



**Independent Acoustic
Consultancy Practice**

Environmental Noise Assessment

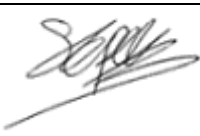
**Land at Usk Road
Penperlleni
Pontypool**

6287/ENS1

Environmental Noise Assessment

Project:	Land at Usk Road
Site Address:	Penperlleni Pontypool NP4
HA Reference:	6287/ENS1
Date:	07/09/2021
Client:	Edenstone Homes 1 st Floor Address Line 2 Wales One Business Park Magor NP26 3DG
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1. INTRODUCTION

We understand a residential development is being promoted on Land at Usk Road, Penperlleni, Pontypool, NP4. We understand the scheme is at an early stage and therefore a noise assessment is required to provide an initial idea of likely noise mitigation measures.

The site is currently three fields. The A4042 runs adjacent along north-west of the site. The Welsh Marches rail line runs 150m to the east of site.

This report has therefore been commissioned to assess existing ambient and background noise levels impinging on the site from local sources.

Survey results have been used for comparison with current planning guidance.

2. CRITERIA

2.1 Planning Policy Wales

The Welsh Government's Planning Policy Wales (Edition 11) dated February 2021, states the following;

"6.7.20 Where sensitive developments need to be located close to existing transportation infrastructure for sustainable movement and access they should be designed, as far as practicable, to limit harmful substances and noise levels within and around those developments both now and in the future. This may include employing the principles of good acoustic design and the inclusion of active travel or travel management measures as part of development proposals. Such development, however, should preferably be located away from existing sources of significant noise, which may include aircraft noise or roads, particularly new roads or those with programmed route improvements."

The document states *"For more information on the principles of good acoustic design, readers are referred to Professional Planning Guidance (ProPG) Supplementary Document 2, produced by the Association of Noise Consultants, the Institute of Acoustics and the Chartered Institute of Environmental Health (<http://www.association-of-noise-consultants.co.uk/propg/>). ProPG has been written principally to assist with the planning process in England, but the design principles put forward in Supplementary Document 2 may also be adopted in Wales.*

2.2 ProPG Supplementary Document 2

Professional Practice Guidance on Planning & Noise, New Residential Development 'Supplementary Document 2 – Good Acoustic Design' produced by the ANC, IOA and CIEH discusses the general principles of Good Acoustic Design, including the following hierarchy of noise management measures in descending order of preference;

- i) Maximising the spatial separation of noise source(s) and receptor(s).*
- ii) Investigating the necessity and feasibility of reducing existing noise levels and relocating existing noise sources.*
- iii) Using existing topography and existing structures (that are likely to last the expected life of the noise-sensitive scheme) to screen the proposed development site from significant sources of noise.*
- iv) Incorporating noise barriers as part of the scheme to screen the proposed development site from significant sources of noise.*
- v) Using the layout of the scheme to reduce noise propagation across the site.*
- vi) Using the orientation of the buildings to reduce the noise exposure of noise-sensitive rooms.*
- vii) Using the building envelope to mitigate noise to acceptable levels.*

“It should be remembered that good acoustic design is a process that begins as soon as land is under consideration for development. The timeline for good acoustic design stretches from the conceptual design stage, through quality control during construction, and beyond to post construction performance testing.

Both internal and external spaces should be considered in the acoustic design process. Care should be taken to ensure that acoustic mitigation measures do not result in an otherwise unsatisfactory development. Good acoustic design must be regarded as an integrated part of the overall design process”.

2.3 Technical Advice Note (Wales) 11

Noise bands defining categories A-D of TAN 11 are set in terms of $L_{Aeq,16hr}$ daytime and $L_{Aeq,8hr}$ night time levels for road traffic noise and mixed sources, free field 1.2-1.5m above ground level as follows;

Table 2.1 – TAN11 Noise Exposure Categories

Recommended noise exposure categories for new dwellings near existing noise sources (ref Table 2 of TAN 11 (Wales) October 1997)					
Noise Source	Time	Noise Exposure Categories			
		A	B	C	D
Road Traffic	07:00-23:00	<55	55-63	63-72	>72
	23:00-07:00	<45	45-57	57-66	>66
Rail Traffic	07:00-23:00	<55	55-66	66-74	>74
	23:00-07:00	<45	45-59	59-66	>66
Air Traffic	07:00-23:00	<57	57-66	66-72	>72
	23:00-07:00	<48	48-57	57-66	>66
Mixed Sources ⁽⁴⁾	07:00-23:00	<55	55-63	63-72	>72
	23:00-07:00	<45	45-57	57-66	>66

Note: In addition, sites where individual noise events regularly exceed 82dB(A) $L_{max}(slow)$, several times in any night time hour should be treated as being in NEC C, unless the $L_{eq}(8 \text{ hour})$ already puts the site in NEC D.

(4) Mixed sources: this refers to any combination of road, rail, air and industrial noise sources. The "mixed source" values are based on the lowest numerical values of the single source limits in the table. The "mixed source" NECs should only be used where no individual noise source is dominant.

2.4 British Standard 8233:2014

British Standard 8233:2014 'Guidance on sound insulation and noise reduction for buildings' includes internal noise criteria of habitable rooms in residential dwellings, as shown below;

Table 2.2 – BS 8233:2014 Internal Ambient Noise Criteria for Habitable Rooms

Location	Desired		Reasonable *	
	07:00 to 23:00	23:00 to 07:00	07:00 to 23:00	23:00 to 07:00
Living room	35 dB $L_{Aeq,16hr}$	-	40 dB $L_{Aeq,16hr}$	-
Dining room/area	40 dB $L_{Aeq,16hr}$	-	45 dB $L_{Aeq,16hr}$	-
Bedroom	35 dB $L_{Aeq,16hr}$	30 dB $L_{Aeq,8hr}$	40 dB $L_{Aeq,16hr}$	35 dB $L_{Aeq,8hr}$

* NOTE 7 states “Where development is considered necessary or desirable, despite external noise levels above WHO guidelines, the internal target levels may be relaxed by up to 5dB and reasonable internal conditions still achieved.

In addition BS 8233:2014 states: “Regular individual noise events (for example, scheduled aircraft or passing trains) can cause sleep disturbance. A guideline value may be set in terms of SEL or $L_{Amax,F}$, depending on the character and number of events per night. Sporadic noise events could require separate values.”

Reference is therefore made to World Health Organisation (WHO) ‘Guidelines for Community Noise, 1999’ which states “For a good sleep, it is believed that indoor sound pressure levels should not exceed approximately 45dB L_{Amax} more than 10-15 times per night (Vallet & Vernet 1991)”.

