



**Independent Acoustic
Consultancy Practice**

Environmental Noise and Vibration Assessment

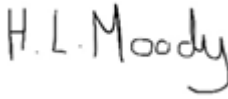
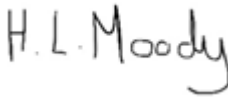
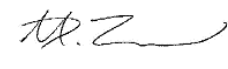
**Principality House
Newport**

7993/ENS1_Rev2

Environmental Noise and Vibration Assessment

Project:	Principality House
Site Address:	Pye Corner Junction Rogerstone Newport NP10 9DT
HA Reference:	7993/ENS1_Rev2
Date:	11/09/2026
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1. INTRODUCTION

We understand a residential scheme is proposed adjacent to the rail line at Principality House, Pye Corner in Newport.

The Client has requested a noise and vibration impact assessment are submitted to accompany the planning application.

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

Survey results have been used for comparison with typical Local Authority Planning conditions and current planning guidance.

2. CRITERIA

2.1 Planning Policy Wales

The Welsh Government's Planning Policy Wales (Edition 12) dated February 2024, 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 British Standard 6472-1:2008

British Standard 6472-1:2008 “Guide to Evaluation of Human Exposure to Vibration in Buildings” gives guidance figures for vibration dose value (VDV) ranges which might result in various probabilities of adverse comment within residential buildings, as shown below;

Table 2.3 – BS 6472-1:2008 VDV Guidance Ranges

Place and Time	Low Probability of Adverse Comment $\text{m/s}^{1.75}$	Adverse Comment Possible $\text{m/s}^{1.75}$	Adverse Comment Probable $\text{m/s}^{1.75}$
Residential buildings 16 h day	0.2 to 0.4	0.4 to 0.8	0.8 to 1.6
Residential buildings 8 h day	0.1 to 0.2	0.2 to 0.4	0.4 to 0.8

In our experience, Local Planning Authorities typically request that dwellings are designed and constructed to ensure that vibration dose values do not exceed $0.4\text{m/s}^{1.75}$ 0700-2300hrs daytime, and $0.26\text{m/s}^{1.75}$ 2300-0700hrs night-time, as calculated in accordance with BS 6472-1:2008 [1Hz to 80Hz].

3. ENVIRONMENTAL NOISE SURVEY

3.1 Procedures

Continuous noise monitoring was carried out from 1110hrs on Tuesday, 07 April 2026 to 1050hrs on Thursday, 09 April 2026 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	Located approximately 5m from the railway line at 4m above ground level
B	Located at the north-east entrance approximately 8m from the roadside at 1.5m above ground level

3.2 Meteorological Conditions

Approximate weather conditions are shown in time history graphs 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 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.
NTi	Type 1 - Sound Level Meter	XL2-TA	A2A-10021-E0	28-Aug-25	UK-25-112
	Preamplifier	MA220	5435	28-Aug-25	UK-25-112
	Microphone Capsule	MC230	8547	28-Aug-25	UK-25-112
NTi	Type 1 - Sound Level Meter	XL2-TA	A2A-14577-E0	21-Jun-24	UK-24-065
	Preamplifier	MA220	7485	21-Jun-24	UK-24-065
	Microphone Capsule	MC230	A15594	21-Jun-24	UK-24-065
Larson Davis	Calibrator (94.00dB / 114.03dB @ 1kHz)	CAL200	19047	29 August 2025	45898-19047-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.

3.4 Results

Time history graphs in Figure B.4 and Figure B.5 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 $L_{Aeq,11.5hr}$ (dB)	07/04/2026	57	61
Night-time $L_{Aeq,8hr}$ (dB)		51	53
Daytime $L_{Aeq,16hr}$ (dB)	08/04/2026	56	62
Night-time $L_{Aeq,8hr}$ (dB)		51	53
Daytime $L_{Aeq,4hr}$ (dB)	09/04/2026	58	61

There was 1no $L_{Amax,F}$ event over 82dB measured during the first night-time period (2300-0700hrs) and 3no events over 82dB during the second night-time period at Position A, with the highest L_{Amax} measuring 87dB. All of these events were train pass-bys. The 10th highest night-time $L_{Amax,F}$ at Position A during both night-time periods was 70dB.

At Position B, there was one $L_{Amax,F}$ event over 82dB measured during the night-time periods (2300-0700hrs), measuring 100dB. This was controlled by a modified car exhaust passing. The 10th highest night-time $L_{Amax,F}$ at Position A during night-time periods was 74dB.

Daytime period is therefore assessed as critical (>5dB difference between daytime and night-time). The site is indicated to fall under NEC B of TAN 11 during both the daytime and night-time.

Graphs in Figure B.6 and Figure B.7 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)	51	45
Night-time (2300-0700hrs) L_{A90} (dB)	40	34

The ambient and background noise climate at all positions was controlled by road traffic noise.

4. RAIL VIBRATION SURVEY

4.1 Procedure

Continuous vibration monitoring was carried out from 11:40hrs on Tuesday, 07 April 2026 to 10:40hrs on Thursday, 09 April 2026.

Hourly VDV's were monitored in three orthogonal axes:

- Radial (horizontal, perpendicular to line of tracks)
- Tangential (horizontal, parallel to line of tracks)
- Vertical

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

Table 4.1 – Vibration Monitoring Location Details

Position	Description
V1	Approx. 7m from the track, on bare ground bearing concrete floor inside the existing building.

4.2 Equipment Used

The following measurement equipment was used during the surveys:

Table 4.1 – Vibration Monitoring Equipment List

Make	Description	Model	Serial Number	Last Calibrated	Certificate No.
Svantek	Vibration Terminal	SV803	142457	02-Jul-24	1509104-1

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

4.3 Results

Table B.1, Table B.2 & Table B.3 of Appendix B show hourly vibration dose value (VDV) results for continuous vibration monitoring at position V1.

Total daytime (0700-2300hrs) and night-time (2300-0700hrs) VDV results are summarised in the table below:

Table 4.2 - Summary of Continuous Vibration Monitoring Results at Position V1

Axis	Monitoring Day in April 2026		
	7 th	8 th	9 th
Radial Totals			
VDV _d Day: 0700-2300hrs (m/s ^{1.75})	0.001	0.001	0.001
VDV _d Night: 2300-0700hrs (m/s ^{1.75})	0.000	0.001	0.001
Tangential Totals			
VDV _d Day: 0700-2300hrs (m/s ^{1.75})	0.001	0.001	0.001
VDV _d Night: 2300-0700hrs (m/s ^{1.75})	0.001	0.001	0.001
Vertical Totals			
VDV _b Day: 0700-2300hrs (m/s ^{1.75})	0.014	0.015	0.013
VDV _b Night: 2300-0700hrs (m/s ^{1.75})	0.005	0.013	0.011

Vibration dose values do not therefore exceed 0.4m/s^{1.75} 0700-2300hrs daytime, and 0.26m/s^{1.75} 2300-0700hrs night-time, as calculated in accordance with BS 6472-1:2008 [1Hz to 80Hz].

5. EXTERNAL BUILDING FABRIC ASSESSMENT

Based on survey results, we have carried out an external building fabric assessment with the aim of controlling noise intrusion to habitable rooms to meet 35dB $L_{Aeq,16hr}$ daytime and 30dB $L_{Aeq,8hr}$ night-time, in line with the desirable internal ambient noise values quoted in BS 8233:2014 (see section 2.4 of this report) under whole dwelling ventilation conditions.

The assessment also aims to control noise intrusion from regular train pass-bys to <45dB $L_{Amax,F}$ in bedrooms during the night and between 50-55dB $L_{Amax,F}$ during the daytime in living rooms.

Critical façades are shown on site plan in Figure 5.1 below, marked up with **MAGENTA** lines.

Figure 5.1 – Façades Requiring Additional Sound Insulation Measures



Note: Habitable rooms include bedrooms, lounges, dining rooms and kitchen/diners but not kitchens or bathrooms.

All habitable rooms (at all floor levels) on façades highlighted above require up-rated acoustic glazing, and ventilation as specified below. Standard thermal double glazing and trickle ventilation should be sufficient on remaining façades (not highlighted).

This assessment has been carried out based on latest drawings referenced in Appendix C. The following glazing areas have been used in our calculations:

- Bedrooms 2 m²
- Lounge/Kitchens 10 m²

The analysis is based on road noise modelling (shown in Appendix C) and spectra quoted in Figure B.8 and Figure B.9 of Appendix B.

5.1 External Walls

The following external wall construction has been used in our analysis;

Brick / cavity / Block or Brick / Cavity / Timber frame

The following SRI performance figures are taken from BS 8233:2014 for 'Brick and block external wall'. The proposed constructions should be capable of achieving these figures as a minimum;

Table 5.1 – External Wall Sound Reduction Index Figures

Element	Description	Sound Reduction Index dB R (BS EN ISO 10140-2:2010) @ Octave Band Centre Frequency (Hz)				
		125	250	500	1k	2k
		40	44	45	51	56
External Wall	Brick / Cavity / Block or Brick / Cavity / Timber frame					

Note: Any areas of cladding would need to be reviewed at the detailed design stage.

