57 – 59 NEAL STREET,
LONDON WC2

ROOF PLANT REPORT

P1877-MEP ROOF PLANT REPORT

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Revision	Date	Details	Authored	Checked
R1	09/09/2020	For Information	RT	SQ

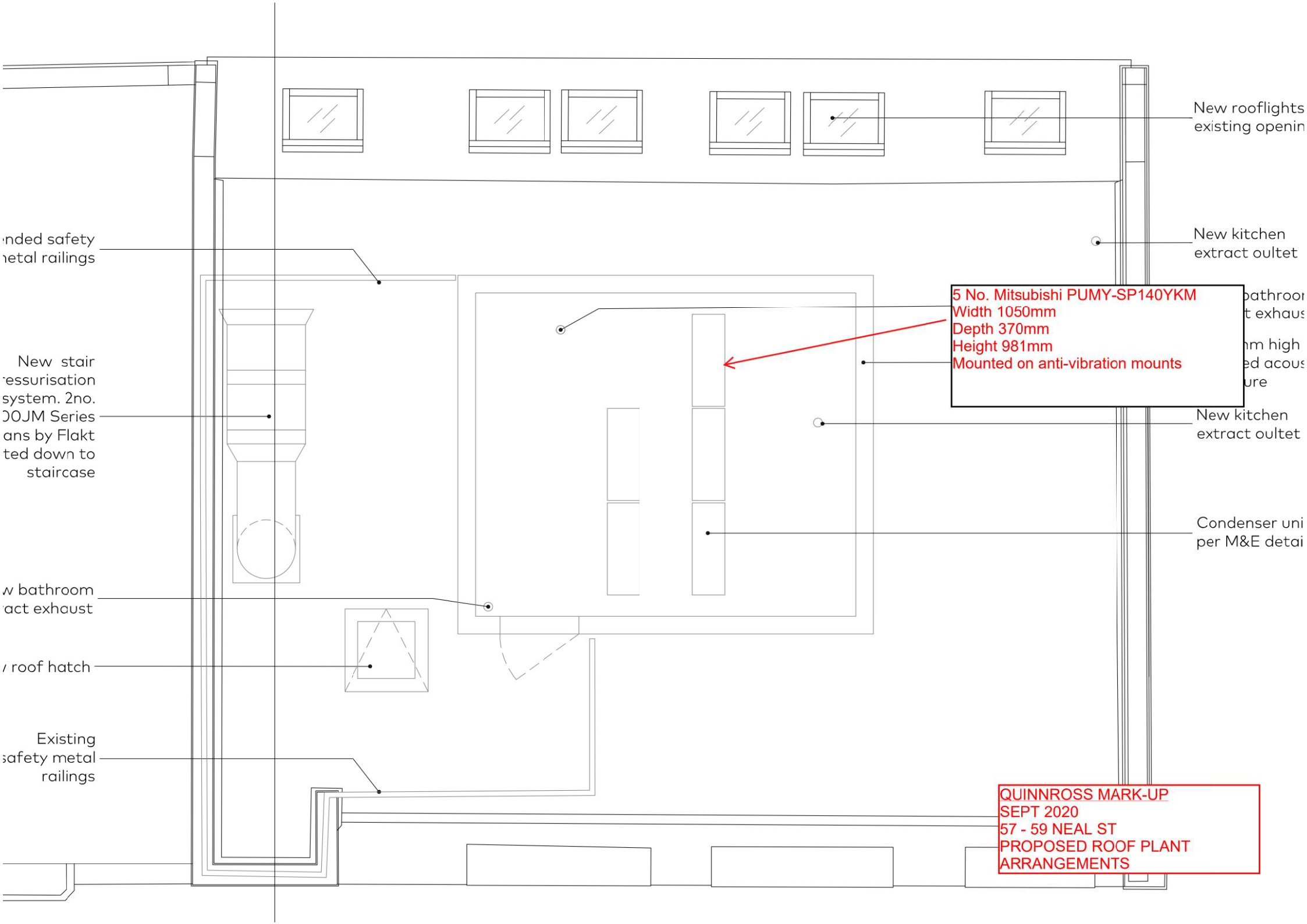
INTRODUCTION

This report is for the refurbishment of 57 – 59 Neal Street, London WC2. The purpose of this report is to provide information on the proposed roof plant to support the planning application. This report shall be read in conjunction with the associated Environment Noise Assessment CPT/160820/010 provided by Eurovib Acoustic Products Ltd. (contained in the appendix) and all current employers' requirements and design team information.

