33 EARLHAM STREET
LONDON
WC2H 9LS

24 HOUR ENVIRONMENTAL NOISE ASSESSMENT

Our Ref: CPT/200521/001

Written By:

Cliff Tucker AMIOA

Date: 20th May 2021

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 33 Earlham Street, London WC2H 9LS.

2.2 A minimum background noise level of 42 (42.4) 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 within a roof top plantroom with air inlet and discharge via acoustic louvres with a minimum transmission loss as follows:

Octave Band Mid Frequency Hz							
63	**125**	**250**	**500**	**1K**	**2K**	**4K**	**8K**
6	7	10	13	17	19	13	11

2.6 The calculated resultant noise level at the Assessment Position with the unit operating at full duty is 30 dB LAeq.

2.7 This is 2 dB-A below the maximum permissable Rating Level and the Local Authority's requirements in regard to noise will therefore be met.

3.0 Location

3.1 33 Earlham Street is a five storey (inc. basement) mixed use property in a street of similar properties within the London Borough of Camden.

3.2 The building bounded by 10 Shorts Gardens to the North; 35 Earlham street to the East; Earlham Street with Cambridge Theatre beyond to the South; and 31 Earlham Street to the west with Seven Dials beyond.

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 10.25 on the 11th May 2021 through until 9.25 on the 12th May 2021.

5.2 The weather throughout the survey period was overcast, an occasional light breeze, and light 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 at roof top level adjacent to the ightwell at the Western end of the property.

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 within the lightwell, a distance of not less than 8 m from the air inlet & discharge paths.

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 L_{A90} level measured was 42.4 dB L_{A90} at 04.55 on the 12th May 2021.

7.4 The maximum permissable Rating Level is therefore set at 32 dB $L_{Aeq,\ 15\ mins}$.

8.0 Analysis

8.1 Proposed Plant & Location

The proposed items of plant are:

- 1 no. Daikin RXYSCQ5-TV1 Air cooled condenser.

The plant is to be installed at rooftop level within an existng plant room.

The Assessment Position is taken to be the top floor windows within the lightwell, a distance of not less than 8 m from the air inlet & discharge paths.

Air inlet & discharge is to be via acoustic louvres with the following minimum transmission loss.

	Octave Band Mid Frequency Hz						
63	**125**	**250**	**500**	**1K**	**2K**	**4K**	**8K**
6	7	10	13	17	19	13	11

These values can typically be achieved using 300 mm acoustic louvres.

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

The manufacturers published Sound Power Level for the unit under full load is as follows:

		Octave Band Mid Frequency Hz						
	63	**125**	**250**	**500**	**1K**	**2K**	**4K**	**8K**
RXYSCQ5	-	70	71	68	65	56	50	45

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**
RXYSCQ5	-	70	71	68	65	56	50	45
Duct Loss		0	0	0	0	0	0	0

	Octave Band Mid Frequency Hz							
	63	**125**	**250**	**500**	**1K**	**2K**	**4K**	**8K**
Bend Loss	-	0	0	0	0	0	0	0
End Ref	-	0	0	0	0	0	0	0
Trans Loss	6	7	10	13	17	19	13	11
Dist. Loss	-	26	26	26	26	26	26	26
Lp Ass	-	37	35	29	22	11	11	8
A weight	26	16	9	3	0	-1	-1	1
Lp-A Ass	-	21	26	26	22	12	12	7

This is equivalent to 30 dB-A.

This is 2 dB-A below the maximum permissable 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 unit should be resiliently mounted such that a vibration isolation efficiency of not less than 95% is achieved at full duty in order to prevent the transfer of vibration or structure borne noise.

Additionally the gas and liquid lines should be fixed on the outside of the insulation.

