

**Proposed 50 Dwellings
Land Off Cross Common Road
Dinas Powys
CF64**

**Environmental Noise Survey
4434/ENS1_Rev1**

31st May 2017

For:

Edenstone Homes Ltd.

Building 102
Wales One Business Park
Magor
NP26 3DG

Email:



Henstaff Court Business Centre
Llantrisant Road, Pontyclun
Cardiff CF72 8NG

Tel: 02920 891 020

Fax: 02920 891 870

Email: info@hunteracoustics.co.uk

Contents

1.0	Introduction	3
2.0	Planning Guidance.....	4
2.1	Technical Advice Note (Wales) 11.....	4
2.2	Planning Condition.....	5
2.3	British Standard BS 8233:2014.....	5
2.4	World Health Organisation Guidelines for Community Noise (1999).....	5
2.5	General Comments.....	6
3.0	Environmental Noise Survey	7
3.1	Procedures	7
3.2	Weather Conditions	7
3.3	Equipment Used	8
4.0	Results	9
4.1	Continuous Monitoring	9
5.0	Noise Mapping and Noise Prediction	10
6.0	External Building Fabric Assessment.....	13
6.1	External Walls	14
6.2	Roof	14
6.3	Ventilation	14
6.4	Glazing.....	15
7.0	Conclusion.....	16
	Appendix A – Acoustic Terminology	17
	Appendix B – Graphs, Tables & Diagrams	18

1.0 Introduction

50 dwellings are proposed on land off Cross Common Road, Dinas Powys, Vale of Glamorgan, CF64.

The A4055 Cardiff Road runs along the Western boundary of the site with Cross Common Road to the north.

Hunter Acoustics has been commissioned to assess existing ambient and background noise levels impinging on the site.

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

Appendix A explains acoustic terminology used in this report.

Appendix B contains graphs, tables and diagrams referenced in this report.

Appendix C contains noise maps referenced in this report.

2.0 Planning Guidance

2.1 Technical Advice Note (Wales) 11

Table 1 from Annex A of TAN 11 defines four noise exposure categories with advice as follows:

TABLE 1: NOISE EXPOSURE CATEGORIES	
A	Noise need not be considered as a determining factor in granting planning permission, although the noise level at the high end of the category should not be regarded as desirable.
B	Noise should be taken into account when determining planning applications and, where appropriate, conditions imposed to ensure an adequate level of protection.
C	Planning permission should not normally be granted. Where it is considered that permission should be given, for example, because there are no alternative quieter sites available, conditions should be imposed to ensure a commensurate level of protection against noise.
D	Planning permission should normally be refused.

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

Table 1. 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	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 hour) already puts the site in NEC D.

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)”.

2.2 Planning Condition

It is understood the following draft planning condition has been issued by the Vale of Glamorgan Local Planning Authority:

“A Noise Assessment shall be submitted as part of any Reserved Matters application to the Local Planning Authority for approval in writing. The noise assessment shall consider the potential impact of road noise from the adjacent highway network to future occupants of the residential development hereby approved, with suitable mitigation recommendations included where necessary. The mitigation as approved shall be implemented prior to the first beneficial occupation of any of the dwellings identified as being potentially affected by the submitted Noise Assessment.

Reason:

In order to assess the noise impact as set out in TAN 11 to ensure that future occupants of the residential development are not affected by unacceptable levels of road noise, in accordance with policies ENV 27 and ENV 29 of the Unitary Development Plan.”

2.3 British Standard BS 8233:2014

British Standard 8233:2014 (Sound Insulation and Noise Reduction for Buildings – Code of Practice) gives guideline values for ambient noise levels in habitable rooms for anonymous noise sources (such as road and rail traffic). These are shown in table 4434/T1 below;

4434/T1 - BS 8233 Internal Ambient Noise Levels

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.*

2.4 World Health Organisation Guidelines for Community Noise (1999)

World Health Organisation’s (WHO) Guidelines for Community Noise (1999) states,

“To protect the majority of people from being seriously annoyed during the daytime, the sound pressure level on balconies, terraces and outdoor living areas should not exceed 55 dB LAeq for a steady, continuous noise. To protect the majority of people from being moderately annoyed during the daytime, the outdoor sound pressure level should not exceed 50 dB LAeq.”

In addition to this, BS 8233:2014 states,

“However, it is also recognized 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 can 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.”

2.5 General Comments

- A central ventilation MVHR system designed to the latest Building Regulations Part F may be considered as an alternative to the mechanical vents quoted above – to be confirmed with Local Planning Authority/EHO.

3.0 Environmental Noise Survey

3.1 Procedures

3.1.1 Continuous Monitoring

Continuous noise monitoring was carried out from 1100hrs on 08/02/2017 for 24-hours at Positions A and B. Data including L_{Amax} , L_{Aeq} , L_{A10} and L_{A90} were logged at 15-minute intervals over the monitoring period.

Site plan 4434/SP1 shows the development site and continuous monitoring positions used, namely:

Position A Located on fence along western site boundary, approx. 8m from A4055 Cardiff Road. Approx. 1.5m above local ground height.

Position B Located on fence along northern site boundary, approx. 5m from Cross Common Road. Approx. 1.5m above local ground height.

4434/SP1 – Site Plan Showing Measurement Positions



3.2 Weather Conditions

Weather conditions are shown in weather history graph 4434/WH1 in Appendix B. To summarise, the weather conditions during the monitoring period were dry with light air.