ROOF MOUNTED PLANT DETAILS

- Heating and comfort cooling to the office and retail demises shall be provided by heat pump comfort cooling air conditioning systems. Heat rejection/injection shall be via roof mounted external units. The units shall be contained within an acoustic enclosure.
- Refer to the Environment Noise Assessment report for noise reduction requirements and calculations, details and specification of the acoustic enclosure.
- The required performance of the acoustic louvre in sound pressure level at each octave band mid frequency is detailed in section 8.2 within the Environment Noise Assessment report.
- The proposed items of plant are 5 no. Mitsubishi PUMY-SP140YKM Air cooled condensers.
- Plant arrangements are shown in the Appendix.

APPENDIX A – ROOF PLANT ARRANGMENT


New rooflights
existing openin
New kitchen
extract oultet
5 No. Mitsubishi PUMY-SP140YKM
Width 1050mm
Depth 370mm
Height 981mm
Mounted on anti-vibration mounts
New kitchen
extract oultet
Condenser uni
per M&E detai
QUINNROSS MARK-UP
SEPT 2020
57 - 59 NEAL ST
PROPOSED ROOF PLANT
ARRANGEMENTS

APPENDIX B – ENVIRONMENTAL NOISE ASSESSMENT

57-59 NEAL STREET
LONDON
WC2H 9PP

24 HOUR ENVIRONMENTAL NOISE ASSESSMENT

Our Ref: CPT/160820/010

Report prepared on behalf of

QuinnRoss Consultants Ltd
Unit 3 Grove Dairy Farm Business Centre
Bobbing Hill
Sittingbourne
Kent
ME9 8NY

By:

Eurovib Acoustic Products Ltd
Goodwood House
86 Holmethorpe Avenue
Redhill
Surrey
RH1 2NL

Written By:

Cliff Tucker AMIOA

Date: 16th August 2020

CONTENTS

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) at the nearest noise sensitive boundary (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 57-59 Neal Street, London WC2H 9PP.

2.2 A minimum background noise level of 42 (41.5) dB $LA_{90,\ 15mins}$ has been measured for the hours of operation of the proposed plant.

2.3 A 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 be 32 dB $LA_{eq,\ 15\ mins}$.

2.5 The proposed plant is to be installed at roof top level.

2.6 It is proposed to enclose the equipment within a purpose built roofless acoustic enclosure formed from 150 mm deep acoustic louvres. The height of the louvres should be not less than 1200 mm.

2.7 The calculated resultant noise level at the Assessment Position with all units operating at full duty is 32 dB LAeq.

2.8 This is equal to the Rating Level and the Local Authority's requirements in regard to noise will therefore be met.

3.0 Location

3.1 57-59 Neal Street is a five storey (inc. basement) building in a street of similar properties within the London Borough of Camden.

3.2 The building bounded by Neal Street to the North East with mixed use (retail & residential) property beyond; 56 Neal Street to the South East, a mixed use (retail & residential) property; Neal's Yard to the South West consisting of mixed use (retail & residential) property; and 61 Neal Street to the North West, another mixed use (retail & residential) property.

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 copies of which are available from our offices on request.

5.0 Time, Date & Environmental Conditions

5.1 The survey was conducted from 10.46 on the 4th August 2020 through until 11.01 on the 5th August 2020.

5.2 The weather throughout the survey period was warm with clear skies, an occasional light breeze, and no rain.

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 the rooftop of 57-59 Neal Street.

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 of 68A Neal Street, a distance of not less than 12 m from the proposed plant location.

6.8 The measurement position; assessment positions; 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 that the specific noise from the proposed plant shall be no greater than 10 dB-A below the minimum measured background noise level measured for the proposed hours of operation of the plant.

