SANDY BROWN

Consultants in Acoustics, Noise & Vibration

024455-R02-A

11 September 2024

RCSSD PTEQ

Environmental noise survey and impact assessment

London, Manchester, Edinburgh, Birmingham, Belfast, Leeds, Bristol

post@sandybrown.com
www.sandybrown.com

Sandy Brown Ltd
Registered in England & Wales No. 13227735

Registered Office: 55 Charterhouse Street, London EC1M 6HA

Version	Date	Comments	Author	Reviewer
A	11 Sept 24		BR	EF

Summary

Sandy Brown have been commissioned to provide acoustic advice in relation to proposed plant at Royal Central School of Speech and Drama PTEQ located at Eton Avenue, London, NW3 3HY.

An environmental noise survey has been carried out to determine the existing sound levels in the area. The noise survey was performed between 11:15 on 15 August 2024 and 15:15 on 21 August 2024.

The minimum background sound levels from the noise survey were:

Location A $L_{A90,15min}$ 56 dB during the day and $L_{A90,15min}$ 48 dB at night

Location B $L_{A90,15min}$ 43 dB during the day and $L_{A90,15min}$ 38 dB at night

Based on the requirements of Camden Council and on the results of the noise survey, all plant must be designed such that the cumulative noise level at 1 m from the worst affected windows of the nearby noise sensitive premises does not exceed:

100 Avenue Road	Day: L_{Aeq} 46 dB	Night: L_{Aeq} 38 dB
1 Adamson Road	Day: L_{Aeq} 33 dB	Night: L_{Aeq} 28 dB

These limits are cumulative and apply with all plant operating under normal conditions.

The proposed plant consists of new roof level building services equipment items that would run during office hours and support the air conditioning system. It is assumed that plant runs until 23:00 at the latest as discussed.

An initial assessment of the proposed plant items has been carried out. The proposed plant items are expected to comply with the relevant noise limits without attenuation.

Contents

1 Introduction

Sandy Brown has been commissioned to provide acoustic advice in relation to proposed plant at Royal Central School of Speech and Drama (RCSSD) PTEQ located at Eton Avenue, London, NW3 3HY.

As part of this, an environmental noise survey is required, the purpose of which is to establish the existing background sound levels in the vicinity of nearby noise sensitive premises and to set appropriate limits for noise egress from building services plant.

This report presents the survey method and results, and a discussion of acceptable limits for noise emissions from building services plant.

The report also includes an assessment of the currently proposed plant items against the noise limits.

2 Site description

2.1 The site and its surrounding

The site location in relation to its surroundings is shown in Figure 1.

Figure 1 Aerial view of site (courtesy of Google Earth Pro)

The site location is highlighted in green, with the proposed plant location shown blue. The unattended noise measurement locations ('A' and 'B') and nearest receptors (orange) are also indicated.

The site is bounded by College Crescent to the west, Eton Avenue to the south and Adamson Road to the east.

The site lies within the jurisdiction of The London Borough of Camden.

2.2 Adjacent premises

The adjacent premises to the site are as follows:

- 100 Avenue Road, a residential building in development, approximately 22 m to the south
- 1 Adamson Road, a residential building approximately 90 meters to the east
- Hampstead Theatre, approximately 34 m to the south
- Northway's Parade, a mixed-use building, is approximately 45 m to the northwest

The Camden Local Plan 2017 defines noise sensitive developments as housing, schools and hospitals as well as offices, workshops and open spaces. For the purposes of the assessment, the nearest sensitive receptor is 100 Avenue Road. A secondary assessment has been undertaken for 1 Adamson Road, as background noise levels near this location were noted to significantly differ from the levels at 100 Avenue Road.

Both 100 Avenue Road and 1 Adamson Road are outlined in red in Figure 1.

3 Development proposal

The development proposes a 2-storey modular installation on the southwest corner of RCSSD. It will house rehearsal and recording space for the school. Three new plant units will be installed on the first floor balcony of the new development.

4 Building services noise egress criteria

4.1 Standard guidance

BS 4142:2014:+A1:2019 *Methods for rating and assessing industrial and commercial sound* (BS 4142) provides a method for assessing noise from items such as building services plant against the existing background sound levels at nearby noise sensitive premises.

