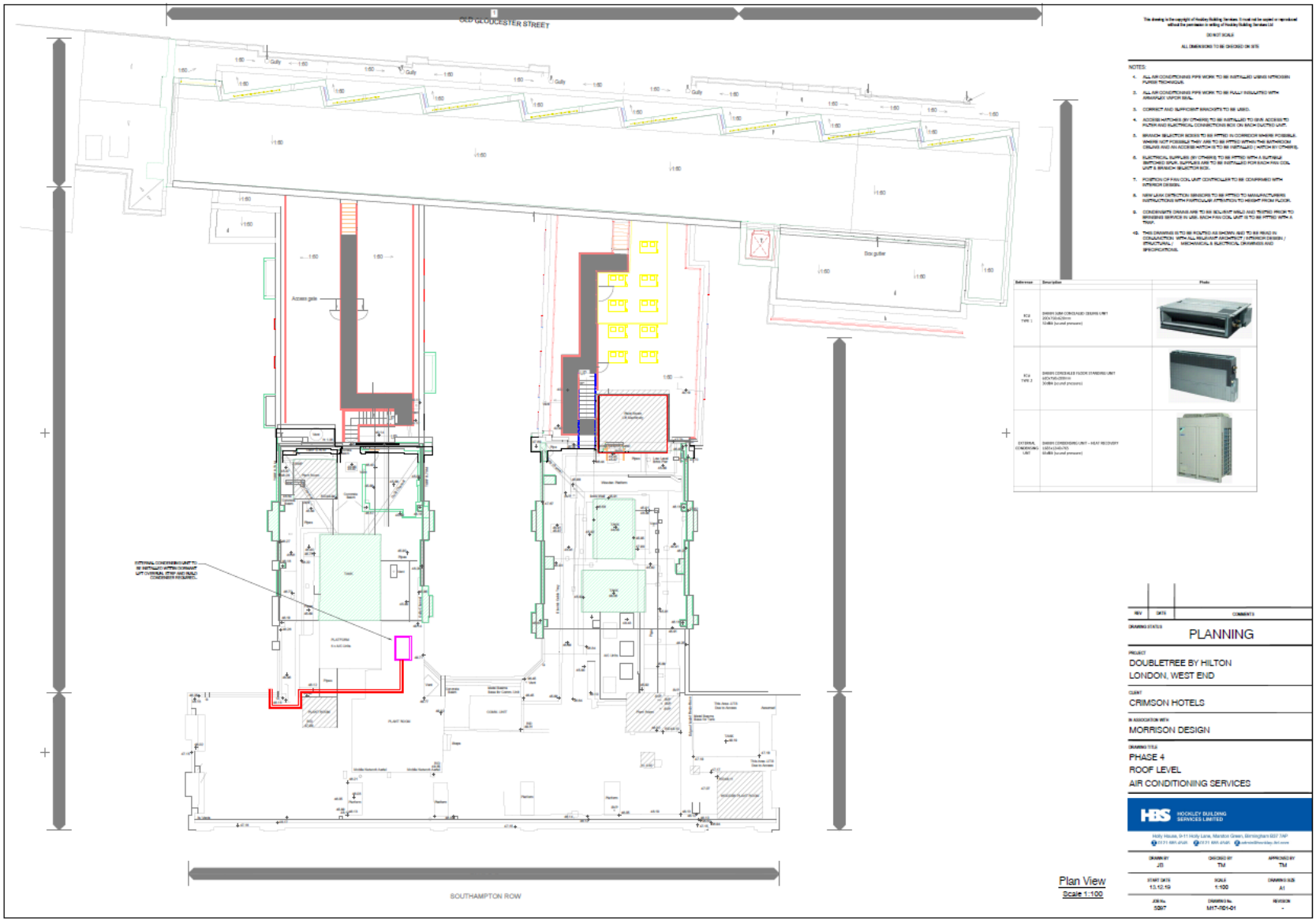
Assuming this is achieved the Local Authority's requirements in terms of noise will be met.