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 C of this report

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

7.3 The minimum LA90 level measured was 41.5 dB LA90 at 02.01 on the 5th August 2020.

7.4 The Rating Level is therefore set at 32 dB LAeq, 15 mins.

8.0 Analysis

8.1 Proposed Plant & Location

The proposed items of plant are:

- 5 no. Mitsubishi PUMY-SP140YKM Air cooled condenser

The plant is to be installed at rooftop level.

The Assessment Position is taken to be the top floor windows of 68A Neal Street, a distance of not less than 12 m from the proposed plant location.

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

The manufacturers published Sound Pressure Level spectrum for the units under full load is as follows:

	Octave Band Mid Frequency Hz							
	63	**125**	**250**	**500**	**1K**	**2K**	**4K**	**8K**
Lp @ 1 m	62	58	56	53	51	47	40	33

The plant noise has no tonal properties. 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 @ 1 m	62	58	56	53	51	47	40	33
Add for 5 no.	7	7	7	7	7	7	7	7
Cumulative	69	65	63	60	58	54	47	40
Dist Loss	22	22	22	22	22	22	22	22
Louvre Loss	4	4	6	9	12	17	11	10
Lp Ass	43	39	35	29	24	15	14	8
A-Weight	26	16	9	3	0	-1	-1	1

	Octave Band Mid Frequency Hz							
	63	**125**	**250**	**500**	**1K**	**2K**	**4K**	**8K**
Lp-A Ass	17	23	26	26	24	16	15	7

This is equivalent to 32 dB-A.

This is equal to 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 rooftop the units should be resiliently mounted to prevent the transfer of vibration or structure borne noise.

Piped connections should be via flexible pipe connectors.

9.0 Conclusion

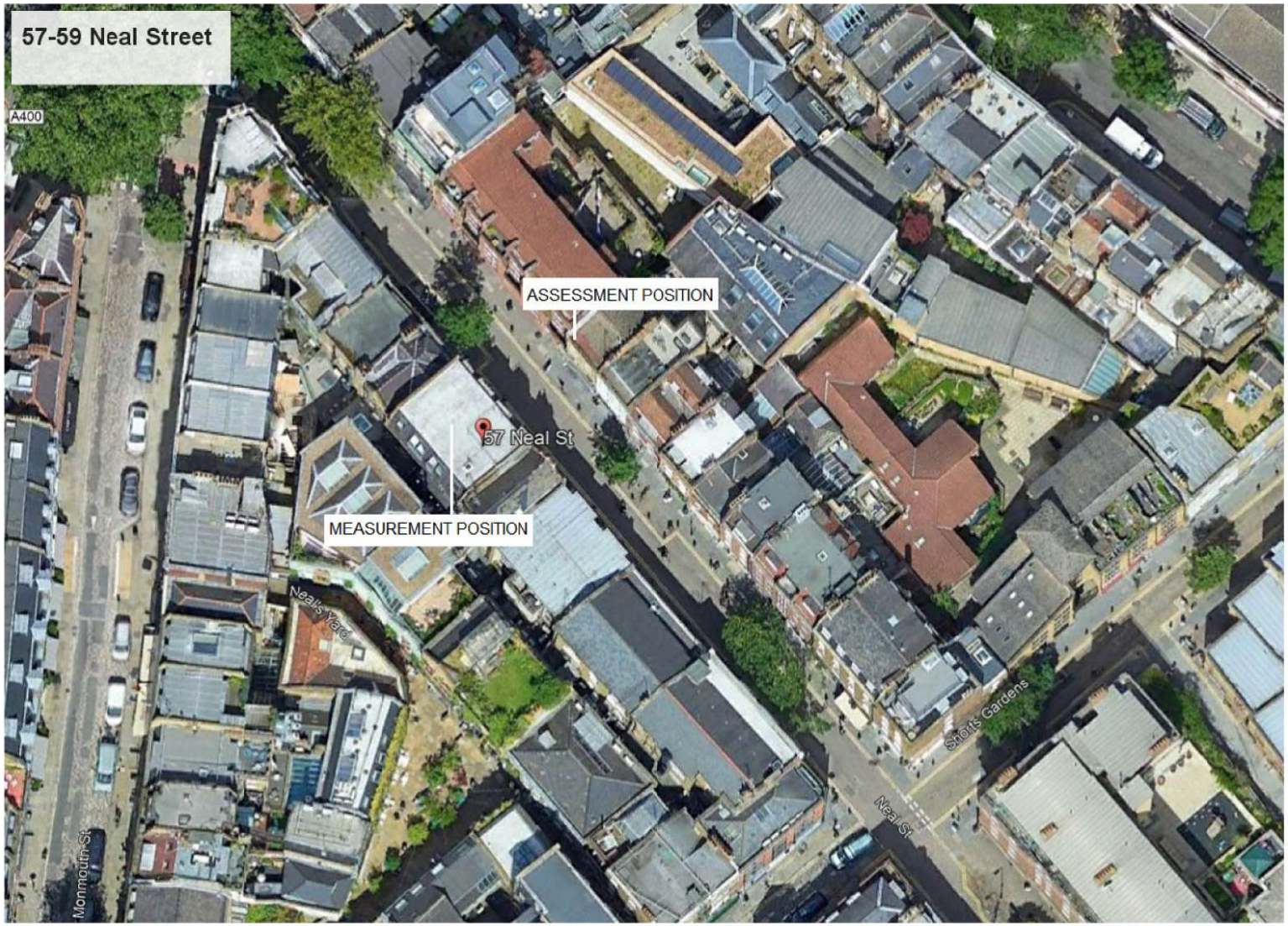
The new plant that is to be installed should be designed, selected, and located to ensure compliance with the above objectives.

