



**Independent Acoustic
Consultancy Practice**

Noise Impact Assessment

**Coedffranc Primary School
Neath**

7566/NIA1

Noise Impact Assessment

Project:	Coedffranc Primary School
Site Address:	19 Stanley Road Neath SA10 6LP
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1. INTRODUCTION

We understand that 2no new air source heat pump units are proposed at Coedffranc Primary School, 19 Stanley Road, Neath, SA10 6LP.

This report has therefore been commissioned to determine existing background sound levels and undertake an impact assessment from the proposed plant in line with current guidance.

2. CRITERIA

2.1 British Standard 4142:2014+A1:2019

British Standard 4142:2014+A1:2019 “Methods for rating and assessing industrial and commercial sound”, provides current guidance for the assessment of industrial noise affecting residential receivers.

This standard describes a rating method comparing L_{Aeq} noise levels from the industrial source with pre-existing background L_{A90} levels at the residential receiver. It advises at a difference (industrial noise - background) of:

- +10dB or higher, likely to be an indication of a significant adverse impact, depending on the context.
- A difference of + 5dB, likely to be an indication of an adverse impact, depending on the context.
- The lower the rating level is relative to the measured background sound level, the less likely it is that the specific sound source will have an adverse impact or a significant adverse impact. Where the rating level does not exceed the background sound level, this is an indication of the specific sound source having a low impact, depending on the context.

A sliding scale of penalties can be applied to industrial/commercial sound levels which have acoustically distinguishing characteristics, including tonality, impulsivity and intermittency.

Tonality – A penalty of 2dB for a tone which is just perceptible at the noise receptor, 4dB where it is clearly perceptible, and 6dB where it is highly perceptible.

Impulsivity – A penalty of 3dB for impulsivity which is just perceptible at the noise receptor, 6dB where it clearly perceptible, and 9dB where it is highly perceptible.

Other sound characteristics – Where the specific sound features characteristics that are neither tonal nor impulsive, though otherwise are readily distinctive against the residual acoustic environment, a penalty of 3dB can be applied

Intermittency – If intermittency is readily distinctive against the residual acoustic environment, a penalty of 3dB can be applied.

BS 4142:2014 states under section 11;

"Where the initial estimate of the impact needs to be modified due to the context, take all pertinent factors into consideration, including the following.

- 1) *The absolute level of sound. For a given difference between the rating level and the background sound level, the magnitude of the overall impact might be greater for an acoustic environment where the residual sound level is high than for an acoustic environment where the residual sound level is low.*

Where background sound levels and rating levels are low, absolute levels might be as, or more, relevant than the margin by which the rating level exceeds the background. This is especially true at night.

Where residual sound levels are very high, the residual sound might itself result in adverse impacts or significant adverse impacts, and the margin by which the rating level exceeds the background might simply be an indication of the extent to which the specific sound source is likely to make those impacts worse.

- 2) *The character and level of the residual sound compared to the character and level of the specific sound. Consider whether it would be beneficial to compare the frequency spectrum and temporal variation of the specific sound with that of the ambient or residual sound to assess the degree to which the specific sound source is likely to be distinguishable and will represent an incongruous sound by comparison to the acoustic environment that would occur in the absence of the specific sound. Any sound parameters, sampling periods and averaging time periods used to undertake character comparisons should reflect the way in which sound of an industrial and/ or commercial nature is likely to be perceived and how people react to it.*

NOTE 3 Consideration should be given to evidence on human response to sound and, in particular, industrial and/or commercial sound where it is available. A number of studies are listed in the "Effects on humans of industrial and commercial sound" portion of the "Further reading" list in the Bibliography.

- 3) *The sensitivity of the receptor and whether dwellings or other premises used for residential purposes will already incorporate design measures that secure good internal and/or outdoor acoustic conditions, such as:*
 - i) *facade insulation treatment;*
 - ii) *ventilation and/or cooling that will reduce the need to have windows open so as to provide rapid or purge ventilation; and*
 - iii) *acoustic screening."*

In addition to the above, the Association of Noise Consultants (ANC) have produced a Technical Note to BS 4142:2014+A1:2019, dated March 2020 (v1.0).

It states under 'Other Contextual Matters' – *"The assessor may also wish to consider matters such as the:*

- *character of a particular neighbourhood;*
- *former uses at or close to a site;*
- *legitimacy of the industrial use, e.g. planning permissions or environmental permits;*
- *implementation of best practicable means for a given process or activity; or*
- *local convention or perceptions.*

When relying on such matters, it is incumbent for the assessor to make clear all elements of context."

It goes on to say, *"There is no theoretical limit to how the context can or should influence the impact assessment, but any alteration of the conclusions of an assessment due to context should be sufficiently explained and justified for the specific circumstances in question."*

3. SOUND SENSITIVE RECEIVERS

In order to set environmental noise limits, it is first necessary to define the existing ambient and background sound climate at the agreed nearest Sound Sensitive Receivers (SSRs).