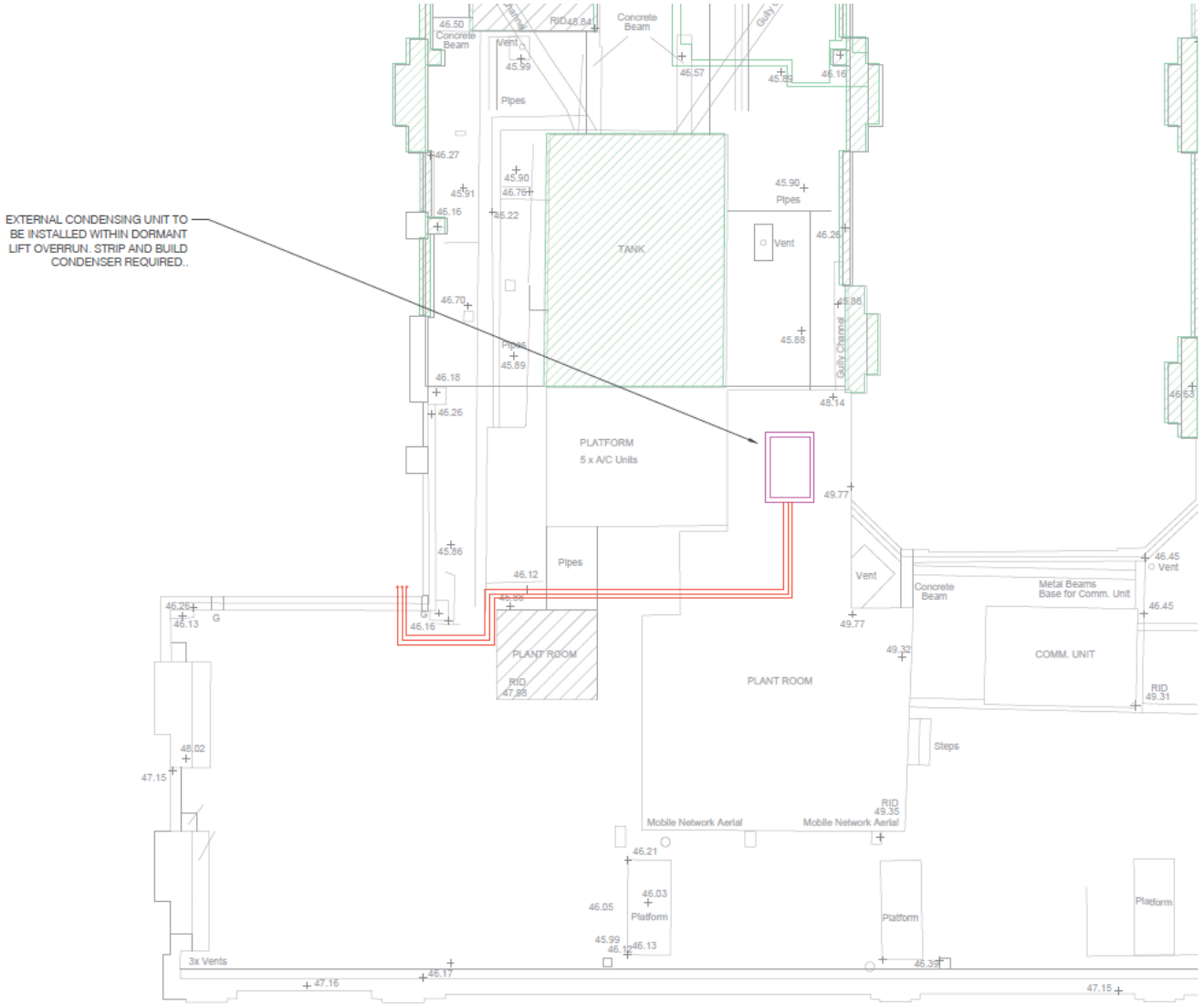
Report ends

Cliff Tucker AMIOA

APPENDIX A – Positions, Distances, & Locations


92 Southampton Row
ASSESSMENT POSITION
MEASUREMENT POSITION
EQUIPMENT POSITION
92 Southampton Row

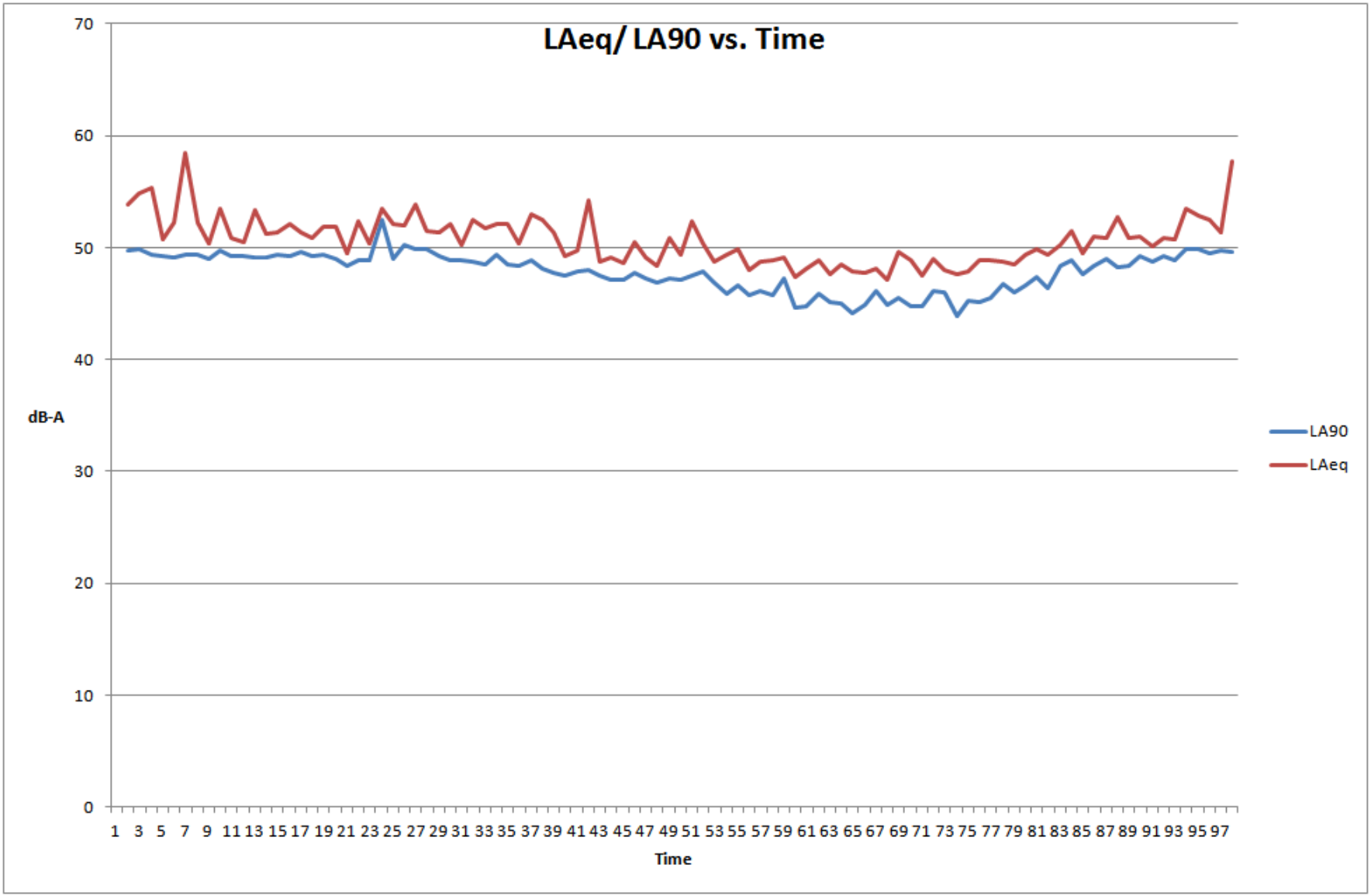

OLD GLOUCESTER STREET
SOUTHAMPTON ROW
Box gutter
Access gate
PLANNING
DOUBLETREE BY HILTON
LONDON, WEST END
CRIMSON HOTELS
MORRISON DESIGN
PHASE 4
ROOF LEVEL
AIR CONDITIONING SERVICES
HOCKLEY BUILDING SERVICES LIMITED
Plan View
Scale 1:100


