



Noise Impact Assessment

Former Black Cat Fireworks

Miller Homes Ltd, Vistry Group and Countryside Properties

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Basis of Report

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1.0 Introduction

Miller Homes Ltd., Vistry Group and Countryside Properties have appointed SLR Consulting Limited to undertake a noise assessment to support a proposed residential development on land at Blackmoorfoot Road, Huddersfield.

SLR has reviewed the Noise Assessment completed in 2017 and the Officer's Report and understand that whilst it was agreed that transportation noise was the dominant noise source at the Site, the woodshed at the Quarry to the south may result in a rating level 5 dB(A) above the baseline background sound level at night, and this industrial noise was considered adverse by the Local Authority. It was concluded that:

“Overall, it is considered that issues regarding noise on the site can be resolved by conditions, which are recommended, in order to protect future occupiers and to satisfy the objectives of Policy LP24. Given the scale of the site, any mitigation would be provided a part of any full or reserved matters application that seeks approval for layout”.

The above is covered by Condition 36 of the Outline Planning Permission for the Site which states:

“Before construction work on a phase commences, a further noise assessment report for that phase shall be submitted to and approved in writing by the Local Planning Authority. The report shall (i) clearly show which rooms in which plots will not achieve satisfactory indoor sound levels with windows open and (ii) for these rooms, provide an alternative ventilation scheme which shall show how these rooms shall be provided with sufficient ventilation to help control thermal comfort and avoid over heating during hot weather without the need to open windows. The dwellings identified in the noise assessment may not be occupied until the works which form part of the approved scheme for all relevant buildings have been completed, such works to be retained thereafter.

Reason: In the interests of the living conditions of future occupiers.”

It is further stated in the Decision Notice that:

“Pursuant to Condition 36, a ventilation scheme that meets the performance specification given in Part 6 of Schedule 1 of the Noise Insulation Regulations 1975 is likely to be acceptable. Trickle ventilation alone is unlikely to provide sufficient ventilation to help control thermal comfort without the need to open windows and would therefore not be acceptable”.

In order to satisfy Condition 36, an environmental noise survey has been undertaken and a noise assessment prepared for the proposed development.

The Noise Assessment is structured to adhere to the requirements of ProPG 'Planning and Noise New Residential Development' (2017) and associated guidance and Standards.

Whilst reasonable effort has been made to ensure that this report is easy to understand, it is technical in nature. To assist the reader, a glossary of terminology has been included in

Appendix A.



2.0 Site Description

2.1 Existing Site

The Site is located at Blackmoorfoot Road.

The Site is bound:

- To the north by parkland.
- To the east by residential dwellings and Crosland Hill Road beyond.
- To the south by Blackmoorfoot Road.
- To the west by Felks Stile Road.

The location of the Site is shown in **Figure 2-1**.

Figure 2-1: Site Location



Image courtesy of Google Earth

2.2 Proposed Use of Site

The Proposals include 700 residential dwellings and a care home. The proposed Site plan is shown in **Figure 2-2**.



Figure 2-2: Site Plan



Image Courtesy of nineteen47 "Feasibility Layout" Drawing No n2114-007 Rev I



3.0 Planning, Noise Guidance

3.1 National Planning and Policy Framework

The National Planning Policy Framework (NPPF) was introduced by The Department for Communities and Local Government in March 2012, and most recently updated in December 2023.

The NPPF defines the Government's planning policies for England and sets out the framework, within which local authorities must prepare their local and neighbourhood plans, reflecting the needs and priorities of their communities. The Government's stated purpose in producing the NPPF was to streamline policy, so the planning process is less restrictive, to give a more easily understood framework for delivering sustainable development. Under the heading of conserving and enhancing the natural environment and Paragraph 180 e), one aim of the NPPF is *"preventing new and existing development from contributing to, being put at unacceptable risk from, or being adversely affected by, unacceptable levels of... noise pollution..."*.

Paragraph 191 requires planning policies and decision to ensure that new development is appropriate for its location. It stipulates a need to account for the likely effects of pollution on health and other matters, requiring the planning process to:

"mitigate and reduce to a minimum, potential adverse impacts resulting from noise from new development – and avoid noise giving rise to significant adverse impacts on health and the quality of life".

The NPPF acknowledges that there is a host of existing sources of national and international guidance which can be used, in conjunction with the Framework, to inform the production of Local Plans and decision making.

3.2 Noise Policy Statement for England

The Noise Policy Statement for England (NPSE) was published in March 2010. It sets out the long-term vision of government noise policy, which is fundamentally to: *"Promote good health and good quality of life through the effective management and control of noise within the context of Government policy on sustainable development"*. The vision is supported by three key aims:

- Avoid significant adverse impacts on health and quality of life;
- Mitigate and reduce to a minimum, other adverse impacts on health; and
- Where possible, contribute to the improvement of health and quality of life.

The NPSE should apply to all forms of noise including environmental noise, neighbour noise and neighbourhood noise but does not apply to noise in the workplace. The NPSE has adopted the following concepts, to help consider whether noise is likely to have "significant adverse" or "adverse" effects on health and quality of life:

SOAEL – Significant Observed Adverse Effect Level. This is the level above which significant adverse effects on health and quality of life occur.

LOAEL – Lowest Observed Adverse Effect Level. This is the level above which adverse effects on health and quality of life can be detected.

NOEL – No Observed Effect Level. This is the level below which no effect can be detected. In simple terms, below this level, there is no detectable effect on health and quality of life due to the noise.