Figure 3.1 below shows the development site and the closest existing SSRs.

Figure 3.1 – Site Plan Showing Nearest SSRs & Measurement Location



Table 3.1 – Nearest Sound Sensitive Receivers (Distance to Nearest Boundary)

SSR	Description	Distance (m)
1	Residential dwellings to the north on New Road	Adjacent
2	Existing Coedffranc School Bulding	Adjacent
3	Little People Day Nursery and new Coedffranc School building	Adjacent

4. ENVIRONMENTAL NOISE SURVEY

4.1 Procedures

Continuous noise monitoring was carried out from 1205hrs on Tuesday, 04 February 2025 to 1205hrs on Wednesday, 05 February 2025 at position A.

Data including L_{Amax} , L_{Aeq} and background L_{A90} was logged at 1 minute intervals over the monitoring period, along with continuous audio and 100ms data to allow source identification and further detailed analysis of results if required.

Site plan in Figure 3.1 above shows the development site and continuous monitoring positions used, namely:

Table 4.1 – Continuous Monitoring Location Details

Position	Description
A	On fence on northern playground boundary in close proximity to proposed ASHPs location

Note: All microphone positions approximately 2.5m above local ground level.

4.2 Meteorological Conditions

Approximate weather conditions are shown in time history graphs in Figure B.1 & Figure B.2 of Appendix B.

To summarise weather conditions during the monitoring period were generally dry with an occasional breeze. Periods of rain occurred on 04th February 2025 between 1400hrs – 1500hrs and on 05th February 2025 between 0330hrs – 0400hrs.

To summarise the weather during the majority of the period was dry and calm winds with an occasional breeze. Periods of rain occurred between 1320-1400hrs, 1440-1510hrs & 1635-1655hrs.

4.3 Measurement Equipment

The following measurement equipment was used during the surveys:

Table 4.2 – Noise Monitoring Equipment List

Make	Description	Model	Serial Number	Last Calibrated	Certificate No.
NTi	Type 1 - Sound Level Meter	XL2-TA	A2A-14577-E0	21 June 2024	UK-24-065
	Preamplifier	MA220	7485	21 June 2024	UK-24-065
	Microphone Capsule	MC230	A15594	21 June 2024	UK-24-065
Larson Davis	Calibrator (94.00dB / 114.03dB @ 1kHz)	CAL200	19047	14 August 2024	48532

Measurement systems were calibrated before and after the surveys and no variation occurred.

Note: Copies of traceable calibration certificates for all equipment are available upon request.

4.4 Results

The time history graph in Figure B.3 of Appendix B shows L_{Amax} , L_{Aeq} and L_{A90} sound pressure levels measured at position A covering the weekday period.

The following $L_{Aeq,1hr}$ hourly noise levels were measured across the survey dated 04 - 05/02/2025:

Table 4.3 – Summary of L_{Aeq} Noise Levels (Weekday)

Date	Period	Position
		A
19/02/2024	Daytime (0700-2300hrs) $L_{Aeq,16hr}$ (dB)	56

The graph in Figure B.4 of Appendix B show statistical analysis of background sound levels measured at position A during a weekday period respectively.

The following minimum consistent daytime background L_{A90} sound levels have been determined:

Table 4.4 – Minimum Consistent Daytime Background L_{A90} Results (Weekday)

Period	Position
	A
Daytime (0700-2300hrs) $L_{A90,1hr}$ (dB)	48*

*For information, the background $L_{A90,15mins}$ level between 0600-0700hrs was 48dB also, so the following assessment is representative of daytime and also the period between 0600-0700hrs.

Road traffic, children playing and the occasional construction noise controls the ambient and background climate during daytime hours

5. NOISE MODELLING

Our analysis has used the proprietary Predictor (v2024 rev2) computer modelling software, in conjunction with procedures of ISO 9613.

This model allows noise levels from noise sources (including building facades) to be predicted over large distances and varying terrain. Attenuation is included accounting for distance, air absorption, ground absorption and screening losses from site topography/local structures.

The analysis predicts resultant noise levels at the SSRs.

5.1 Source Plant Noise Data

The proposed plant is as follows:

- 2no Mitsubishi MEHP-iS-G07 0102 units, of sound power level 82dB(A)

Sound power level spectra from Mitsubishi has been used in the model:

Table 5.1 - Fixed Plant Noise Data Used in Model

L_w at Octave Band Centre Frequencies, Hz (dB)								L_{wA}
63	125	250	500	1000	2000	4000	8000	(dB)
89	82	81	79	77	74	69	65	82

5.2 Noise Model Scenarios

It is understood that 2no units operate simultaneously during school hours, during the daytime only.

5.3 Noise Model Results

5.3.1 Daytime (2no Units Running)

The noise map models in Figure C.1 & Figure C.2 of Appendix C shows the predicted noise contour plots across the surrounding area to critical SSRs at 1.5m & 4.5m above local ground height from the proposed plant.