9.0 Conclusion

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

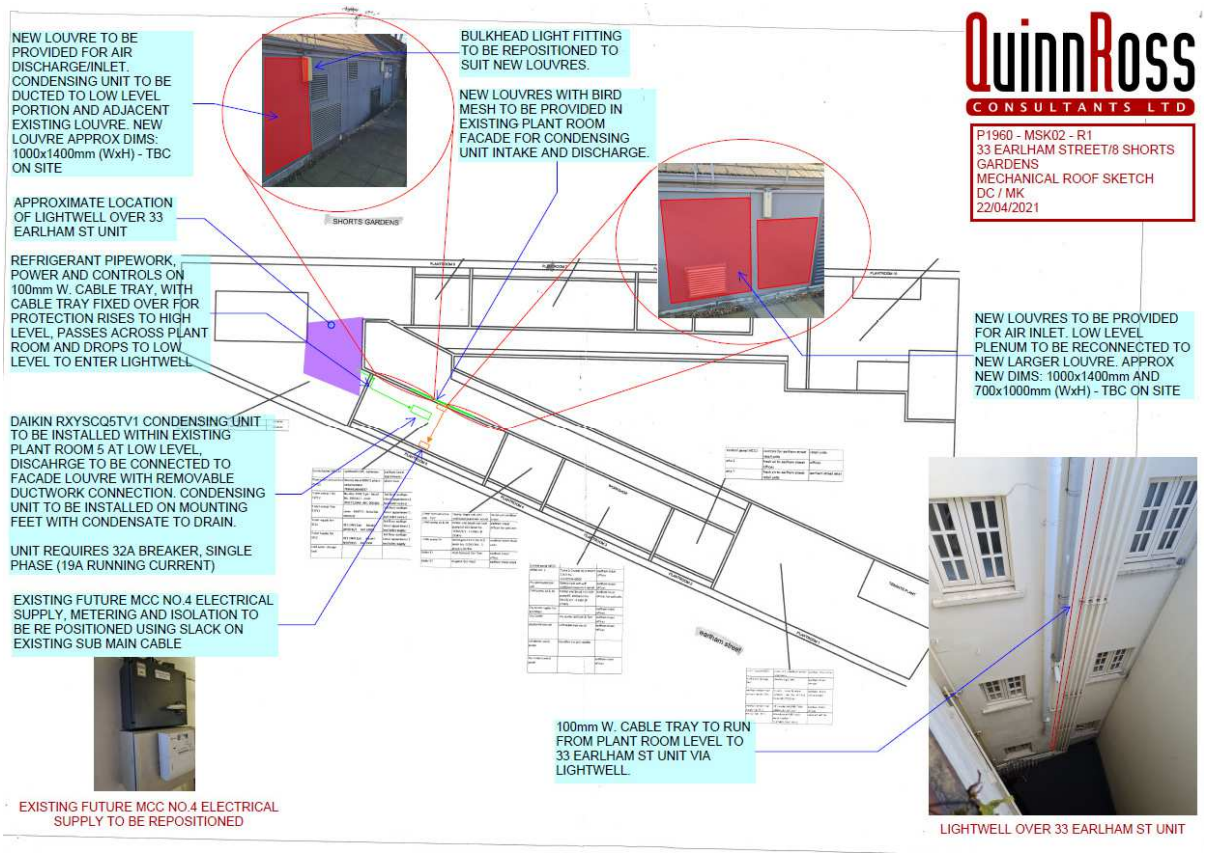
Assuming this is achieved as outlined above then the Local Authority's requirements in terms of noise will be met.

