



**Independent Acoustic
Consultancy Practice**

Noise Impact Assessment – Planning Stage Report

**Proposed Shrimp Farm
Neath**

7017/NIA1

Noise Impact Assessment – Planning Stage Report

Project: **Proposed Shrimp Farm**

Site Address: Metalbox
Milland Road
Neath
SA11 1NJ

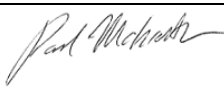
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Client: Three-Sixty Aquaculture
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1. INTRODUCTION

We understand a new Shrimp Farm is proposed at Metalbox, Neath, SA11 1NJ which is to include external plant including Containerised Combined Heat & Power (CHPs) and stand-by diesel generators.

The Local Planning Authority has requested a noise impact assessment is submitted to accompany the planning application.

This report has therefore been commissioned to determine existing background sound levels. An initial assessment of the proposed plant's predict noise levels has been carried with limiting noise levels issued for critical items of plant.

2. CRITERIA

2.1 Planning Policy Wales

The Welsh Government's Planning Policy Wales (Edition 11) dated February 2021 sets out the land use planning policies of the Welsh Government. It is supplemented by a series of Technical Advice Notes (TANs), Welsh Government Circulars, and policy clarification letters which together with PPW provide the national planning policy framework for Wales.

Reference to noise is made in Paragraph 6.74: Framework for Addressing Air Quality and Soundscape, which states that:

"6.74 The planning system should maximise its contribution to achieving the well – being goals, and in particular a healthier Wales, by aiming to reduce average population exposure to air and noise pollution. In doing so, it should consider the long – term effects of current and predicted levels of air and noise pollution on individuals, society and the environment and identify and pursue any opportunities to reduce, or at least, minimise population exposure to air and noise pollution".

Reference is also made to noise in Paragraphs 6.7.15 - 17:

"Location of Commercial, Industrial and other Potentially Polluting Development

6.7.15 For the purposes of this section, potentially polluting development includes commercial, industrial, energy and agricultural or transport infrastructure. Such development should be located in areas where there is low potential for public exposure, or where its impact can be minimised. Novel or new development types may potentially cause pollution and should be carefully considered, and where appropriate, decisions should be based on the precautionary principle.

6.7.16 Relevant considerations in making planning decisions for potentially polluting development are likely to include:

- location, including the reasons for selecting the chosen site itself;*
- impact on health and amenity;*
- effect of pollution on the natural and built environment and the enjoyment of areas of landscape and historic and cultural value;*
- impact on groundwater and surface water quality;*
- effect on biodiversity and ecosystem resilience, including where there may be cumulative impacts on air or water quality which may have adverse consequences for biodiversity and ecosystem resilience;*

- *the risk and impact of potential pollution from the development, insofar as this might lead to the creation of, or worsen the situation in, an air quality management area, a noise action planning priority area or an area where there are sensitive receptors; and*
- *impact on the road and other transport networks, and in particular on traffic generation, particularly where the proposed development is not transport infrastructure itself.*

6.7.17 *The location of potentially polluting development adjacent to sensitive receptors will be unacceptable where health and amenity impacts cannot be minimised through appropriate design and mitigation measures. It is the overall expectation that levels of pollution should be reduced as far as possible and for this reason the location of potentially polluting development should be taken into account as part of overall strategies in development plans to ensure it can be appropriately located and maximum environmental benefits can be gained through measures such as green infrastructure."*

2.2 Technical Advice Note (Wales) 11

The below summarises the advice given TAN11 (1997) regarding new noise generating developments.

"3. This note provides advice on how the planning system can be used to minimise the adverse impact of noise without placing unreasonable restrictions on development or adding unduly to the costs and administrative burdens of business. It outlines some of the main considerations which local planning authorities should take into account in drawing-up development plan policies and when determining planning applications for development which will either generate noise or be exposed to existing noise sources.

4. Local authorities should adopt a corporate approach and ensure close co-operation between planning and environmental health departments when considering noise and noise generating developments.

Development Control

Noise generating development

8. Local planning authorities must ensure that noise generating development does not cause an unacceptable degree of disturbance. They should also bear in mind that if subsequent intensification or change of use results in greater intrusion, consideration should be given to the use of appropriate conditions.

9. Noise characteristics and levels can vary substantially according to their source and the type of activity involved. In the case of industrial development, for example, the character of the noise should be taken into account as well as its level. Sudden impulses,

irregular noise or noise which contains a distinguishable continuous tone will require special consideration. In addition to noise from aircraft landing and taking off, noise from aerodromes is likely to result from engine testing as well as ground movements. The impact of noise from sport, recreation and entertainment will depend to a large extent on frequency of use and the design of facilities. Advice on assessing noise and on factors to consider in relation to the major noise sources including roads, railways, airports, industrial and recreational noise and their measurement is given in Annex B.

Noise from industrial and commercial developments

B17. The likelihood of complaints about noise from industrial development can be assessed, where the Standard is appropriate, using guidance in BS 4142: 1990. Tonal or impulsive characteristics of the noise are likely to increase the scope for complaints and this is taken into account by the "rating level" defined in BS 4142. This "rating level" should be used when stipulating the level of noise that can be permitted. The likelihood of complaints is indicated by the difference between the noise from the new development (expressed in terms of the rating level) and the existing background noise. The Standard states that, 'A difference of around 10 dB or higher indicates that complaints are likely. A difference of around 5 dB is of marginal significance'. Since background noise levels vary throughout a 24 hour period it will usually be necessary to assess the acceptability of noise levels for separate periods (e.g. day and night) chosen to suit the hours of operation of the proposed development. Similar considerations apply to developments that will emit significant noise at the weekend as well as during the week. In addition, general guidance on acceptable noise levels within buildings can be found in BS 8233: 1987."