3.3 Equipment Used

The following equipment was used:

4434/T2 – Equipment List

Make	Description	Model	Serial Number	Last Calibrated	Certificate No.
NTi	Type 1 - Sound Level Meter	XL2-TA	A2A-10021-E0	19-Aug-15	-
NTi	Preamplifier	MA220	5435	19-Aug-15	-
NTi	Microphone	Capsule	8547	19-Aug-15	-
Larson Davis	Type 1 - Sound Level Meter	820	1334	11-May-15	23928
Larson Davis	Preamplifier	828	1960	11-May-15	23928
PCB	Microphone 1/2" Prepolarized FF	377B02	LW135480	11-May-15	23928

The measurement systems were calibrated before and after the surveys, no variation occurred.

4.0 Results

4.1 Continuous Monitoring

Time history graphs 4434/TH1&2 in Appendix B shows L_{Amax} , L_{Aeq} , L_{A10} and L_{A90} sound pressure levels measured over consecutive 15-minute periods at Positions A & B respectively.

The following L_{Aeq} 16-hour daytime and 8-hour night-time noise levels have been measured;

4434/T3 – Continuous Monitoring Results Table

Position A	
08-09/02/2017	Daytime 0700-2300 $L_{Aeq,16hr}$ = 70.8 dB
	Night-time 2300-0700 $L_{Aeq,8hr}$ = 64.04 dB

Position B	
08-09/02/2017	Daytime 0700-2300 $L_{Aeq,16hr}$ = 56.7 dB
	Night-time 2300-0700 $L_{Aeq,8hr}$ = 49.1 dB

There were 4no $L_{max,F}$ events over 82dB at Position A during the night-time period (2300-0700hrs). These events were observed to be caused by loud bike and car vehicle pass-bys.

Graph 4434/G1 shows road traffic noise L_{Aeq} and L_{max} spectra measured at Position A which would be used in the external building fabric analysis.

Noise surveys indicated that daytime is indicated to be the critical assessment period.

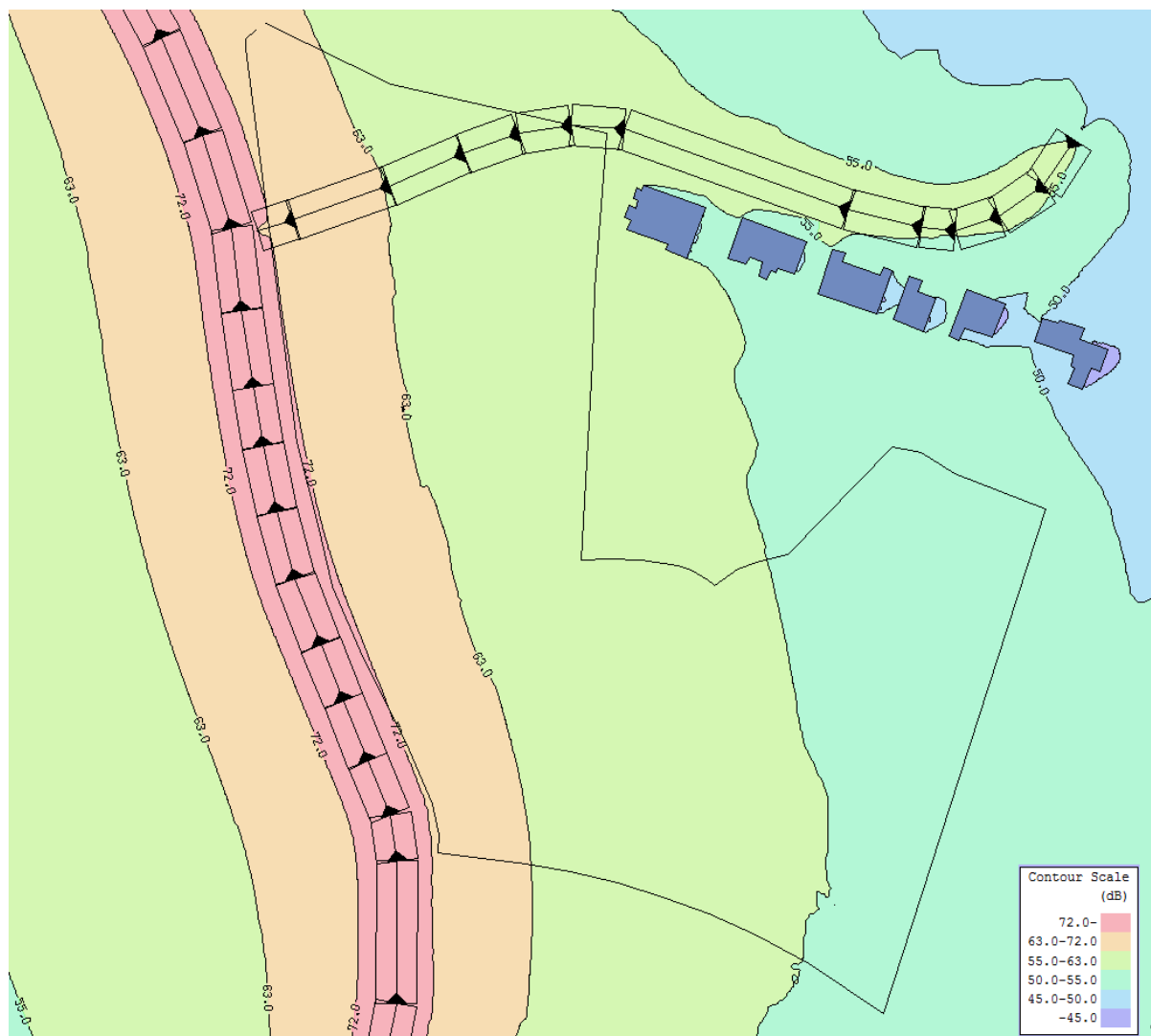
5.0 Noise Mapping and Noise Prediction

A site noise survey has been carried out confirming road traffic noise levels impinging on the site. Results from the survey has been used to calibrate a noise map using 'Noise Map Five' edition 5.1.2, which in turn uses methodology from CRTN. The noise map model accounts for losses for distance and screening from buildings and site topography.