5.2 Roof

The following roof constructions have been used in our analysis:

Flat timber-joist roof, asphalt on boarding, 12mm plasterboard ceiling, thermal insulation

Table 5.2 – Roof Sound Reduction Index Figures

Element	Description	Sound Reduction Index dB R (BS EN ISO 10140-2:2010) @ Octave Band Centre Frequency (Hz)				
		125	250	500	1k	2k
Flat Roof	Flat timber-joist roof, asphalt on boarding, 12mm plasterboard ceiling, thermal insulation	22	37	43	49	57

5.3 Glazing

The following sound reduction index figures shall be met for glazing:

Table 5.3 - Glazing Sound Reduction Index Figures

Element	Description	Sound Reduction Index dB R (BS EN ISO 10140-2:2010) @ Octave Band Centre Frequency (Hz)				
		125	250	500	1k	2k
MAGENTA	For budgetary guidance: based on Pilkington 6mm / 16mm argon / 8.8mm Optiphon	25	27	38	48	47

A typical glazing system that should be capable of achieving the quoted SRI figures (based on Pilkington test data) is included in the table for initial budgetary guidance, however;

The successful glazing suppliers shall provide independent laboratory test data to BS EN ISO 10140-5 – 2010, confirming their proposed systems (including frames/seals) meet the quoted octave band sound reduction performance figures above.

5.4 Ventilation

Habitable rooms on critical façades highlighted **MAGENTA** require a ventilation strategy that does not rely on opening windows to achieve 'extract ventilation' and 'whole building ventilation' rates as required by Building Regulations Part F, Regulation F1(1) 2010 2022 Edition.

Continuous mechanical supply and extract with heat recovery. Guidance on minimum provisions for extract and whole building ventilation is set out Para 1.69 of Building Regulations Part F.

These strategies rely on windows being closed; however, occupiers may still open windows for purge ventilation, or under normal ventilation conditions if they so choose to, and so glazing would not be 'fixed pane'.

The final proposed ventilation strategy should be confirmed acceptable with planners/EHO and Building Control.

5.4.1 Mechanical Ventilation System Noise

All mechanical ventilation systems should be designed to meet the noise criteria set out in Building Regulations Approved Document Part F, 2022 Edition – For use in Wales which states the following:

“Although there is no requirement to undertake noise testing, achieving the levels in the following guidance should ensure good acoustic conditions. The average A-weighted sound pressure level for a ventilator operating under normal conditions and not at boost rates should not exceed both of the following.

- a) 30dB LAeq,T for noise-sensitive rooms (e.g. bedrooms and living rooms) when a continuous mechanical ventilation system is running on its minimum low rate.*
- b) 45dB LAeq,T in less noise-sensitive rooms (e.g. kitchens and bathrooms) when a continuous operation system is running at the minimum high rate or an intermittent operation system is running.”*

5.4.2 General

Do not include standard background (trickle) ventilators within window frames on critical facades.

Final proposals should be confirmed with Building Control and Environmental Health prior to orders being placed.

6. EXTERNAL NOISE ASSESSMENT (SHARED AMENITY SPACE)

A shared amenity space is indicated on the scheme at the north of the site. Noise map modelling indicates levels of 55-56dB $L_{Aeq,16hr}$ in this area.

This is indicated in line with reasonable external amenity criteria set out in BS 8233:2014 (see Section 2.4) and in our opinion, should be acceptable for a shared external amenity space in an apartment block.

7. CONCLUSION

An environmental noise and vibration assessment has been carried out for the proposed residential development at Principality House, Pye Corner Junction, Newport, NP10 9DT.

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

The site is indicated to fall under NEC B of TAN 11 during both the daytime and night-time. The noise survey indicates that daytime is the critical period (day/night difference > 5dB).

An external building fabric assessment has been carried out. Critical facades requiring additional sound insulation measures have been highlighted and specifications for external wall, roof, ventilation and glazing are included.

Vibration dose values (VDVs) are indicated to fall below thresholds typically set out in Local Planning Authority conditions for residential development.

Noise levels in the shared amenity areas are indicated at 55-56dB $L_{Aeq,16hr}$. This is indicated in line with reasonable external amenity criteria set out in BS 8233:2014 (see Section 2.4) and in our opinion, should be acceptable for a shared external amenity space in an apartment block.

Overall therefore, subject to mitigation set out in this report, there are no acoustic or vibration constraints to the proposed residential development.

APPENDIX A - ACOUSTIC TERMINOLOGY

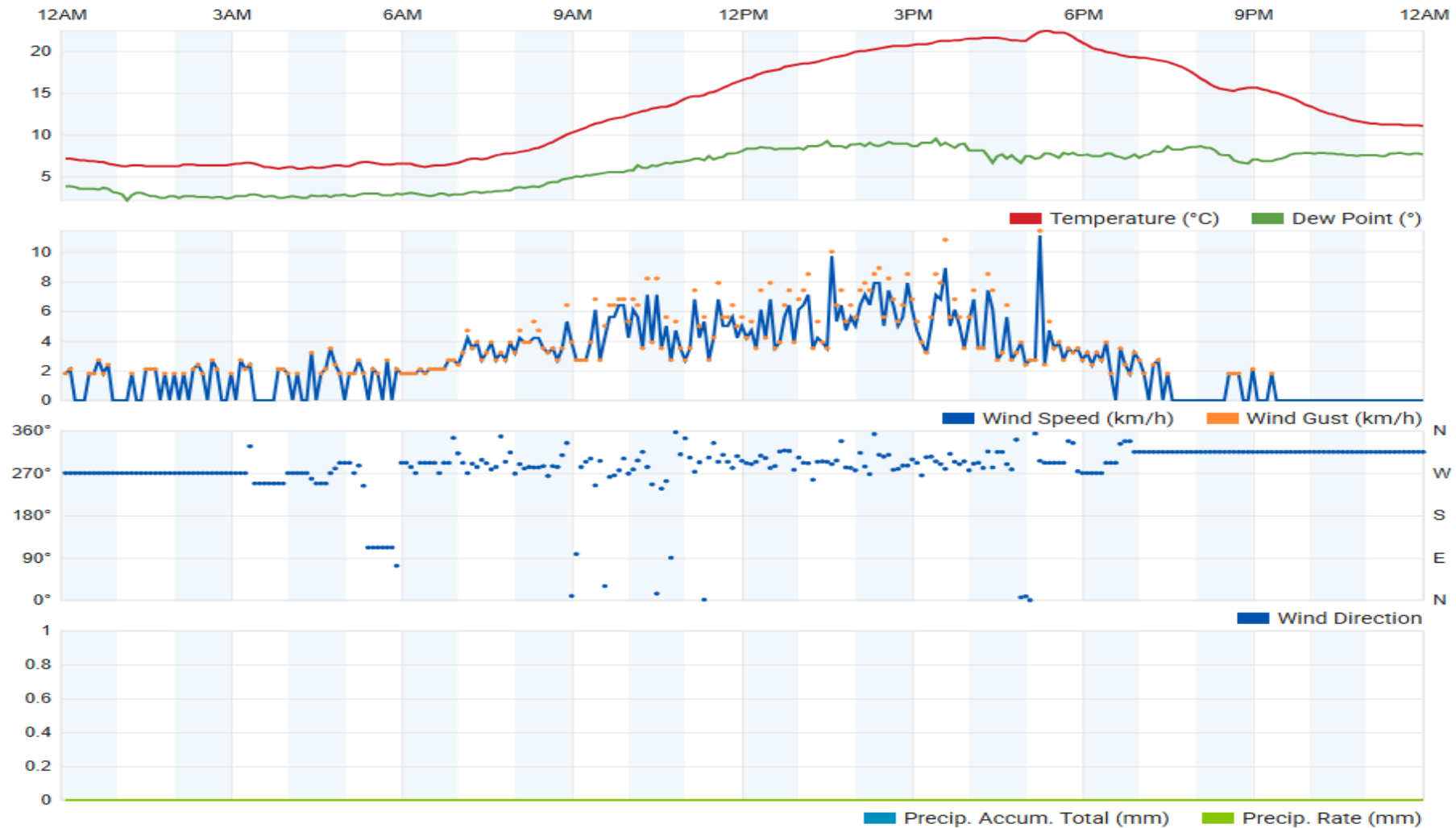
Human response to noise depends on a number of factors including loudness, frequency content and variations in level with time. Various frequency weightings and statistical indices have been developed in order to objectively quantify 'annoyance'.

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.
$L_{Ar,Tr}$	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
$VDV_{b/d,T}$	Vibration Dose Value – the measure of the total vibration experienced over a specified period. It is weighted using W_b and W_d as appropriate, over a given time period, T . The VDV defines a relationship that yields a consistent assessment of continuous, intermittent, occasional and impulsive vibration and correlates well with subjective response.