Section 7.7.3.2 of BS 8233:2014 entitled ‘Design criteria for external noise’ states;

“For traditional external areas that are used for amenity space, such as gardens and patios, it is desirable that the external noise level does not exceed 50 dB $L_{Aeq,T}$ with an upper guideline value of 55 dB $L_{Aeq,T}$ which would be acceptable in noisier environments. However, it is also recognised that these guideline values are not achievable in all circumstances where development might be desirable. In higher noise areas, such as city centres or urban areas adjoining the strategic transport network, a compromise between elevated noise levels and other factors, such as the convenience of living in these locations or making efficient use of land resources to ensure development needs to be met, might be warranted. In such a situation, development should be designed to achieve the lowest practicable levels in these external amenity spaces, but should not be prohibited.”

The above criteria in BS 8233:2014 apply for sources without specific character, previously termed “anonymous noise”. BS 8233:2014 7.7.1 advises:

“NOTE: Noise has a specific character if it contains features such as a distinguishable, discrete and continuous tone, is irregular enough to attract attention, or has strong low-frequency content, in which case lower noise limits might be appropriate.”

2.5 Planning Conditions

No planning conditions have been issued for this site. However, Monmouthshire County Council Environmental Health has issued the following guidance:

“Please note in order to ensure that the amenities of future occupiers are protected the following noise levels from road / rail traffic are expected to be met, exceedances of which would need to be satisfactorily justified.

Road / Rail Traffic Noise – Internal

All habitable rooms exposed to external road / rail traffic noise in excess of 55 dBA Leq 16 hour [free field] during the day [07.00 to 23.00 hours] or 45 dBA Leq 8 hour [free field] at night [23.00 to 07.00 hours] shall be subject to sound insulation measures to ensure that all such rooms achieve an internal noise level of 35 dBA Leq 16 hour during the day and 30 dBA Leq 8 hour at night.

Road / Rail Traffic Noise – External

The maximum day time noise level in outdoor living areas exposed to external road / rail traffic noise shall not exceed 50 dBA Leq 16 hour [free field].”

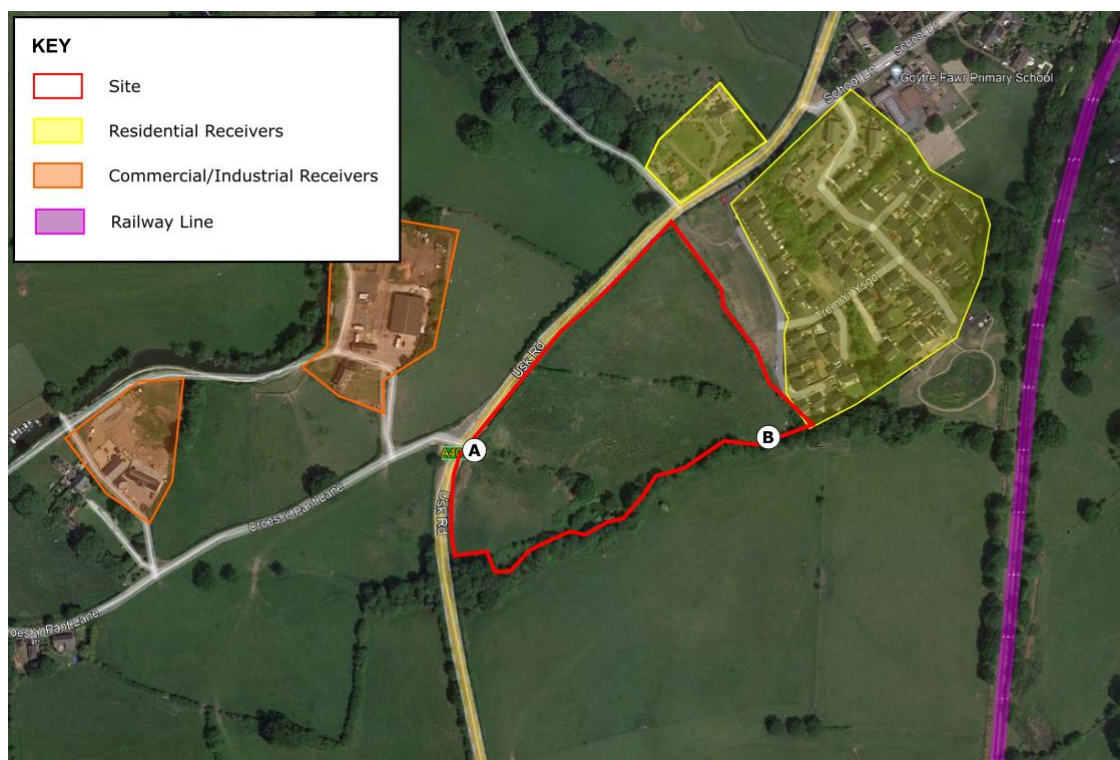
3. ENVIRONMENTAL NOISE SURVEY

3.1 Procedures

Continuous noise monitoring was carried out from 1145hrs on Tuesday, 24 August 2021 to 1145hrs on Wednesday, 25 August 2021 at positions A and B.

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.

Figure 3.1 – Site Plan Showing Monitoring Locations



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

Table 3.1 – Continuous Monitoring Location Details

Position	Description
A	Along the western boundary, 2m from Usk Road
B	Along the eastern boundary, approx. 22m to the nearest residential dwelling

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

3.2 Meteorological Conditions

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

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

3.3 Measurement Equipment

The following measurement equipment was used during the surveys:

Table 3.2 – Noise Monitoring Equipment List

Make	Description	Model	Serial Number	Last Calibrated	Certificate No.
Norsonic AS	Calibrator (113.95dB @ 999.27Hz)	1251	24202	17 August 2021	U35462
NTi	Type 1 - Sound Level Meter	XL2-TA	A2A-08723-E0	30 October 2019	FL-19-235
	Preamplifier	MA220	1820	30 October 2019	FL-19-235
	Microphone	Capsule	9381	30 October 2019	FL-19-235
NTi	Type 1 - Sound Level Meter	XL2-TA	A2A-10021-E0	17 August 2021	TCRT21/1568
	Preamplifier	MA220	5435	17 August 2021	TCRT21/1568
	Microphone	Capsule	8547	17 August 2021	TCRT21/1568

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.

3.4 Results

Time history graphs in Figure B.3, Figure B.4 of Appendix B show L_{Amax} , L_{Aeq} and L_{A90} sound pressure levels measured at positions A and B respectively.

The following $L_{Aeq,16hr}$ daytime (0700-2300hrs) and $L_{Aeq,8hr}$ night-time (2300-0700hrs) noise levels were measured;

Table 3.3 – Summary of Daytime $L_{Aeq,16hr}$ and Night-time $L_{Aeq,8hr}$ Results

Period	Date	Position	
		A	B
Daytime $L_{Aeq,16hr}$ (dB)	06-07/08/2021	73	49
Night-time $L_{Aeq,8hr}$ (dB)	06-07/08/2021	66	42

There were regular $L_{Amax,F}$ events over 82dB measured during the night-time period (2300-0700hrs) at Position A. This was due to the sound level meter position located 2m away from the carriage way and vehicles passing by caused this level to be exceeded.