BS 4142 suggests that if the noise level is 10 dB or more higher than the existing background sound level, it is likely to be an indication of a significant adverse impact. If the level is 5 dB above the existing background sound level, it is likely to be an indication of an adverse impact. If the level does not exceed the background sound level, it is an indication of having a low impact.

If the noise contains 'attention catching features' such as tones, bangs etc. a penalty, based on the type and impact of those features, is applied. This is discussed in Appendix C.

4.2 Local Authority criteria

The Camden Local Plan 2017 employs the idea of "effect levels" as described in the National Planning Policy Framework and Planning Practice Guidance. The effect levels are: No Observed Effect Level (NOEL), Lowest Observed Adverse Effect Level (LOAEL), and Significant Observed Adverse Effect Level (SOAEL). There are numerical values assigned to each effect level.

The Camden Local Plan 2017 suggest that noise from industrial and commercial sources should be designed to be 10 dB below the background noise level (15 dB below if tonal components are present).

Camden's Local Area Requirements for Planning Applications 2018 requires a noise assessment and report when plant, ventilation, air extraction, or conditions equipment and flues are proposed.

It is understood that Camden consider both commercial and residential buildings to be noise sensitive.

5 Noise survey method

The survey included unattended and attended noise measurements.

5.1 Unattended measurements

Unattended noise monitoring was undertaken at the site over 6 days.

Details of the equipment used and the noise indices measured are provided in Appendix A.

The unattended measurements were taken over 15-minute periods between 11:15 on 15 August 2024 and 15:15 on 21 August 2024. The chosen time period aligns with BS 4142:2014.

The survey included one measurement position within the bin store area on the west end of the premises, and one position on the Level 3 balcony of the east wing. These locations are indicated in Figure 1, denoted by the letters 'A' and 'B'. Photographs showing the measurement locations are provided in Figure 2. Position 'A' is considered to be a 'free field' position, while Position 'B' is considered to be a 'facade' position.

This location was chosen to be reasonably representative of noise levels at the site and outside the nearest noise sensitive premises.

Figure 2 Photograph of unattended noise monitoring equipment at Locations 'A' and 'B' (left and right respectively)

5.2 Attended measurements

Attended sample measurements were taken at 5 locations around PTEQ. These are indicated in Figure 1 as positions 1 to 5. The measurements were carried out on 18 June 2024 between 13:00 and 14:45. All measurements were 15 minutes in duration.

At each of the positions, the microphone was mounted on a tripod approximately 1.5 m above the ground level and at least 1.5 m from any other reflective surface. Photos of each of the attended measurement positions are shown in Figure 3 to Figure 7.

Details of the equipment used and the noise indices measured are provided in Appendix A.

Dominant noise sources occurring during the measurements were noted.

Figure 3 Attended measurement position 1

Figure 4 Attended measurement position 2

Figure 5 Attended measurement position 3

Figure 6 Attended measurement position 4

Figure 7 Attended measurement position 5

5.3 Weather conditions

Weather conditions during the survey are described in Appendix A.

6 Noise survey results

6.1 Observations

The dominant noise source observed at the site during the survey was from:

- Vehicle traffic on the surrounding roads
- Building works at PTEQ including drilling and sanding

Less dominant noise sources that were observed included:

- Pedestrians in the surrounding area including a farmers' market which occurs on Wednesdays from 10am-3pm
- Trees rustling in the wind.

6.2 Noise measurement results

6.2.1 Unattended measurement results

Graphs showing the results of the unattended measurements for positions 'A' and 'B' are provided in Appendix B.

6.2.2 Position 'A'

Ambient noise levels measured during the unattended survey at position 'A' are presented in Table 1.

Measured minimum background sound levels and maximum sound levels are given in Table 2 and Table 3 respectively.

The noise monitoring equipment was positioned approximately 4 m above ground level and at least 3.5 m from any vertical reflective surfaces (eg, building facades). As such, these measurements are considered to have been taken in 'free field' conditions.