Referring to continuous monitoring results at Position C, the daytime period is indicated to be the critical period of assessment. The noise map model therefore concentrates on daytime noise levels.

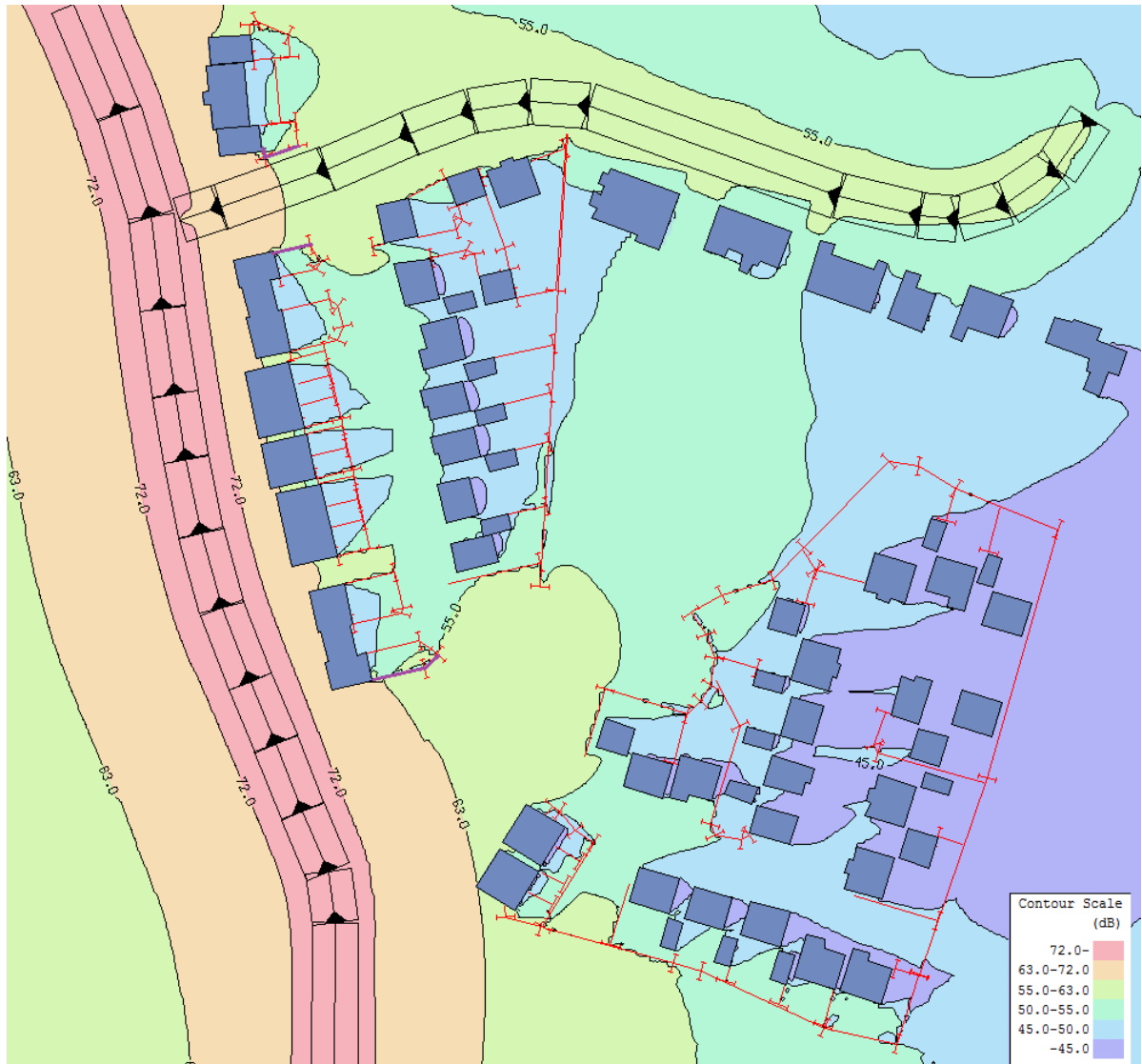
Noise map 4434/NM1 below shows predicted daytime noise levels at 1.5m above local ground level. These noise maps show the majority of the undeveloped site falls under NEC C of TAN 11 during the daytime.