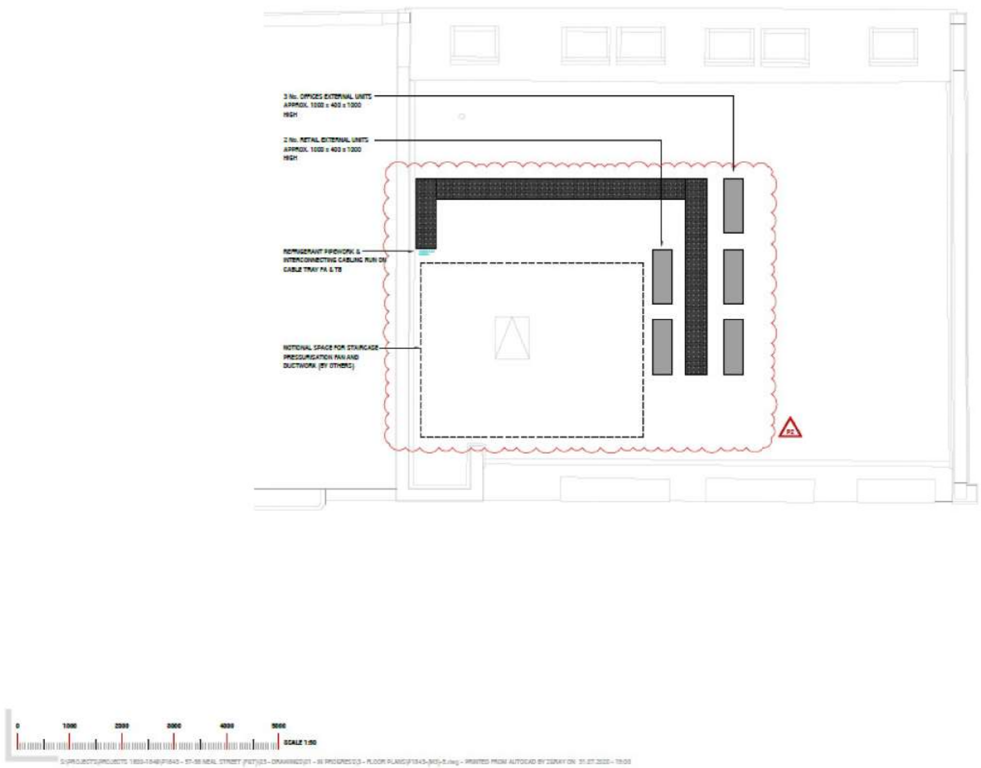
Assuming this is achieved as outlined above then the Local Authority's requirements in terms of noise will be met.