There were no $L_{Amax,F}$ events over 82dB measured during the night-time period (2300-0700hrs) at Position B.

Daytime period is therefore assessed as critical (>5dB difference between daytime and night-time).

Graphs in Figure B.5 and Figure B.6 of Appendix B show statistical analysis of background sound levels measured at positions A and B respectively.

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

Table 3.4 – Minimum Consistent Daytime and Night-time Background L_{A90} Results

Period	Position	
	A	B
Daytime (0700-2300hrs) L_{A90} (dB)	52	44
Night-time (2300-0700hrs) L_{A90} (dB)	24	25

The ambient and background noise level was controlled by road traffic noise along A4042 Usk Road.

A railway line lies approximately 170m east of the site, trains were largely undetectable from the recordings and whilst on site at both positions.

4. NOISE MAP MODELLING

Three dimensional noise map modelling has been undertaken using the proprietary NoiseMap Five environmental noise mapping software package, which in turn uses calculation methods of Calculation of Road Traffic Noise (CRTN).

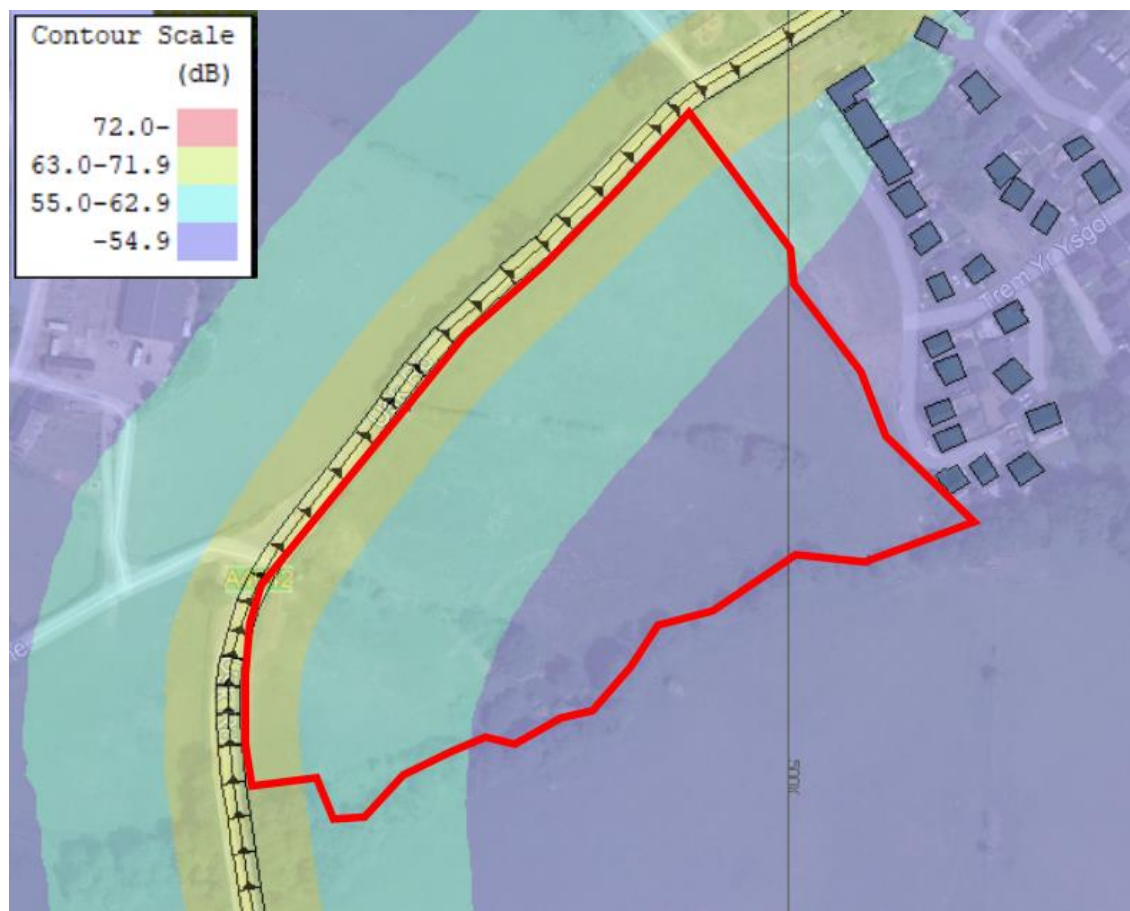
Models have been set up to predict daytime noise levels across the site from road traffic noise based on measured noise levels discussed in section 3.4 of this report.

The model takes into account distance and screening losses from existing and new structures.

4.1 Undeveloped Site

The noise map model in Figure 4.1 below shows predicted road traffic noise levels during the critical daytime period (0700-2300hrs) at 1.5m above local ground level across the undeveloped site. Noise levels during the night-time period (2300 – 0700) can be found in Figure B.9 in Appendix B.

Figure 4.1 - Daytime Model (Undeveloped Site) $L_{Aeq,16hr}$ Contours at 1.5m Height



The site is indicated to fall under NECs A, B and C of TAN11.

5. INITIAL FEASIBILITY ASSESSMENT

At this stage a housing layout does not currently exist. The following sections discuss the likely noise mitigation measures which may need to be considered for the site to control noise levels to internal and external spaces.

A detailed assessment of noise levels and required mitigation measures could be undertaken as housing layouts are developed.

5.1 Internal Noise Levels

Areas which fall under NECs B & C would require additional noise mitigation measures, ProPG stage 2 guidance advises: *“internal noise levels can be assessed with windows closed, however any façade openings used to provide whole dwelling ventilation (e.g. trickle ventilators) should be assessed in the “open” position and, in this scenario”*. The majority of the site should be capable of meeting the 35dB $L_{Aeq,16hr}$ & 30dB $L_{Aeq,8hr}$ internal noise criteria quoted BS8233 and ProPG guidance with standard trickle ventilators in open position and windows closed. However, dwellings closest to the A4042 are indicated to require some additional mitigation. Noise mitigation measures can be readily accommodated and it is therefore not considered to be a significant constraint to developing the site. At these locations good acoustic design principles are to be followed to minimise the potential noise impacts. These are likely to include:

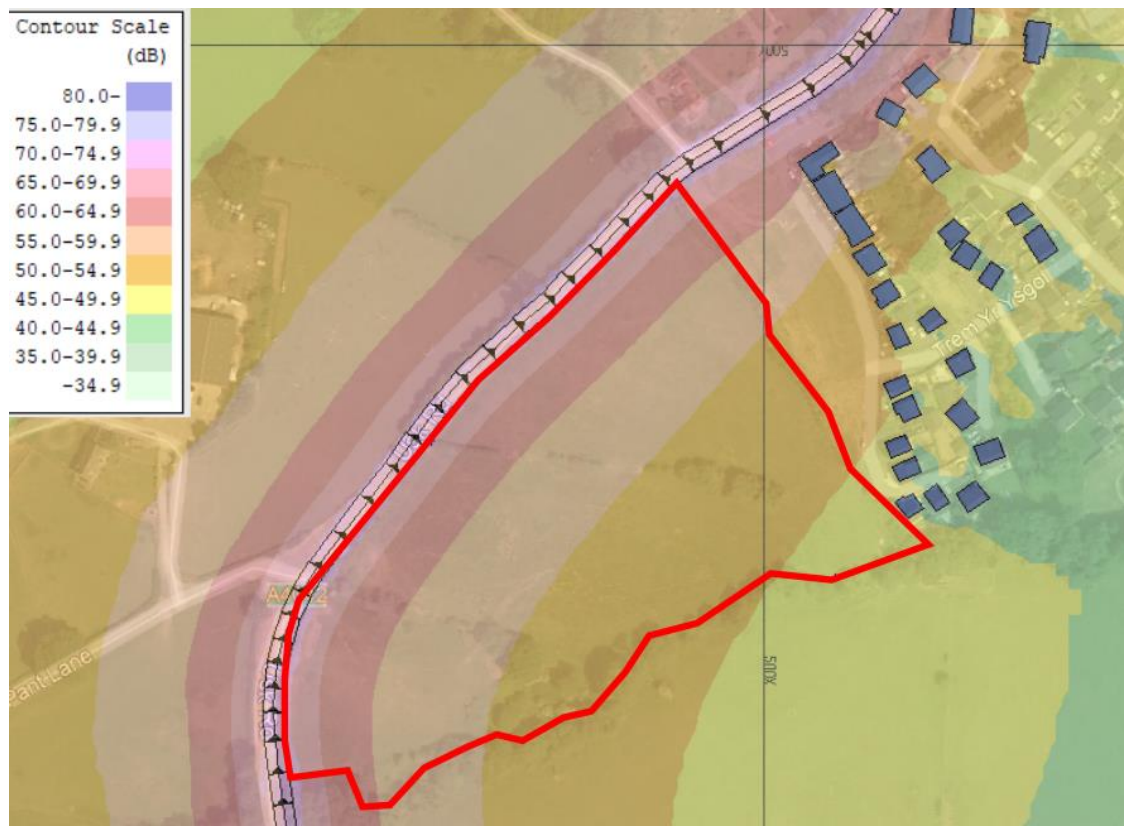
- additional sound insulation measures, typically in the form of uprated acoustic glazing and mechanical ventilation, to control road noise and regular night-time $L_{Amax,F}$ levels intrusion to within BS8233 / ProPG guideline criteria.

5.2 External Noise Levels - Gardens

Based on the results discussed in section 4.1, consideration of housing layouts and barrier fencing are therefore required to mitigate noise intrusion to dwellings and garden areas. Additional sound insulation measures such as up-rated acoustic glazing and mechanical ventilation are likely to be required to a selection of dwellings along the boundary parallel to Usk Road.

We have reviewed the undeveloped site to provide an assessment on likely screening requirement to control of road traffic noise levels into external amenity areas. It is likely garden fences and houses once modelled will improve screening to areas of the site.

Figure 5.1 – Garden Preliminary Assessment Daytime Model (Undeveloped Site)
 $L_{Aeq,16hr}$ Contours at 1.5m Height



The EHO guidance requires a garden criteria of 50dB $L_{Aeq,16hr}$. Gardens closest to the A4042 are unlikely to achieve this value even through good acoustic design; however the upper guidance value of 55dB $L_{Aeq,16hr}$ quoted in BS8233:2014 should remain practical.

BS8233:2014 guidance advises further (see Section 2.4 of this report): *In such a situation, development should be designed to achieve the lowest practicable levels in these external amenity spaces, but should not be prohibited.*

At this stage the following initial noise mitigation options for gardens closest to the A4042 should be considered:

- 1) Orientating housing so that gardens are located at the rear (east, south-east) of dwellings so that maximum screening can be provided.
- 2) Screening adjacent to the road along the length of the north-western site boundary

Screening could take the form of a solid structure (10kg/m²) or an earth bund / landscaping.

- 3) Increased local fence heights to plots/gardens
- 4) Possible use of acoustic buffer zones on land near the A4042

6. CONCLUSION

An environmental noise assessment has been carried out for the proposed residential development at Land at Usk Road, Penperlleni, Pontypool, NP4.

Noise surveys have been carried out across the site. Road traffic is indicated to control the ambient noise climate day and night across the site.

The noise survey indicates that daytime is the critical period (day/night difference > 5dB).

Noise map models have been generated to show noise propagation across the undeveloped site. The site is indicated to fall under NECs A, B and C of TAN11.

A preliminary review of internal and external noise levels have been discussed.

APPENDIX A - ACOUSTIC TERMINOLOGY

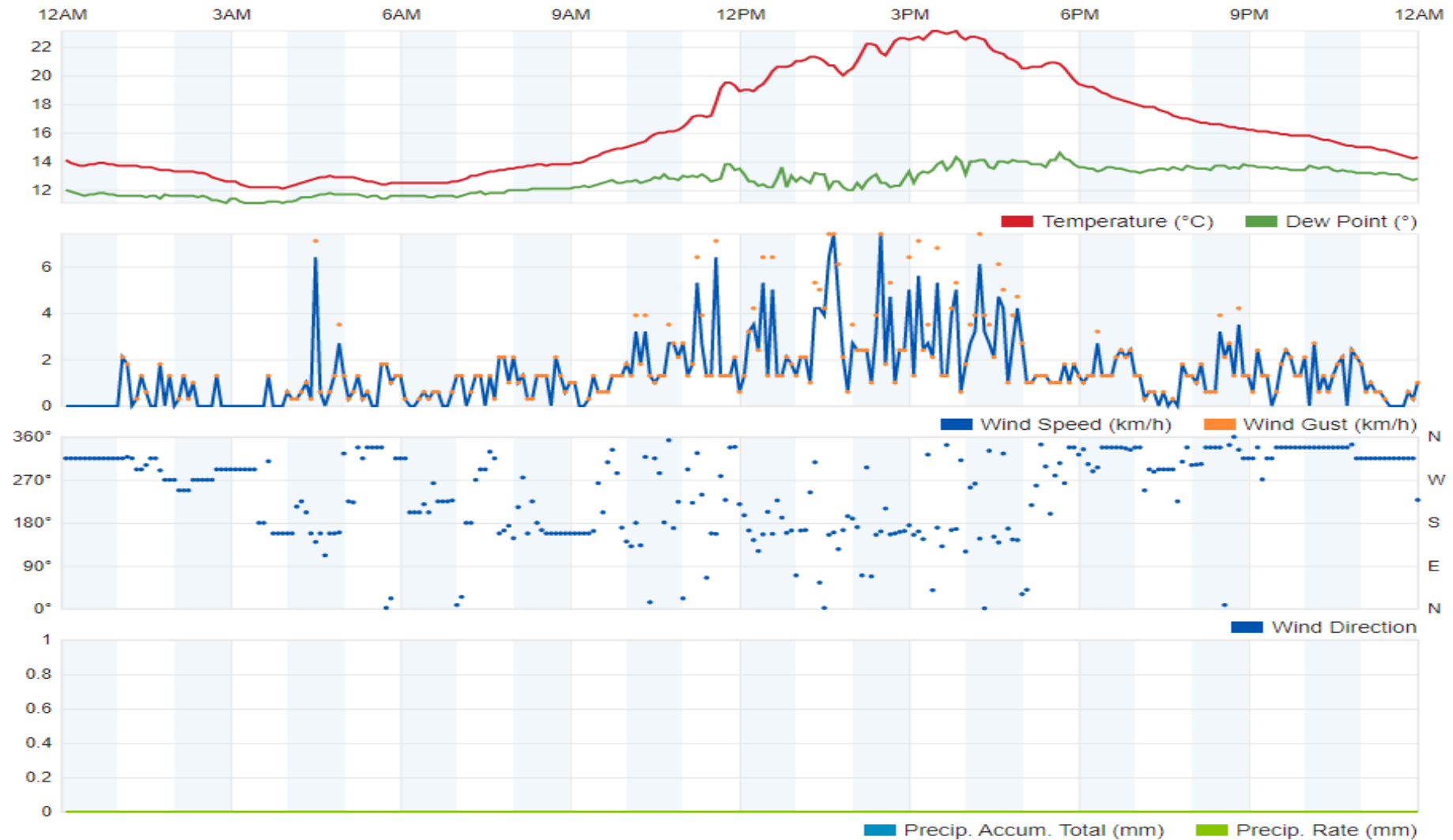
Human response to noise depends on a number of factors including loudness, frequency content and variations in level with time. Various frequency weightings and statistical indices have been developed in order to objectively quantify 'annoyance'.