“It is not possible to have a single objective noise-based measure that defines SOAEL that is applicable to all sources of noise in all situations. Consequently, the SOAEL is likely to be different for different noise sources, for different receptors and at different times. It is acknowledged that further research is required to increase our understanding of what may constitute a significant adverse impact on health and quality of life from noise. However, not having specific SOAEL values in the NPSE provides the necessary policy flexibility until further evidence and suitable guidance is available (Defra, 2010).”

3.3 National Planning Practice Guidance

Revised Planning Practice Guidance was released in March 2014 to support the NPPF and last updated in July 2019. The Guidance stipulates that Local Planning Authorities’ plan making and decision making should take account of the acoustic environment and in doing so consider:

- Whether or not a significant adverse effect is occurring or likely to occur;
- Whether or not an adverse effect is occurring or likely to occur; and
- Whether or not a good standard of amenity can be achieved.

The guidance has also provided the following noise exposure hierarchy table *“when noise could be a concern”*.

Table 3-1: Planning Practice Guidance Noise Exposure Hierarchy Table

Response	Example of Outcomes	Increasing Effect Level	Action
NOEL – No observed effect level			
Not present	No effect	NOEL	No specific measures required
No observed adverse effect level			
Present and not intrusive	Noise can be heard but does not cause any change in behaviour or attitude. Can slightly affect the acoustic character of the area but not such that there is a perceived change in the quality of life.	No Observed Adverse Effect	No specific measures required
LOAEL – Lowest Observed Adverse Effect Level			
Present and intrusive	Noise can be heard and causes small changes in behaviour and/or attitude, e.g. turning up volume of television; speaking more loudly; where there is no alternative ventilation, having to close windows for some of the time because of the noise. Potential for sleep disturbance. Affects acoustic character of the area and creates a perceived change in quality of life.	Observed Adverse Effect	Mitigate and reduce to a minimum
SOAEL – Significant Observed Adverse Effect Level			
Present and disruptive	The noise causes a material change in behaviour and/or attitude, e.g. avoiding certain activities during periods of intrusion; where there is no alternative ventilation, having to keep windows closed most of the time because of the noise. Potential for sleep disturbance resulting in difficulty in getting to sleep, premature awakening and	Significant Observed Adverse Effect	Avoid



Response	Example of Outcomes	Increasing Effect Level	Action
	difficulty in getting back to sleep. Quality of life diminished due to change in acoustic character of the area.		
Present and very disruptive	Extensive and regular changes in behaviour and/or an inability to mitigate effect of noise leading to psychological stress or physiological effects, e.g. regular sleep deprivation/awakening; loss of appetite, significant, medically definable harm, e.g. auditory and non-auditory	Unacceptable Adverse Effect	Prevent

3.4 ProPG: Planning & Noise (2017)

ProPG: Planning & Noise – Professional Practice Guidance on Planning & Noise, New Residential Development was developed by a working group consisting of representatives from the Association of Noise Consultants (ANC), Institute of Acoustics (IOA), Chartered Institute of Environmental Health (CIEH) and practitioners from a planning and local authority background.

This guidance was made effective in May 2017 to provide a recommended approach to the management of noise within the planning system in England. It has drawn upon legislation, guidance and standards available at the time of publication to reflect the Noise Policy Statement for England (NPSE), the National Planning Policy Framework (NPPF) and Planning Practice Guidance (PPG-Noise) and other authoritative sources of guidance.

ProPG has been noted to advocate two sequential stages covering an ‘initial noise risk assessment’ at Stage 1 then a ‘full assessment’ at Stage 2 considering four key elements.

- Element 1 – Good acoustic design process.
- Element 2 – Internal noise level guidelines.
- Element 3 – External amenity area noise assessment.
- Element 4 – Assessment of other relevant issues.

The scope of ProPG considers new residential development that will be predominantly exposed to airborne noise from transportation sources. In cases where the site is exposed to noise of an industrial and/or commercial nature, this shall be considered at Stage 1 of the ProPG approach.

ProPG has provided a summary of internal noise level guidelines as part of Stage 2 assessment requirements. These guidelines values, shown in **Table 3-2**, have been derived from British Standard BS 8233:2014 *Guidance on Sound Insulation and Noise Reduction for Buildings* and *The World Health Organisation Guidelines for Community Noise* (1999).

Table 3-2: ProPG Internal Ambient Noise Levels, dB

Activity	Location	07:00 to 23:00 dB $L_{Aeq,16h}$	23:00 to 07:00 dB $L_{Aeq,8h}$
Resting	Living room	35	-
Dining	Dining room/area	40	-
Sleeping (daytime resting)	Bedroom	35	30 45 dB $L_{Amax(F)}$ *



Activity	Location	07:00 to 23:00 dB $L_{Aeq,16h}$	23:00 to 07:00 dB $L_{Aeq,8h}$
* Not normally exceeded more than 10 times per night.			

3.5 British Standard 4142:2014+A1:2019

British Standard 4142:2014+A1:2019 ‘*Methods for rating and assessing industrial and commercial sound*’ is intended to be used to assess the potential adverse impact of sound, of an industrial and/or commercial nature, at nearby noise-sensitive receptor locations within the context of the existing sound environment.