TAN11 refers to BS 4142:1997 and BS 8233:1987. These have been superseded by BS 4142:2014+A1:2019 (see Section 2.3 below) and BS 8233:2014 (see Section **Error! Reference source not found.** below).

2.3 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. façade 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 assess the environmental noise impact, it is first necessary to define the existing ambient and background sound climate at the 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)

Sound Sensitive Reciever	Distance (m)
Residential dwellings on Furnace Terrace and Pantyrheol	200-275

4. ENVIRONMENTAL NOISE SURVEY

4.1 Procedures

Continuous noise monitoring was carried out from 1520hrs on Wednesday, 05 July 2023 to 1450hrs on Friday, 04 August 2023 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	Located on lamppost at south of Metalbox site. Considered representative of lowest backgrounds at SSRs. <i>There was no plant or any other sources from the Metalbox which were indicated to control the background at this location.</i>

Note: All microphone positions approximately 1.5m above local ground level.

4.2 Meteorological Conditions

Approximate weather conditions are shown in time history graphs in Figure B.1, Figure B.2 and Figure B.3 of Appendix B.

To summarise, the weather conditions during the monitoring period were dry with an occasional rain shower.

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	23 June 2022	UK - 22 -051
	Preamplifier	MA220	7485	23 June 2022	UK - 22 -051
	Microphone Capsule	MC230	A15594	23 June 2022	UK - 22 -051
Larson Davis	Calibrator (94.00dB / 114.03dB @ 1kHz)	CAL200	19047	15 August 2022	44788-19047-CAL200

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

Time history graphs in Figure B.4 of Appendix B show L_{Amax} , L_{Aeq} and L_{A90} sound pressure levels measured at position A.

The graph in Figure B.5 of Appendix B shows a statistical analysis of background sound levels measured at position A.

The following minimum consistent daytime and night-time background L_{A90} sound levels have been determined;

Table 4.3 – Minimum Consistent Daytime and Night-time Background L_{A90} Results

Period	Position
	A
Daytime (0700-2300hrs) $L_{A90,1hr}$ (dB)	45
Night-time (2300-0700hrs) $L_{A90,15min}$ (dB)	32

Distant road traffic from the A465 was controlling background climate.

5. PRELIMINARY NOISE MODELLING

Our analysis has used the proprietary Predictor (v2022.1) 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.

Standard LiDAR DTM 1m data has been used for terrain modelling, along with site observations of specific features. Figure C.1 shows the 3D terrain model. Drawings used in our assessment are referenced in Appendix E.

5.1 Noise Model Scenarios

Two scenarios have been modelled:

1. Normal Operation
2. Standby / Emergency – CHPs off, Diesel Generators

As plant would run continuously, the daytime and night-time noise models for each scenario are the same.

The analysis predicts resultant noise levels at the SSRs. The noise model contains all plant from Phases 1 & 2.

5.2 Source Plant Noise Limits

At this stage manufacturers have not provided a full set of noise data for their equipment. *We would require this to complete the detailed noise model and impact assessment.*

We have therefore based our model on the following plant noise limits which should be quoted to the suppliers/manufacturers.

Table 5.1 – CHP Noise Limits

Noise Source	Limiting Sound Pressure Level (dBA)
Container Noise Break-out	60 @10m
Exhaust	55 @10m
Cooling Fans*	55 @10m

*The cooling fan duty / speed should be also confirmed

Table 5.2 – Blower Noise Limit

Noise Source	Limiting Sound Pressure Level (dBA)
Blower	60 @10m

Table 5.3 – Diesel generator Noise Limit

Noise Source	Limiting Sound Pressure Level (dBA)
Diesel Generator	60 @10m

The above limits have been quoted to meet plant noise level not exceeding background sound level. Standby Diesel Generators have been designed to a 5dB less stringent limit.

5.3 Preliminary Noise Model Results

The source sound power level data used in the noise map is listed in Table C.1.

The noise map model in Figure C.2 of Appendix C shows the predicted noise contour plot across the surrounding area to critical SSRs at 4.5m above local ground height.

The highest predicted levels at critical SSRs are shown in Table 5.4 below;

Table 5.4 - Noise Map Predicted levels at Critical SSR

Sound Sensitive Receiver (SSR)	Predicted $L_{Aeq,T}$ (dB)	
	Normal	Standby
Pantyrheol Road	32	36
Heol Westbourne	30	34
Griffiths Buildings / Furnace Terrace	29	36

5.4 Discussion

Based on the plant noise limits quoted above, the noise levels under normal operation are not indicated to exceed the background sound level.

During Standby Operation, predicted noise levels are not indicated to exceed the background sound by more than 5dB.

6. CONCLUSION

A preliminary noise impact assessment has been carried out for the proposed Shrimp farm plant ventilation plant at Metalbox, Neath, SA11 1NJ.

At this stage noise emission limits for CHP, blower and standby generators have been issued in this report for manufacturers to quote against.