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
SEL	'Sound Exposure Level', The dB(A) level which, if it lasted 1 second, would produce the same sound energy as the event in question (e.g. a train pass-by).

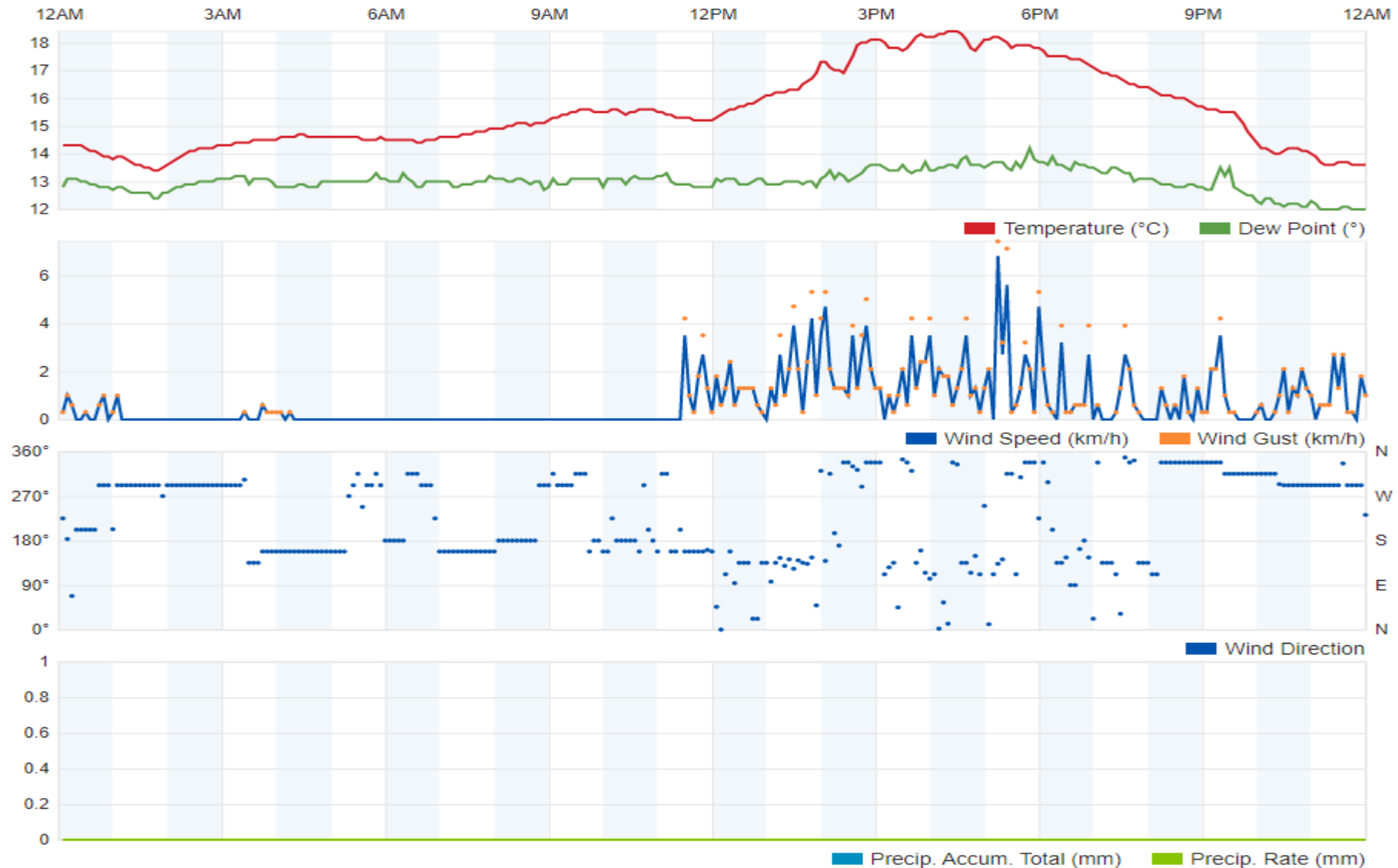
APPENDIX B - DIAGRAMS, GRAPHS AND TABLES

Figure B.1 – Approximate Weather History for Tuesday, 24 August 2021



Note: Taken from www.wunderground.com - weather station IPONTY14 located in Brynheulog [Elev 47 m, 51.69 °N, 3.03 °W]

Figure B.2 – Approximate Weather History for Wednesday, 25 August 2021



Note: Taken from www.wunderground.com - weather station IPONTY14 located in Brynheulog [Elev 47 m, 51.69 °N, 3.03 °W]

Figure B.3 – Time History at Position A (Tuesday, 24 August 2021 to Wednesday, 25 August 2021)