Table 1 Ambient noise levels measured during the unattended survey at position 'A'

Date	Day (07:00 – 23:00) $L_{Aeq,16h}$ (dB)	Night (23:00 – 07:00) $L_{Aeq,8h}$ (dB)
Thursday 15 August 2024	-	65
Friday 16 August 2024	68	69
Saturday 17 August 2024	69	64
Sunday 18 August 2024	66	64
Monday 19 August 2024	67	64
Tuesday 20 August 2024	68	65
Average	68	65

Table 2 Minimum background sound levels measured during the unattended survey at position 'A'

Date	Day (07:00 – 23:00) $L_{A90,15min}$ (dB)	Night (23:00 – 07:00) $L_{A90,15min}$ (dB)
Thursday 15 August 2024	60 [1]	52
Friday 16 August 2024	60	51
Saturday 17 August 2024	57	48

Sunday 18 August 2024	56	49
Monday 19 August 2024	58	51
Tuesday 20 August 2024	59	49
Wednesday 21 August 2024	62 [1]	-

[1] Measurement not made over full period due to monitoring start and end time.

The lowest background sound levels measured during the survey were $L_{A90,15min}$ 56 dB during the day and $L_{A90,15min}$ 48 dB at night.

Table 3 Sound levels exceeded 1% of the time measured during the attended survey at position 'A'

Date	Day (07:00 – 23:00) $L_{A1,16h}$ (dB)	Night (23:00 – 07:00) $L_{A1,8h}$ (dB)
Thursday 15 August 2024	88 [1]	81
Friday 16 August 2024	87	97
Saturday 17 August 2024	83	83
Sunday 18 August 2024	85	82
Monday 19 August 2024	82	78
Tuesday 20 August 2024	87	80
Wednesday 21 August 2024	81 [1]	

[1] Measurement not made over full period due to monitoring start and end time.

6.2.3 Position 'B'

Ambient noise levels measured during the unattended survey are presented in Table 4 Ambient noise levels measured during the unattended survey at position 'B' Table 4.

Measured minimum background sound levels and maximum sound levels are given in Table 5 and Table 6 respectively.

The noise monitoring equipment was positioned approximately 12 m above ground level and at least 1 m from any vertical reflective surfaces (eg, building facades). These measurements are considered to have been taken in 'facade' conditions.

Table 4 Ambient noise levels measured during the unattended survey at position 'B'

Date	Day (07:00 – 23:00) $L_{Aeq,16h}$ (dB)	Night (23:00 – 07:00) $L_{Aeq,8h}$ (dB)
Thursday 15 August 2024	-	53
Friday 16 August 2024	54	48
Saturday 17 August 2024	51	48
Sunday 18 August 2024	51	48
Monday 19 August 2024	55	50
Tuesday 20 August 2024	54	50
Average	53	50

Table 5 Minimum background sound levels measured during the unattended survey at position 'B'

Date	Day (07:00 – 23:00) $L_{A90,15min}$ (dB)	Night (23:00 – 07:00) $L_{A90,15min}$ (dB)
Thursday 15 August 2024	48 [1]	43
Friday 16 August 2024	47	40
Saturday 17 August 2024	45	42
Sunday 18 August 2024	43	38
Monday 19 August 2024	46	44
Tuesday 20 August 2024	48	41
Wednesday 21 August 2024	49 [1]	-

[1] Measurement not made over full period due to monitoring start and end time.

The lowest background noise levels measured during the survey were $L_{A90,15min}$ 43 dB during the day and $L_{A90,15min}$ 38 dB at night.

Table 6 Sound levels exceeded 1% of the time measured during the attended survey at position 'B'

Date	Day (07:00 – 23:00)	Night (23:00 – 07:00)
	$L_{A1,16h}$ (dB)	$L_{A1,8h}$ (dB)
Thursday 15 August 2024	67 [1]	64
Friday 16 August 2024	71	68
Saturday 17 August 2024	65	65
Sunday 18 August 2024	68	64
Monday 19 August 2024	80	64
Tuesday 20 August 2024	70	70
Wednesday 21 August 2024	74 [1]	-

[2] Measurement not made over full period due to monitoring start and end time.

6.2.4 Attended measurement results

Noise levels and key sources recorded during the attended measurements are summarised in Table 7. All positions were in the free field.