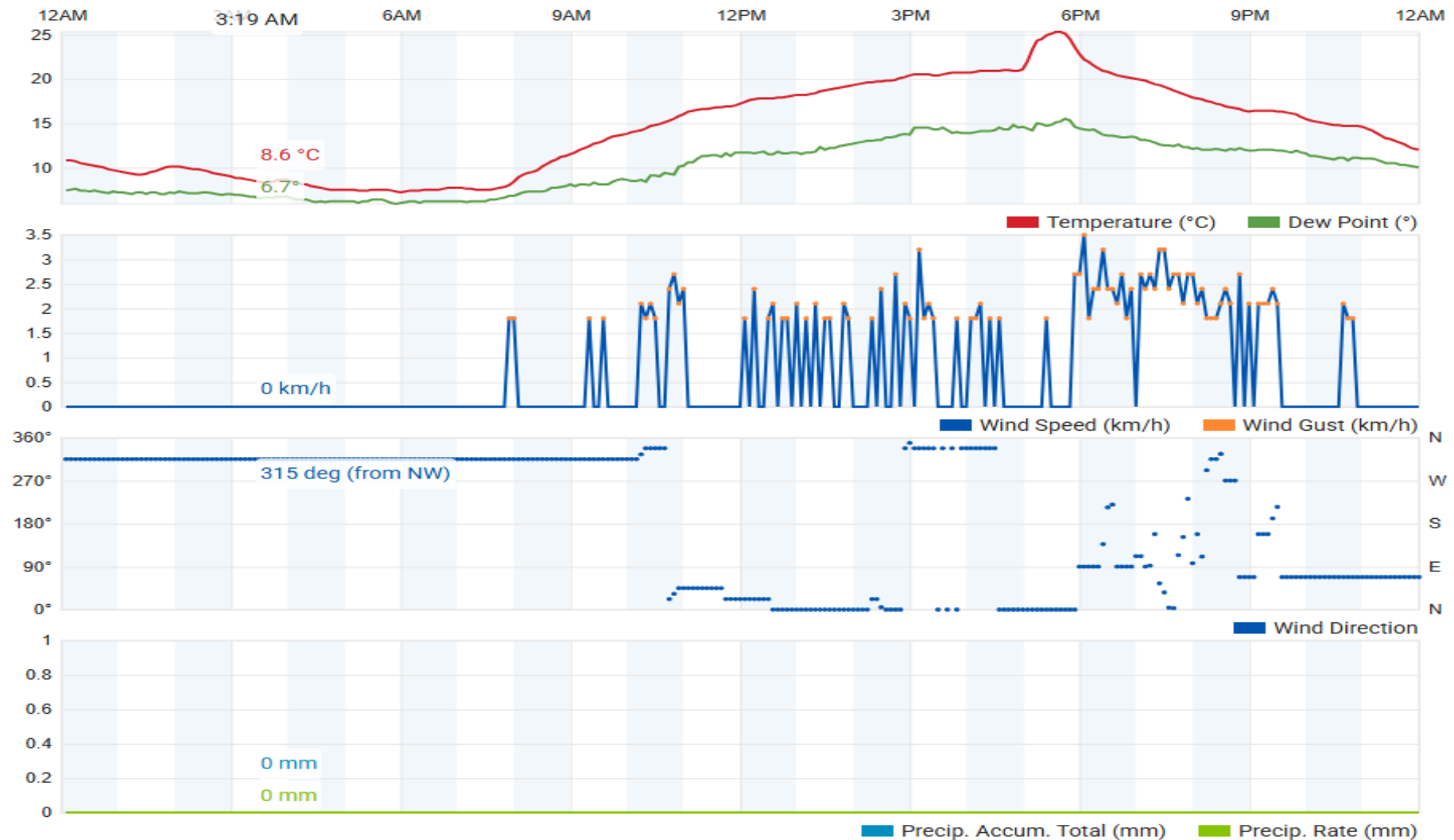
APPENDIX B - DIAGRAMS, GRAPHS AND TABLES

Figure B.1 – Approximate Weather History for Tuesday, 07 April 2026



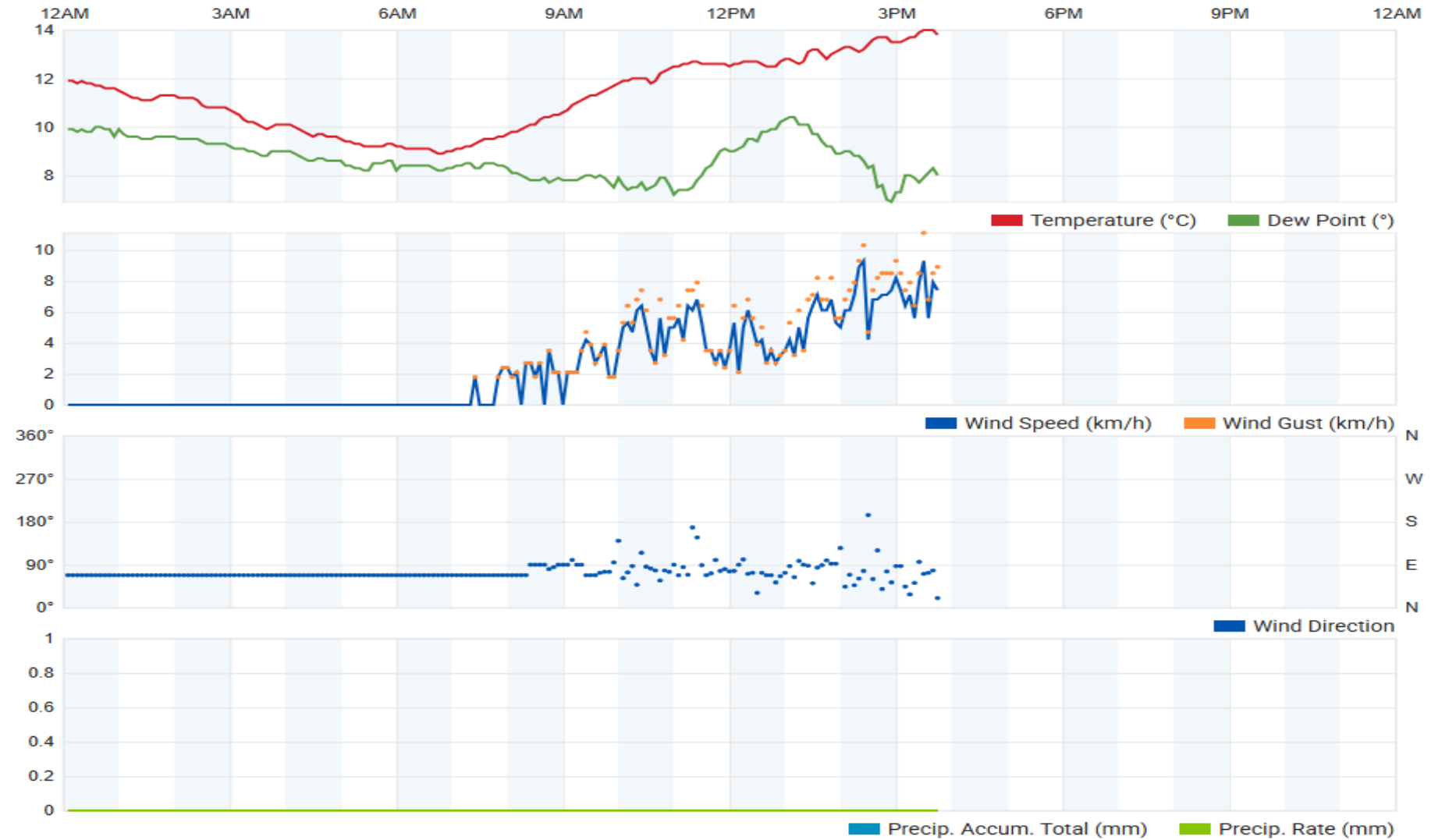
Note: Taken from www.wunderground.com - weather station INEWPO165 located in Pye Corner [Elev 13 m, 51.58 °N, 3.03 °W]

Figure B.2 – Approximate Weather History for Wednesday, 08 April 2026



Note: Taken from www.wunderground.com - weather station INEWPO165 located in Pye Corner [Elev 13 m, 51.58 °N, 3.03 °W]

Figure B.3 – Approximate Weather History for Thursday, 09 April 2026



Note: Taken from www.wunderground.com - weather station INEWPO165 located in Pye Corner [Elev 13 m, 51.58 °N, 3.03 °W]

Figure B.4 – Time History at Position A (Tuesday, 07 April 2026 to Thursday, 09 April 2026)