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 - used as a measure of background noise.
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 Wednesday, 02 August 2023

August 2, 2023

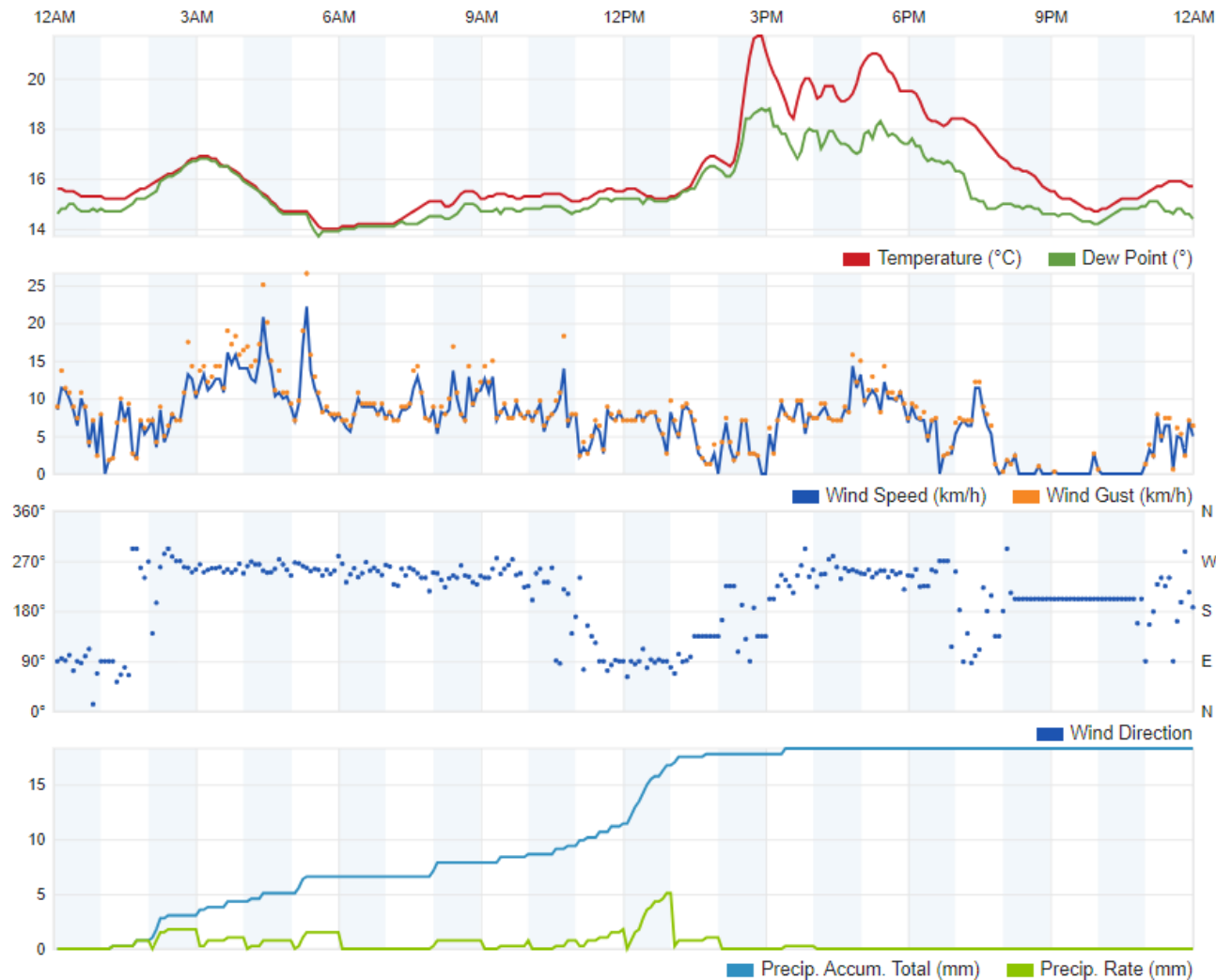


Figure B.2 – Approximate Weather History for Thursday, 03 August 2023

August 3, 2023

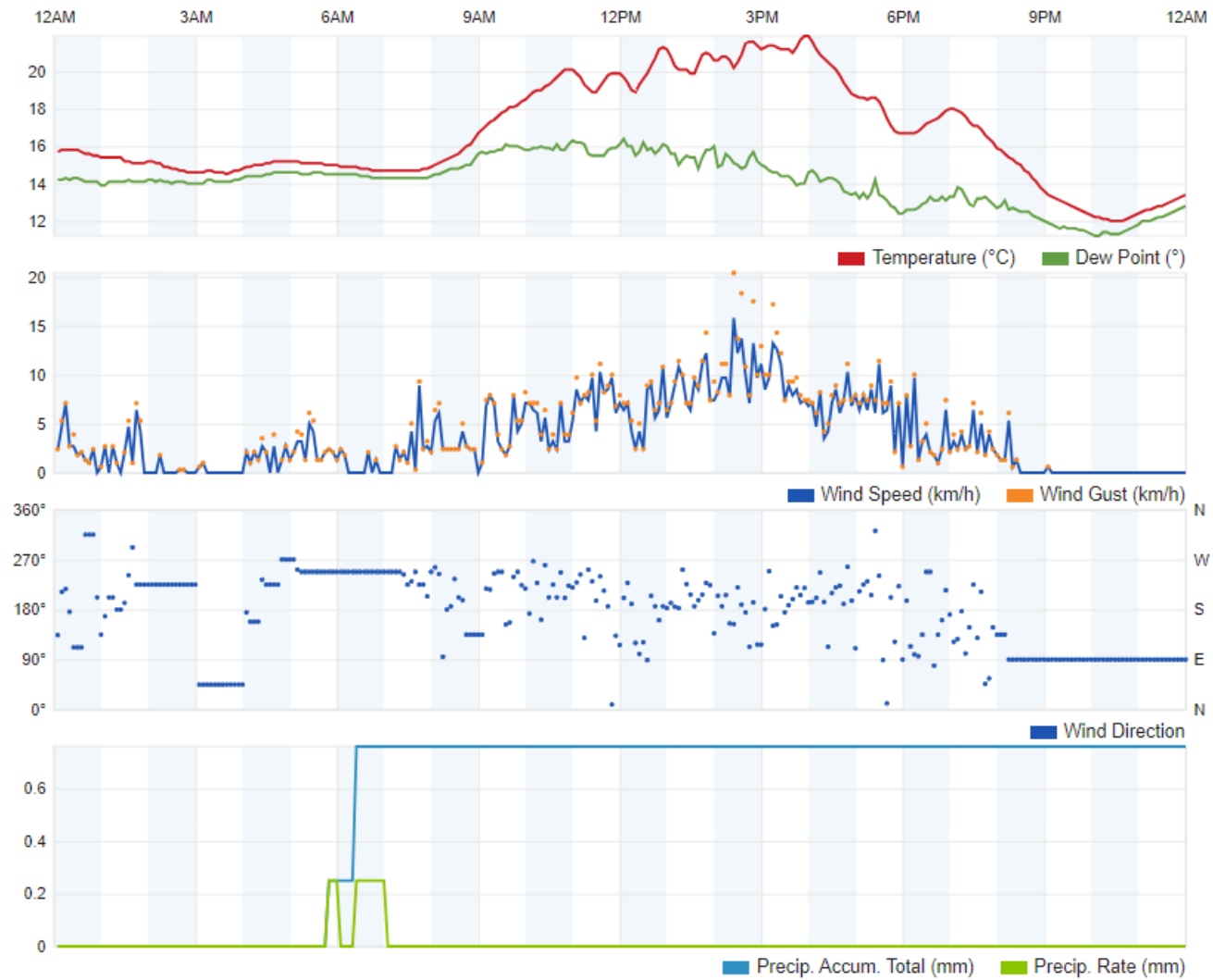
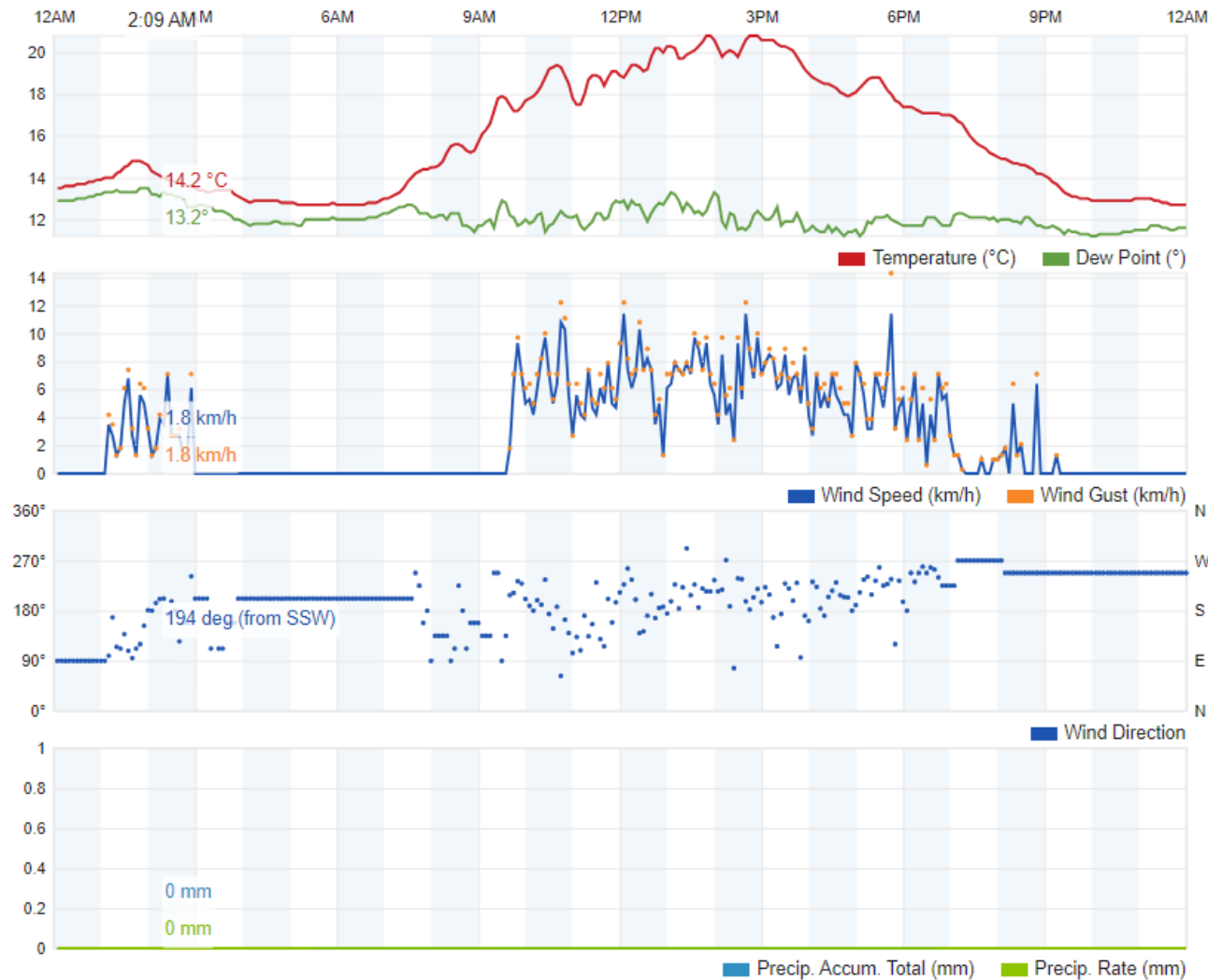