Report ends

Cliff Tucker AMIOA
Eurovib (Acoustic Products) Ltd

APPENDIX A – Positions, Distances, & Locations


57-59 Neal Street
A400
ASSESSMENT POSITION
57 Neal St
MEASUREMENT POSITION
Neal's Yard
Monmouth St
Shorts Gardens
Neal St



DRAWING NOTES

1. THIS DRAWING SHALL BE READ IN CONJUNCTION WITH ALL PROJECT RELEVANT QUINNROSS INFORMATION, THE CONTRACT SPECIFICATION, ALL ARCHITECTS & CONSULTANTS LATEST INFORMATION & ALL RELEVANT THIRD PARTY INFORMATION.
2. ALL DIMENSIONS ARE IN MILLIMETRES (mm) UNLESS OTHERWISE STATED.

PIPEWORK LEGEND:

- PIPEWORK UNDER FLOOR
- PIPEWORK AT ML/LL
- PIPEWORK AT HL
- PIPEWORK ABOVE CEILING
- CONDENSATE PIPEWORK
- REFRIGERANT PIPEWORK
- RETURN AIR DUCTWORK

GENERAL ABBREVIATIONS:

AP	ACCESS PANEL
C/W	COMPLETE WITH
FA / FB	FROM ABOVE / FROM BELOW
FFL	FINISHED FLOOR LEVEL
LL / HL / ML	LOW LEVEL / HIGH LEVEL / MID LEVEL
SD / SU	SET DOWN / SET UP
TA / TB	TO ABOVE / TO BELOW -

AC ABBREVIATIONS

AC	AIR CONDITIONING
ACC	AIR COOLED CONDENSER
AHU	AIR HANDLING UNIT
FCU	FAN COIL UNIT
RA	RETURN AIR
RAG	RETURN AIR GRILLE
RE	RODDING EYE
SG	SUPPLY GRILLE
SPL	SUPPLY AIR
VCD	VOLUME CONTROL DAMPER