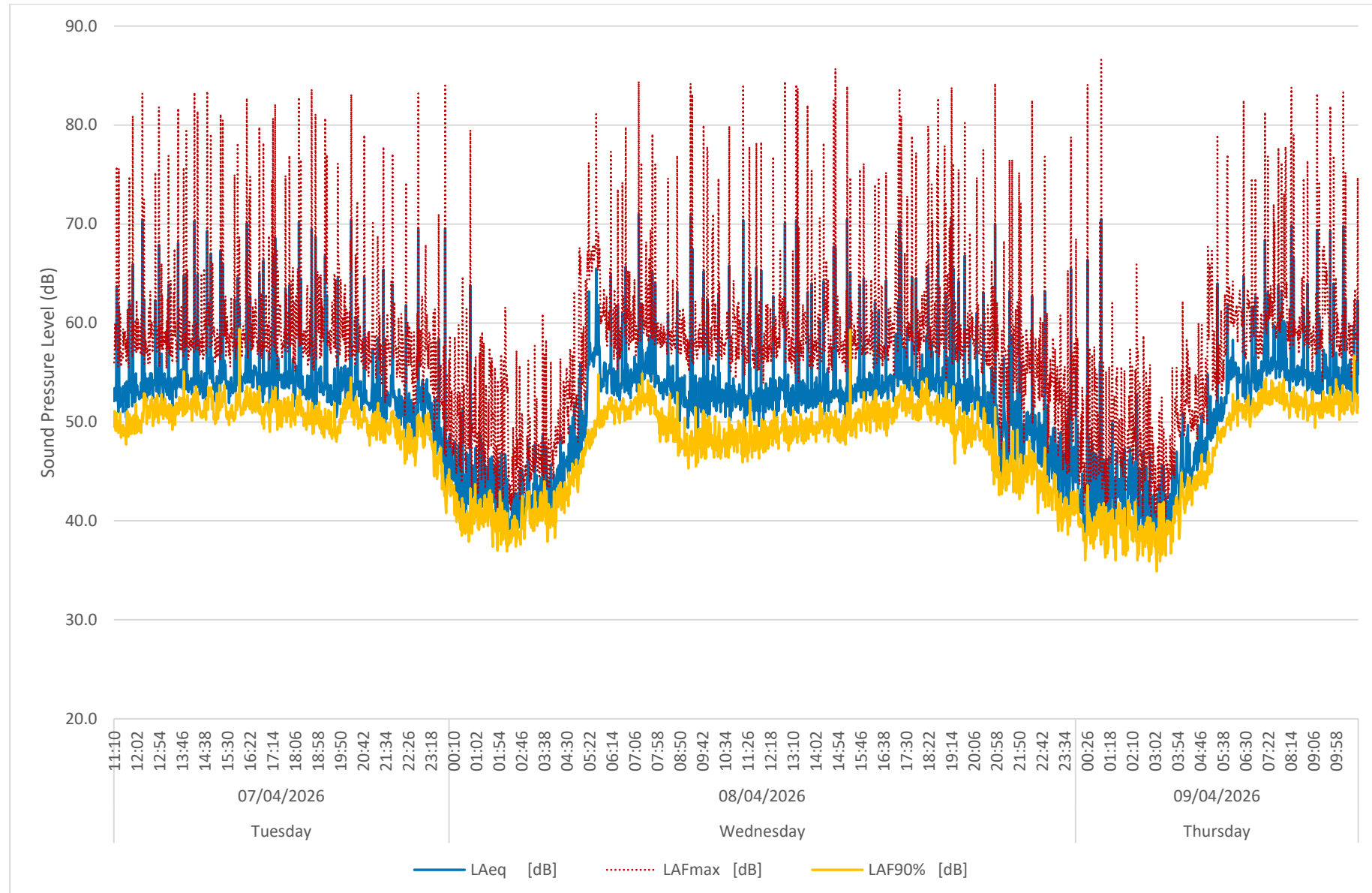


Figure B.5 – Time History at Position B (Tuesday, 07 April 2026 to Thursday, 09 April 2026)

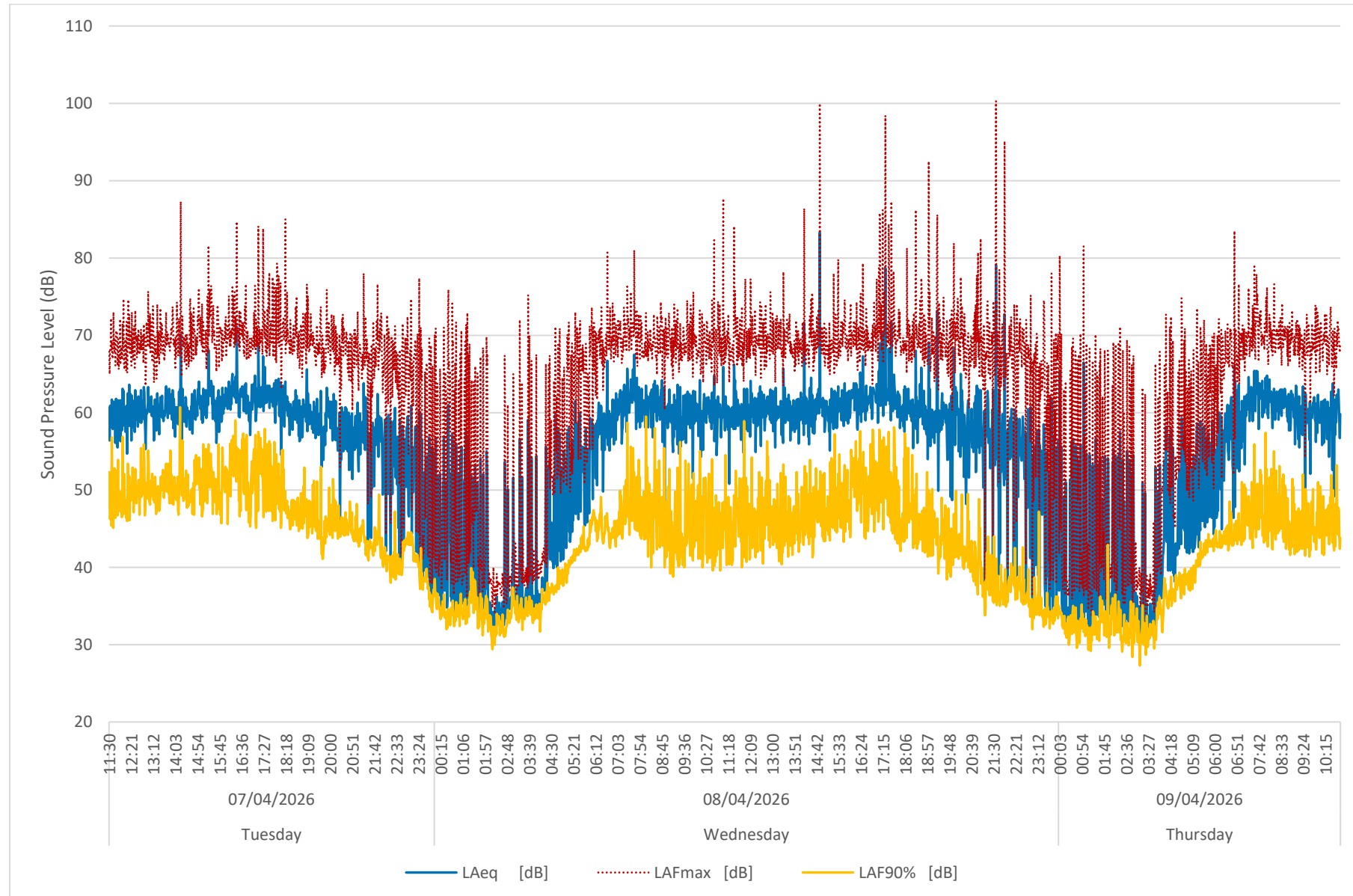


Figure B.6 – Statistical Analysis of Background Sound Levels at Position A (Tuesday, 07 April 2026 to Thursday, 09 April 2026)

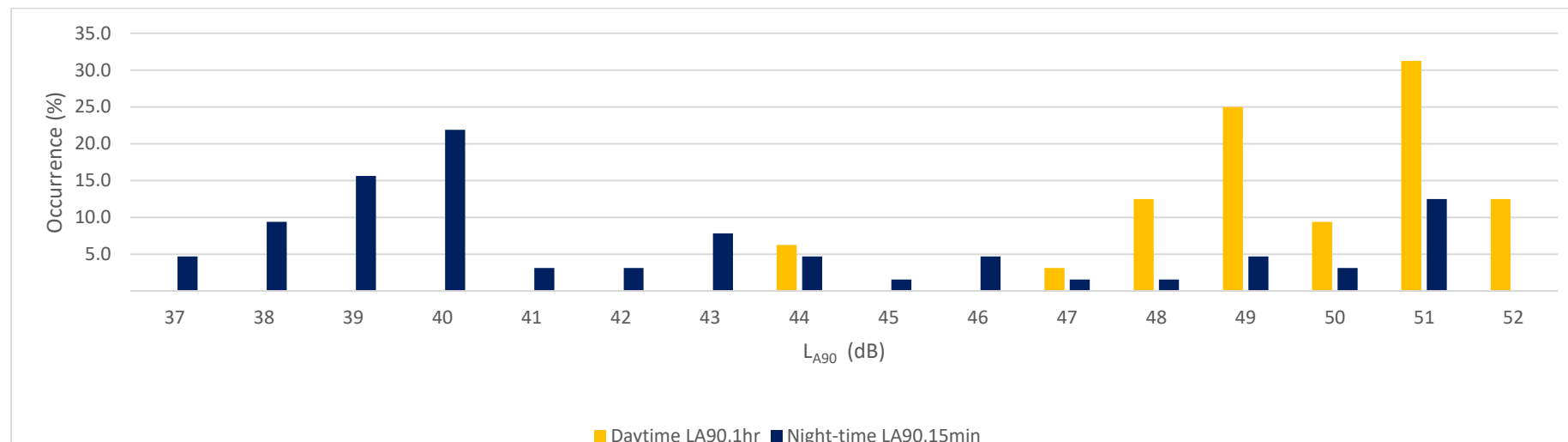


Figure B.7 – Statistical Analysis of Background Sound Levels at Position B (Tuesday, 07 April 2026 to Thursday, 09 April 2026)