Predicted noise levels from ASHPs at critical sound sensitive receivers are shown below:

Table 5.2 – Precited ASHP Noise Levels at Critical SSRs

SSR	Height Above Local Ground (m)	Predicted $L_{Aeq,T}$ (dB)
Little People Nursery	1.5	41
	4.5	42
23a Stanley Road	1.5	41
	4.5	46
23 Stanley Road	1.5	42
	4.5	46
199 New Road	1.5	41
	4.5	42
200 New Road	1.5	41
	4.5	43
205 New Road	1.5	33
	4.5	41
197 New Road	1.5	35
	4.5	43
School Rec 1	1.5	54
School Rec 2	1.5	54
School Rec 3	1.5	39
School Rec 4	1.5	33
New School Building	1.5	53

Noise level at the closest school facade is 54dB L_{Aeq} .

6. NOISE IMPACT ASSESSMENT

6.1 Assessment of Normal Daytime Noise Impact Weekday

6.1.1 Acoustic Character Correction

Predicted absolute levels are indicated to fall below background and below ambient sound levels at the closest SSRs and therefore no penalty is proposed at this stage.

6.1.2 BS 4142:2014+A1:2019 Assessments

BS 4142 assessment for the weekday daytime scenario is included in Table D.1 in Appendix D for the most critical receiver.

The results of these are summarised in Table 6.1 below:

Table 6.1 – Predicted Daytime Rating Levels at Critical SSR (Weekday)

Sound Sensitive Receiver (SSR)	Predicted Rating Level $L_{Ar,1hr}$ (dB)	Daytime Background Sound Level L_{A90} (dB)	Excess Rating over Background
23 Stanley Road	46	48	-2

An initial BS4142 assessment would indicate a low impact at the SSRs during daytime hours.

7. CONCLUSION

It is proposed to locate 2no ASHP in an external plant area at Coedffranc Primary School, 19 Stanley Road, Neath, SA10 6LP.

An environmental noise survey has been undertaken to assess the existing background climate at the closest sound sensitive receivers (SSRs) during a weekday period.

When rated and assessed in accordance with BS 4142:2014+A1:2019, a low impact is indicated for daytime operations.

At the existing school buildings, noise levels from ASHP plant are indicated to fall at or below 54dB(A). Allowing a 15dB loss through a partially open window, this would equate to a level of 39dB(A) which just meets noise intrusion criteria from BB93 for a naturally ventilated teaching space.

APPENDIX A - ACOUSTIC TERMINOLOGY

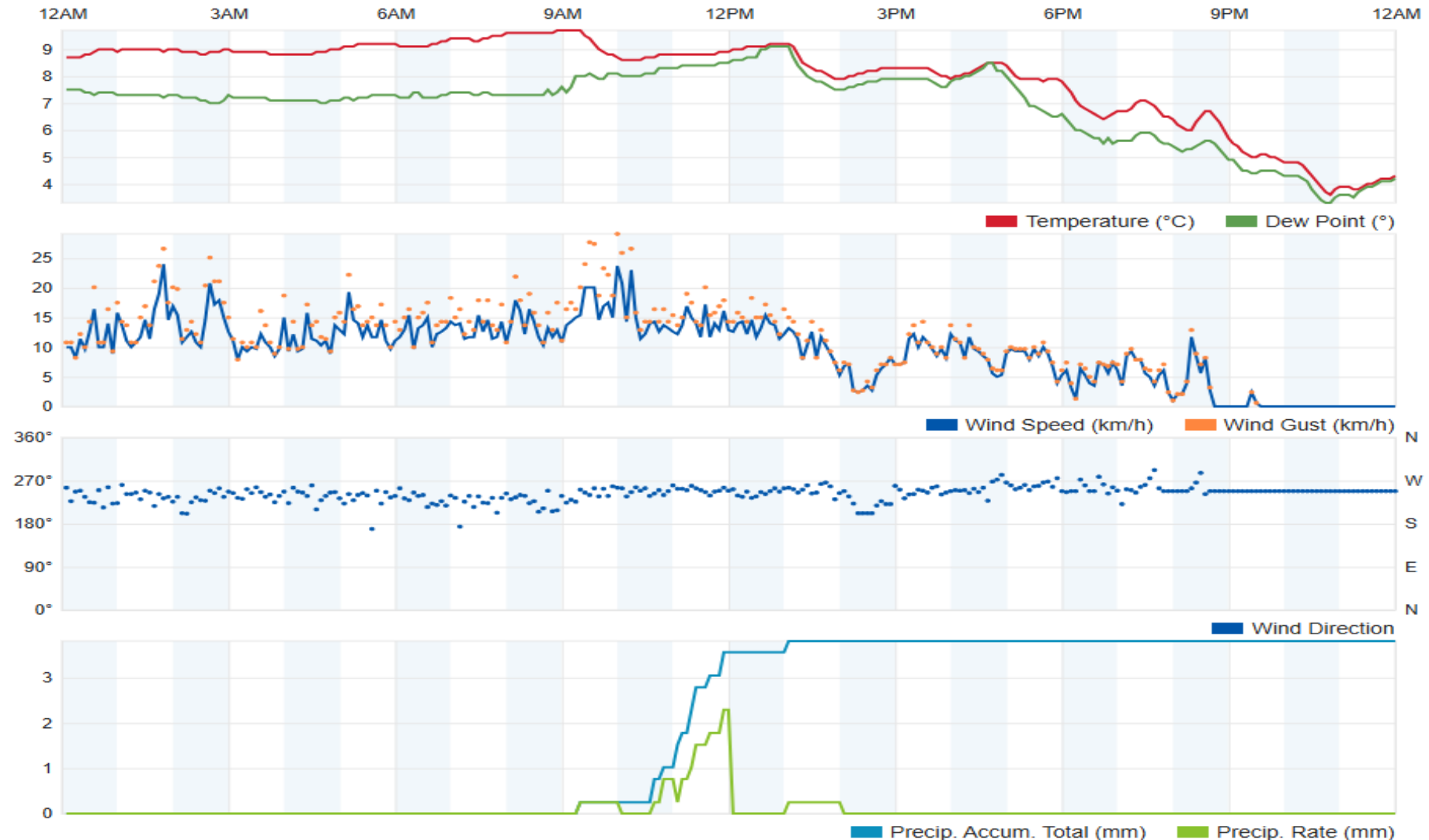
Human response to noise depends on a number of factors including loudness, frequency content and variations in level with time. Various frequency weightings and statistical indices have been developed in order to objectively quantify 'annoyance'.