Table 7 Noise levels and key noise sources from attended measurements

Position	Start time	Sound pressure levels (dB)			Noise sources
		$L_{Aeq,15min}$	$L_{A1,15min}$	$L_{A90,15min}$	
1	13:00	61	71	56	Pedestrians, market stalls, trees rustling in wind, vehicles on surrounding roads
2	13:30	60	66	57	Workers sanding tables near location A5, pedestrians, market stalls, trees rustling in wind, vehicles on surrounding roads
3	13:45	67	76	62	Vehicles on adjacent road, market stalls, pedestrians, trees rustling in wind

4	14:15	60.6	69	55.4	Nearby group lunching, vehicles on surrounding roads, market
5	14:30	59.8	70.6	54.3	Vehicles on surrounding roads, market packing up

7 Plant noise assessment

7.1 Basic limits

Based on the above criteria and the measurement results, the cumulative noise level from the operation of all new plant should not exceed the limits set out in Table 8.

The limits apply at 1 m from the worst affected windows of the nearest noise sensitive premises and are presented as facade levels. The nearest noise sensitive receptor has been identified as the development at 100 Avenue Road, with an additional receptor identified at 1 Adamson Road. Both receptors are outlined red in Figure 1.

All building services plant will be designed to achieve the noise limits. The plant is not expected to operate with any tonal or attention catching characteristics and therefore a lower noise limit is not deemed necessary. It is understood that the plant will not be running between the hours of 23:00 and 07:00.

Table 8 Plant noise limits at 1 m from the nearest noise sensitive premises

Receptor	Maximum sound pressure level at 1 m from noise sensitive premises, $L_{Aeq,15min}$ (dB)	
	Day	Night
100 Avenue Road	46	38
1 Adamson Road	33	28

7.2 Proposed plant items

A drawing showing the locations of the proposed plant items is presented in Figure 8.

The plant is proposed to be surrounded by a 1 m high enclosing wall.