4434/NM1 – $L_{eq,16hr}$ Daytime (0700-2300hrs); Undeveloped Site Ground Floor Level

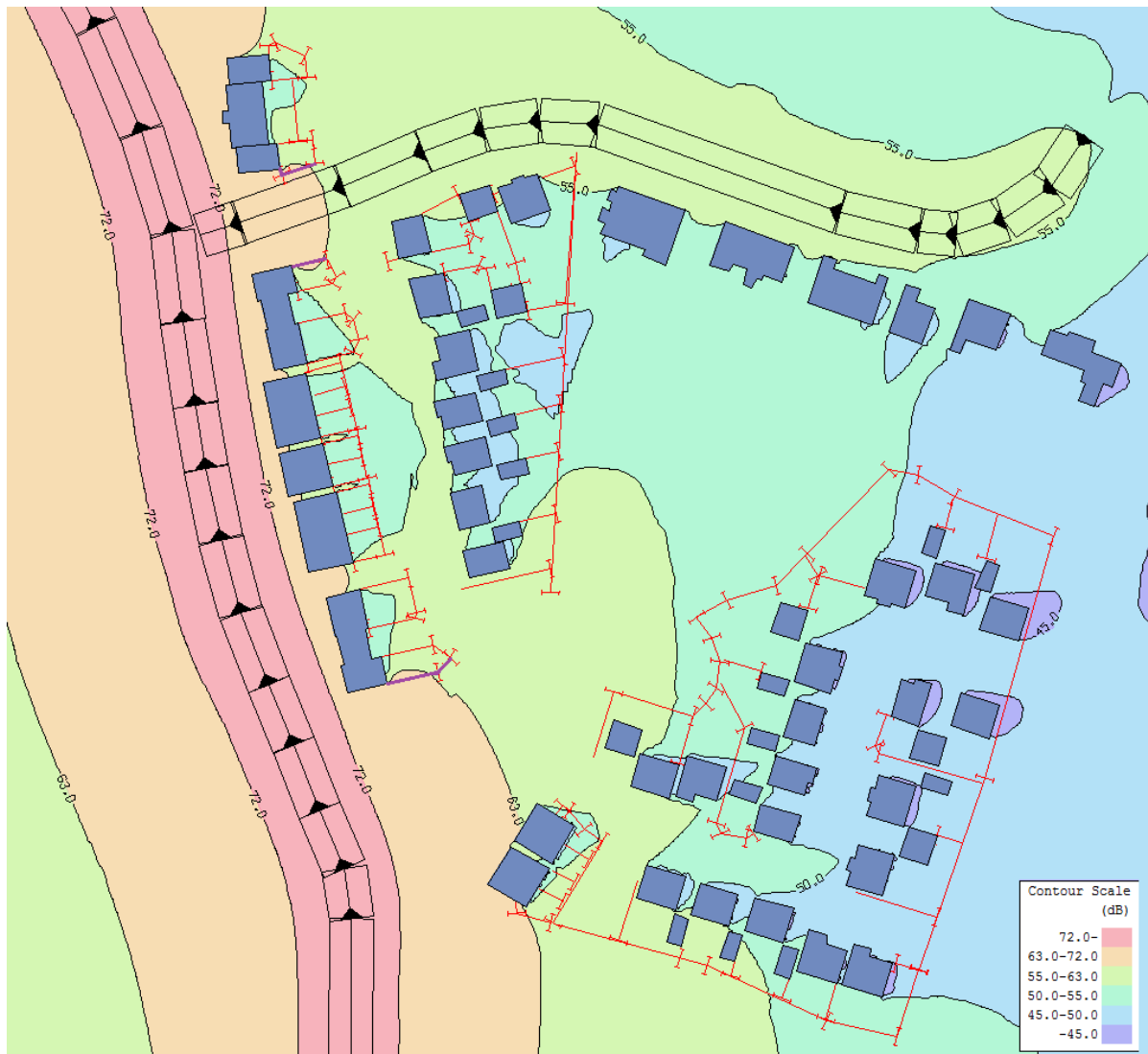


Noise maps 4434/NM2 & NM3 below show predicted daytime noise levels at the developed site with the inclusion of closed-boarded fences to gardens. The layout is from Hammonds Yates planning layout drawing 1628 100 Rev A1 dated Feb 2017.

4434/NM2 – $L_{eq,16hr}$ Daytime (0700-2300hrs); Developed Site Ground Floor Level



Note: **Red** lines indicate 1.8m high closed boarded fences that have been included in the noise map models. **Purple** lines indicate 2m high closed boarded fences that have been included in the noise map models.

4434/NM3 – $L_{eq,16hr}$ Daytime (0700-2300hrs); Developed Site First Floor Level (4.5m)

Note: **Red** lines indicate 1.8m high closed boarded fences that have been included in the noise map models. **Purple** lines indicate 2m high closed boarded fences that have been included in the noise map models.

5.1 Façade Noise Levels

The above noise maps indicate plots overlooking Cardiff Road are exposed to excessive road traffic noise levels and would require additional sound insulation measures in the form of uprated glazing and ventilation. This is assessed in Section 6.0.

5.2 Garden Noise Levels

Garden noise levels across the development are to indicated to meet the proposed $55\text{dB}L_{Aeq,16hr}$ criterion with 2m high fences included to Plots 8, 9 and 20. These are also shown on Site Plan 4434/SP2 below.

6.0 External Building Fabric Assessment

Based on survey results – including road traffic noise spectra shown in 4434/G1 – we have carried out an external building fabric assessment with the aim of controlling noise intrusion to BS8233 desirable levels to habitable rooms – See Section 2.3. At this stage prior to final house/room layouts being received our assessment is based on a standard bedroom, following the example calculation given in BS8233:2014.

BLUE lines indicate facades which require treating at both ground and first floor level and **RED** lines indicate facades which only require treating at first floor level. These are shown on site plan 4434/SP2 below. 2m high close boarded garden fences are also indicated in **PURPLE** to Plots 8, 9 & 20. *Note: Habitable rooms include bedrooms, lounges, dining rooms and kitchen/diners but not kitchens or bathrooms.*

4434/SP2 – Façades Requiring Acoustic Glazing and Ventilation



Standard thermal double glazing (Glazing Spec' A) and trickle ventilation (Ventilation spec' A) is indicated sufficient for the majority of the plots/facades.