Where the specific sound contains tonality, impulsivity and/or other sound characteristics, penalties should be applied depending on the perceptibility. For tonality, a correction of either 0, 2, 4 or 6 dB should be added and for impulsivity, a correction of either 0, 3, 6 or 9 dB should be added. If the sound contains specific sound features which are neither tonal nor impulsive, a penalty of 3 dB should be added.

In addition, if the sound contains identifiable operational and non-operational periods, that are readily distinguishable against the existing sound environment, a further penalty of 3dB may be applied.

The assessment of impact contained in BS 4142:2014+A1:2019 is undertaken by comparing the sound rating level, i.e. the specific sound level of the source plus any penalties, to the measured representative background sound level immediately outside the noise-sensitive receptor location. Consideration is then given to the context of the existing sound environment at the noise-sensitive receptor location to assess the potential impact.

Once an initial estimate of the impact is determined, by subtracting the measured background sound level from the rating sound level, BS 4142:2014+A1:2019 states that the following should be considered:

- typically, the greater the difference, the greater the magnitude of the impact;
- a difference of around +10 dB or more is likely to be an indication of a significant adverse impact, depending on the context;
- a difference of around +5 dB is likely to be an indication of an adverse impact, depending on the context; and
- 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. It is an indication that the specific sound source has a low impact, depending on the context.

BS 4142:2014+A1:2019 notes that:

“Adverse impacts include, but are not limited to, annoyance and sleep disturbance. Not all adverse impacts will lead to complaints and not every complaint is proof of an adverse impact.”

BS 4142:2014+A1:2019 outlines guidance for the consideration of the context of the potential impact including consideration of the existing residual sound levels, location and/or absolute sound levels.

To account for the acoustic character of proposed sound sources, BS 4142:2014+A1:2019 provides the following with respect to the application of penalties to account for “*the subjective prominence of the character of the specific sound at the noise-sensitive locations and the extent to which such acoustically distinguishing characteristics will attract attention*”.



- **Tonality** – “For sound ranging from not tonal to predominantly tonal the Joint Nordic Method gives a correction of between 0dB and +6dB for tonality. Subjectively, this can be converted to a penalty of 2dB for a tone which is just perceptible at the noise receptor, 4 dB where it is clearly perceptible and 6dB where it is highly perceptible;
- **Impulsivity** – A correction of up to +9 dB can be applied for sound that is highly impulsive, considering both the rapidity of the change in sound level and the overall change in sound level. Subjectively, this can be converted to a penalty of 3dB for impulsivity which is just perceptible at the noise receptor, 6 dB where it is clearly perceptible, and 9dB where it is highly perceptible;
- **Intermittency** – When the specific sound has identifiable on/off conditions, the specific sound level ought to be representative of the time period of length equal to the reference time interval which contains the greatest total amount of on time. If the intermittency is readily distinctive against the residual acoustic environment, a penalty of 3 dB can be applied; and
- **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 3 dB can be applied.”

Finally, BS 4142:2014+A1:2019 outlines guidance for the consideration of the context of the potential impact, including consideration of the existing residual sound levels, location and/or absolute sound levels.

3.6 Acoustics, Ventilation and Overheating Guide (AVO)

The AVO Guide has been published for application by practitioners when following Stage 2 Element 1 of good acoustic design within ProPG. This extended guidance document has aimed to assist designers to adopt an integrated approach to the acoustic design within the context of the ventilation and thermal comfort requirements.

It has been acknowledged from the AVO Guide that there is a need to address how the ventilation strategy and overheating mitigation impacts of the impacts on the acoustic conditions and whether a more-informed strategy is required in the mitigation of overheating. The Building Regulations 2010 Overheating: Approved Document O has since regulated the requirements for overheating ventilation and noise at night, as detailed further below.

3.7 Approved Document O

The Building Regulations 2010 Overheating: Approved Document O (ADO) was published on the 15th December 2021. This is an entirely new Approved Document which provides the normal means of complying with Part O to the Building Regulations 2010.

The simple way to comply with Part O is to provide adequate window openings such that comfortable internal temperatures can be maintained during the hottest times of the year. However, the document precludes the use of open windows for overheating control at night if this would result in internal noise levels above 40 dB $L_{Aeq,T}$ or 55 dB $L_{Amax(F)}$.

Unlike the AVO Guide, ADO does not appear to offer any flexibility with respect to how often windows might be required to be opened. Therefore, the noise limits are absolute. I.e., if they will be exceeded with windows open then an alternative overheating ventilation strategy would be required, even if windows would only need to be opened on a few nights of the year.

Note: Part O is now a legal requirement and component of the Building Regulations in the UK applicable to all new residential buildings in the UK (noting the above exceptions) and



therefore these criteria do not need to be further considered by the Local Planning Authority or imposed by way of a planning condition.

It should however be noted that Part O took effect on 15th June 2022. It does not apply to work subject to a building notice, full plans application or initial notice submitted before that date, provided the work is started on site before 15th June 2023. On this basis as of 15th June 2023, all new residential development in the UK needs to comply with the acoustic and thermal requirement of the legislation, as such design decisions made at planning stage should consider the implications of the performance standards thoroughly and accommodate any acoustic design requirements resulting at the earliest possible stage.



4.0 Environmental Noise Survey

To establish the prevailing sound climate at the Site, a baseline survey was undertaken between 29th September 2023 and 3rd October 2023.

4.1 Equipment and Measurements

Sound pressure level measurements were carried out using the following equipment listed in **Table 4-1** conforming to Class 1 acoustic accuracy for sound level meters and matched calibrators.