The following units have been used in this report:

dB(A)	The sound pressure level A-weighted to correspond with the frequency response of the human ear and therefore a persons' subjective response to frequency content.
L_{eq}	The equivalent continuous sound level is a notional steady state level which over a quoted time period would have the same acoustic energy content as the actual fluctuating noise measured over that period.
L_{max}	The highest instantaneous sound level recorded during the measurement period.
L_{10}	The sound level which is exceeded for 10% of the measurement period. i.e. The level exceeded for 6 minutes of a 1 hour measurement.
L_{90}	The sound level which is exceeded for 90% of the measurement period. i.e. The level exceeded for 54 minutes of a 1 hour measurement - used as a measure of background noise.
$L_{Ar,Tr}$	The 'rating' level, as described in BS 4142:2014 – the specific noise plus any adjustment for the characteristic features of the noise.
SSR	Sound sensitive receiver

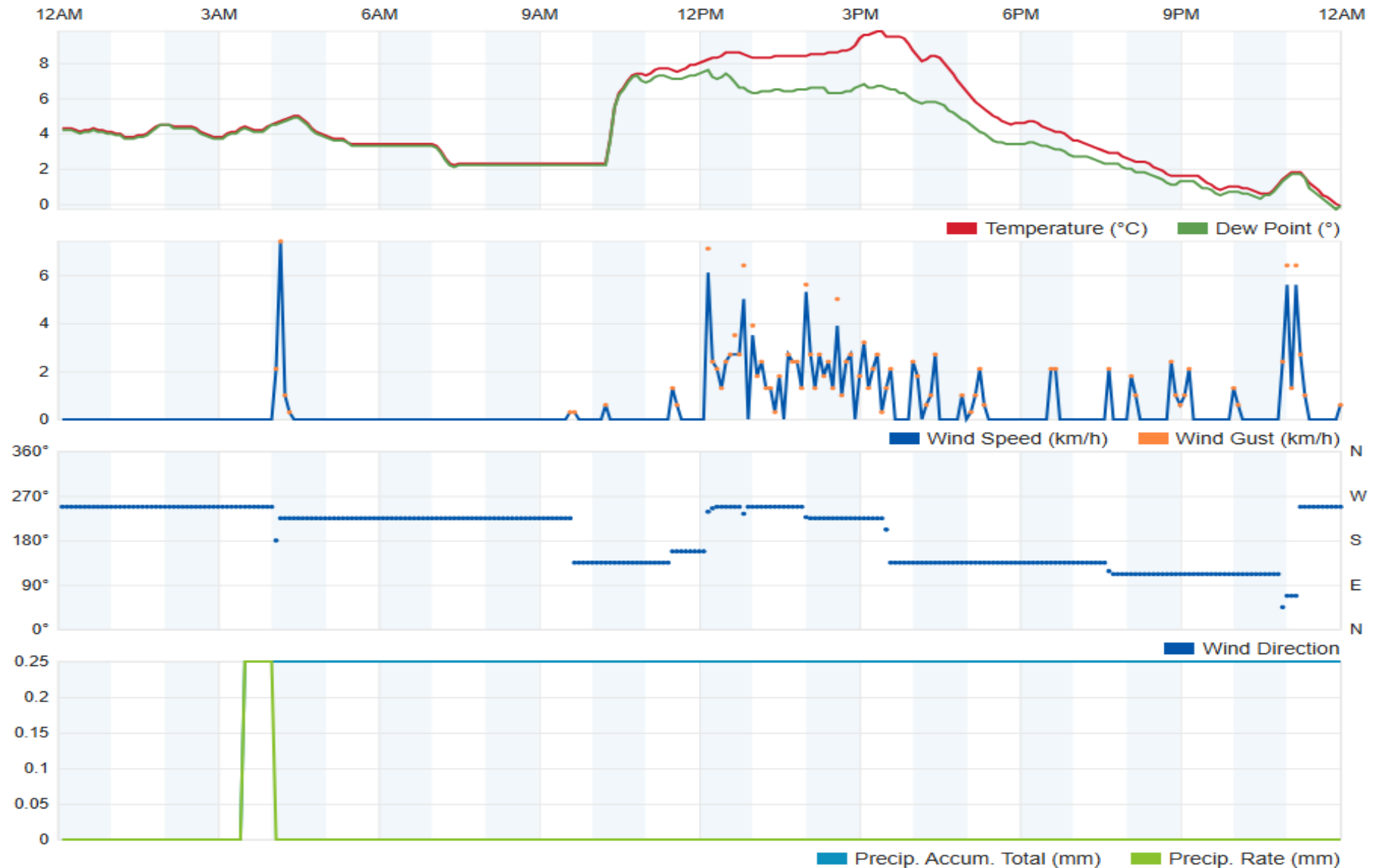
APPENDIX B - DIAGRAMS, GRAPHS AND TABLES