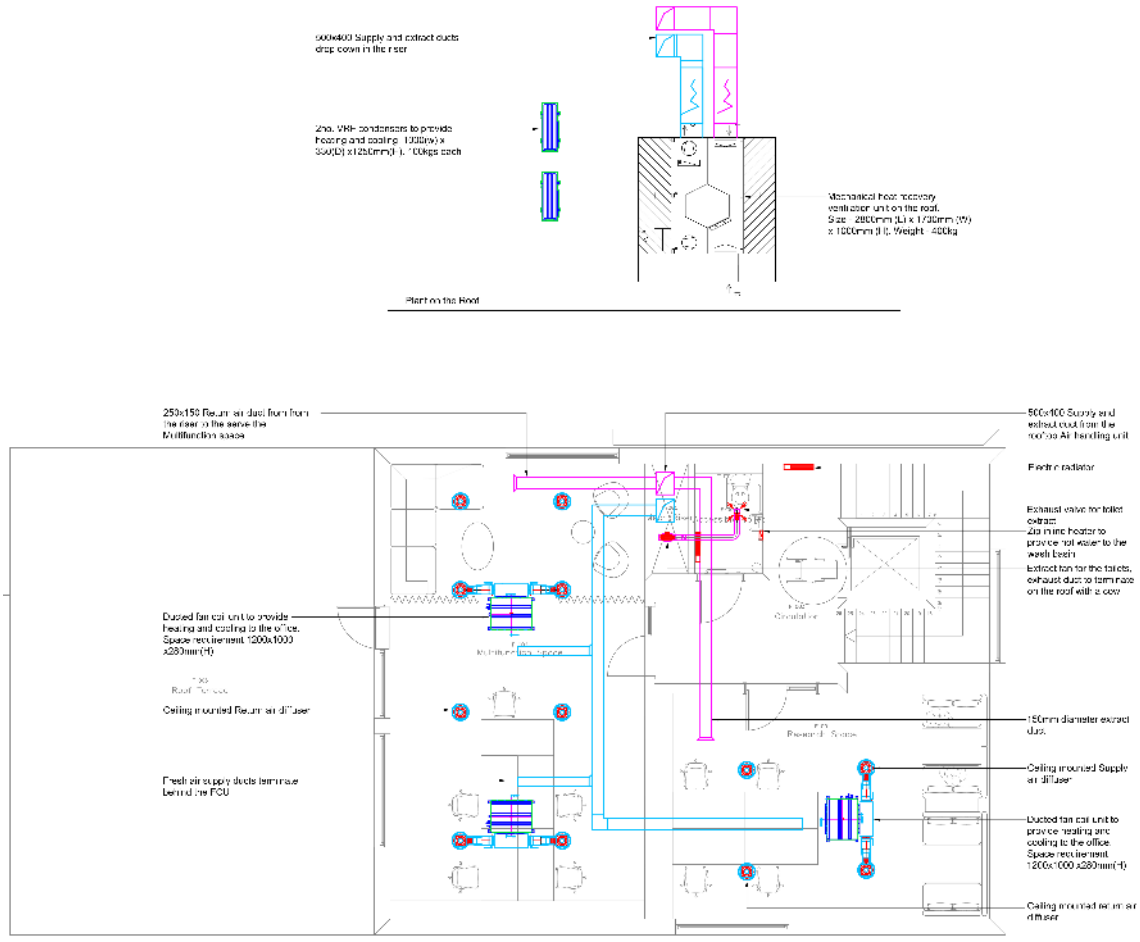


Figure 8 Scale drawings showing the location of the proposed roof plant

7.2.1 Normally operating plant

The proposed noise-generating plant items are:

- One Airflow Duplexvent 2500 Multi Eco-N air handling unit
- Two Samsung DVM S Eco Heat Recovery Mini VRF units
- S&P TD-1000/200 Silent Ecowatt In-Line Duct Fans

Sound power level data for the units has been provided by the mechanical engineers and is presented in Table 9.

Table 9 Sound power level data for each unit

Unit	Sound power level (dB) Octave band centre frequency (Hz)								
	63	125	250	500	1000	2000	4000	8000	dBA
Airflow Duplexvent 2500 Multi Eco-N AHU[1]	58	73	81	70	67	63	60	54	75
Samsung DVM Eco Heat Recovery Mini VRF	-	75	69	67	65	58	52	49	69
S&P TD-1000/200 Silent Ecowatt Duct Fan	52	56	62	57	55	48	37	32	59

[1] The fresh air intake and case radiated noise level are sufficiently below the exhaust and therefore only the exhaust has been assessed

7.3 Assessment

7.3.1 Normally operating plant

Based on the data provided, an assessment of the predicted sound pressure level at 100 Avenue Road and 1 Adamson Road has been carried out, taking into account:

- Sound power levels as per Table 9
- Appropriate distance attenuation to both receptors
- Path difference due to the building edge screening effect.

Based on this, the predicted sound pressure levels 1 m from the nearest facade of the receptors are presented in Table 10.

Table 10 Predicted sound pressure level at Location 'R'

Receptor	Predicted sound pressure level (dB)	Calculated criteria (dB)	
		Day	Night
100 Avenue Road	36	46	38
1 Adamson Road	26	33	28

The predicted noise level at both locations achieves the day and night period limit without attenuation. It is understood that the units will not be running during night hours (23:00-07:00).

8 Conclusion

The minimum background sound levels from the noise survey were:

Location A $L_{A90,15min}$ 56 dB during the day and $L_{A90,15min}$ 48 dB at night

Location B $L_{A90,15min}$ 43 dB during the day and $L_{A90,15min}$ 38 dB at night

Based on the requirements of the Local Authority, the relevant plant noise limits at the worst affected existing noise sensitive premises are:

100 Avenue Road L_{Aeq} 46 dB during the day and L_{Aeq} 38 dB at night

1 Adamson Road L_{Aeq} 33 dB during the day and L_{Aeq} 28 dB at night

These limits are cumulative and apply to all plant operating under normal conditions.

An initial assessment of the proposed plant items has been carried out. The proposed plant items are expected to comply with the relevant noise limits without attenuation.

Appendix A

Survey details

Equipment

The unattended noise measurements were each taken using two Rion NL-52 sound level meters and the attended noise measurements were taken using one Rion NL-52 sound level meter.

Calibration details for the equipment used during the survey are provided in Table A1.