The sound level meters were calibrated before the measurements were taken, using the handheld acoustic calibrator and the calibration was checked upon completion of the survey. No significant drift was observed with calibration offsets of ≤ 0.6 dB. The calibration chain of equipment has been maintained as at least traceable to National Standards, no greater than one year for sound calibrators and two years for sound level meters.

Table 4-1: Monitoring Equipment

Location	Equipment	Serial Number
Location 1	Cirrus CR:171B Class 1 Sound Level Meter	G061094
	Cirrus CR:515 Acoustic Calibrator	72210
Location 2	Cirrus CR:171B Class 1 Sound Level Meter	G068726
	Cirrus CR:515 Acoustic Calibrator	59336
Location 3	Cirrus CR:171B Class 1 Sound Level Meter	G080284
	Cirrus CR:515 Acoustic Calibrator	59336
Location 4	Norsonic Nor140 Class 1 Sound Level Meter	1403010
	Norsonic 1251 Acoustic Calibrator	31875

Measurements were recorded in free field conditions, as measured in-situ 1.5 m above ground at the elevation of the site.

The monitoring protocol consisted of substantially unattended readings over the survey period with nominal 1-hour attendances at the start and end of the monitoring periods.

The following sound level indices have been reported at 15-minute intervals in decibels (dB):

- $L_{Aeq,T}$ – The A-weighted equivalent continuous noise level over the measurement period.
- $L_{A90,T}$ – The A-weighted noise level exceeded for 90% of the measurement period.
- $L_{A10,T}$ – The A-weighted noise level exceeded for 10% of the measurement period.
- $L_{Amax(F)}$ – The maximum A-weighted noise level during the measurement period.

4.2 Locations and Measurements

Sound pressure levels were measured at the following locations.

- Location 1: West of the Site, opposite the entrance to the golf club.
- Location 2: Southeast corner of the Site, by the site entrance on Blackmoorfoot Road.



- Location 3: East of the Site, representative of the receptors at Farmhouse Court.
- Location 4: On the site itself, to the north above centre. This location was chosen to gauge noise levels on the site itself.

The monitoring locations are shown in **Figure 4-1**.

Figure 4-1: Monitoring Locations at Site and Site Context



Image courtesy of Google Earth

4.3 Observed Sound Climate

The observed soundscape at each position was as follows:

- Location 1:
 - On setup: road noise, breeze in the trees, birdsong, distant banging sound, high altitude planes
 - On collection: road noise, breeze in the trees, birdsong, high altitude planes and leaf blower from golf club
- Location 2:
 - On setup: road noise, breeze in the trees
 - On collection: road noise, breeze in the trees
- Location 3:
 - On setup: wind noise, high altitude planes, very distant construction noise, distant road noise, sirens



- On collection: wind noise, high altitude planes, distant road noise, sirens
- Location 4:
 - On setup: breeze in the trees, distant train, digger hydraulics jostling scoop, distant road noise WNW, distant construction beeping
 - On collection: breeze in the trees, distant road noise WNW

4.4 Weather Conditions

A weather station was deployed for the duration of the study. The results from this device have indicated that during the survey, weather conditions were conducive to noise monitoring, with dry and calm conditions during all periods with average wind speeds below 5 m/s and without precipitation. A full overview of weather conditions can be seen in **Appendix B**.

4.5 Baseline Survey Results

The single figure free field noise indices recorded are presented in graphical format within **Appendix C**. The relevant results of the survey have been summarised in **Table 4-2** to **Table 4-5**. Night-time levels have been established from the period 23:00 – 07:00, with maxima reviewed in terms of 2-minute dB $L_{Amax(F)}$ values, with the 2nd and 10th highest reported.

Table 4-2: Location 1 Summary of Measured Sound Levels, dB

Date	Period	$L_{Aeq,T}$	Median L_{A90}	Median L_{A10}	L_{Amax}	L_{Amax} 2 nd highest 2min	L_{Amax} 10 th highest 2min
Friday 29 th September 2023	Daytime	53.9	41.4	57.9	82.6	-	-
	Night-Time	43.0	34.1	38.9	74.7	71.3	65.6
Saturday 30 th September 2023	Daytime	52.9	37.2	55.7	79.8	-	-
	Night-Time	45.8	35.8	43.9	72.7	70.7	68.1
Sunday 1 st October 2023	Daytime	51.3	35.5	53.0	87.8	-	-
	Night-Time	42.4	25.7	33.6	71.4	70.4	65.7
Monday 2 nd October 2023	Daytime	53.1	37.9	56.0	84.7	-	-
	Night-Time	45.3	35.1	40.6	74.2	73.0	68.4
Tuesday 3 rd October 2023	Daytime	55.1	44.7	57.7	79.2	-	-
	Night-Time	-	-	-	-	-	-



Table 4-3: Location 2 Summary of Measured Sound Levels, dB

Date	Period	L _{Aeq,T}	Median L _{A90}	Median L _{A10}	L _{Amax}	L _{Amax} 2 nd highest 2min	L _{Amax} 10 th highest 2min
Friday 29 th September 2023	Daytime	61.3	42.9	66.7	90.1	-	-
	Night-Time	54.1	32.9	43.1	95.8	77.8*	75.7
Saturday 30 th September 2023	Daytime	61.6	41.7	66.4	91.1	-	-
	Night-Time	55.1	37.5	53.0	86.3	79.6**	77.4
Sunday 1 st October 2023	Daytime	61.0	38.1	65.7	91.9	-	-
	Night-Time	54.2	29.1	37.0	81.7	80.9	77.7
Monday 2 nd October 2023	Daytime	62.8	43.5	67.2	92.5	-	-
	Night-Time	-	-	-	-	-	-
Tuesday 3 rd October 2023	Daytime	-	-	-	-	-	-
	Night-Time	-	-	-	-	-	-