REV	DATE	DESCRIPTION	DRN	CHK
P2	31.07.20	ISSUED FOR COMMENT	RT	RT
P1	12.06.20	ISSUED FOR COMMENT	AM	RT

QUINNROSS CONSULTANTS LTD

FOR COMMENT

CLIENT
F&T

PROJECT
57-59 NEAL STREET
WEST END
LONDON
WC2H 9PP

TITLE
ROOF LEVEL
MECHANICAL SERVICES
VENTILATION & AC LAYOUT

SCALE	SIZE	PLOTTED
1:50	A2	ZGRAY

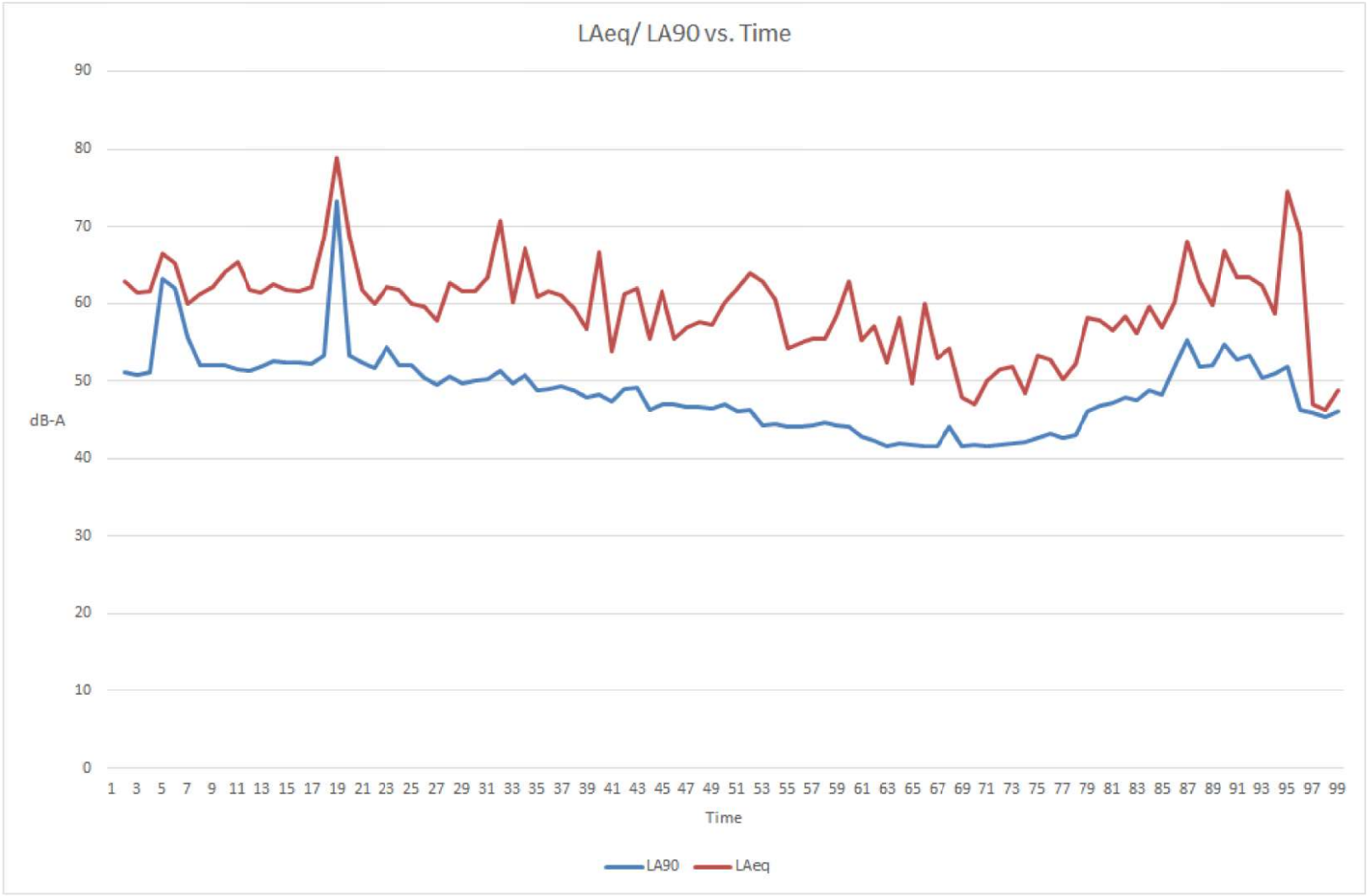
DRAWING No. P1843-(M3)-5-105 REV P2

THIS DRAWING IS TO BE PRINTED IN COLOUR

Appendix B – Full Measured Levels

Ref	Time	Measurment Time	LAmax	LAmin	LA10	LA90	LAeq
1	04/08/2020 10:46	0:15:00	82.2	47.1	64.7	51.1	62.9
2	04/08/2020 11:01	0:15:00	79.6	47.2	64.1	50.8	61.4
3	04/08/2020 11:16	0:15:00	83.6	48.3	62.0	51.2	61.6
4	04/08/2020 11:31	0:15:00	76.7	59.9	68.1	63.1	66.4
5	04/08/2020 11:46	0:15:00	81.6	59.0	67.1	61.9	65.2
6	04/08/2020 12:01	0:15:00	79.9	50.0	61.9	55.7	60.0
7	04/08/2020 12:16	0:15:00	83.4	47.3	61.4	52.1	61.2
8	04/08/2020 12:31	0:15:00	83.0	48.7	63.8	52.1	62.1
9	04/08/2020 12:46	0:15:00	85.6	48.0	65.9	52.0	64.0
10	04/08/2020 13:01	0:15:00	90.1	47.3	63.7	51.5	65.4
11	04/08/2020 13:16	0:15:00	79.7	47.7	65.4	51.3	61.7
12	04/08/2020 13:31	0:15:00	82.2	47.5	63.0	51.8	61.4
13	04/08/2020 13:46	0:15:00	84.3	49.0	64.5	52.6	62.5
14	04/08/2020 14:01	0:15:00	78.6	48.5	64.6	52.3	61.8
15	04/08/2020 14:16	0:15:00	80.4	47.7	64.3	52.4	61.5
16	04/08/2020 14:31	0:15:00	87.7	49.0	62.9	52.2	62.1
17	04/08/2020 14:46	0:15:00	79.6	49.7	74.7	53.2	68.5
18	04/08/2020 15:01	0:15:00	95.4	70.7	80.9	73.2	78.8
19	04/08/2020 15:16	0:15:00	88.1	49.0	68.9	53.3	68.7
20	04/08/2020 15:31	0:15:00	81.5	47.8	63.7	52.3	61.7