Figure B.3 – Approximate Weather History for Friday, 04 August 2023

August 4, 2023



*Note: Taken from www.wunderground.com - Weather Station ID: INEATH13 Station Name: Latty No1
Latitude / Longitude: 51.663° N, 3.846° W Elevation: 67 City: Neath*

Figure B.4 – Time History at Position A (Wednesday, 02 August 2023 to Friday, 04 August 2023)

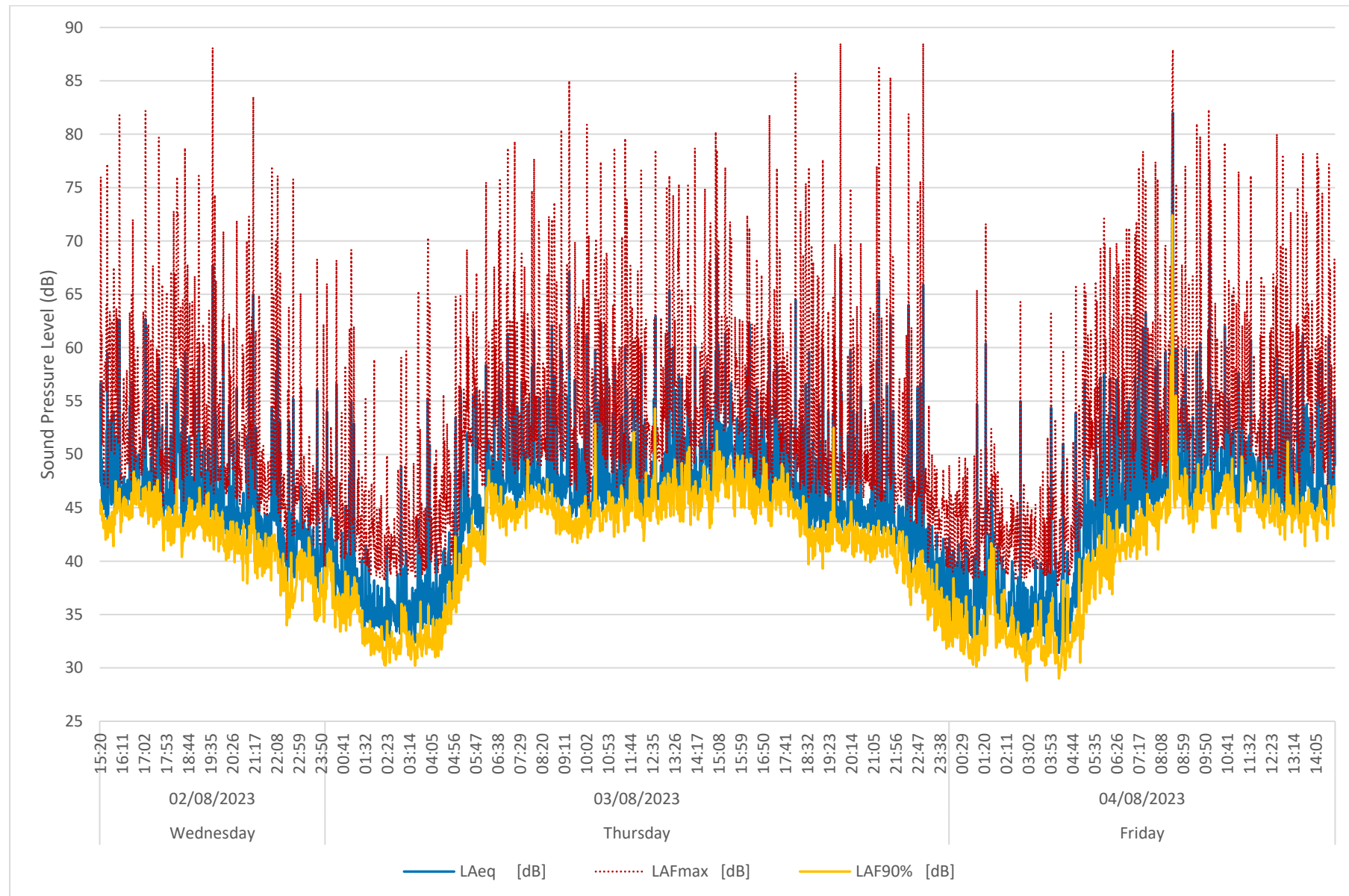
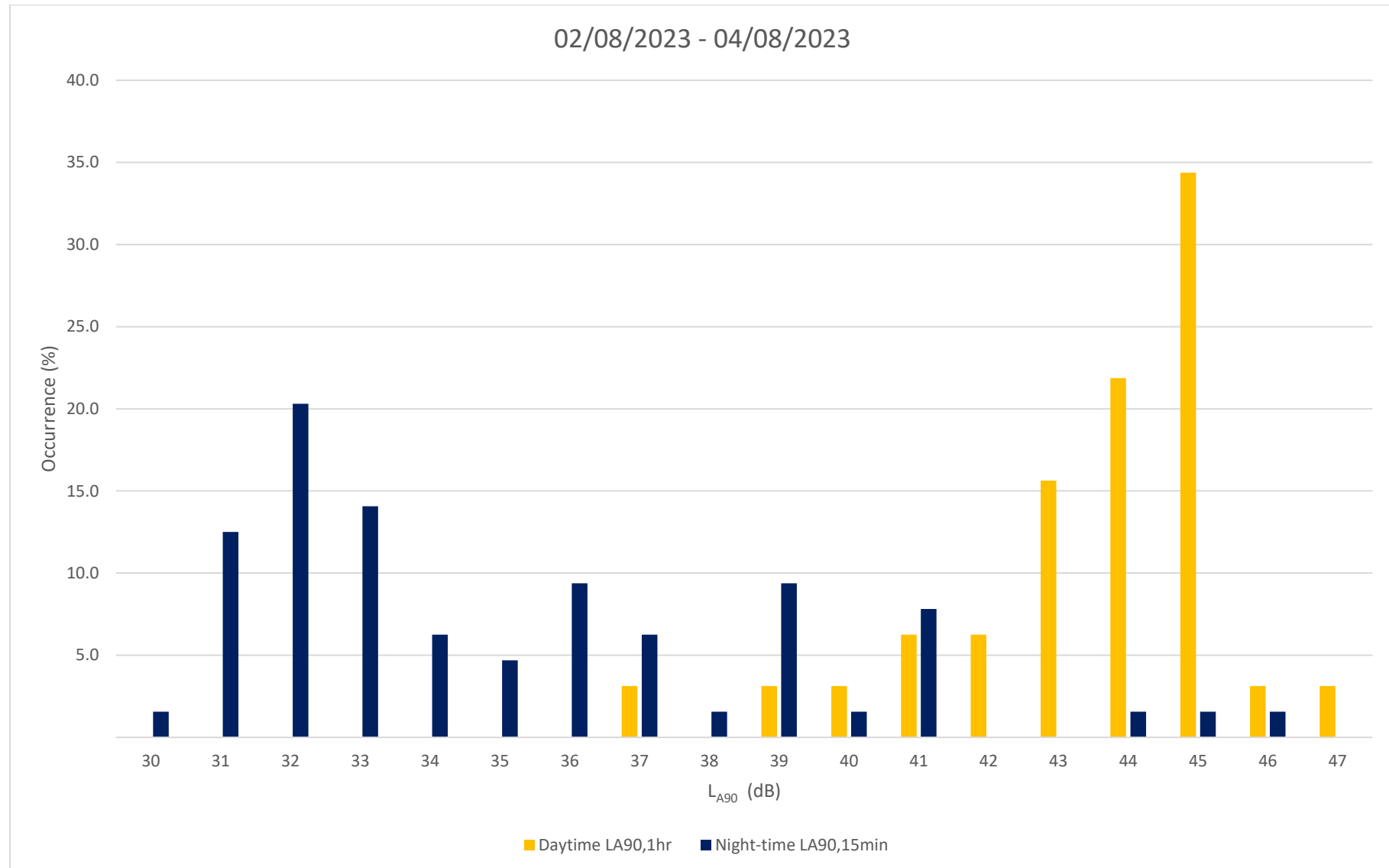