6.1 External Walls

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

- *Brick / 75mm cavity / 100mm block*

The following SRI performance figures are taken from BS 8233:2014: “Brick and block external wall”;

4434/T4 – Wall Sound Reduction Index Figures

Element	Description	Sound Reduction Index (SRI: BS EN ISO 140) at Octave Band Centre Frequency (Hz)				
		125	250	500	1k	2k
Wall	Brick / cavity / block	40	44	45	51	56

6.2 Roof

The following roof construction has been used in our analysis;

- *Pitched tiled roof, timber trusses, plasterboard ceiling with 100mm mineral wool insulation.*

The following SRI performance figures are taken from BS 8233 for “tiles on felt roof with 100mm mineral wool on plasterboard ceiling”;

4434/T5 – Roof Sound Reduction Index Figures

Element	Description	Sound Reduction Index (SRI: BS EN ISO 140) at Octave Band Centre Frequency (Hz)				
		125	250	500	1k	2k
Roof	Pitched tiled roof, timber trusses, plasterboard ceiling with 100mm mineral wool	28	34	40	45	49

There should be no rooms in roof/mansard sections included on these critical plots highlighted below.

6.3 Ventilation

All habitable rooms on facades highlighted in **BLUE** require mechanical ventilation at ground and first floor levels or a whole house ventilation system. All first floor bedrooms on facades highlighted in **RED** require mechanical ventilation.

This usually takes the form of either:

- Mechanical acoustic ventilators meeting requirements of the Noise Insulation Regulations 1988 or,
- A whole house ventilation system (meeting the requirements of Part F of the Building Regulations) – to be confirmed acceptable by the local planners/EHO.

Do not include standard trickle ventilation to these critical rooms. Inlet/exhaust grilles for these systems should preferably be located at the rear of these plots, facing away from the road.

If acoustic trickle ventilators are included (e.g as part of an MEV system) they shall meet the following requirements (Ventilator Spec B) to achieve reasonable internal noise requirements with vents open and windows closed. Standard trickle ventilators (Ventilator Spec A) are indicated sufficient for all other areas.

4434/T6 – Ventilator Specifications

Element	Description	dB D _{n,e} at Octave Band Centre Frequency (Hz)					D _{n,e,w}
		125	250	500	1k	2k	
Ventilator A	For budgetary guidance: based on Simon Airstrip 19000	31	26	26	25	27	29
Ventilator B	For budgetary guidance: based on Greenwood EHA574	31	37	36	39	46	42

For initial budgetary guidance, the ventilators listed in the above table should be capable of achieving these figures based on manufacturer's test data, however;

The proposed ventilator supplier shall provide independent laboratory test data confirming their proposed system meets the above octave band D_{n,e} performance figures.

The calculation has allowed for a maximum of 2no acoustic trickle ventilators per space.

Final proposals should be confirmed with Building Control and Environmental Health.

6.4 Glazing

All habitable rooms on facades highlighted in **BLUE** require Glazing Spec C. Habitable rooms on facades highlighted in **RED** require Glazing Spec B. Standard thermal double glazing (Glazing Spec A) is indicated sufficient for all other areas.

4434/T7 – Glazing Sound Reduction Index Figures

Element	Description	dB Sound Reduction Index, R (SRI: BS EN ISO 140) at Octave Band Centre Frequency (Hz)					R _w + C _{tr}
		125	250	500	1k	2k	
Glazing A	For budgetary guidance: based on Pilkington 4mm / 6 - 16mm / 4mm	21	17	24	35	37	25
Glazing B	For budgetary guidance: based on Pilkington 6mm / 6 - 16mm / 4mm	21	20	25	38	37	28
Glazing C	For budgetary guidance: based on Pilkington 10mm / 6 - 16mm / 6mm	24	24	32	37	37	32

For initial budgetary guidance, glazing constructions listed in the table should be capable of achieving these figures based on Pilkington test data, however;

The successful glazing suppliers shall provide independent laboratory test data confirming their proposed systems (including frames/seals) meet the quoted octave band sound reduction performance figures above.

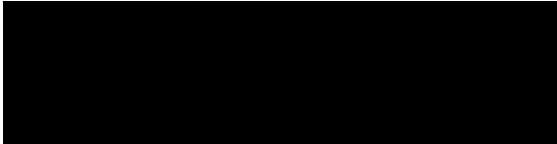
7.0 Conclusion

An environmental noise survey has been carried out to assess existing ambient and background noise levels impinging on the proposed development site on land off Cross Common Road, Dinas Powys, Vale of Glamorgan, CF64 from local road traffic.

Noise maps have been plotted predicting road traffic noise levels across the site. Façades overlooking Cardiff Road are indicated to require additional sound insulation measures in the form of uprated glazing and ventilation in order to meet proposed internal noise criteria. Specifications for external building fabric requirements (including glazing and ventilation) have been included in this report to control road traffic noise intrusion by day and night.

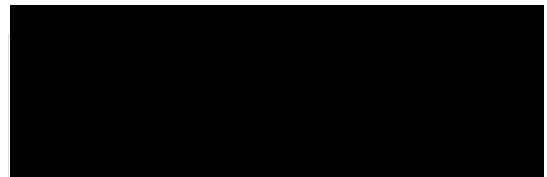
Garden noise levels are indicated to be within the proposed 55dB_{L_{Aeq,16hr}} criterion with 2m high close boarded fences included to Plots 8, 9 & 20.