21	04/08/2020 15:46	0:15:00	80.3	48.1	62.3	51.7	59.9
22	04/08/2020 16:01	0:15:00	80.3	48.9	65.4	54.3	62.1
23	04/08/2020 16:16	0:15:00	85.3	48.5	64.9	52.1	61.7
24	04/08/2020 16:31	0:15:00	80.1	47.0	62.1	52.0	59.9
25	04/08/2020 16:46	0:15:00	79.9	46.2	62.0	50.4	59.6
26	04/08/2020 17:01	0:15:00	75.3	46.0	59.8	49.5	57.7
27	04/08/2020 17:16	0:15:00	86.3	47.2	60.4	50.6	62.6
28	04/08/2020 17:31	0:15:00	85.4	46.4	62.9	49.6	61.6
29	04/08/2020 17:46	0:15:00	83.2	46.9	63.0	50.0	61.6
30	04/08/2020 18:01	0:15:00	86.1	47.5	62.8	50.3	63.3
31	04/08/2020 18:16	0:15:00	92.9	46.7	71.6	51.3	70.7
32	04/08/2020 18:31	0:15:00	83.4	46.4	58.7	49.6	60.1
33	04/08/2020 18:46	0:15:00	87.1	46.2	69.0	50.8	67.2
34	04/08/2020 19:01	0:15:00	81.8	45.0	61.9	48.8	60.9
35	04/08/2020 19:16	0:15:00	84.7	45.4	63.7	49.0	61.5
36	04/08/2020 19:31	0:15:00	84.2	45.6	63.2	49.4	61.1
37	04/08/2020 19:46	0:15:00	80.6	45.0	62.3	48.7	59.4
38	04/08/2020 20:01	0:15:00	76.1	44.0	58.7	47.8	56.7
39	04/08/2020 20:16	0:15:00	90.8	44.5	61.9	48.3	66.6
40	04/08/2020 20:31	0:15:00	72.7	44.2	56.1	47.3	53.8
41	04/08/2020 20:46	0:15:00	80.5	44.9	64.8	49.0	61.2
42	04/08/2020 21:01	0:15:00	80.5	44.5	65.1	49.2	61.9
43	04/08/2020 21:16	0:15:00	76.0	43.5	57.2	46.2	55.5
44	04/08/2020 21:31	0:15:00	80.5	42.5	63.7	46.9	61.5
45	04/08/2020 21:46	0:15:00	76.5	43.3	58.3	47.0	55.5
46	04/08/2020 22:01	0:15:00	76.6	43.3	59.5	46.6	56.8
47	04/08/2020 22:16	0:15:00	75.7	43.1	60.6	46.7	57.6
48	04/08/2020 22:31	0:15:00	79.3	42.8	59.0	46.4	57.3
49	04/08/2020 22:46	0:15:00	80.3	42.9	61.6	46.9	60.2