Report ends

Cliff Tucker AMIOA
Eurovib (Acoustic Products) Ltd

APPENDIX A – Positions, Distances, & Locations

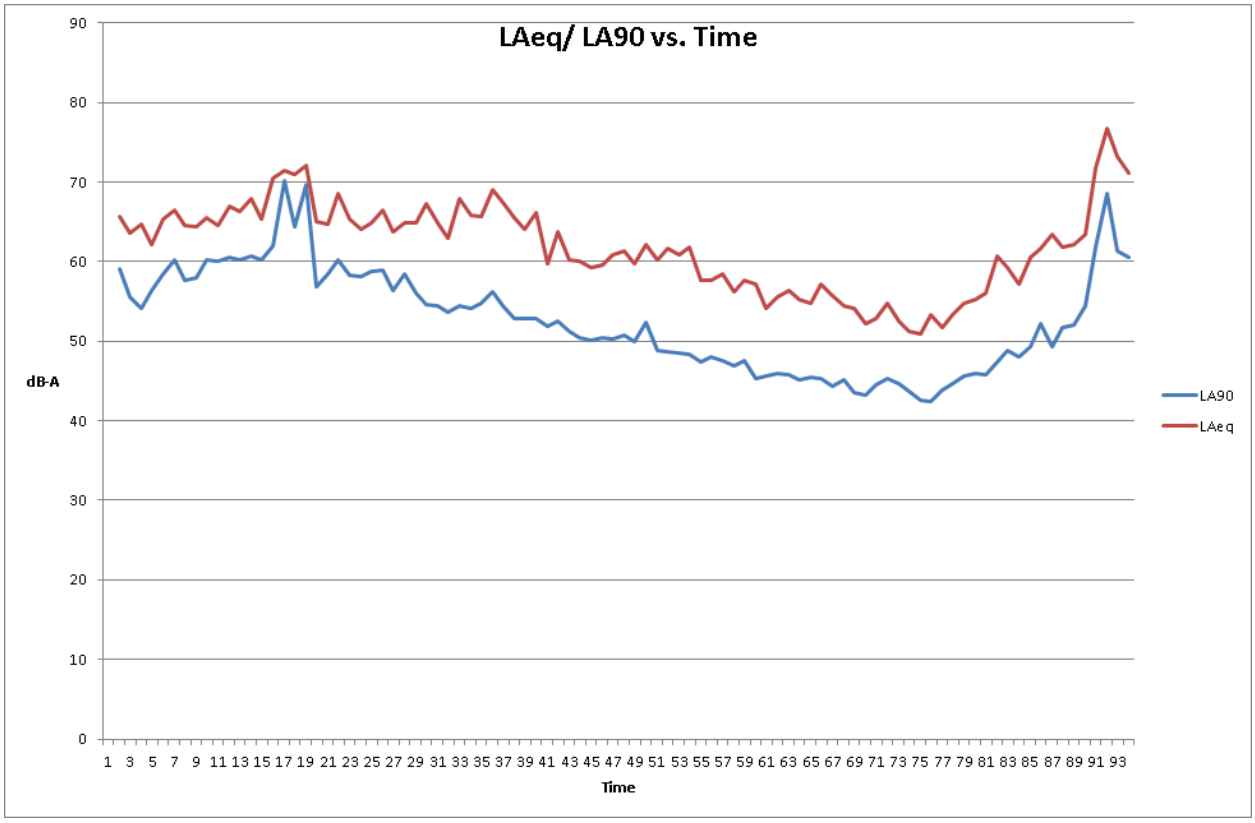

33 Earlham Street
Shorts Gardens
MEASUREMENT POSITION
ASSESSMENT POSITION
33 Earlham St
Earlham St


NEW LOUVRE TO BE PROVIDED FOR AIR DISCHARGE/INLET. CONDENSING UNIT TO BE DUCTED TO LOW LEVEL PORTION AND ADJACENT EXISTING LOUVRE. NEW LOUVRE APPROX DIMS: 1000x1400mm (WxH) - TBC ON SITE
BULKHEAD LIGHT FITTING TO BE REPOSITIONED TO SUIT NEW LOUVRES.
NEW LOUVRES WITH BIRD MESH TO BE PROVIDED IN EXISTING PLANT ROOM FACADE FOR CONDENSING UNIT INTAKE AND DISCHARGE.
APPROXIMATE LOCATION OF LIGHTWELL OVER 33 EARLHAM ST UNIT
REFRIGERANT PIPEWORK, POWER AND CONTROLS ON 100mm W. CABLE TRAY, WITH CABLE TRAY FIXED OVER FOR PROTECTION RISES TO HIGH LEVEL, PASSES ACROSS PLANT ROOM AND DROPS TO LOW LEVEL TO ENTER LIGHTWELL
DAIKIN RXYSCQ5TV1 CONDENSING UNIT TO BE INSTALLED WITHIN EXISTING PLANT ROOM 5 AT LOW LEVEL, DISCAHRGE TO BE CONNECTED TO FACADE LOUVRE WITH REMOVABLE DUCTWORK CONNECTION. CONDENSING UNIT TO BE INSTALLED ON MOUNTING FEET WITH CONDENSATE TO DRAIN.
UNIT REQUIRES 32A BREAKER, SINGLE PHASE (19A RUNNING CURRENT)
EXISTING FUTURE MCC NO.4 ELECTRICAL SUPPLY, METERING AND ISOLATION TO BE RE POSITIONED USING SLACK ON EXISTING SUB MAIN CABLE
EXISTING FUTURE MCC NO.4 ELECTRICAL SUPPLY TO BE REPOSITIONED
SHORTS GARDENS
earlham street
QuinnRoss
CONSULTANTS LTD
P1960 - MSK02 - R1
33 EARLHAM STREET/8 SHORTS GARDENS
MECHANICAL ROOF SKETCH
DC / MK
22/04/2021
NEW LOUVRES TO BE PROVIDED FOR AIR INLET. LOW LEVEL PLENUM TO BE RECONNECTED TO NEW LARGER LOUVRE. APPROX NEW DIMS: 1000x1400mm AND 700x1000mm (WxH) - TBC ON SITE
100mm W. CABLE TRAY TO RUN FROM PLANT ROOM LEVEL TO 33 EARLHAM ST UNIT VIA LIGHTWELL.
LIGHTWELL OVER 33 EARLHAM ST UNIT