Figure B.5 – Statistical Analysis of Background Sound Levels Measured at Position A (Wednesday, 02 August 2023 to Friday, 04 August 2023)



APPENDIX C - NOISE MODELLING

C.1 Noise Model Input Data

Table C.1 – Fixed Plant Noise Data Used in Model

Plant Item / Activity	L_{WA} at Octave Band Centre Frequencies, Hz (dB)								L_{WA} (dB)
	63	125	250	500	1000	2000	4000	8000	
CHP Container*	61	74	79	77	73	63	81	51	85
CHP Exhaust Stack*	68	74	75	77	76	74	72	59	83
CHP Cooling Fans*	59	66	70	78	80	77	72	64	84
Blower**	56	64	74	77	71	69	61	46	80
Diesel Generator	61	74	79	77	73	63	81	51	85

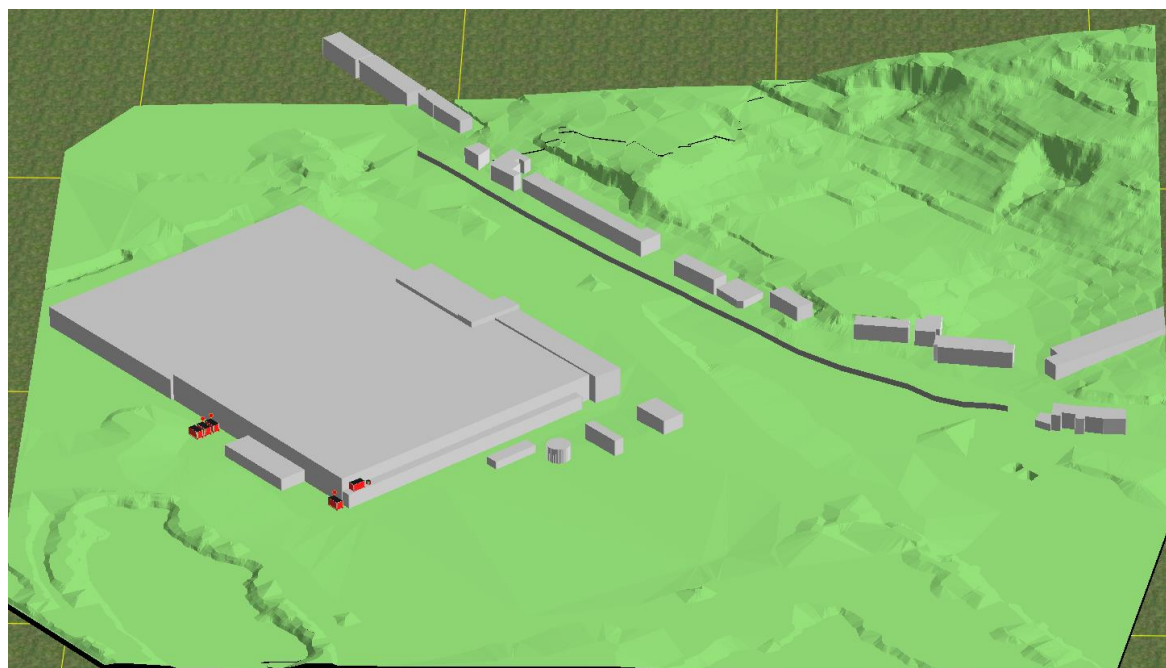
*Spectra based on company database spectra for similar CHPs

**Spectra based on Predictor database for typical fan

Plant Item / Activity	Source Height (m), AOD
CHP Container	3.0
CHP Exhaust	5.0
CHP Cooling Fans	4.5
Blower	1.7 - On top of 6m high roof
Diesel Generator	3.0 – Phase 1 On top of 6m high roof 3.0 – Phase 2 at ground level

C.2 Noise Model 3D Views

Figure C.1 – 3D Model of Site (looking East)