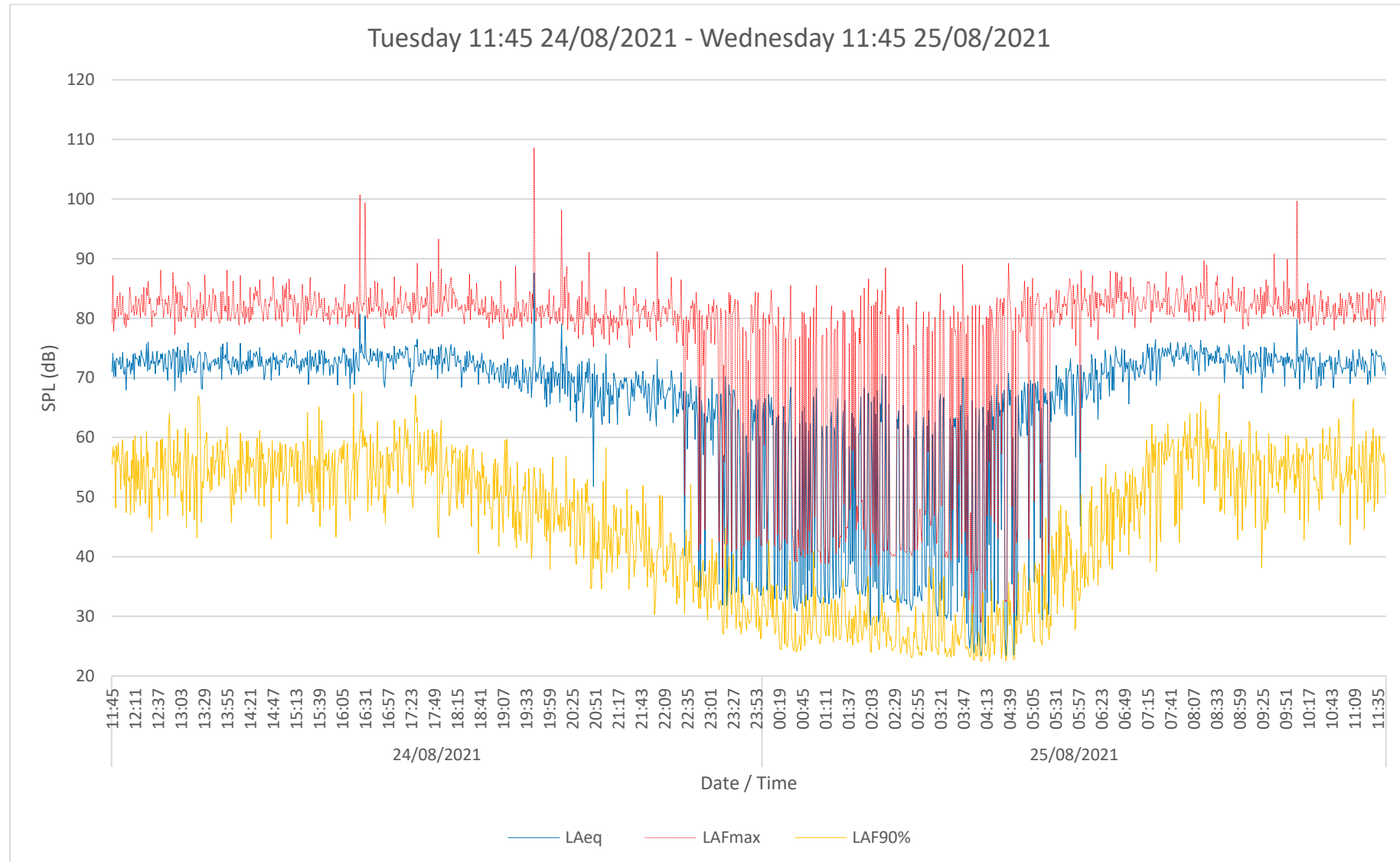


Figure B.4 – Time History at Position B (Tuesday, 24 August 2021 to Wednesday, 25 August 2021)

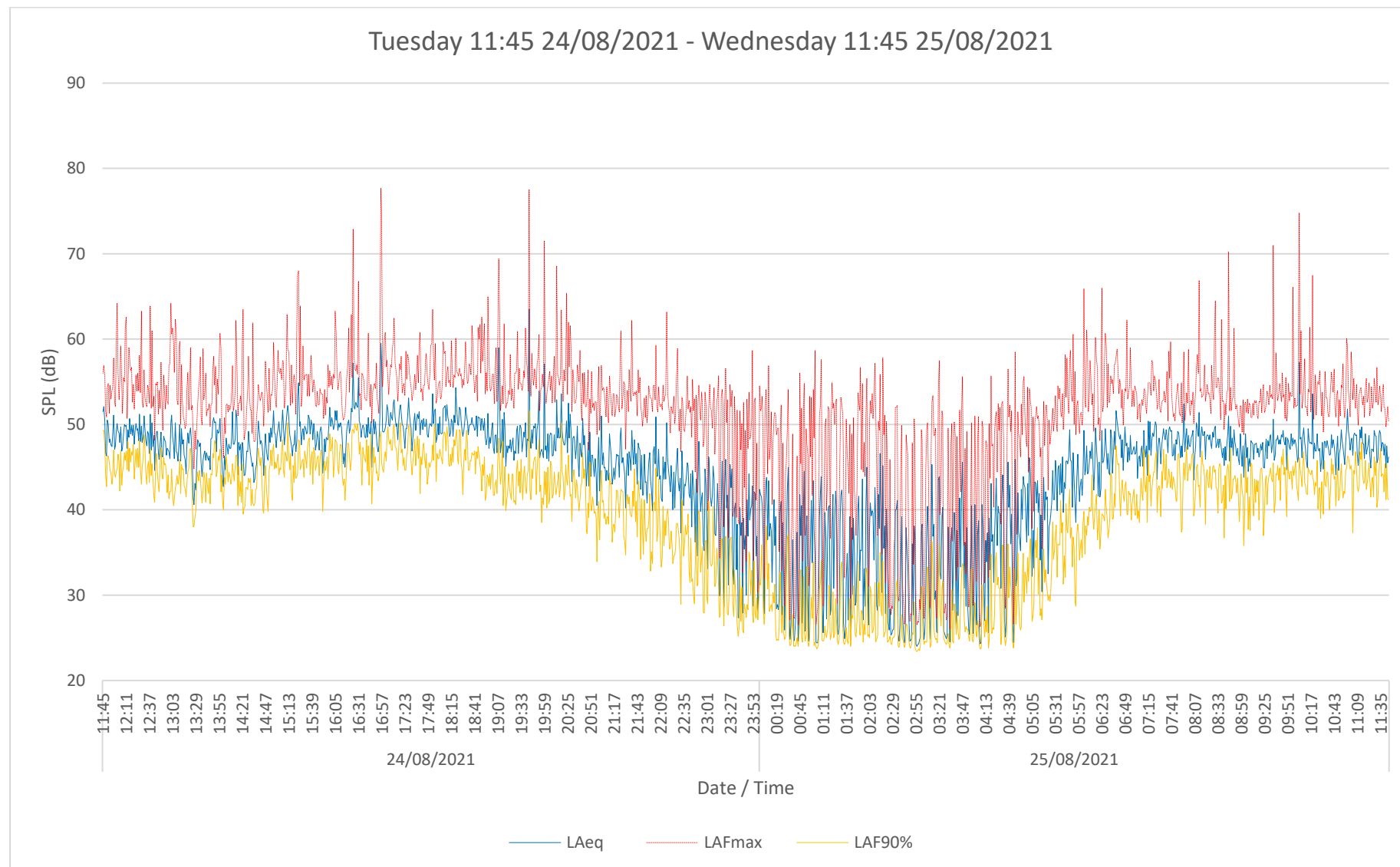


Figure B.5 – Statistical Analysis of Background Sound Levels Measured at Position A (24-25 August 2021)