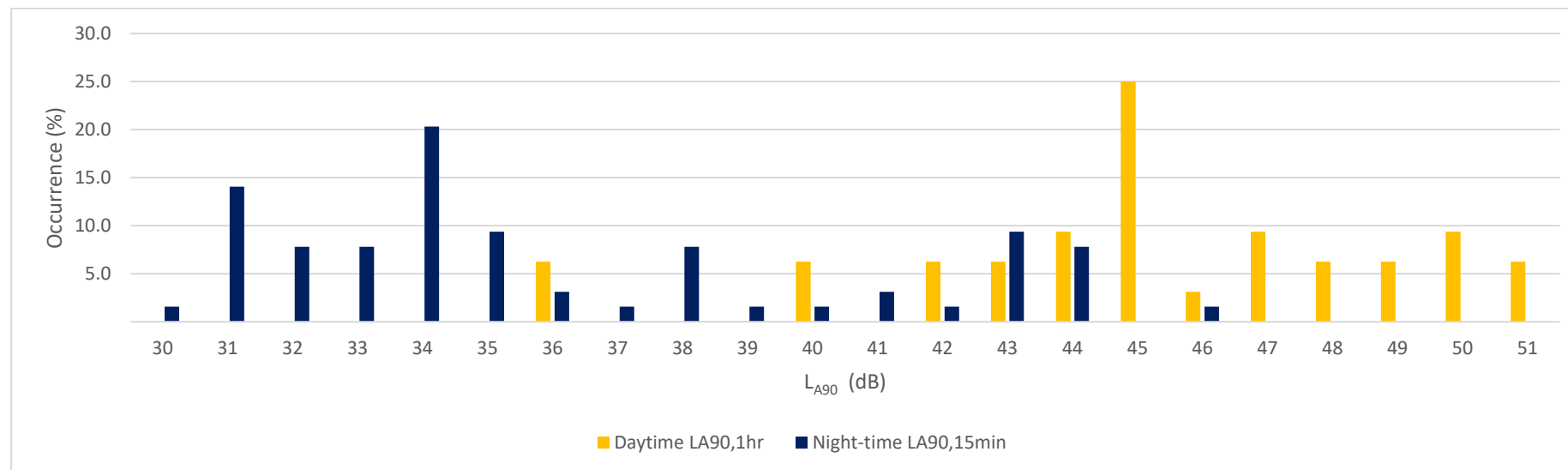


Figure B.8 – L_{eq} and $L_{max,F}$ Octave Band Spectra Measured at Position A (Tuesday, 07 April 2026 and Wednesday, 08 April 2026)

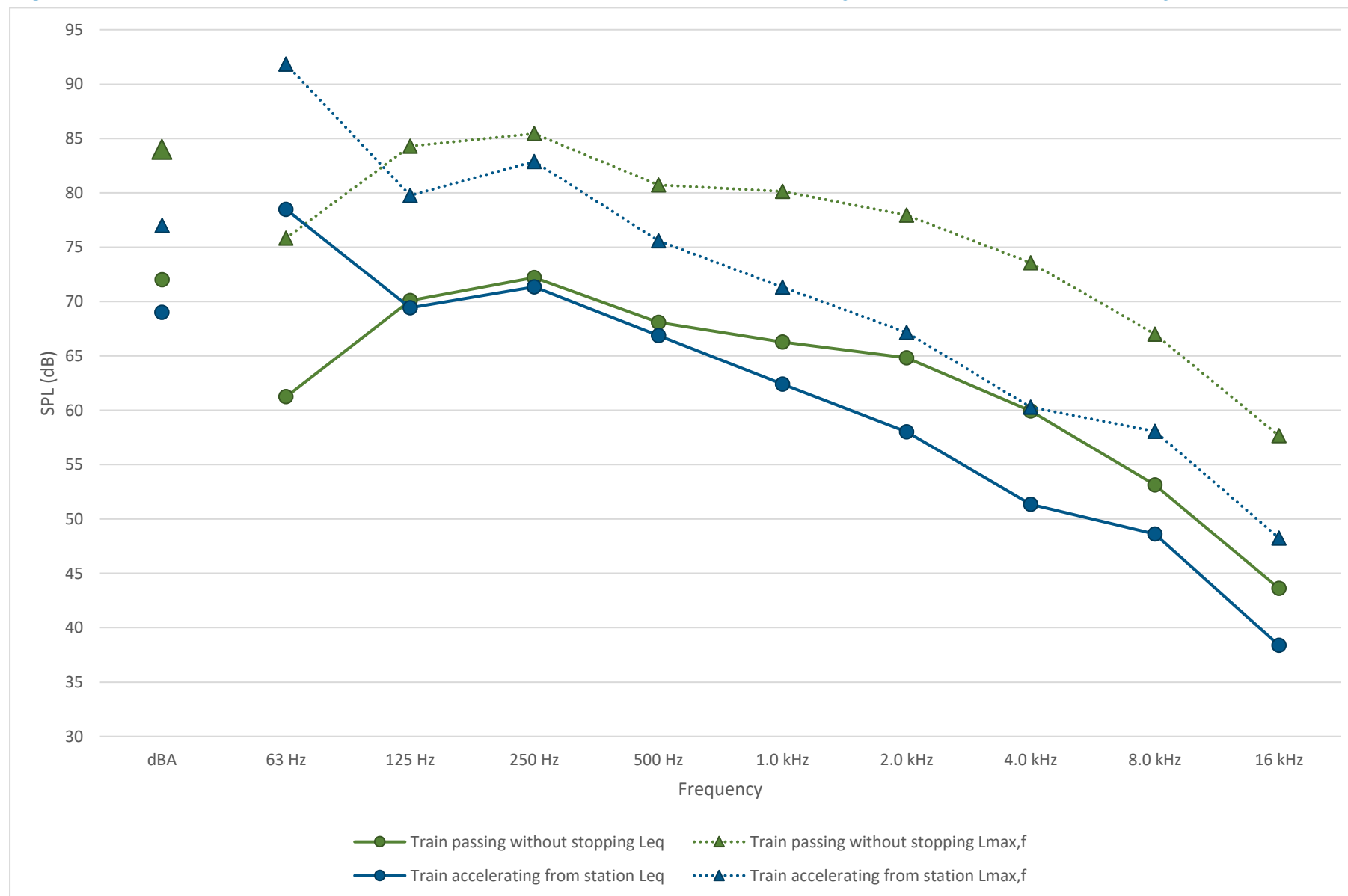


Figure B.9 – L_{eq} and $L_{max,F}$ Octave Band Spectra Measured at Position B (Tuesday, 07 April 2026)

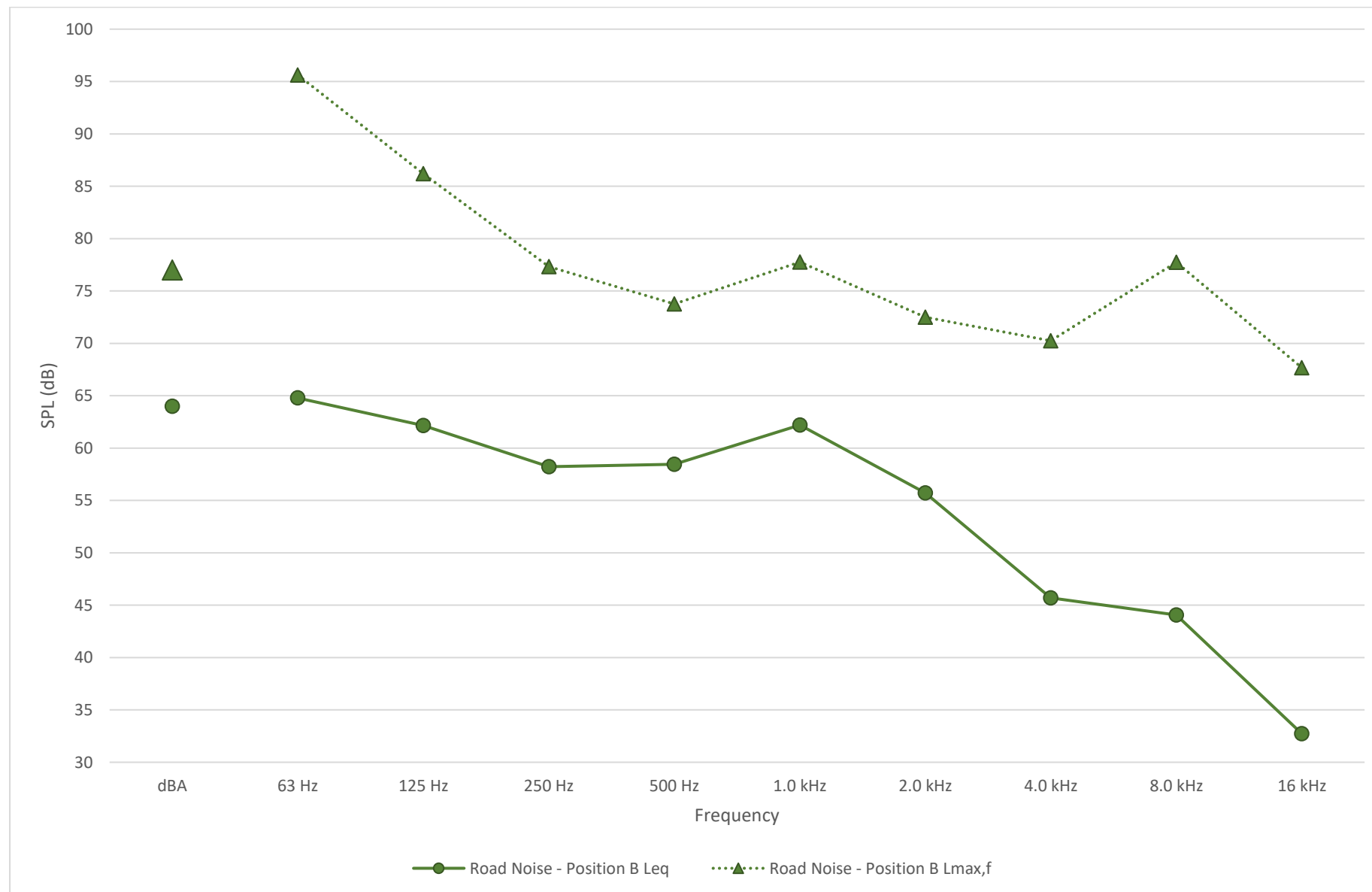


Table B.1 - Vibration Dose Values (VDVs) at Position V1 (Tuesday, 07 April 2026)