C.3 Preliminary Noise Model Contour Plots

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

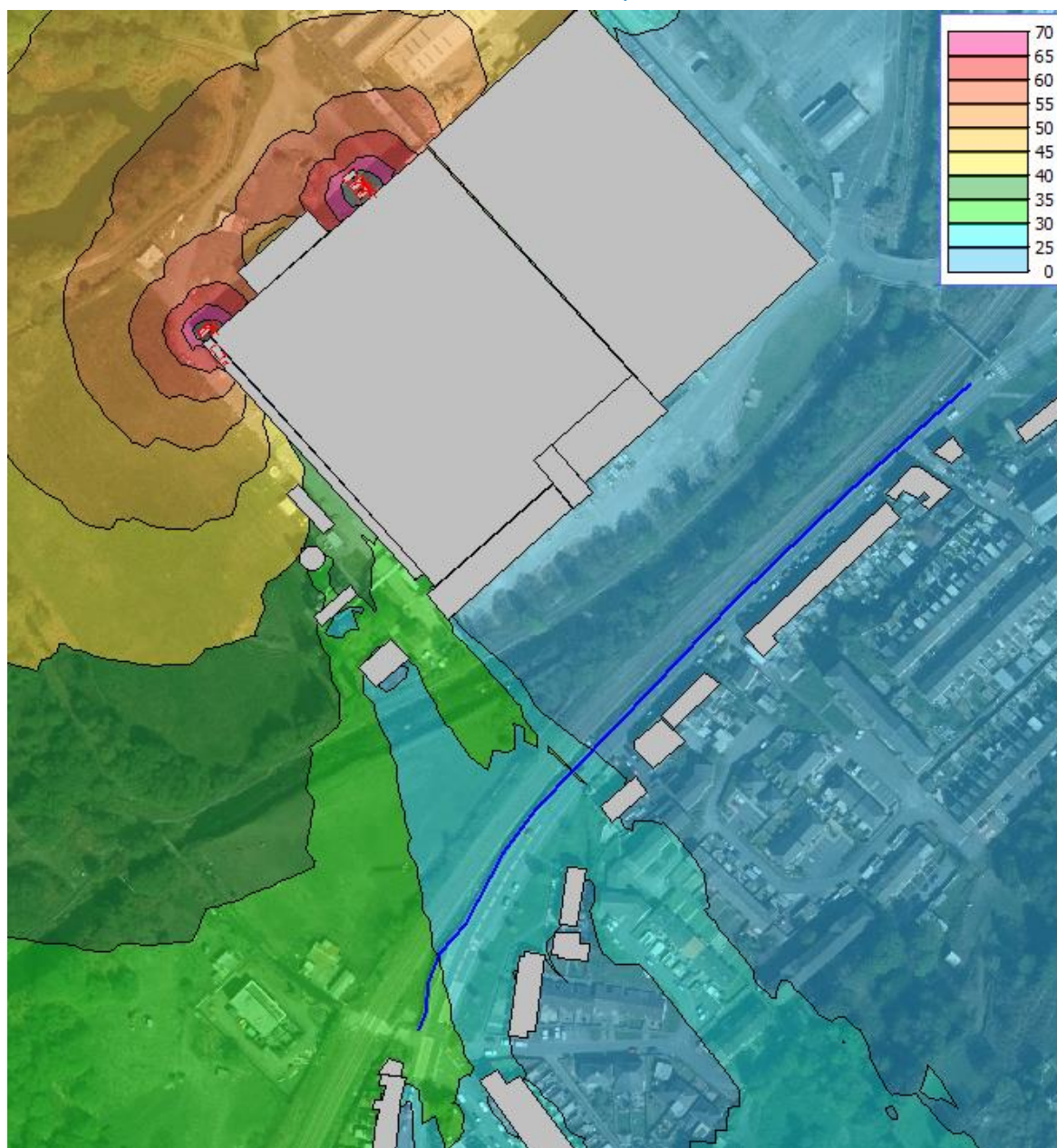
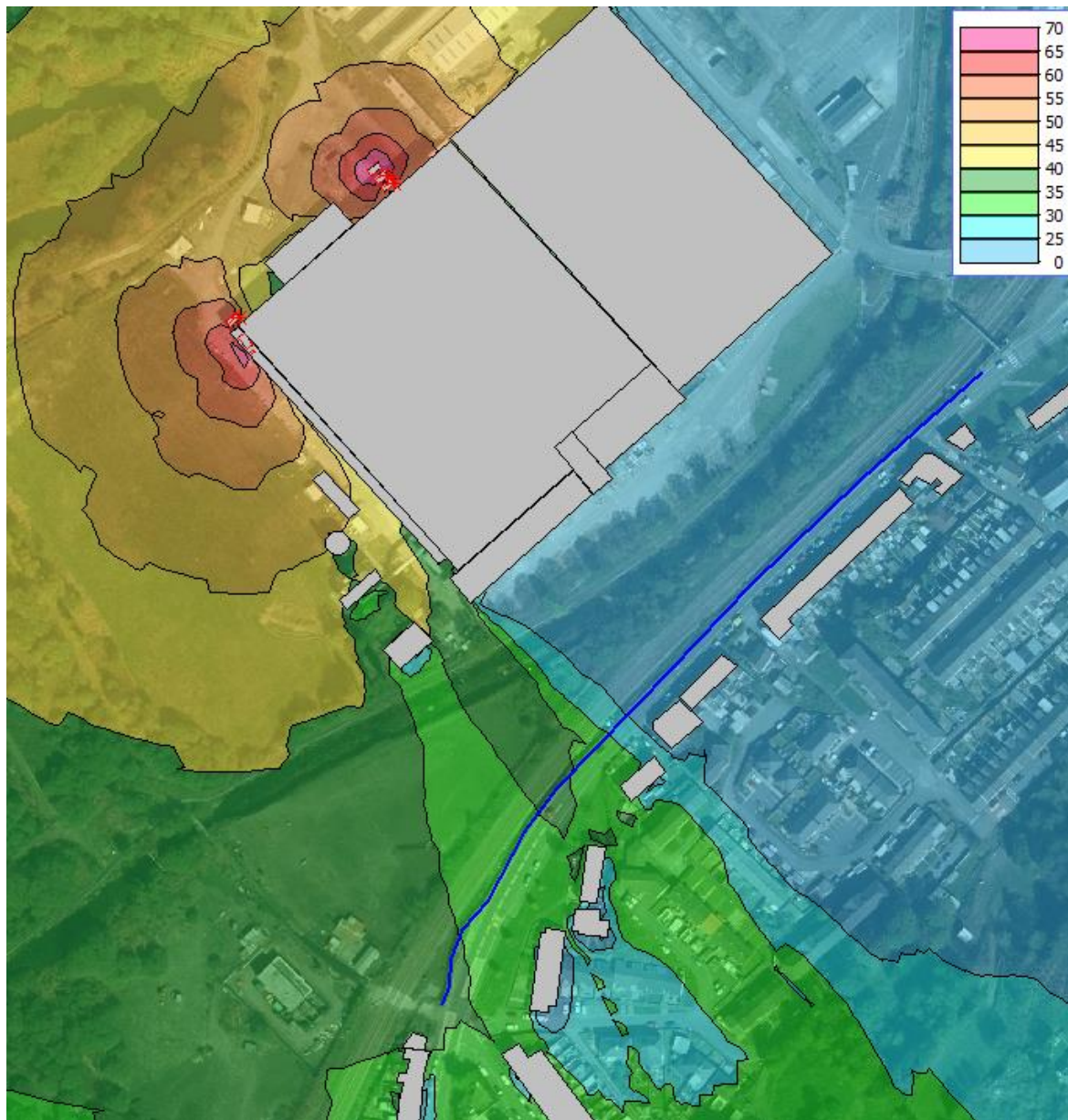


Figure C.3 – Standby Operation - Noise Model $L_{Aeq,T}$ Contours at 4.5m Height



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

Not included in draft...

APPENDIX E - DRAWING LISTS

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

Table E.1 – Ateb Consult Drawing List

Drawing Number	Rev	Date	Drawing Title
23/021 100	A	May '23	Proposed Aqua360 Unit
23/021 102	A	May '23	Proposed Building Extent
23/021 105	A	May '23	Proposed Layout
23/021 201	B	May '23	Proposed Elevations & Roof Remodelling
23/021 202	B	May '23	Proposed Side Elevation