*Excluding 2 extraneous measurements

**Excluding 2 extraneous measurements

Table 4-4: Location 3 Summary of Measured Sound Levels, dB

Date	Period	L _{Aeq,T}	Median L _{A90}	Median L _{A10}	L _{Amax}	L _{Amax} 2 nd highest 2min	L _{Amax} 10 th highest 2min
Friday 29 th September 2023	Daytime	51.6	38.0	46.2	97.2	-	-
	Night-Time	38.2	33.1	39.7	75.8	56.3*	53.4
Saturday 30 th September 2023	Daytime	44.0	33.7	44.4	73.6	-	-
	Night-Time	47.5	31.1	41.5	81.7	79.7	75.4
Sunday 1 st October 2023	Daytime	45.5	34.0	43.4	76.9	-	-
	Night-Time	36.5	28.6	33.9	64.1	56.8**	53.2
Monday 2 nd October 2023	Daytime	44.2	35.5	46.0	76.9	-	-
	Night-Time	42.4	33.6	40.3	73.1	72.6	65.6
Tuesday 3 rd October 2023	Daytime	53.6	43.7	53.0	92.2	-	-
	Night-Time	-	-	-	-	-	-

*Excluding 1 extraneous measurement

**Excluding 1 extraneous measurement



Table 4-5: Location 4 Summary of Measured Sound Levels, dB

Date	Period	L _{Aeq,T}	Median L _{A90}	Median L _{A10}	L _{Amax}	L _{Amax} 2 nd highest 15min*	L _{Amax} 10 th highest 15min*
Friday 29 th September 2023	Daytime	47.5	37.9	43.9	78.9	-	-
	Night-Time	36.3	32.7	37.4	62.2	57.8	48.7
Saturday 30 th September 2023	Daytime	44.3	34.1	42.1	79.5	-	-
	Night-Time	36.5 ¹	31.4	38.9	66.8	63.5	55.5
Sunday 1 st October 2023	Daytime	45.1	33.7	41.1	81.9	-	-
	Night-Time	34.5	26.1	31.8	59.3	59.1	47.6
Monday 2 nd October 2023	Daytime	41.8	35.3	42.8	76.9	-	-
	Night-Time	38.5	33.2	38.1	69.5	64.8	53.4
Tuesday 3 rd October 2023	Daytime	47.4	43.2	48.9	68.8	-	-
	Night-Time	-	-	-	-	-	-

*L_{Amax} 2-minute data not available

¹ Data between 04:00 to 05:00 removed as data was much higher and not consistent with the rest of the dataset



5.0 ProPG Stage 1 Assessment

The assessment method of ProPG has been applied to the development to understand the risks and design requirements to mitigate the proposal from environmental noise sources.

The environmental survey provided in **Section 4** of this report has been utilised to inform a baseline noise modelling exercise for the site.

5.1 Noise Model

The sound predictions for the assessment have been undertaken using a proprietary software-based noise model, CadnaA®, which implements the full range of UK calculation methods. The calculation algorithms set out in ISO 9613-2:2009 have been used and the model assumes:

- Relative humidity of 70 %.
- Air temperature of 10 °C.
- Contour Data to include OS terrain data.
- A reflection factor of 2.

The noise model includes:

- Transport noise sources from Blackmoorfoot Road and Felks Stile Road.

5.2 Daytime Ambient

The daytime $L_{Aeq,16hr}$ noise environment at a height of 1.5 m above ground level can be seen in **Figure 5-1**².