EXTERNAL CONDENSING UNIT TO BE INSTALLED WITHIN DORMANT LIFT OVERRUN. STRIP AND BUILD CONDENSER REQUIRED..
TANK
PLATFORM
5 x A/C Units
PLANT ROOM
PLANT ROOM
COMM. UNIT
Concrete Beam
Metal Beams Base for Comm. Unit
Pipes
Vent
Steps
Mobile Network Aerial
Mobile Network Aerial
Platform
Platform
Platform
3x Vents
Gully Channel

Appendix B – Full Measured Levels

Ref	Time	Measurment Time	LAmax	LAmin	LA10	LA90	LAeq
1	15/08/2018 10:04	0:15:00	80.3	48.2	53.0	49.7	53.9
2	15/08/2018 10:19	0:15:00	67.6	47.8	57.0	49.8	54.8
3	15/08/2018 10:34	0:15:00	67.8	47.9	60.1	49.4	55.3
4	15/08/2018 10:49	0:15:00	62.8	47.7	51.5	49.2	50.7
5	15/08/2018 11:04	0:15:00	66.4	47.8	53.3	49.1	52.2
6	15/08/2018 11:19	0:15:00	75.6	48.3	60.7	49.4	58.5
7	15/08/2018 11:34	0:15:00	62.7	48.4	54.4	49.4	52.2
8	15/08/2018 11:49	0:15:00	62.1	47.7	51.3	49.0	50.3
9	15/08/2018 12:04	0:15:00	71.4	48.6	56.1	49.7	53.5
10	15/08/2018 12:19	0:15:00	64.7	47.7	52.3	49.2	50.9
11	15/08/2018 12:34	0:15:00	64.2	48.1	51.4	49.2	50.5
12	15/08/2018 12:49	0:15:00	70.6	47.5	53.0	49.1	53.3
13	15/08/2018 13:04	0:15:00	66.8	47.9	51.3	49.1	51.2
14	15/08/2018 13:19	0:15:00	66.7	47.9	51.5	49.3	51.4
15	15/08/2018 13:34	0:15:00	67.2	48.0	51.9	49.2	52.1
16	15/08/2018 13:49	0:15:00	70.3	48.2	53.0	49.6	51.3
17	15/08/2018 14:04	0:15:00	66.7	47.6	52.1	49.2	50.9
18	15/08/2018 14:19	0:15:00	67.5	48.2	53.5	49.4	51.9
19	15/08/2018 14:34	0:15:00	66.5	47.4	53.0	49.0	51.8
20	15/08/2018 14:49	0:15:00	62.7	46.8	50.5	48.4	49.5
21	15/08/2018 15:04	0:15:00	70.3	47.3	52.9	48.9	52.3
22	15/08/2018 15:19	0:15:00	67.9	47.6	51.1	48.9	50.3
23	15/08/2018 15:34	0:15:00	71.7	49.7	54.3	52.5	53.5
24	15/08/2018 15:49	0:15:00	72.6	47.2	53.3	49.0	52.1
25	15/08/2018 16:04	0:15:00	64.3	49.0	53.7	50.2	52.0
26	15/08/2018 16:19	0:15:00	68.5	48.6	56.0	49.9	53.8
27	15/08/2018 16:34	0:15:00	65.9	48.6	52.5	49.9	51.5
28	15/08/2018 16:49	0:15:00	59.0	47.9	53.3	49.2	51.3
29	15/08/2018 17:04	0:15:00	66.0	47.0	54.2	48.8	52.1
30	15/08/2018 17:19	0:15:00	58.1	47.3	51.4	48.8	50.2
31	15/08/2018 17:34	0:15:00	70.5	46.9	54.1	48.7	52.5
32	15/08/2018 17:49	0:15:00	72.5	47.1	53.3	48.5	51.7
33	15/08/2018 18:04	0:15:00	66.6	47.3	53.7	49.3	52.1
34	15/08/2018 18:19	0:15:00	70.8	47.2	52.6	48.5	52.1
35	15/08/2018 18:34	0:15:00	64.5	47.2	51.9	48.4	50.3
36	15/08/2018 18:49	0:15:00	69.9	47.1	54.9	48.9	53.0
37	15/08/2018 19:04	0:15:00	68.9	46.5	53.2	48.1	52.5
38	15/08/2018 19:19	0:15:00	77.6	45.7	52.5	47.7	51.3
39	15/08/2018 19:34	0:15:00	61.5	46.0	50.6	47.5	49.2
40	15/08/2018 19:49	0:15:00	60.3	46.1	51.2	47.9	49.7
41	15/08/2018 20:04	0:15:00	70.0	46.6	56.3	48.0	54.2
42	15/08/2018 20:19	0:15:00	62.6	46.1	49.9	47.5	48.7
43	15/08/2018 20:34	0:15:00	64.4	45.7	50.0	47.1	49.1
44	15/08/2018 20:49	0:15:00	58.5	45.6	49.8	47.1	48.6
45	15/08/2018 21:04	0:15:00	70.3	45.8	52.7	47.8	50.5
46	15/08/2018 21:19	0:15:00	64.5	45.3	50.5	47.3	49.1
47	15/08/2018 21:34	0:15:00	58.5	45.4	49.6	46.9	48.4