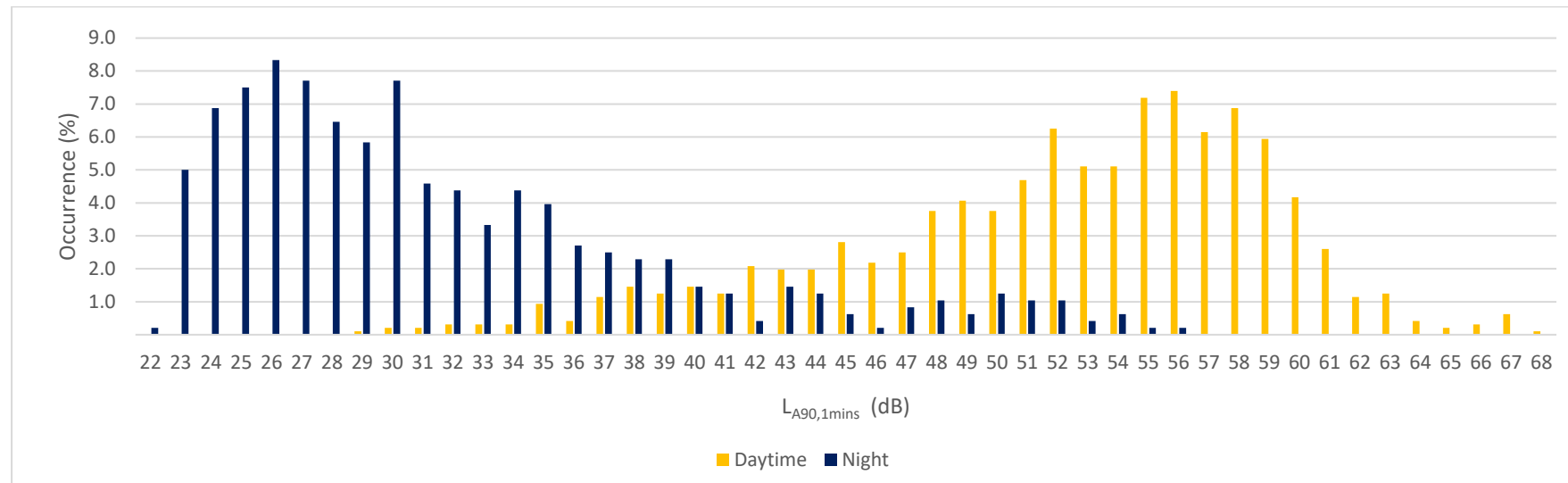


Figure B.6 – Statistical Analysis of Background Sound Levels Measured at Position B (24-25 August 2021)

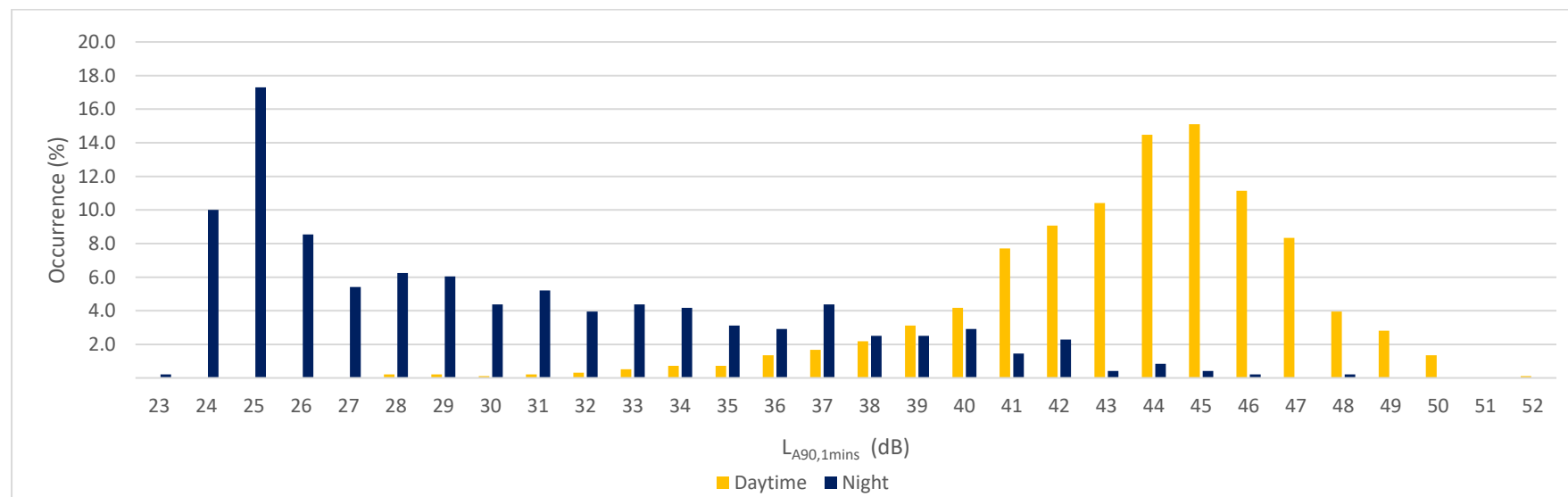
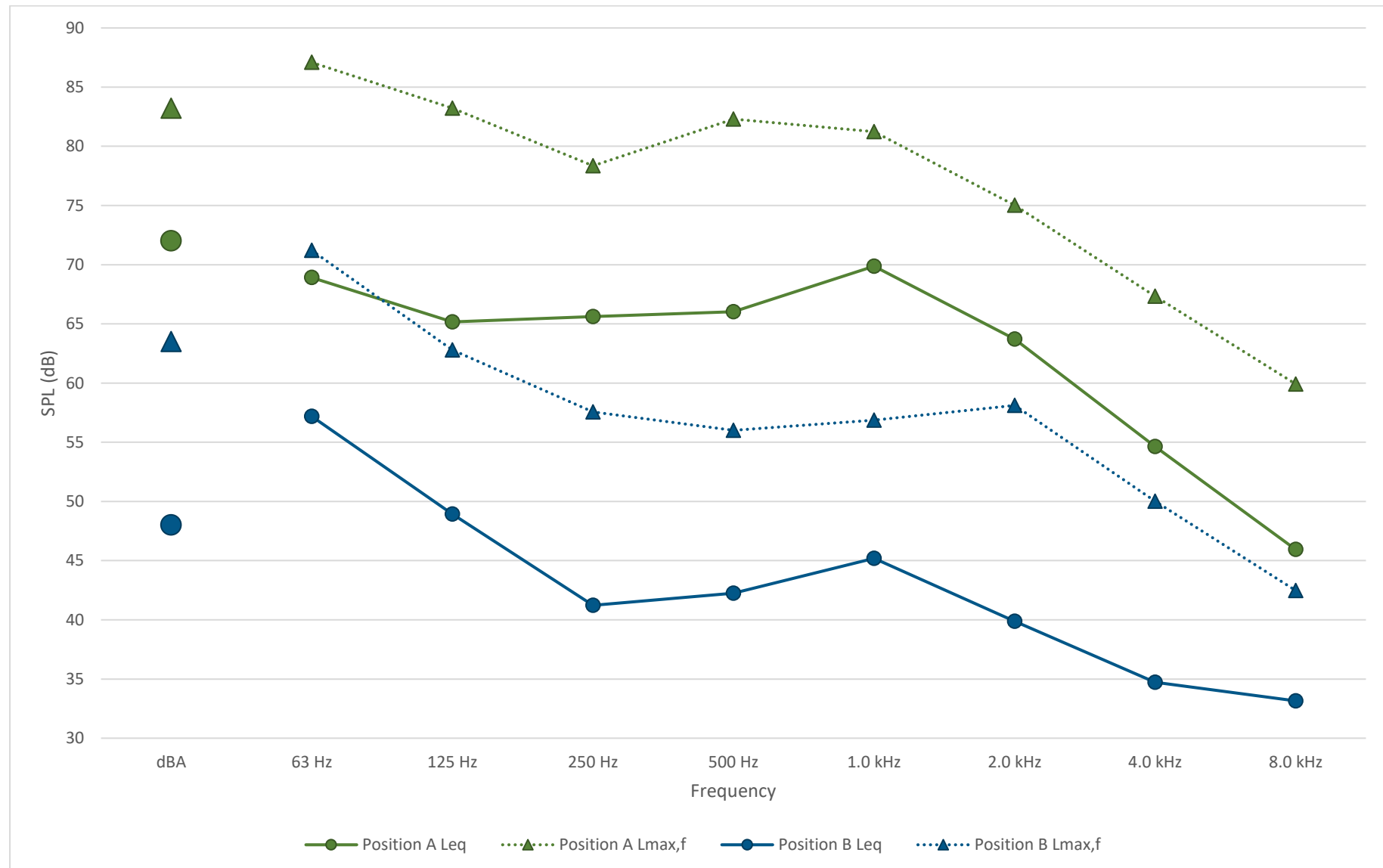