Figure B.1 – Approximate Weather History for Tuesday, 04 February 2025



Note: Taken from www.wunderground.com - weather station INEATH13 located in Neath [Elev 67 m, 51.66 °N, 3.85 °W]

Figure B.2 – Approximate Weather History for Wednesday, 05 February 2025



Note: Taken from www.wunderground.com - weather station INEATH13 located in Neath [Elev 67 m, 51.66 °N, 3.85 °W]

Figure B.3 – Time History at Position A (Tuesday, 04 February 2025 to Wednesday, 05 February 2025)

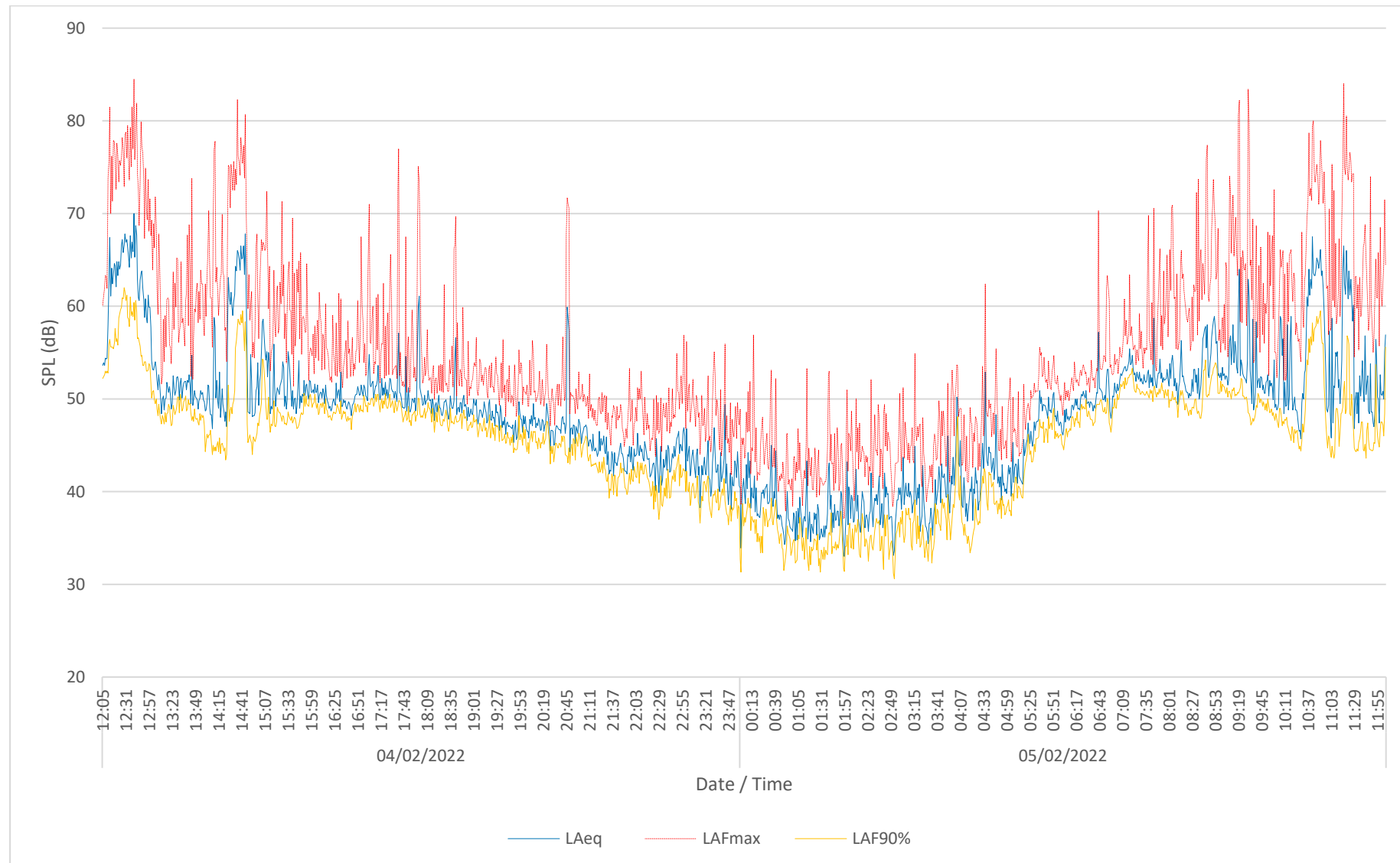
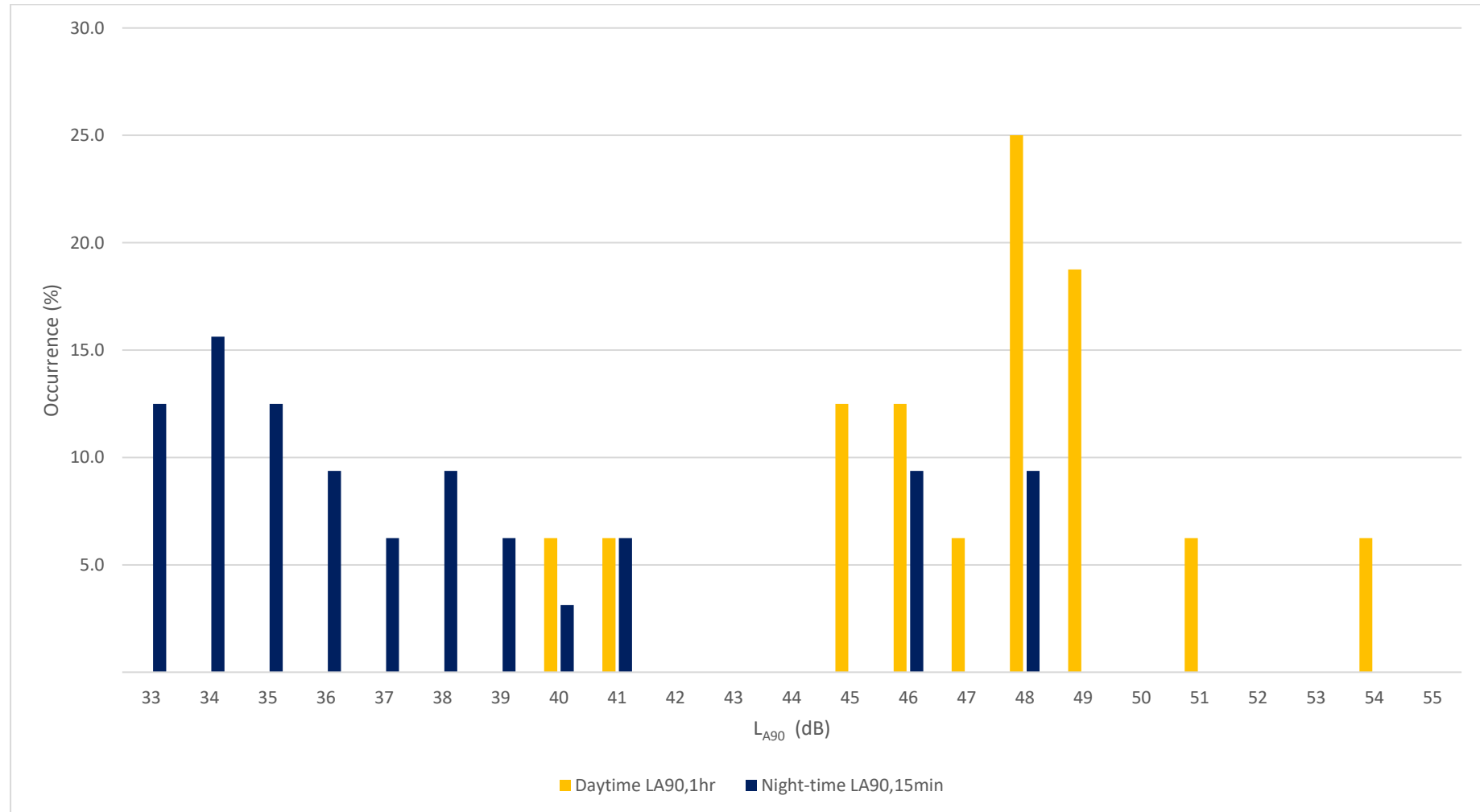


Figure B.4 – Statistical Analysis of Background Sound Levels Measured at Position A (04/02/2024 to 05/02/2024)