Prepared by:



Rhodri Owen
BSc(Hons) AMIOA
Hunter Acoustics

Checked by:



Paul McGrath
BSc(Hons) MIOA
Hunter Acoustics

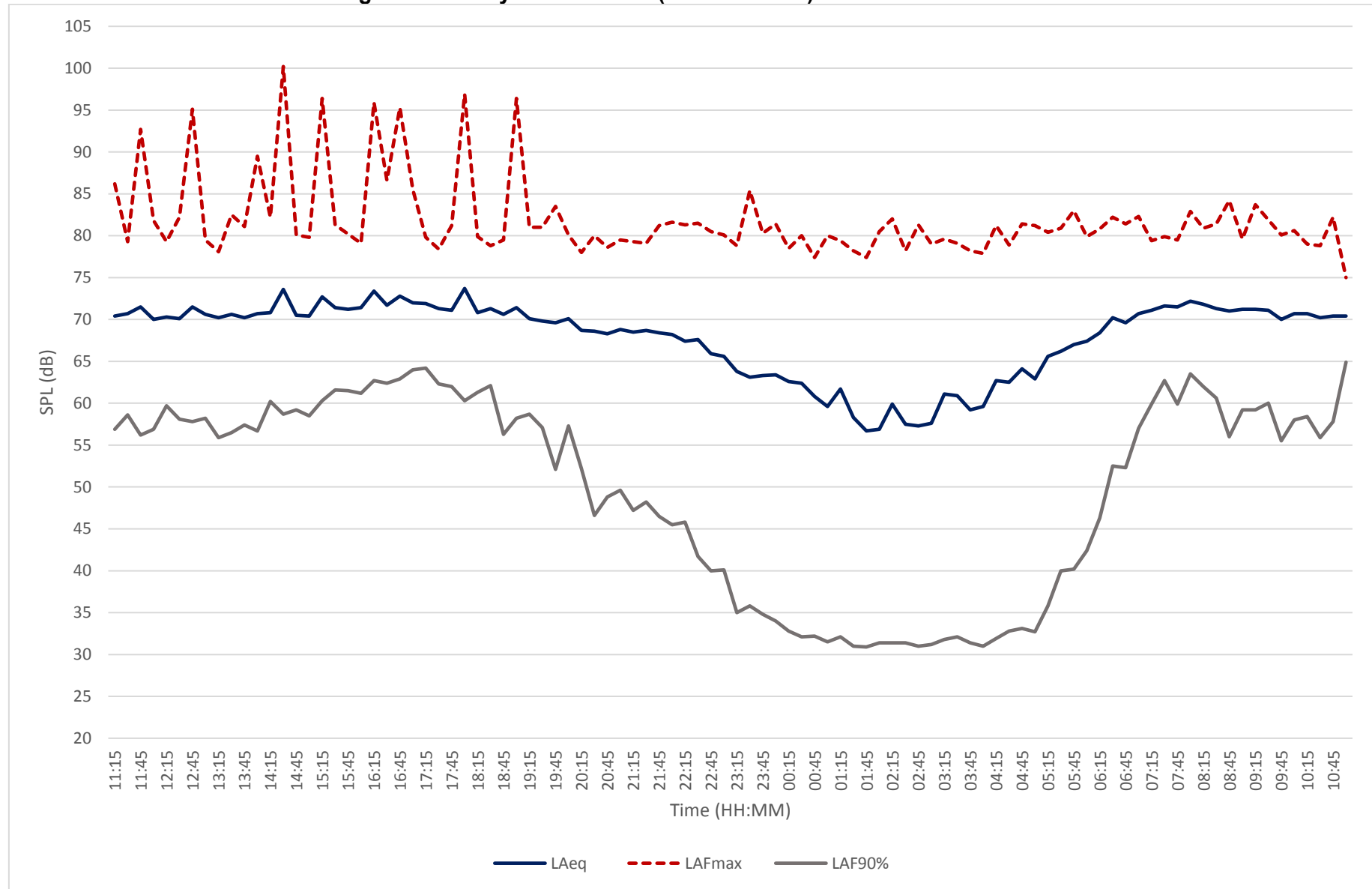
Appendix A – Acoustic Terminology

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'.