Figure B.7 – L_{eq} and $L_{max,F}$ Octave Band Spectra Measured at Positions A and B (24-25 August 2021)



Noise map Models

Figure B.8 – Daytime Noise Map (Undeveloped Site) $L_{Aeq,16hr}$ Contours at 1.5m Height

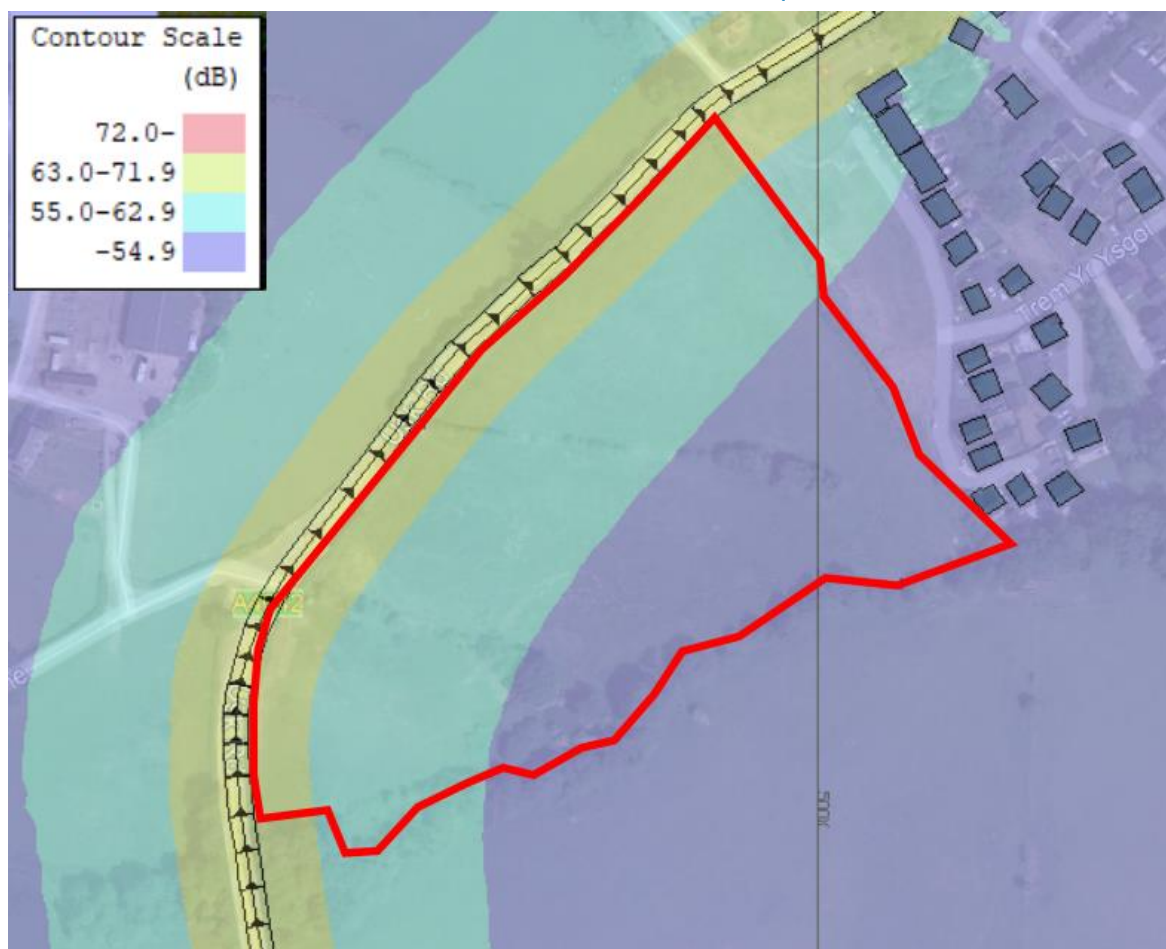


Figure B.9 – Night-time Noise Map (Undeveloped Site) $L_{Aeq,8hr}$ Contours at 1.5m Height



APPENDIX C - DRAWING LISTS

The following HM Land Registry drawing has been used in our assessment;

Table C.1 – Drawing List

Drawing Title	Drawing Number	Rev	Date
Penperlleni North HOTs plan	CYM103550	-	21/07/2021