APPENDIX C - NOISEMAPS

Figure C.1 – Noise Model $L_{Aeq,T}$ Contours at 1.5m Height

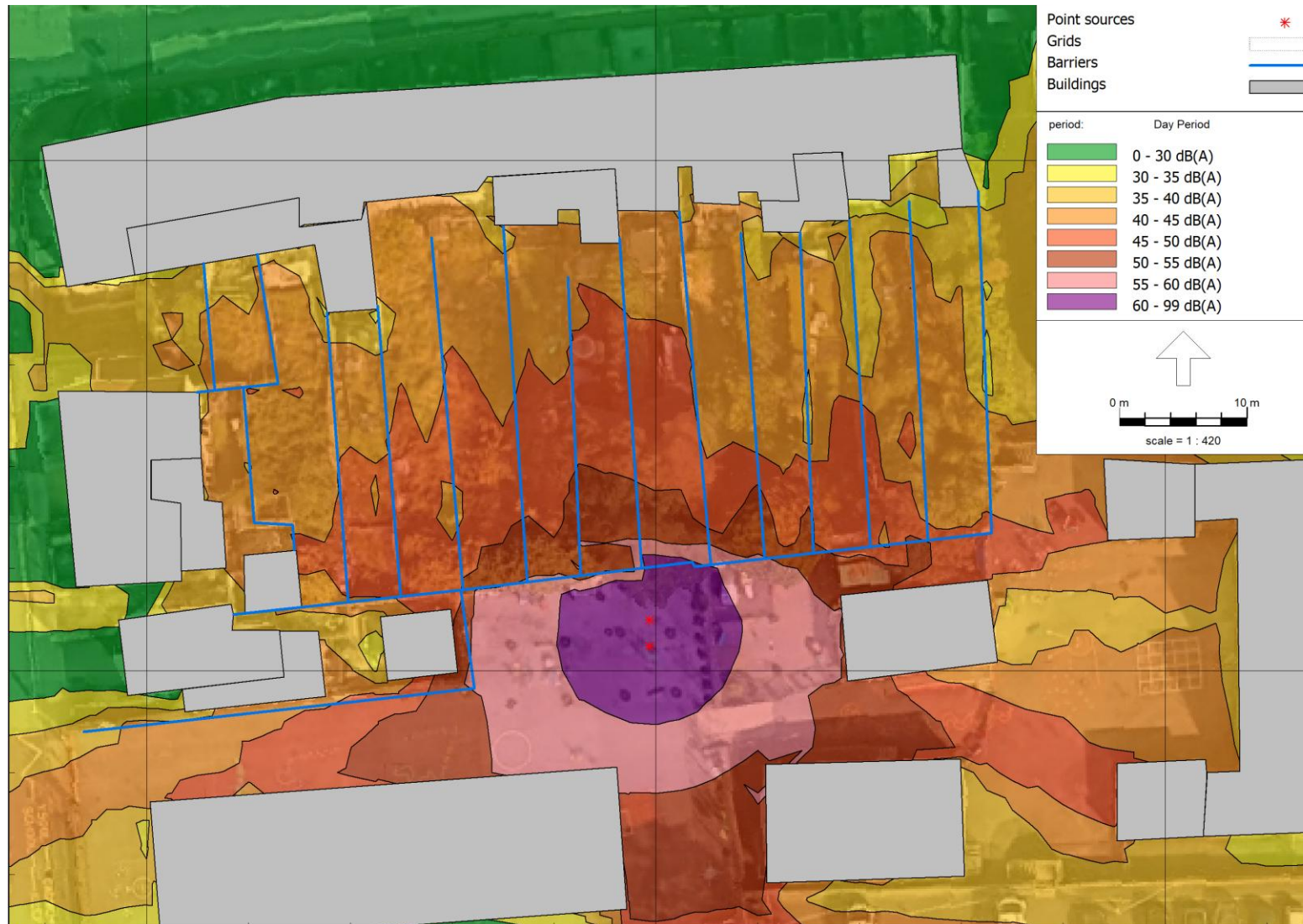
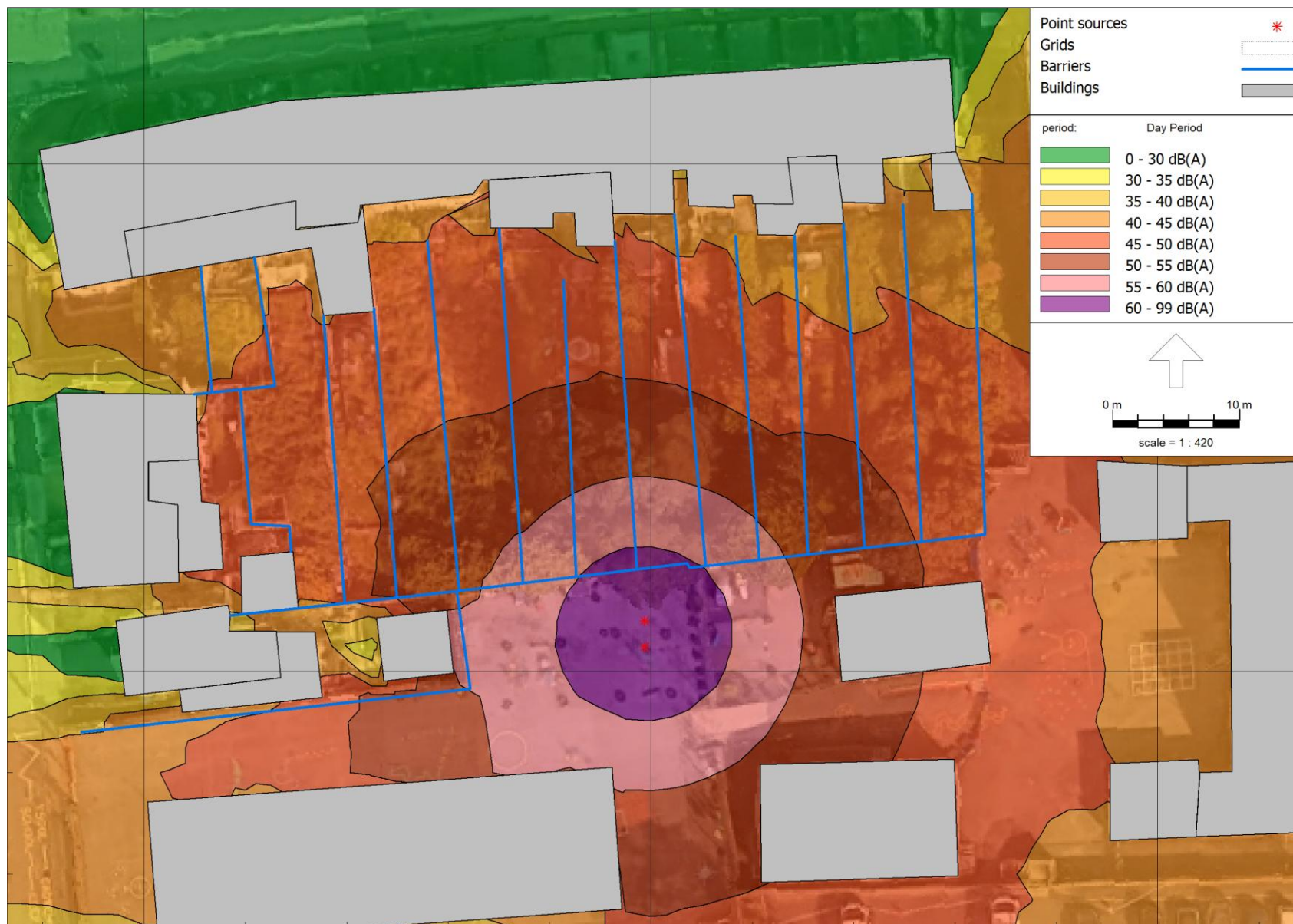