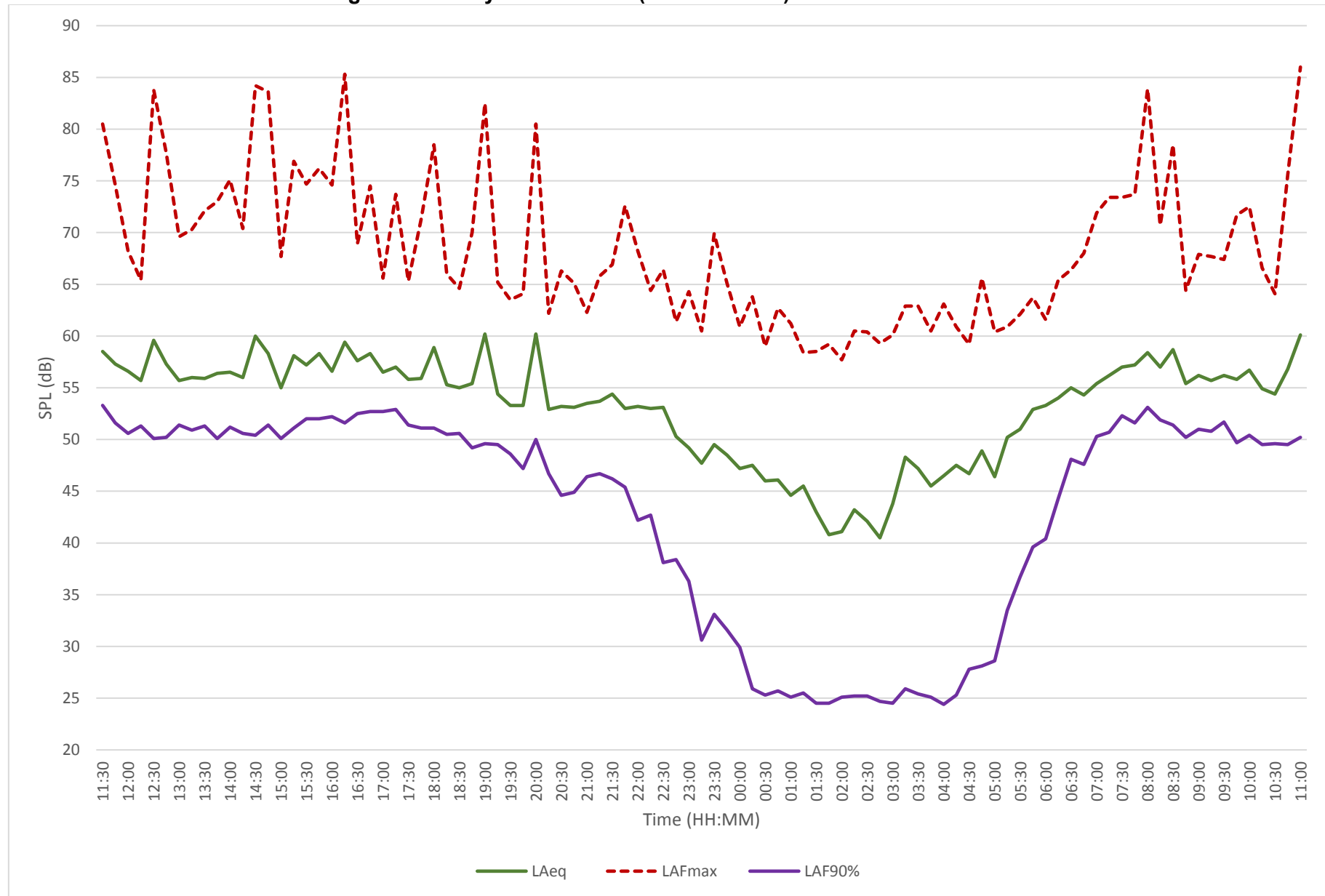
The following units have been used in this report:

- dB(A):** The sound pressure level weighted to correspond with the frequency response of the human ear, and therefore a person's 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.
- L₉₀:** 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. It is often used to define the background noise level.
- L₁₀:** 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_{max}:** The highest instantaneous noise level recorded over the measurement period.
- 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. an HGV pass-by).

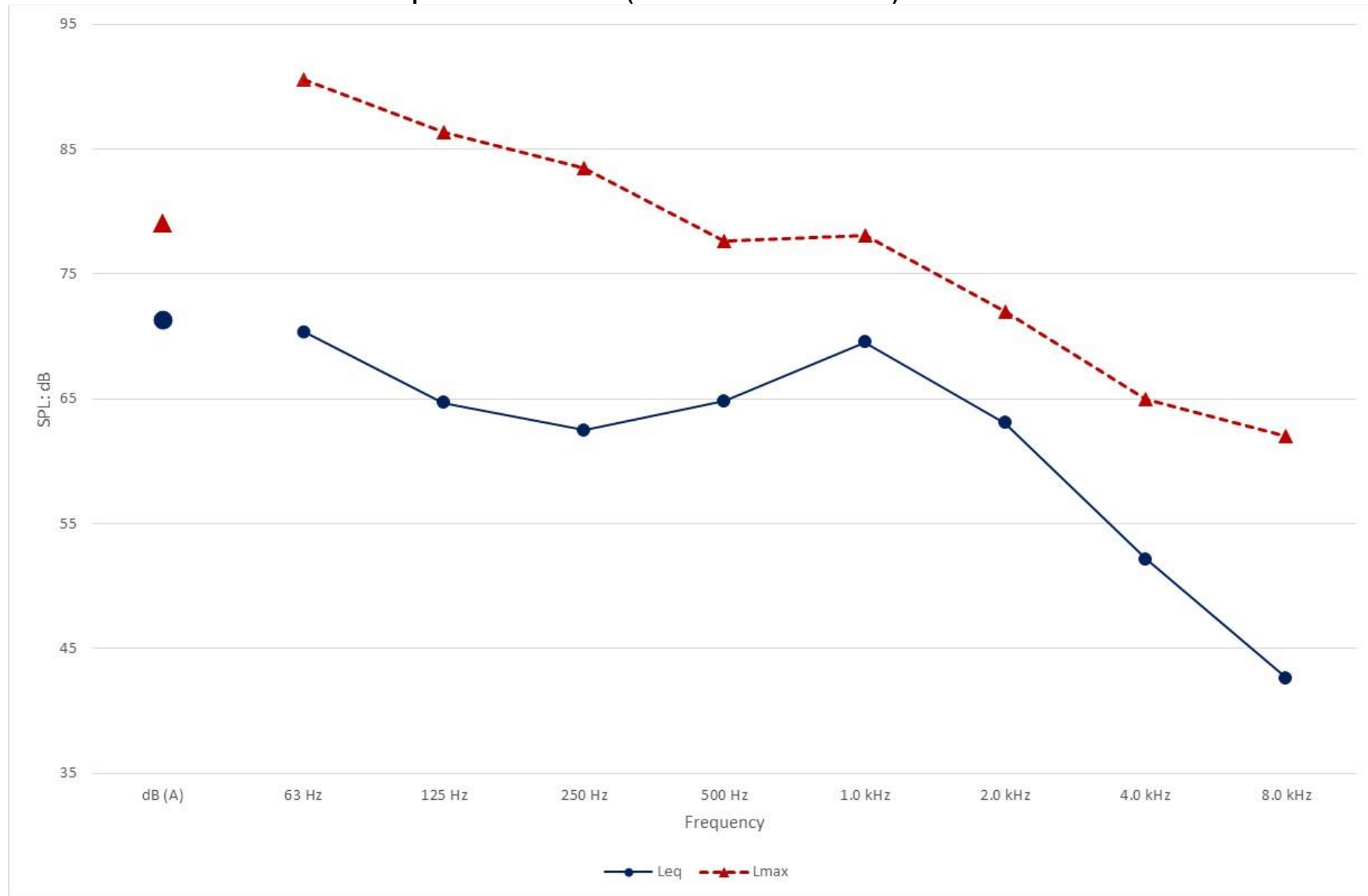
Appendix B – Graphs, Tables & Diagrams 4434/TH1 – Continuous Monitoring Time History at Position A (08-09/02/2017)