Ref	Time	Measurment Time	LAmax	LAmin	LA10	LA90	LAeq
48	15/08/2018 21:49	0:15:00	68.2	45.5	52.6	47.2	50.8
49	15/08/2018 22:04	0:15:00	64.8	45.7	50.8	47.1	49.4
50	15/08/2018 22:19	0:15:00	70.8	46.0	54.6	47.5	52.4
51	15/08/2018 22:34	0:15:00	67.6	45.5	50.3	47.9	50.3
52	15/08/2018 22:49	0:15:00	60.9	45.0	50.1	46.9	48.7
53	15/08/2018 23:04	0:15:00	66.7	44.5	49.9	45.9	49.4
54	15/08/2018 23:19	0:15:00	71.6	44.8	52.3	46.6	49.8
55	15/08/2018 23:34	0:15:00	63.6	43.9	49.6	45.7	48.0
56	15/08/2018 23:49	0:15:00	62.1	44.6	49.9	46.1	48.7
57	16/08/2018 00:04	0:15:00	64.8	43.5	52.0	45.7	48.8
58	16/08/2018 00:19	0:15:00	64.6	45.5	50.3	47.2	49.1
59	16/08/2018 00:34	0:15:00	59.6	42.6	49.2	44.6	47.4
60	16/08/2018 00:49	0:15:00	59.5	42.8	50.5	44.7	48.1
61	16/08/2018 01:04	0:15:00	63.7	43.8	51.3	45.9	48.8
62	16/08/2018 01:19	0:15:00	59.7	43.6	48.6	45.1	47.6
63	16/08/2018 01:34	0:15:00	70.5	43.6	52.5	45.0	48.5
64	16/08/2018 01:49	0:15:00	63.4	42.3	49.5	44.1	47.9
65	16/08/2018 02:04	0:15:00	59.7	42.8	49.4	44.9	47.7
66	16/08/2018 02:19	0:15:00	58.3	43.9	49.7	46.1	48.1
67	16/08/2018 02:34	0:15:00	63.8	42.9	48.5	44.9	47.1
68	16/08/2018 02:49	0:15:00	71.5	43.6	52.4	45.5	49.6
69	16/08/2018 03:04	0:15:00	64.3	42.6	49.6	44.8	48.9
70	16/08/2018 03:19	0:15:00	59.5	42.5	49.6	44.7	47.5
71	16/08/2018 03:34	0:15:00	70.9	42.8	51.4	46.1	49.0
72	16/08/2018 03:49	0:15:00	64.4	44.8	49.2	46.0	48.0
73	16/08/2018 04:04	0:15:00	62.0	41.9	50.0	43.9	47.6
74	16/08/2018 04:19	0:15:00	63.5	43.5	49.5	45.3	47.9
75	16/08/2018 04:34	0:15:00	63.1	41.2	49.6	45.1	48.9
76	16/08/2018 04:49	0:15:00	59.6	43.4	51.8	45.5	48.8
77	16/08/2018 05:04	0:15:00	63.2	44.8	50.0	46.7	48.7
78	16/08/2018 05:19	0:15:00	61.5	44.0	49.7	46.0	48.5
79	16/08/2018 05:34	0:15:00	62.8	43.7	51.8	46.6	49.3
80	16/08/2018 05:49	0:15:00	63.4	45.7	51.4	47.4	49.9
81	16/08/2018 06:04	0:15:00	64.9	44.4	51.8	46.4	49.3
82	16/08/2018 06:19	0:15:00	57.5	46.7	51.9	48.4	50.2
83	16/08/2018 06:34	0:15:00	70.5	46.8	53.0	48.8	51.5
84	16/08/2018 06:49	0:15:00	63.5	46.2	50.9	47.6	49.5
85	16/08/2018 07:04	0:15:00	70.4	46.8	53.0	48.3	51.0
86	16/08/2018 07:19	0:15:00	63.6	47.4	52.3	49.0	50.9
87	16/08/2018 07:34	0:15:00	68.5	46.3	53.5	48.2	52.7
88	16/08/2018 07:49	0:15:00	63.6	46.9	53.1	48.3	50.8
89	16/08/2018 08:04	0:15:00	66.0	47.8	52.2	49.2	51.0
90	16/08/2018 08:19	0:15:00	59.2	47.3	51.4	48.7	50.1
91	16/08/2018 08:34	0:15:00	62.0	47.8	52.1	49.2	50.9
92	16/08/2018 08:49	0:15:00	60.6	47.6	51.8	48.9	50.7
93	16/08/2018 09:04	0:15:00	68.5	48.6	54.5	49.9	53.5
94	16/08/2018 09:19	0:15:00	69.1	47.9	54.6	49.9	52.9
95	16/08/2018 09:34	0:15:00	66.1	47.9	53.1	49.5	52.5
96	16/08/2018 09:49	0:15:00	69.5	48.1	52.4	49.7	51.4
97	16/08/2018 10:04	0:05:27	75.9	48.2	55.3	49.6	57.7