Appendix B – Full Measured Levels

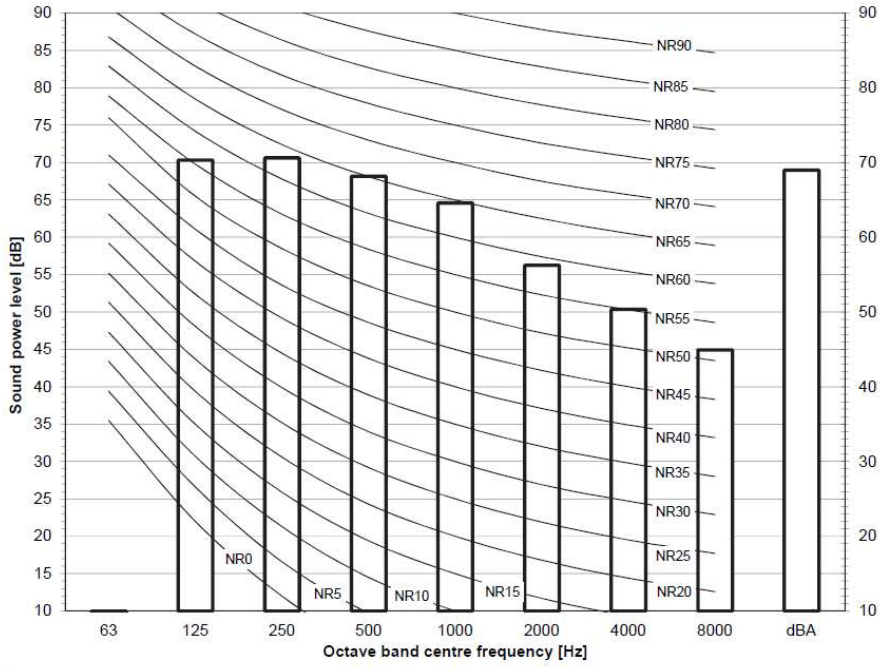
Ref	Time	Measurment Time	LAmax	LAmin	LA10	LA90	LAeq
1	11/05/2021 10:25	0:15:00	86.8	47.5	68.1	59.1	65.6
2	11/05/2021 10:40	0:15:00	81.6	50.7	66.8	55.6	63.6
3	11/05/2021 10:55	0:15:00	81.5	50.2	67.8	54.2	64.7
4	11/05/2021 11:10	0:15:00	78.9	49.5	65.0	56.3	62.1
5	11/05/2021 11:25	0:15:00	84.6	54.9	67.6	58.4	65.3
6	11/05/2021 11:40	0:15:00	82.7	57.0	68.6	60.2	66.4
7	11/05/2021 11:55	0:15:00	81.6	55.1	67.2	57.7	64.5
8	11/05/2021 12:10	0:15:00	82.9	55.1	66.5	57.9	64.4
9	11/05/2021 12:25	0:15:00	82.6	57.9	68.0	60.3	65.5
10	11/05/2021 12:40	0:15:00	78.5	56.9	67.5	60.1	64.6
11	11/05/2021 12:55	0:15:00	84.6	56.8	69.4	60.5	66.9
12	11/05/2021 13:10	0:15:00	85.2	56.8	68.9	60.3	66.3
13	11/05/2021 13:25	0:15:00	86.4	57.7	69.4	60.7	67.9
14	11/05/2021 13:40	0:15:00	82.2	58.6	67.5	60.3	65.4
15	11/05/2021 13:55	0:15:00	82.6	58.4	72.9	62.0	70.5
16	11/05/2021 14:10	0:15:00	77.1	55.4	73.0	70.1	71.5
17	11/05/2021 14:25	0:15:00	77.3	55.7	72.8	64.4	71.0
18	11/05/2021 14:40	0:15:00	91.4	56.6	72.7	69.7	72.1
19	11/05/2021 14:55	0:15:00	78.6	52.4	68.4	56.8	65.1
20	11/05/2021 15:10	0:15:00	82.0	54.7	67.9	58.4	64.7
21	11/05/2021 15:25	0:15:00	89.1	56.6	70.0	60.2	68.6
22	11/05/2021 15:40	0:15:00	77.2	55.6	68.9	58.3	65.3