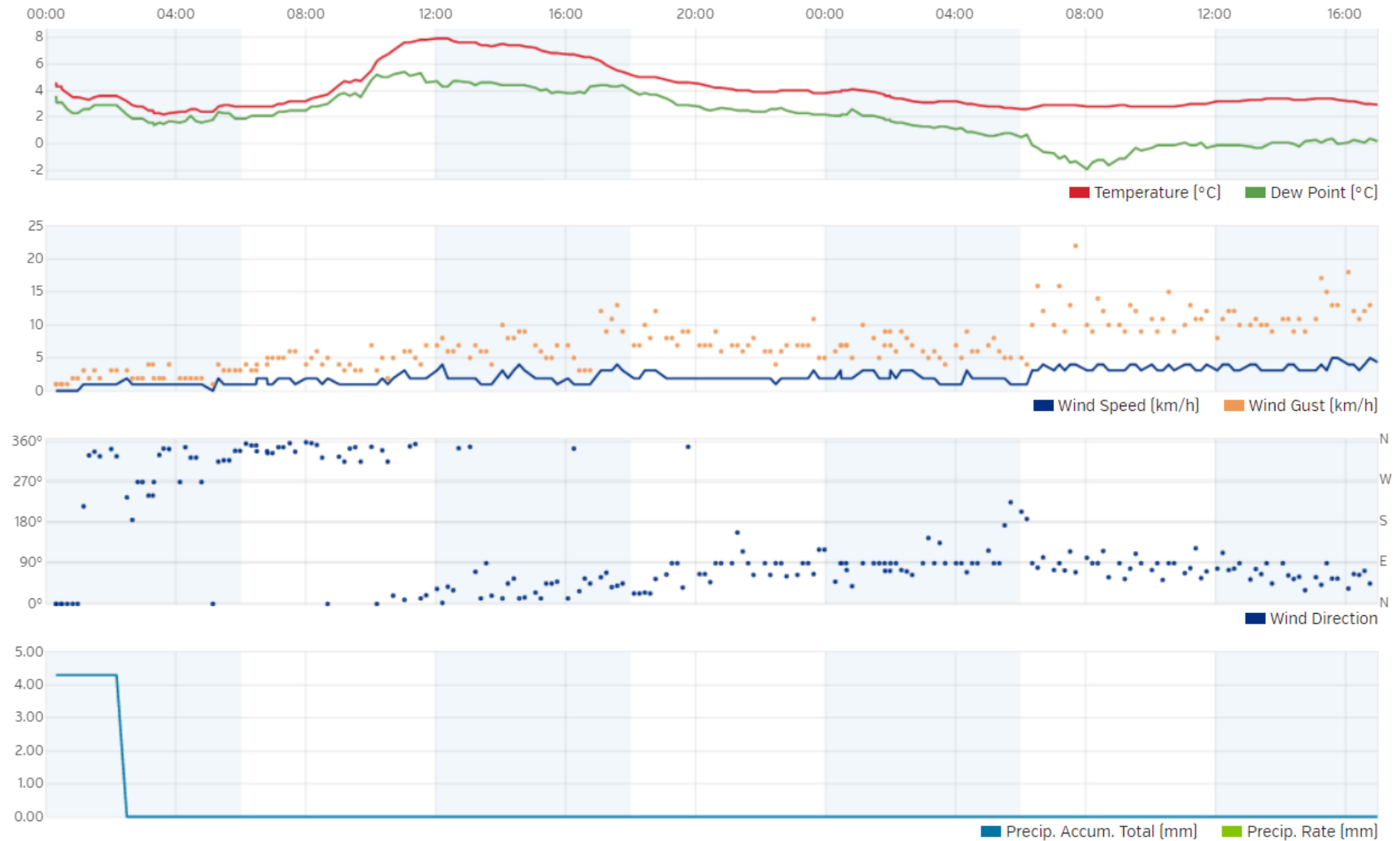
4434/TH2 – Continuous Monitoring Time History at Position B (08-09/02/2017)



4434/G1 – Octave Band Road Traffic Spectra at Position A (1600-1615hrs 08/02/2017)



4434/WH1 – Approximate Weather History Graph; 08/02/2017 – 09/02/2017



Data taken from www.wunderground.com. Weather Station: IPENARTH5, located in Penarth [N 51 ° 25 ' 41 " , W 3 ° 10 ' 37 "]