Date	Start	Channel	Weighting	VDV, ms ^{-1.75}	Date	Start	Channel	Weighting	VDV, ms ^{-1.75}
07/04/2026	11:40	Radial	W _d	4.73E-04	07/04/2026	23:40	Radial	W _d	3.30E-04
		Tangential	W _d	7.23E-04			Tangential	W _d	5.53E-04
		Vertical	W _k	7.18E-03			Vertical	W _k	4.50E-03
07/04/2026	12:40	Radial	W _d	5.57E-04	08/04/2026	00:40	Radial	W _d	0.00E+00
		Tangential	W _d	8.08E-04			Tangential	W _d	0.00E+00
		Vertical	W _k	8.01E-03			Vertical	W _k	0.00E+00
07/04/2026	13:40	Radial	W _d	5.53E-04	08/04/2026	01:40	Radial	W _d	0.00E+00
		Tangential	W _d	7.81E-04			Tangential	W _d	0.00E+00
		Vertical	W _k	7.62E-03			Vertical	W _k	0.00E+00
07/04/2026	14:40	Radial	W _d	4.85E-04	08/04/2026	02:40	Radial	W _d	0.00E+00
		Tangential	W _d	7.78E-04			Tangential	W _d	0.00E+00
		Vertical	W _k	7.82E-03			Vertical	W _k	0.00E+00
07/04/2026	15:40	Radial	W _d	5.61E-04	08/04/2026	03:40	Radial	W _d	0.00E+00
		Tangential	W _d	8.08E-04			Tangential	W _d	0.00E+00
		Vertical	W _k	8.30E-03			Vertical	W _k	0.00E+00
07/04/2026	16:40	Radial	W _d	4.80E-04	08/04/2026	04:40	Radial	W _d	0.00E+00
		Tangential	W _d	8.34E-04			Tangential	W _d	0.00E+00
		Vertical	W _k	8.90E-03			Vertical	W _k	0.00E+00
07/04/2026	17:40	Radial	W _d	4.40E-04	08/04/2026	05:40	Radial	W _d	0.00E+00
		Tangential	W _d	6.37E-04			Tangential	W _d	0.00E+00
		Vertical	W _k	6.55E-03			Vertical	W _k	0.00E+00
07/04/2026	18:40	Radial	W _d	4.58E-04	08/04/2026	06:40	Radial	W _d	0.00E+00
		Tangential	W _d	7.67E-04			Tangential	W _d	0.00E+00
		Vertical	W _k	7.69E-03			Vertical	W _k	0.00E+00
07/04/2026	19:40	Radial	W _d	5.45E-04	08/04/2026	07:40	Radial	W _d	0.00E+00
		Tangential	W _d	7.82E-04			Tangential	W _d	0.00E+00
		Vertical	W _k	7.34E-03			Vertical	W _k	0.00E+00
07/04/2026	20:40	Radial	W _d	4.87E-04	08/04/2026	08:40	Radial	W _d	0.00E+00
		Tangential	W _d	6.41E-04			Tangential	W _d	0.00E+00
		Vertical	W _k	7.01E-03			Vertical	W _k	0.00E+00
07/04/2026	21:40	Radial	W _d	4.19E-04	08/04/2026	09:40	Radial	W _d	0.00E+00
		Tangential	W _d	5.57E-04			Tangential	W _d	0.00E+00
		Vertical	W _k	6.45E-03			Vertical	W _k	0.00E+00
07/04/2026	22:40	Radial	W _d	3.59E-04	08/04/2026	10:40	Radial	W _d	0.00E+00
		Tangential	W _d	5.47E-04			Tangential	W _d	0.00E+00
		Vertical	W _k	4.96E-03			Vertical	W _k	0.00E+00
Radial Totals					VDV _d (Day: 0700-2300hrs)		0.001		ms ^{-1.75}
					VDV _d (Night: 2300-0700hrs)		0.000		ms ^{-1.75}
Tangential Totals					VDV _d (Day: 0700-2300hrs)		0.001		ms ^{-1.75}
					VDV _d (Night: 2300-0700hrs)		0.001		ms ^{-1.75}
Vertical Totals					VDV _b (Day: 0700-2300hrs)		0.014		ms ^{-1.75}
					VDV _b (Night: 2300-0700hrs)		0.005		ms ^{-1.75}

Table B.2 - Vibration Dose Values (VDVs) at Position V1 (Wednesday, 08 April 2026)

Date	Start	Channel	Weighting	VDV, ms ^{-1.75}	Date	Start	Channel	Weighting	VDV, ms ^{-1.75}
08/04/2026	00:01	Radial	W _d	5.67E-04	08/04/2026	12:01	Radial	W _d	4.12E-04
		Tangential	W _d	9.87E-04			Tangential	W _d	6.17E-04
		Vertical	W _k	1.07E-02			Vertical	W _k	6.73E-03
08/04/2026	01:01	Radial	W _d	4.25E-05	08/04/2026	13:01	Radial	W _d	5.25E-04
		Tangential	W _d	4.39E-05			Tangential	W _d	7.55E-04
		Vertical	W _k	4.92E-04			Vertical	W _k	7.91E-03
08/04/2026	02:01	Radial	W _d	4.16E-05	08/04/2026	14:01	Radial	W _d	4.20E-04
		Tangential	W _d	4.42E-05			Tangential	W _d	6.61E-04
		Vertical	W _k	3.85E-04			Vertical	W _k	7.35E-03
08/04/2026	03:01	Radial	W _d	4.50E-05	08/04/2026	15:01	Radial	W _d	6.19E-04
		Tangential	W _d	4.66E-05			Tangential	W _d	7.77E-04
		Vertical	W _k	4.98E-04			Vertical	W _k	7.44E-03
08/04/2026	04:01	Radial	W _d	4.51E-05	08/04/2026	16:01	Radial	W _d	4.36E-04
		Tangential	W _d	5.02E-05			Tangential	W _d	6.08E-04
		Vertical	W _k	5.32E-04			Vertical	W _k	6.74E-03
08/04/2026	05:01	Radial	W _d	6.50E-04	08/04/2026	17:01	Radial	W _d	4.64E-04
		Tangential	W _d	9.10E-04			Tangential	W _d	7.15E-04
		Vertical	W _k	1.07E-02			Vertical	W _k	7.15E-03
08/04/2026	06:01	Radial	W _d	4.24E-04	08/04/2026	18:01	Radial	W _d	4.04E-04
		Tangential	W _d	6.52E-04			Tangential	W _d	6.35E-04
		Vertical	W _k	6.64E-03			Vertical	W _k	7.34E-03
08/04/2026	07:01	Radial	W _d	5.53E-04	08/04/2026	19:01	Radial	W _d	5.93E-04
		Tangential	W _d	8.00E-04			Tangential	W _d	7.83E-04
		Vertical	W _k	9.23E-03			Vertical	W _k	7.94E-03
08/04/2026	08:01	Radial	W _d	3.93E-04	08/04/2026	20:01	Radial	W _d	3.68E-04
		Tangential	W _d	6.78E-04			Tangential	W _d	5.60E-04
		Vertical	W _k	7.33E-03			Vertical	W _k	5.51E-03
08/04/2026	09:01	Radial	W _d	5.68E-04	08/04/2026	21:01	Radial	W _d	4.05E-04
		Tangential	W _d	8.42E-04			Tangential	W _d	6.08E-04
		Vertical	W _k	8.34E-03			Vertical	W _k	6.94E-03
08/04/2026	10:01	Radial	W _d	3.53E-04	08/04/2026	22:01	Radial	W _d	4.09E-04
		Tangential	W _d	5.22E-04			Tangential	W _d	6.52E-04
		Vertical	W _k	5.80E-03			Vertical	W _k	7.38E-03
08/04/2026	11:01	Radial	W _d	4.82E-04	08/04/2026	23:01	Radial	W _d	3.50E-04
		Tangential	W _d	7.46E-04			Tangential	W _d	4.75E-04
		Vertical	W _k	7.34E-03			Vertical	W _k	4.26E-03
Radial Totals					VDV _d (Day: 0700-2300hrz)			0.001	ms ^{-1.75}
					VDV _d (Night: 2300-0700hrz)			0.001	ms ^{-1.75}
Tangential Totals					VDV _d (Day: 0700-2300hrz)			0.001	ms ^{-1.75}
					VDV _d (Night: 2300-0700hrz)			0.001	ms ^{-1.75}
Vertical Totals					VDV _k (Day: 0700-2300hrz)			0.015	ms ^{-1.75}
					VDV _k (Night: 2300-0700hrz)			0.013	ms ^{-1.75}