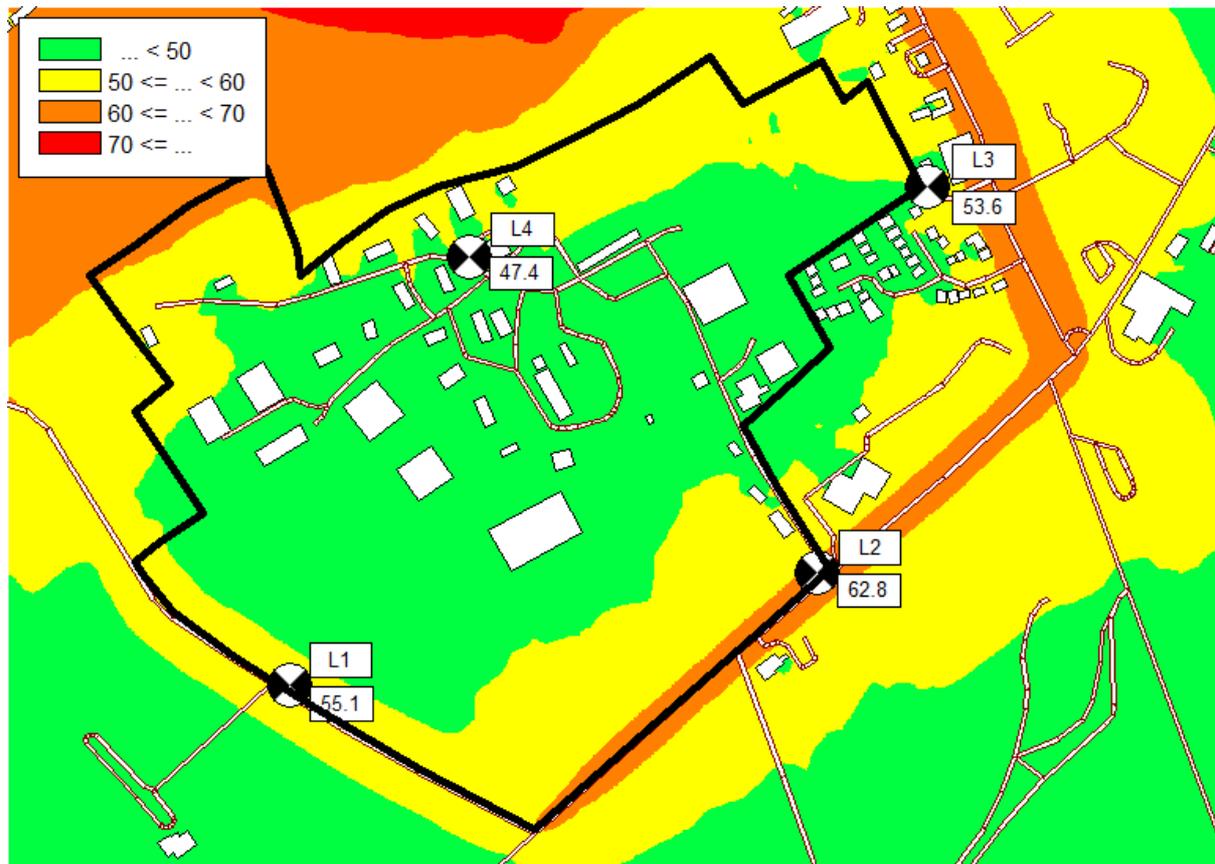
For model verification purposes Locations 1 to 4 and their respective predicted $L_{Aeq,16hr}$ noise levels have been included in **Figure 5-1**.

From a comparison with the data in **Section 4** the calculated noise levels are within 0.1 dB dB(A) of the highest daytime $L_{Aeq,16\text{ hour}}$ value.

² The grid is at 1.5m. The receivers were at the height of the monitoring position, so elevated.



Figure 5-1: Daytime $L_{Aeq,T}$ Noise Level Across Site, dB



5.3 Night-Time Ambient

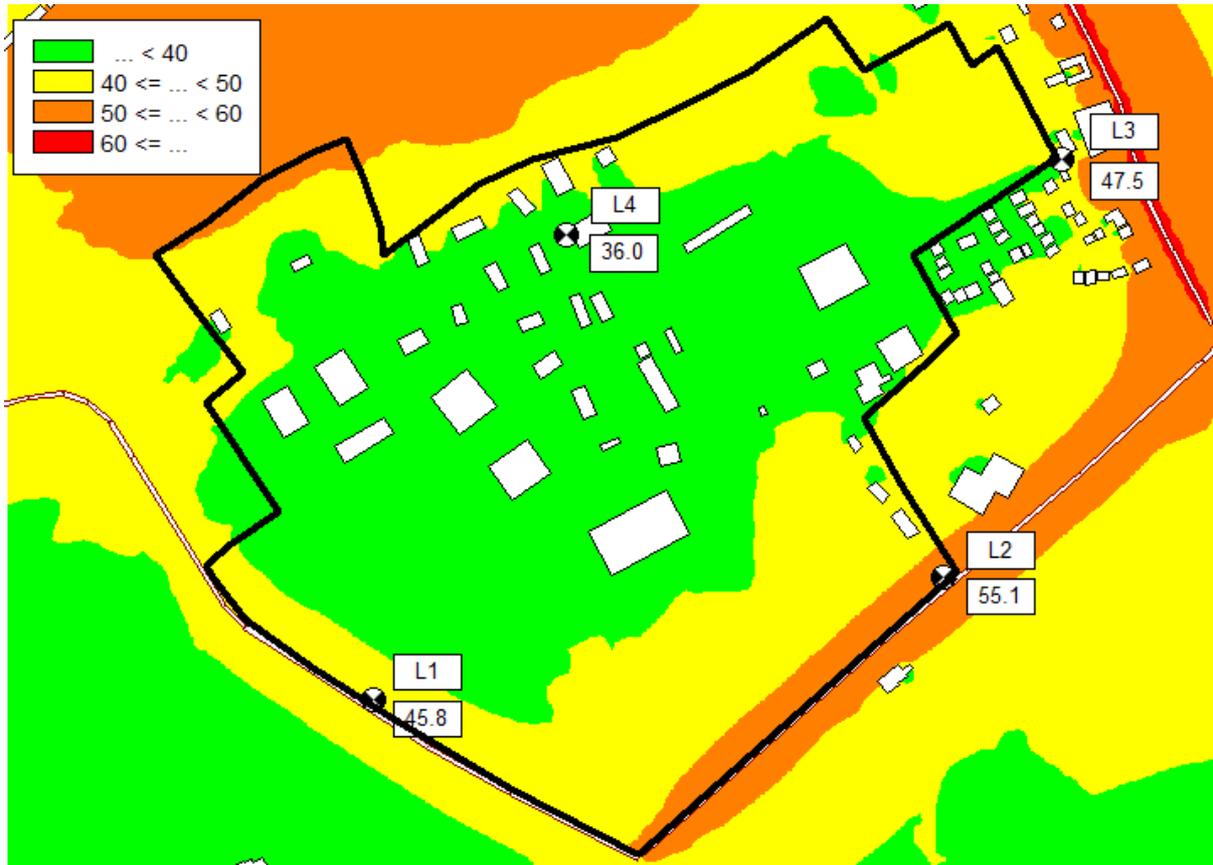
The night-time $L_{Aeq,8hr}$ noise environment at a height of 1.5 m above ground level can be seen in **Figure 5-2**.