Table A1 Equipment calibration data

Equipment description	Type/serial number	Manufacturer	Calibration expiry	Calibration certification number
Sound level meter	NL-52/00242702	Rion	27 Feb 25	TCRT23/1190
Microphone	UC-59/06185	Rion	27 Feb 25	TCRT23/1190
Pre-amp	NH-25/32730	Rion	27 Feb 25	TCRT23/1190
Calibrator	CAL200/4499	Larson Davis	24 Feb 25	TCRT23/1184
Sound level meter	NL-52/00264531	Rion	15 Dec 25	TCRT23/1926
Microphone	UC-59/09678	Rion	15 Dec 25	TCRT23/1926
Pre-amp	NH-25/64656	Rion	15 Dec 25	TCRT23/1926
Calibrator	NC-75/35013664	Rion	14 Dec 25	TCRT23/1925
Sound level meter	NL-52/00320633	Rion	13 Jun 26	TCRT24/1433
Microphone	UC-59/12576	Rion	13 Jun 26	TCRT24/1433
Pre-amp	NH-25/10641	Rion	13 Jun 26	TCRT24/1433
Calibrator	NC-74/34125430	Rion	13 Jun 26	TCRT24/1431

[1] Calibration of the meters used for the measurements is traceable to national standards. Calibration certificates for the sound level meter used in this survey are available upon request.

Calibration checks were carried out on the meters and their measurement chains at the beginning and end of the survey. No significant calibration deviation occurred.

Noise indices

Noise indices recorded included the following:

- $L_{Aeq,T}$ The A-weighted equivalent continuous sound pressure level over a period of time, T.
- $L_{AFmax,T}$ The A-weighted maximum sound pressure level that occurred during a given period, T, with a fast time weighting.
- $L_{A90,T}$ The A-weighted sound pressure level exceeded for 90% of the measurement period. Indicative of the background sound level.

Sound pressure level measurements are normally taken with an A-weighting (denoted by a subscript 'A', eg L_{A90}) to approximate the frequency response of the human ear.

A more detailed explanation of these quantities can be found in BS7445: Part 1: 2003 *Description and measurement of environmental noise, Part 1. Guide to quantities and procedures.*