LAeq/ LA90 vs. Time
70
60
50
40
30
20
10
0
dB-A
1 3 5 7 9 11 13 15 17 19 21 23 25 27 29 31 33 35 37 39 41 43 45 47 49 51 53 55 57 59 61 63 65 67 69 71 73 75 77 79 81 83 85 87 89 91 93 95 97
Time
LA90
LAeq

Appendix C – Definitions

DECIBEL - The ratio of sound pressures that we can hear is a ratio of 10^6. A logarithmic measurement scale is therefore used for convenience. The resulting parameter is called the 'sound pressure level' (Lp) and the associated measurement unit is the decibel (dB). As the decibel is a logarithmic ratio, the laws of logarithmic addition and subtraction apply.

The threshold of normal hearing is in the region of 0 dB, and 140 dB is the threshold of pain.

A change of 1 dB is only perceptible under controlled conditions.

dB(A) - The unit generally used for measuring environmental, traffic or industrial noise is the A-weighted sound pressure level in decibels, denoted dB(A). An 'A'-weighting network can be built into a sound level measuring instrument such that sound levels in dB(A) can be read directly from a meter. The weighting is based on the frequency response of the human ear and has been found to correlate well with human subjective reactions to various sounds. A change of 3 dB(A) is the minimum perceptible under normal conditions, and a change of 10 dB(A) corresponds to a subjective halving or doubling of the loudness of a sound.

EQUIVALENT CONTINUOUS SOUND LEVEL (LEQ) - An index often used for the assessment of overall noise exposure is the equivalent continuous sound level, (LEQ). This is a notional steady level which would, over a given period of time, deliver the same sound energy as the actual time-varying sound over the same period. Hence fluctuating levels can be described in terms of a single figure level.

The 'A' weighted statistical sound level over a time period, T, is denoted $LA_{EQ,T}$.

AMBIENT NOISE - The total encompassing sound in a given situation at a given time. Most often described in terms of the index $LA_{EQ,.T}$.

SPECIFIC NOISE ($LA_{EQ,T}$) - The equivalent continuous A-Weighted sound pressure level at the assessment position produced by the specific noise source over a time interval T.

STATISTICAL NOISE LEVELS - For levels of noise that vary widely with time, for example road traffic noise, it is necessary to employ an index which allows for this variation.

- The L10, the level exceeded for ten per cent of the time period under consideration, has been adopted in this country for the assessment of road traffic noise.
- The L90, the level exceeded for ninety per cent of the time, has been adopted to represent the background noise level.

'A' weighted statistical noise levels are generally used and are denoted LA10, LA90 etc. The reference time period (T) is normally included, e.g. $LA_{10,}$