Ref	Time	Measurment Time	LAmax	LAmin	LA10	LA90	LAeq
50	04/08/2020 23:01	0:15:00	86.1	42.6	61.2	46.0	62.0
51	04/08/2020 23:16	0:15:00	84.2	42.8	66.9	46.3	63.9
52	04/08/2020 23:31	0:15:00	87.7	42.0	60.5	44.3	62.8
53	04/08/2020 23:46	0:15:00	84.1	41.4	62.3	44.4	60.5
54	05/08/2020 00:01	0:15:00	75.1	41.2	56.5	44.1	54.1
55	05/08/2020 00:16	0:15:00	73.7	41.9	57.0	44.1	54.9
56	05/08/2020 00:31	0:15:00	77.0	41.5	57.7	44.3	55.5
57	05/08/2020 00:46	0:15:00	80.3	42.2	56.2	44.6	55.5
58	05/08/2020 01:01	0:15:00	80.9	41.8	59.3	44.2	58.3
59	05/08/2020 01:16	0:15:00	82.1	42.3	64.1	44.1	62.8
60	05/08/2020 01:31	0:15:00	76.8	41.1	56.7	42.8	55.2
61	05/08/2020 01:46	0:15:00	78.5	40.5	59.5	42.3	57.0
62	05/08/2020 02:01	0:15:00	77.0	40.3	53.8	41.5	52.4
63	05/08/2020 02:16	0:15:00	81.0	40.4	55.2	41.9	58.1
64	05/08/2020 02:31	0:15:00	72.1	40.4	51.3	41.7	49.7
65	05/08/2020 02:46	0:15:00	86.1	40.6	53.4	41.6	59.9
66	05/08/2020 03:01	0:15:00	77.8	40.6	54.7	41.6	53.0
67	05/08/2020 03:16	0:15:00	75.6	41.2	57.6	44.1	54.1
68	05/08/2020 03:31	0:15:00	64.8	40.6	52.0	41.6	47.9
69	05/08/2020 03:46	0:15:00	68.4	40.5	50.1	41.7	47.0
70	05/08/2020 04:01	0:15:00	71.2	40.5	51.7	41.6	50.0
71	05/08/2020 04:16	0:15:00	73.2	40.5	52.4	41.7	51.4
72	05/08/2020 04:31	0:15:00	75.6	40.7	52.2	41.9	51.8
73	05/08/2020 04:46	0:15:00	64.8	40.8	51.9	42.2	48.5
74	05/08/2020 05:01	0:15:00	78.7	41.3	55.3	42.7	53.2
75	05/08/2020 05:16	0:15:00	73.7	41.5	56.2	43.2	52.7
76	05/08/2020 05:31	0:15:00	64.5	41.1	53.7	42.6	50.3
77	05/08/2020 05:46	0:15:00	70.6	41.4	56.2	43.1	52.2
78	05/08/2020 06:01	0:15:00	76.0	43.5	62.5	46.0	58.1
79	05/08/2020 06:16	0:15:00	74.5	43.4	61.4	46.8	57.8
80	05/08/2020 06:31	0:15:00	76.7	43.6	58.2	47.2	56.6
81	05/08/2020 06:46	0:15:00	82.4	44.8	59.3	47.8	58.4
82	05/08/2020 07:01	0:15:00	73.2	44.7	58.2	47.6	56.2
83	05/08/2020 07:16	0:15:00	82.1	44.5	60.6	48.7	59.5
84	05/08/2020 07:31	0:15:00	76.6	43.3	58.3	48.3	56.8
85	05/08/2020 07:46	0:15:00	79.4	46.2	62.8	51.8	60.2
86	05/08/2020 08:01	0:15:00	82.9	50.4	70.3	55.3	68.1
87	05/08/2020 08:16	0:15:00	88.1	45.9	66.0	51.9	62.8
88	05/08/2020 08:31	0:15:00	82.3	47.5	62.7	52.0	59.8
89	05/08/2020 08:46	0:15:00	78.5	49.7	71.1	54.7	66.7
90	05/08/2020 09:01	0:15:00	75.0	48.2	67.4	52.8	63.4
91	05/08/2020 09:16	0:15:00	82.5	49.6	67.3	53.3	63.4
92	05/08/2020 09:31	0:15:00	78.4	46.1	65.9	50.4	62.3
93	05/08/2020 09:46	0:15:00	72.4	47.3	61.4	51.0	58.7
94	05/08/2020 10:01	0:15:00	95.5	29.4	77.2	51.9	74.6
95	05/08/2020 10:16	0:15:00	89.2	39.9	69.5	46.3	69.2
96	05/08/2020 10:31	0:15:00	57.6	44.7	47.8	45.9	46.9
97	05/08/2020 10:46	0:15:00	63.3	44.2	46.9	45.3	46.2
98	05/08/2020 11:01	0:15:00	59.3	44.4	50.5	46.1	48.8


LAeq/ LA90 vs. Time
90
80
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 99
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. $LA_{10,}$