Table B.3 - Vibration Dose Values (VDVs) at Position V1 (Thursday, 09 April 2026)

Date	Start	Channel	Weighting	DV, ms ^{-1.7}	Date	Start	Channel	Weighting	DV, ms ^{-1.7}
09/04/2026	00:00	Radial	W _d	3.70E-04	09/04/2026	12:00	Radial	W _d	4.20E-04
		Tangential	W _d	6.30E-04			Tangential	W _d	5.32E-04
		Vertical	W _k	6.98E-03			Vertical	W _k	5.79E-03
09/04/2026	01:00	Radial	W _d	4.78E-04	09/04/2026	13:00	Radial	W _d	4.71E-04
		Tangential	W _d	1.15E-03			Tangential	W _d	5.92E-04
		Vertical	W _k	1.05E-02			Vertical	W _k	7.19E-03
09/04/2026	02:00	Radial	W _d	3.67E-05	09/04/2026	14:00	Radial	W _d	3.53E-04
		Tangential	W _d	4.26E-05			Tangential	W _d	5.32E-04
		Vertical	W _k	5.50E-04			Vertical	W _k	5.64E-03
09/04/2026	03:00	Radial	W _d	3.77E-05	09/04/2026	15:00	Radial	W _d	4.25E-04
		Tangential	W _d	3.90E-05			Tangential	W _d	6.18E-04
		Vertical	W _k	4.09E-04			Vertical	W _k	6.79E-03
09/04/2026	04:00	Radial	W _d	3.57E-05	09/04/2026	16:00	Radial	W _d	3.54E-04
		Tangential	W _d	3.89E-05			Tangential	W _d	6.00E-04
		Vertical	W _k	4.13E-04			Vertical	W _k	5.39E-03
09/04/2026	05:00	Radial	W _d	3.38E-05	09/04/2026	17:00	Radial	W _d	5.00E-04
		Tangential	W _d	3.54E-05			Tangential	W _d	6.96E-04
		Vertical	W _k	3.17E-04			Vertical	W _k	8.26E-03
09/04/2026	06:00	Radial	W _d	3.41E-05	09/04/2026	18:00	Radial	W _d	3.75E-04
		Tangential	W _d	3.38E-05			Tangential	W _d	5.61E-04
		Vertical	W _k	2.08E-04			Vertical	W _k	5.97E-03
09/04/2026	07:00	Radial	W _d	3.42E-05	09/04/2026	19:00	Radial	W _d	5.02E-04
		Tangential	W _d	3.39E-05			Tangential	W _d	6.44E-04
		Vertical	W _k	2.30E-04			Vertical	W _k	5.63E-03
09/04/2026	08:00	Radial	W _d	3.61E-05	09/04/2026	20:00	Radial	W _d	3.68E-04
		Tangential	W _d	3.86E-05			Tangential	W _d	5.64E-04
		Vertical	W _k	4.48E-04			Vertical	W _k	5.21E-03
09/04/2026	09:00	Radial	W _d	3.74E-05	09/04/2026	21:00	Radial	W _d	7.03E-05
		Tangential	W _d	3.92E-05			Tangential	W _d	6.91E-05
		Vertical	W _k	3.96E-04			Vertical	W _k	1.04E-03
09/04/2026	10:00	Radial	W _d	5.92E-04	09/04/2026	22:00	Radial	W _d	0.00E+00
		Tangential	W _d	9.16E-04			Tangential	W _d	0.00E+00
		Vertical	W _k	1.04E-02			Vertical	W _k	0.00E+00
09/04/2026	11:00	Radial	W _d	2.38E-04	09/04/2026	23:00	Radial	W _d	0.00E+00
		Tangential	W _d	3.97E-04			Tangential	W _d	0.00E+00
		Vertical	W _k	4.24E-03			Vertical	W _k	0.00E+00
Radial Totals					VDV _d (Day : 0700-2300hrr)		0.001 ms ^{-1.75}		
					VDV _d (Night : 2300-0700hrr)		0.001 ms ^{-1.75}		
Tangential Totals					VDV _d (Day : 0700-2300hrr)		0.001 ms ^{-1.75}		
					VDV _d (Night : 2300-0700hrr)		0.001 ms ^{-1.75}		
Vertical Totals					VDV _k (Day : 0700-2300hrr)		0.013 ms ^{-1.75}		
					VDV _k (Night : 2300-0700hrr)		0.011 ms ^{-1.75}		

APPENDIX C – NOISE MAP MODELS

Figure C.1 – Daytime Road Noise (Developed Site) $L_{Aeq,16hr}$ Contours at 1.5m Height

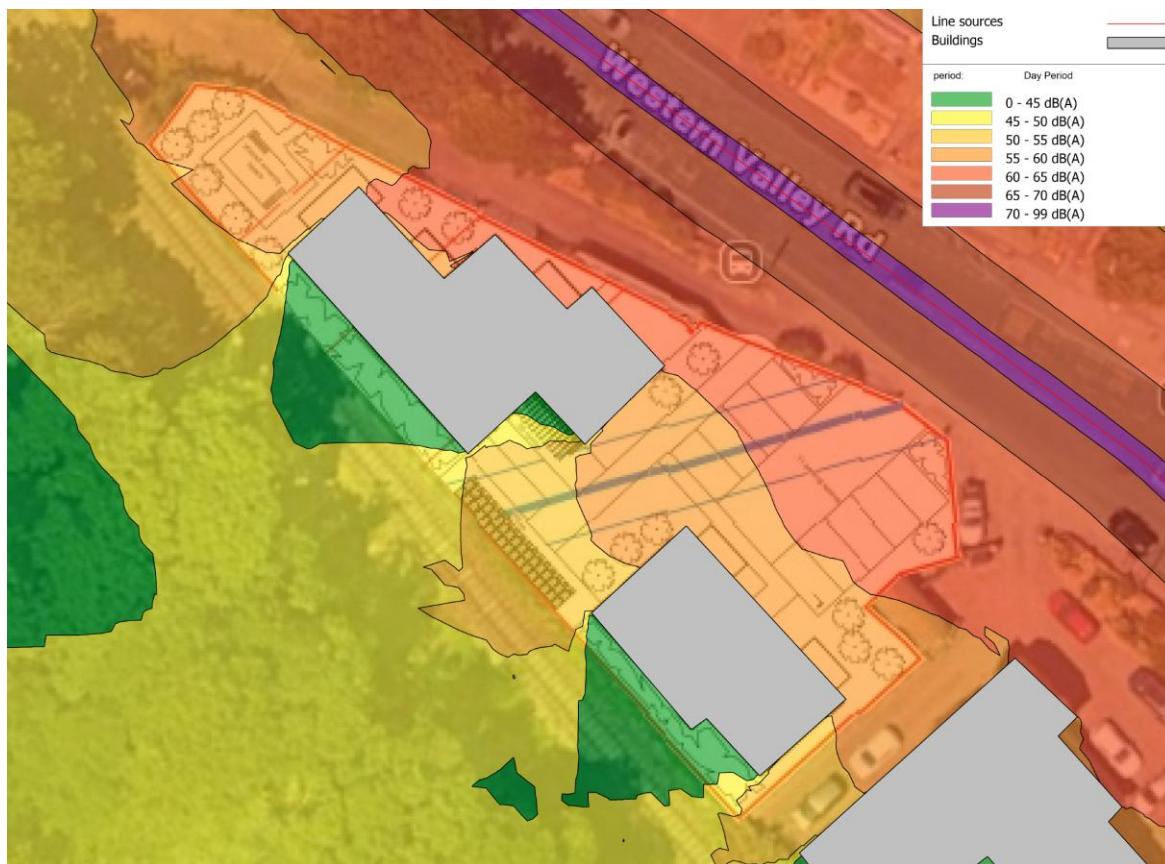


Figure C.2 – Daytime Road Noise (Developed Site) $L_{Aeq,16hr}$ Contours at 4.5m Height