For model verification purposes Locations 1 to 4 and their respective predicted $L_{Aeq,8hr}$ noise levels have been included in **Figure 5-2**.

From a comparison with the data in **Section 4** the calculated noise levels are within 0.1 dB dB(A) of the highest night-time $L_{Aeq,8\text{ hour}}$ value.



Figure 5-2: Night-Time $L_{Aeq,T}$ Noise Level Across Site, dB



5.4 Stage 1 – Initial Risk Assessment

The modelling of road traffic noise across the existing site in Figure 5-1 and Figure 5-2 have been used to undertake an initial Site risk assessment, in accordance with Stage 1 of ProPG.

The dominant sound source across the Site was noted from transportation sources. **Figure 5-3** provides an indication of risk in accordance with the ProPG noise risk hierarchy.

Figure 5-3: ProPG Indicative Risk Assessment

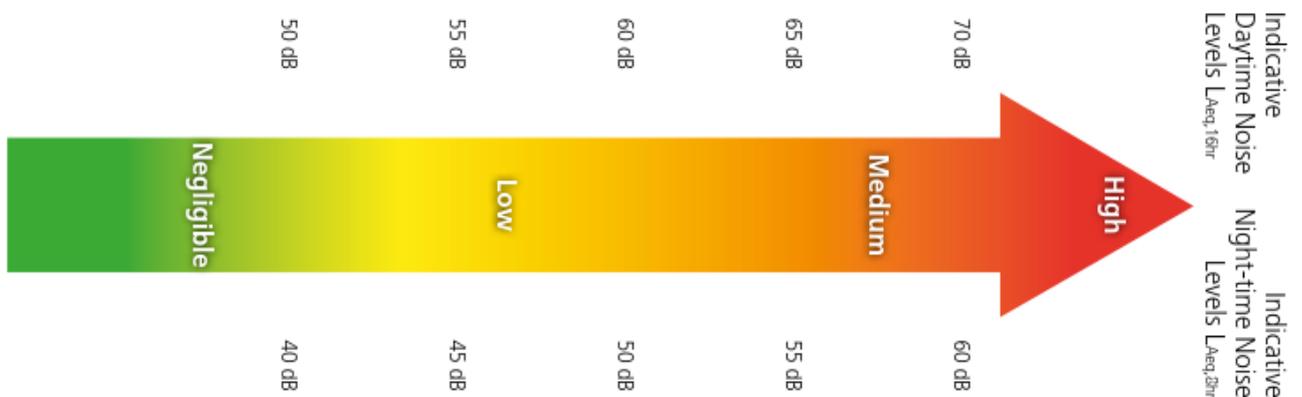


Table 5-1 provides a summary of the noise levels at each boundary (at the position of proposed dwellings) at a height of 1.5 m.



Table 5-1: Summary Assessment of External Noise Levels

Location	Period	Hours	Indicative Noise Level, dB
Northern Boundary	Daytime	07:00 – 23:00	40 – 50
	Night-Time	23:00 – 07:00	35 – 45
	Night-Time Max	23:00 – 07:00	49 – 56*
Eastern Boundary	Daytime	07:00 – 23:00	40 – 55
	Night-Time	23:00 – 07:00	35 – 45
	Night-Time Max	23:00 – 07:00	53 – 75*
Southern Boundary	Daytime	07:00 – 23:00	60 – 65
	Night-Time	23:00 – 07:00	50 – 55
	Night-Time Max	23:00 – 07:00	76 – 78*
Western Boundary	Daytime	07:00 – 23:00	50 – 55
	Night-Time	23:00 – 07:00	40 – 45
	Night-Time Max	23:00 – 07:00	66 – 68*

*Considering the 10th highest L_{Amax} values in Section 4.5

In accordance with ProPG, when reviewing **Figure 5-1** and **Table 5-1**, during the daytime, the external noise level for the majority of the Site is below 60 dB $L_{Aeq,16hr}$ which is considered a low risk.

During the night-time, the external noise level is in the region of 40 – 50 dB $L_{Aeq,8hr}$, which is considered a low risk.

During the night-time, the external max noise level are noted to be up to 78 dB L_{Amax} on the southern boundary which is considered a high level of risk.

The initial Site noise risk assessment has been categorised in the worst-case, of ‘high risk’ on future occupants of the new noise sensitive development. Where a high noise risk has been noted, the pre-planning application advice stated in ProPG has been provided as follows:

“High noise levels indicate that there is an increased risk that development may be refused on noise grounds. This risk may be reduced by following a good acoustic design process that is demonstrated in a detailed ADS. Applicants are strongly advised to seek expert advice.”



6.0 ProPG Stage 2 Assessment

6.1 Good Acoustic Design Process

ProPG has stated it is imperative for acoustic design to be considered at an early stage of the development control process, as to avoid unreasonable acoustic conditions and prevent those which are unacceptable.

The main requirements for Good Acoustic Design have been explained relative to noise sources incident on the site.