23	11/05/2021 15:55	0:15:00	78.4	55.8	66.6	58.2	64.1
24	11/05/2021 16:10	0:15:00	82.6	55.9	68.1	58.8	64.9
25	11/05/2021 16:25	0:15:00	81.0	54.1	69.6	59.0	66.5
26	11/05/2021 16:40	0:15:00	85.5	52.8	66.2	56.3	63.8
27	11/05/2021 16:55	0:15:00	82.3	54.4	67.5	58.4	64.8
28	11/05/2021 17:10	0:15:00	83.2	51.8	67.8	56.1	64.9
29	11/05/2021 17:25	0:15:00	88.5	51.0	70.2	54.6	67.3
30	11/05/2021 17:40	0:15:00	85.9	49.8	67.4	54.4	64.8
31	11/05/2021 17:55	0:15:00	81.8	50.5	66.3	53.7	62.9
32	11/05/2021 18:10	0:15:00	84.7	50.0	71.1	54.5	67.9
33	11/05/2021 18:25	0:15:00	85.4	49.5	68.3	54.2	65.9
34	11/05/2021 18:40	0:15:00	83.6	50.8	68.1	54.7	65.6
35	11/05/2021 18:55	0:15:00	86.6	50.9	72.6	56.2	69.1
36	11/05/2021 19:10	0:15:00	86.7	48.8	69.7	54.5	67.5
37	11/05/2021 19:25	0:15:00	84.1	48.2	68.7	52.9	65.5
38	11/05/2021 19:40	0:15:00	80.3	48.8	67.1	52.8	64.1
39	11/05/2021 19:55	0:15:00	86.9	50.0	66.6	52.8	66.1
40	11/05/2021 20:10	0:15:00	75.0	49.5	63.8	51.9	59.8
41	11/05/2021 20:25	0:15:00	84.2	49.1	66.5	52.5	63.8
42	11/05/2021 20:40	0:15:00	76.1	48.8	64.1	51.2	60.3
43	11/05/2021 20:55	0:15:00	74.6	48.0	64.1	50.4	60.1
44	11/05/2021 21:10	0:15:00	76.7	48.0	63.6	50.1	59.3
45	11/05/2021 21:25	0:15:00	75.0	48.0	63.5	50.4	59.6
46	11/05/2021 21:40	0:15:00	78.4	47.0	64.4	50.2	60.9
47	11/05/2021 21:55	0:15:00	79.6	47.3	65.1	50.7	61.3