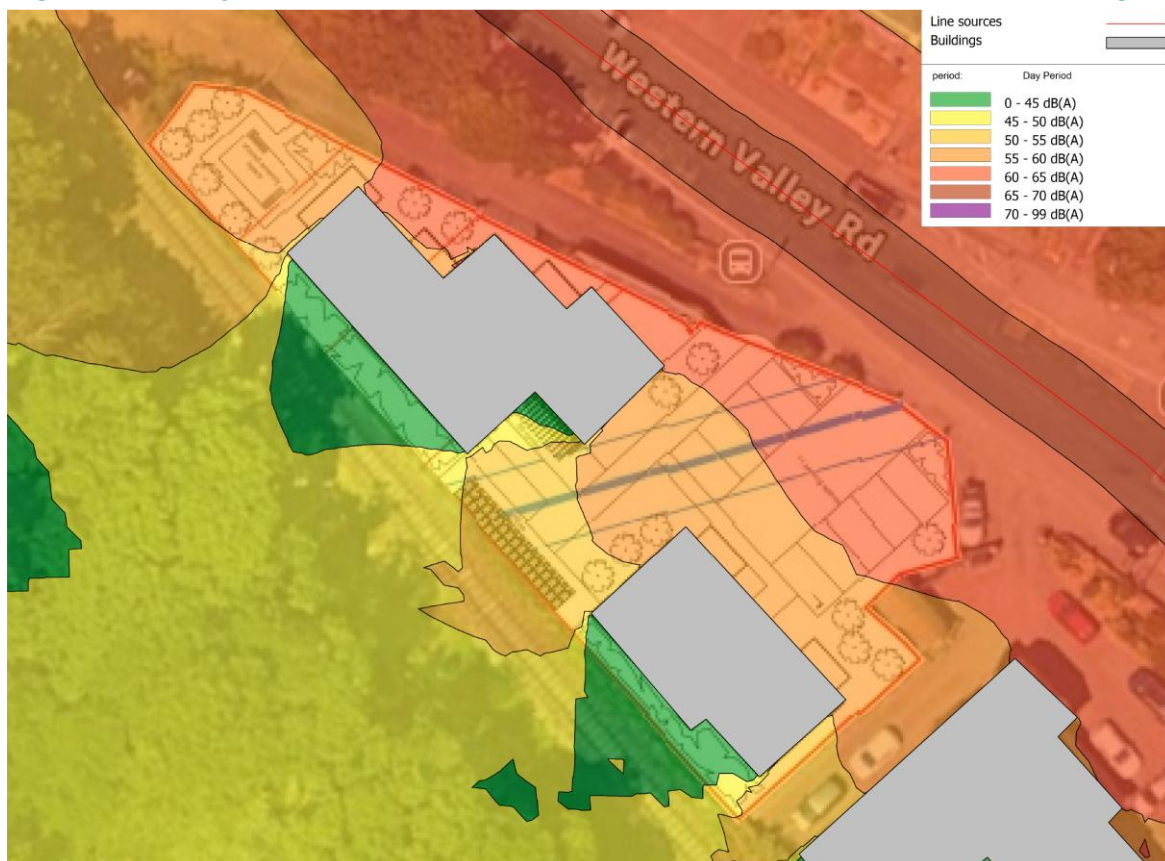
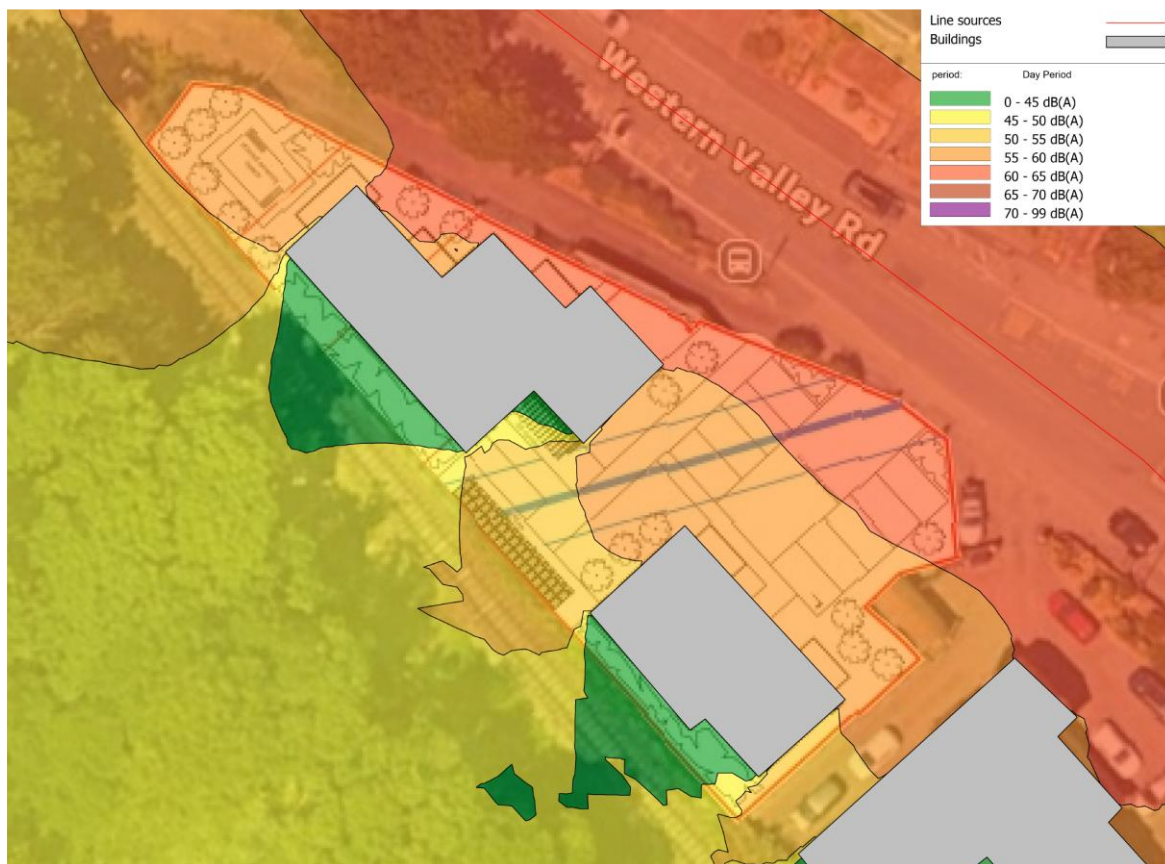
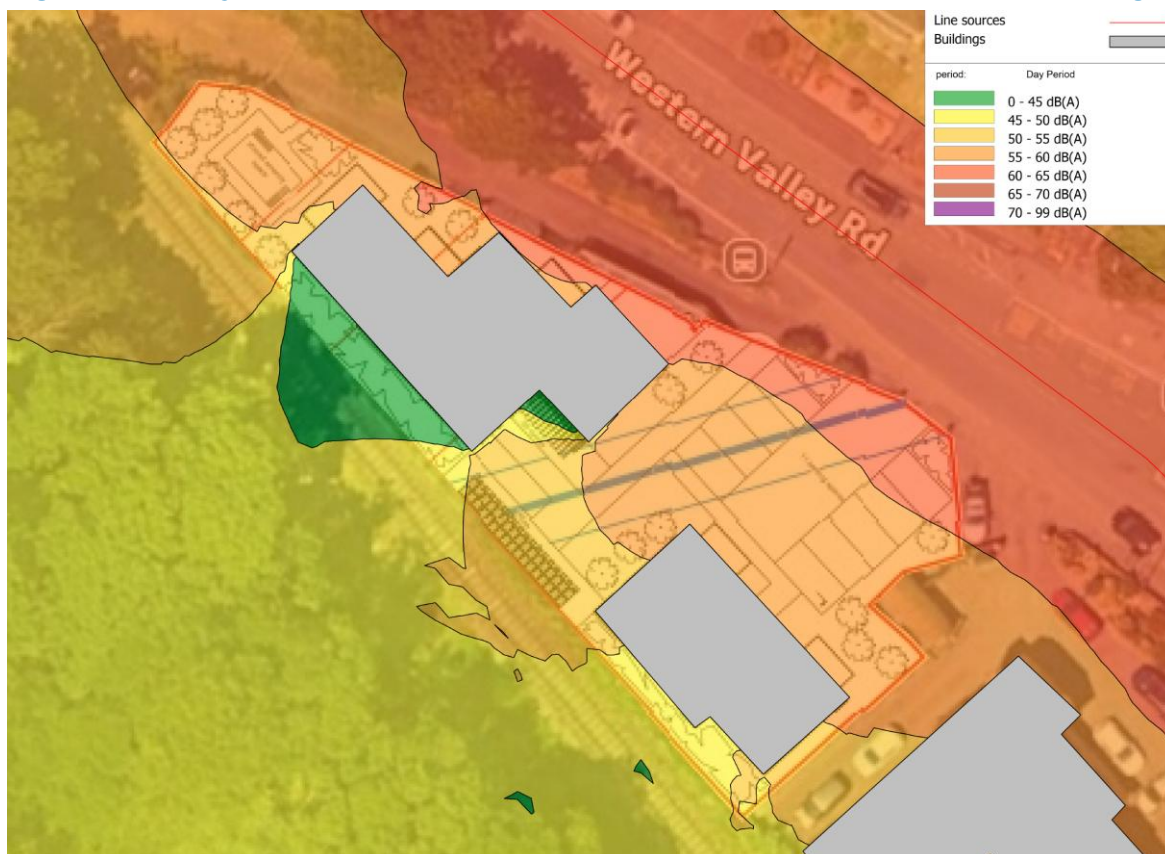


Figure C.3 – Daytime Road Noise (Developed Site) $L_{Aeq,16hr}$ Contours at 7.5m Height**Figure C.4 – Daytime Road Noise (Developed Site) $L_{Aeq,16hr}$ Contours at 10.5m Height**

APPENDIX D - DRAWING LISTS

The following C2J Architects drawings have been used in our assessment:

Table D.1 – Drawing List

Drawing Title	Drawing Number	Rev	Date
Proposed Site Plan	26-030-AL(90)10	E	13/04/2026
Proposed Ground Floor Plan	26-030-AL(0)10	F	13/04/2026
Proposed First and Second Floor Plans	26-030-AL(0)11	D	13/04/2026
Proposed Third Floor and Roof Plans	26-030-AL(0)12	D	13/04/2026
Proposed Unit Types	26-030-AL(0)13	E	13/04/2026
Proposed Elevations	26-030-AL(0)20	D	13/04/2026