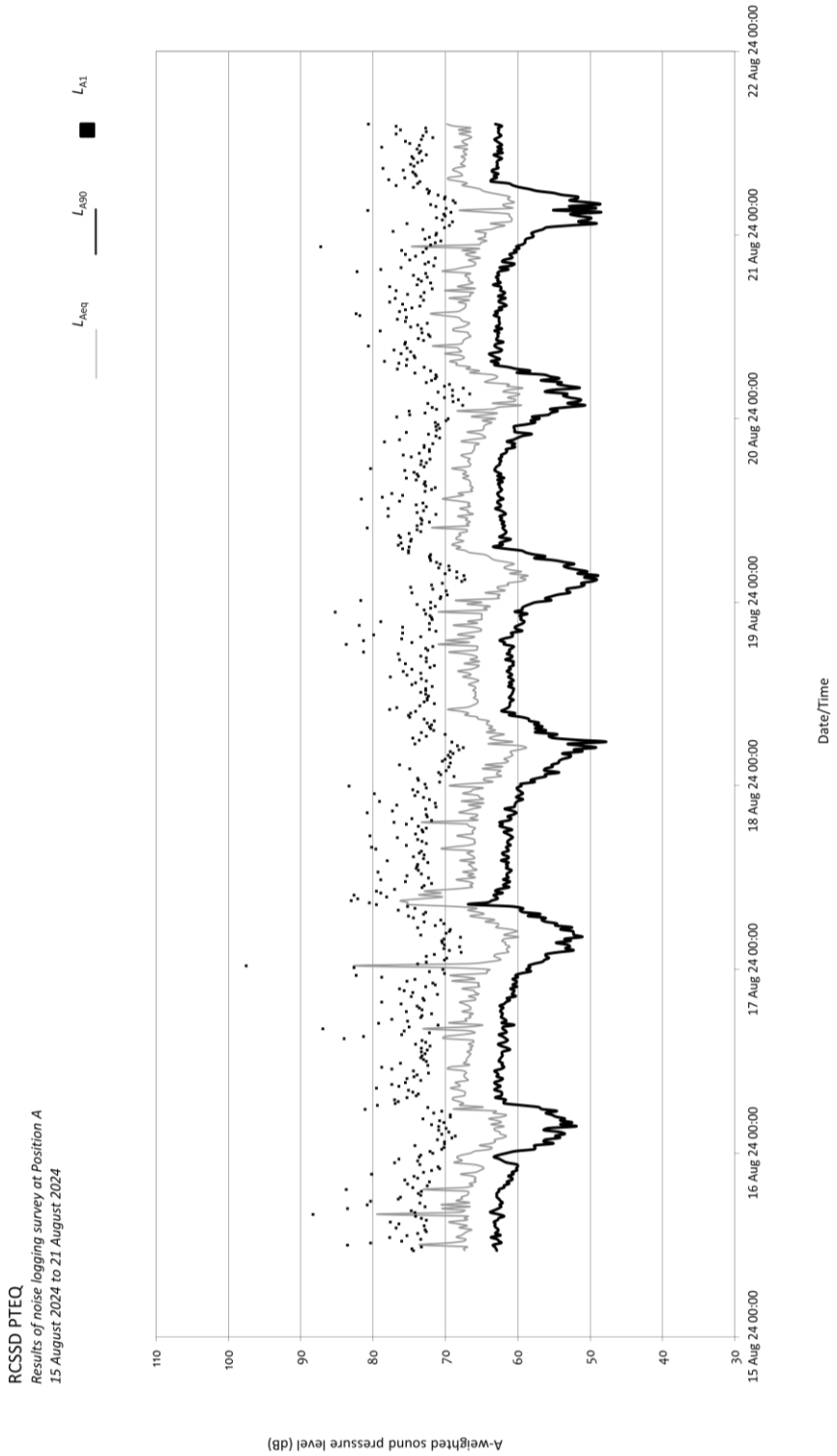
Weather conditions

During the unattended noise measurements, weather reports for the area indicated that temperatures varied between 13°C at night and 25°C during the day, and the wind speed was typically in the region of 8 m/s or less and dry with no precipitation.

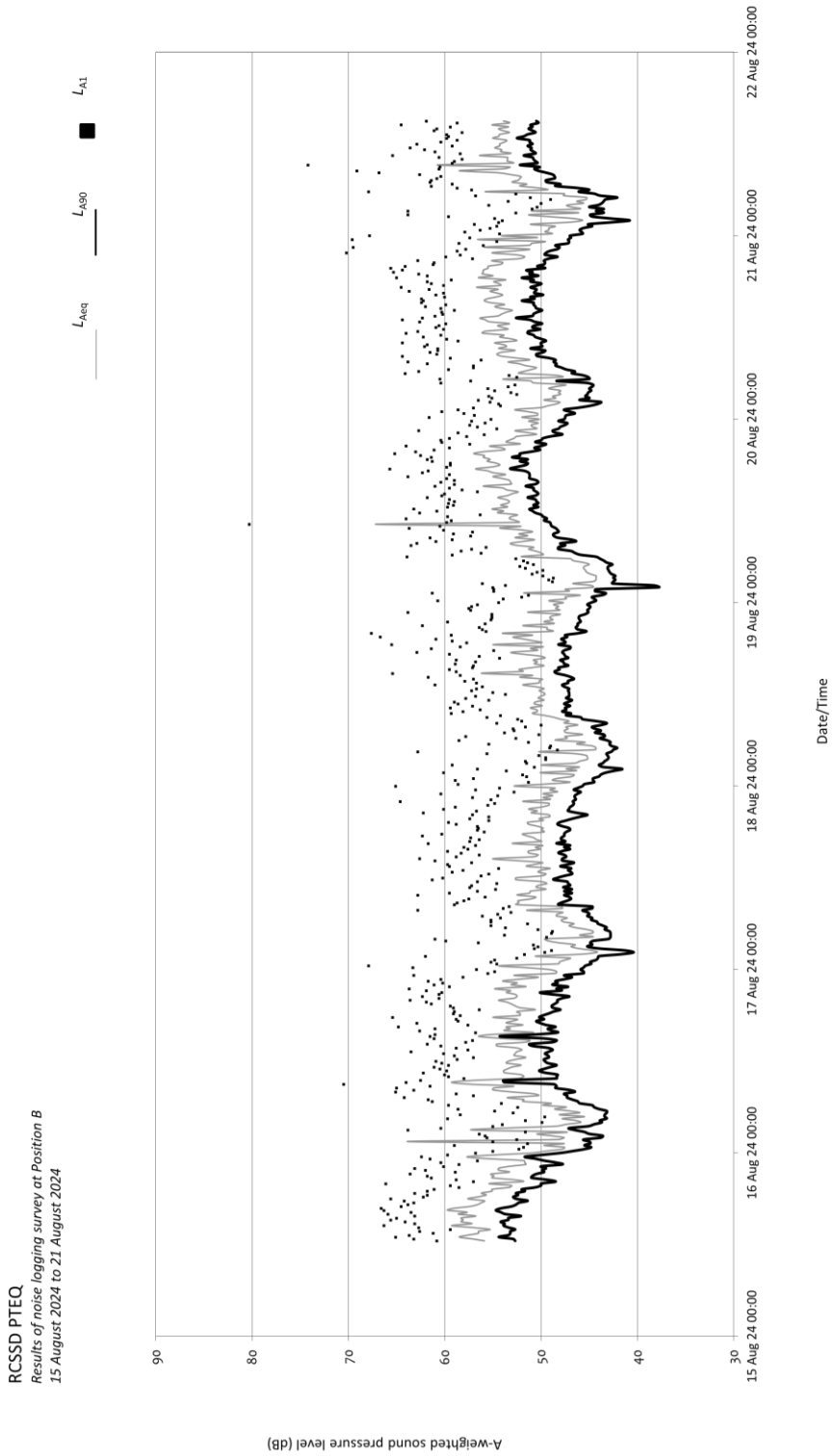
These weather conditions are considered suitable for obtaining representative measurements.