Ref	Time	Measurment Time	LAmax	LAmin	LA10	LA90	LAeq
48	11/05/2021 22:10	0:15:00	76.8	47.6	63.8	49.9	59.8
49	11/05/2021 22:25	0:15:00	82.9	47.3	65.6	52.3	62.1
50	11/05/2021 22:40	0:15:00	75.5	46.2	65.0	48.9	60.2
51	11/05/2021 22:55	0:15:00	84.7	45.5	64.1	48.7	61.7
52	11/05/2021 23:10	0:15:00	75.1	44.8	65.3	48.5	60.8
53	11/05/2021 23:25	0:15:00	84.8	44.8	64.7	48.4	61.9
54	11/05/2021 23:40	0:15:00	81.1	43.4	62.4	47.4	57.7
55	11/05/2021 23:55	0:15:00	81.5	44.2	62.1	48.0	57.7
56	12/05/2021 00:10	0:15:00	75.1	44.8	63.2	47.6	58.5
57	12/05/2021 00:25	0:15:00	72.0	43.3	60.1	46.9	56.2
58	12/05/2021 00:40	0:15:00	71.4	43.4	62.3	47.5	57.6
59	12/05/2021 00:55	0:15:00	72.7	42.5	61.3	45.3	57.1
60	12/05/2021 01:10	0:15:00	68.2	42.6	57.2	45.6	54.2
61	12/05/2021 01:25	0:15:00	74.3	42.9	58.9	45.9	55.6
62	12/05/2021 01:40	0:15:00	71.1	42.9	60.3	45.8	56.3
63	12/05/2021 01:55	0:15:00	73.5	42.5	58.3	45.2	55.3
64	12/05/2021 02:10	0:15:00	69.8	42.9	58.5	45.5	54.7
65	12/05/2021 02:25	0:15:00	77.5	41.8	59.8	45.3	57.2
66	12/05/2021 02:40	0:15:00	72.1	41.8	59.0	44.4	55.7
67	12/05/2021 02:55	0:15:00	69.9	41.7	57.9	45.1	54.4
68	12/05/2021 03:10	0:15:00	70.3	41.6	55.8	43.5	54.1
69	12/05/2021 03:25	0:15:00	72.8	41.3	54.2	43.3	52.2
70	12/05/2021 03:40	0:15:00	70.9	41.4	55.4	44.5	52.9
71	12/05/2021 03:55	0:15:00	75.8	42.3	54.9	45.3	54.7
72	12/05/2021 04:10	0:15:00	68.9	41.8	54.7	44.7	52.6
73	12/05/2021 04:25	0:15:00	72.8	41.4	52.4	43.7	51.3
74	12/05/2021 04:40	0:15:00	70.0	40.2	52.8	42.6	51.0
75	12/05/2021 04:55	0:15:00	72.6	40.4	54.0	42.4	53.4
76	12/05/2021 05:10	0:15:00	70.3	41.0	53.9	43.9	51.8
77	12/05/2021 05:25	0:15:00	70.4	42.3	56.6	44.6	53.3
78	12/05/2021 05:40	0:15:00	70.7	42.4	56.2	45.6	54.7
79	12/05/2021 05:55	0:15:00	73.8	42.9	58.6	45.9	55.3
80	12/05/2021 06:10	0:15:00	78.4	43.4	57.6	45.8	56.0
81	12/05/2021 06:25	0:15:00	87.1	44.4	61.3	47.4	60.7
82	12/05/2021 06:40	0:15:00	75.3	44.1	62.9	48.8	59.2
83	12/05/2021 06:55	0:15:00	75.7	44.5	59.6	48.0	57.2
84	12/05/2021 07:10	0:15:00	82.0	46.4	64.4	49.3	60.5
85	12/05/2021 07:25	0:15:00	76.0	47.0	65.0	52.2	61.6
86	12/05/2021 07:40	0:15:00	85.9	45.5	65.3	49.3	63.5
87	12/05/2021 07:55	0:15:00	77.9	46.5	65.7	51.8	61.8
88	12/05/2021 08:10	0:15:00	75.2	47.4	66.2	52.0	62.2
89	12/05/2021 08:25	0:15:00	81.0	50.4	66.9	54.5	63.5
90	12/05/2021 08:40	0:15:00	85.3	57.5	73.6	61.9	71.7
91	12/05/2021 08:55	0:15:00	86.2	62.4	81.9	68.5	76.8
92	12/05/2021 09:10	0:15:00	86.2	53.3	78.2	61.4	73.2
93	12/05/2021 09:25	0:14:57	85.8	45.8	74.9	60.5	71.1


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
Time
LA90
LAeq

Appendix C – Equipment Data

RXYSCQ5TV1



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

3D098239

Appendix D – 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. $LA_{10,}$