Figure C.2 – Noise Model $L_{Aeq,T}$ Contours at 4.5m Height



APPENDIX D – BS 4142:2014+A1:2019 ASSESSMENTS

Table D.1 – BS 4142 Daytime Assessment at 23 Stanley Road

Results		Relevant Clause	Commentary
Predicted Plant level at 23 Stanley Road	$L_{Aeq} = 46\text{dB}$	7.3.2	Predicted ASHP level at 23 Stanley Road
Residual sound level	$L_{Aeq} = \text{N/AdB}$	7.3.3	Using predicted levels
Background sound level (Daytime)	$L_{A90(0700-1900\text{hrs})} = 48\text{dB}$	8.1.1 8.1.3 8.3	Background sound level measured at Position A
Assessment made during the daytime so the reference time interval is 1hr.		7.2	
Specific sound level calculated by correcting the ambient sound level to remove the contribution of the residual sound level.	$L_{Aeq,1hr} = 46\text{dB}$	7.3.4	Predicted using noise mapping software
Acoustic feature correction	0dB	9.2	Given the predicted plant level is below the background sound level, no acoustic feature correction is to be applied
Rating Level	$(46 + 0) = 46\text{dB}$		
Background sound level (daytime)	$L_{A90(0700-1900\text{hrs})} = 48\text{dB}$	8.3	
Excess of rating over background sound level	$(46 - 48) \text{ dB} = -2\text{dB}$	11	
Assessment indicates a low impact dependent on context		11	At 2dB below background BS 4142:2014 advises a low impact depending on context
Uncertainty of assessment		10	Uncertainty in background noise measurements is considered low.

APPENDIX E – DRAWINGS & DOCUMENTS LIST

The following drawings and documents have been used in our assessment:

Table E.1 – Documents List

Document Title	Document Number	Rev	Date
Alternative Ramp Proposed Location Plan	A1188 – 126	-	Oct 2024