Appendix B

Results of unattended measurements at Location 'A'


RCSSD PTEQ
Results of noise logging survey at Position A
15 August 2024 to 21 August 2024
L_{Aeq}
L_{A90}
L_{A1}
A-weighted sound pressure level (dB)
110
100
90
80
70
60
50
40
30
15 Aug 24 00:00
16 Aug 24 00:00
17 Aug 24 00:00
18 Aug 24 00:00
19 Aug 24 00:00
20 Aug 24 00:00
21 Aug 24 00:00
22 Aug 24 00:00
Date/Time

Results of unattended measurements at Location ‘B’


RCSSD PTEQ
Results of noise logging survey at Position B
15 August 2024 to 21 August 2024
L_{Aeq}
L_{A90}
L_{A1}
A-weighted sound pressure level (dB)
90
80
70
60
50
40
30
15 Aug 24 00:00
16 Aug 24 00:00
17 Aug 24 00:00
18 Aug 24 00:00
19 Aug 24 00:00
20 Aug 24 00:00
21 Aug 24 00:00
22 Aug 24 00:00
Date/Time

Appendix C

BS 4142 corrections for attention catching features

The following applies where plant noise is assessed in accordance with BS 4142:2014+A1:2019.

If the proposed plant noise contains attention catching features (such as tonal elements, whines, whistles, bangs etc), penalty corrections should be applied based on the type and impact of the features.

If appropriate, a subjective assessment of the plant features can be adopted. Where the plant noise contains tonal elements, the following corrections can be made depending on how perceptible the tone is at the noise receptor:

- 0 dB where the tone is not perceptible.
- 2 dB where the tone is just perceptible.
- 4 dB where the tone is clearly perceptible.
- 6 dB where the tone is highly perceptible.

Where the plant noise is impulsive, the following corrections can be made depending on how perceptible the impulsivity is at the noise receptor:

- 0 dB where the impulse is not perceptible.
- 3 dB where the impulse is just perceptible.
- 6 dB where the impulse is clearly perceptible.
- 9 dB where the impulse is highly perceptible.

For noise, which is equally both impulsive and tonal, then both features can be accounted for by linearly summing the corrections for both characteristics.

If the plant has other distinctive characteristics, such as intermittency, then a 3 dB correction can be made.

If a subjective assessment of tonality is not appropriate, an objective assessment can be made by analysis of time-averaged, third-octave band sound pressure levels. A noise source is deemed to be tonal if the level in a third-octave band exceeds the level in adjacent third-octave bands by the level differences given below:

- 15 dB in the low frequency third-octave bands (25 Hz to 125 Hz)
- 8 dB in the mid frequency third-octave bands (160 Hz to 400 Hz)
- 5 dB in the high frequency third-octave bands (500 Hz to 10000 Hz).

If an objective assessment identifies the plant noise to be tonal then a 6 dB correction must be made.