- Barriers Bunds, terrace barrier blocks: The use of the Local Centre and Care home blocks placed between Blackmoorfoot Road and further NSR's within the Site.
- Standoff distances: Sensitive Receptors have been set back from Blackmoorfoot Road.
- Plot Orientation: Amenity areas have been placed to the rear of properties allowing for buildings to shield the majority of properties.
- Internal Layouts: It has been acknowledged that 'good acoustic design' generally requires facing less-sensitive rooms (i.e. kitchens and bathrooms) towards the dominant incident noise sources.

It has been presently assumed that all proposed buildings are to be formed by traditional brick construction along with an insulated roof.

The sound insulation of these components has been deemed less consequential to resulting internal ambient noise levels, where the acoustic performance of glazing and ventilation elements will typically remain as dictating the performance requirements.

On the basis of the above consideration to acoustic design of building fabric, glazing and ventilation associated with the proposals is the foremost 'good acoustic design' Strategy for the Site.

6.2 Building Fabric, Glazing and Ventilation-Acoustic Design

6.2.1 Noise Model

The sound predictions for the assessment have been undertaken using a proprietary software-based noise model, CadnaA®, which implements the full range of UK calculation methods. The calculation algorithms set out in ISO 9613-2:2009 have been used and the model assumes:

- Relative humidity of 70 %.
- Air temperature of 10 °C.
- Contour Data to include OS terrain data.
- A reflection factor of 3.

The effects of the existing noise climate impacting the proposed new development have been modelled to inform acoustic design of the Site.

With reference to the criteria set out in this document and the noise modelling inputs and impacts summarised, building evaluation maps have been produced for the daytime and night-time periods.



The scale has been set to be directly comparable with the negligible, low, medium and high risk of adverse effects categories set out within ProPG and has been used to provide a hierarchy of noise mitigation measures required to protect occupants.

The noise model includes:

- Blackmoorfoot Road
- Felks Stile Road
- Crosland Hill Road

Specific details of the design measures to be incorporated would be reviewed once further information on the “as built” project design proposals emerge, typically at detailed planning stage or RIBA Stage 4 (Technical Design).

6.2.2 Glazing and Ventilation Specification

At this stage it has been determined that the specification of sound insulation measures will be controlled by incident external maximum noise level events (L_{AFmax}).

Glazing and ventilation that would meet this requirement would also mitigate external ambient average noise levels day and night to a sufficient level to meet the internal ambient daytime and night-time noise limits of 35 dB $L_{Aeq,16hour}$ and 30 dB $L_{Aeq,8hour}$ respectively from BS 8233:2014.

6.2.2.1 Glazing

The required glazing at each façade is shown in **Table 6-1**.

An adaptation term has been provided for all specifications following the method ISO 717-1:2020. This has included a comparison between the normalised, A-weighted sound spectrum for day and night against the adaptation curves for *Ctr*.

6.2.2.2 Ventilation

The range of whole dwelling ventilation strategies for development has been taken from The Building Regulations 2010 Approved Document F (2022) Means of Ventilation (ADF) and are summarised below.

Note: the 2013 edition referenced different ventilation modes as System 1-4, for ease of reference this is maintained in the below assessment³.

- System 1: Intermittent extract fans.
- System 2: Passive stack ventilation.
- System 3: Continuous mechanical extract (MEV).
- System 4: Continuous mechanical supply and extract with heat recovery (MVHR).

³ As of 2022 it should be noted that other ventilation strategies are also viable and considered valid subject to detailed design such as PiV (Positive Input Ventilation).



Table 6-1: Specifications for Windows and Ventilators

Location	Element	Rw Ctr dB / $D_{ne,w}$ dB value Required	Initial Configuration
Mitigate $L_{A_{fmax}}$ Noise	Windows	30 ^A	4-14-6 standard double glazing
	Ventilator	-	System 1 to 4 appropriate ^B
Mitigate $L_{A_{fmax}}$ Noise	Windows	27 ^A	4-14-6 standard double glazing
	Ventilator	-	System 1 to 4 appropriate ^B
*Only one ventilator accounted per habitable room, assuming CMEV approach. If more than one ventilator is used per habitable room, then the specification would need to increase by a factor $10 \times \log_{10}(n)$ where n = ventilator quantity.			
A) It is understood that the BDW standard glazing has an Rw Ctr dB value of 31 dB(A)			
B) Note the ventilation strategy is further informed by the ADO assessment			

The specification for sound insulation across the scheme has been provided in **Figure 6-1** below. The Figures account for the reduction required to mitigate the $L_{A_{max}}$ to an internal level below 45 dB(A).

It will occasionally be necessary to open windows to provide additional ventilation for purge (e.g. short-term extraction of fumes or odours) or to cool an overheating room. There is no need to apply limits to noise ingress during purge ventilation as this is usually done for a short duration and can often be planned not to coincide with times when the occupants may wish to maintain low internal noise levels.

It may also be desirable to open windows to provide cooling during the hotter months of the year. Occupants should not have to choose between unacceptably high internal noise levels or uncomfortable internal temperatures.



Figure 6-1: Glazing and Ventilator Rw Requirements dB



7.0 Approved Document O Review

7.1 ADO Site Review

In accordance with Approved Document O, the following limits must be met during the overheating condition with the ventilation strategy in operation:

- Night-time internal ambient noise level of 40 dB(A).
- Individual maximum noise events during the night-time of 55 dB(A) no more than 10 times.

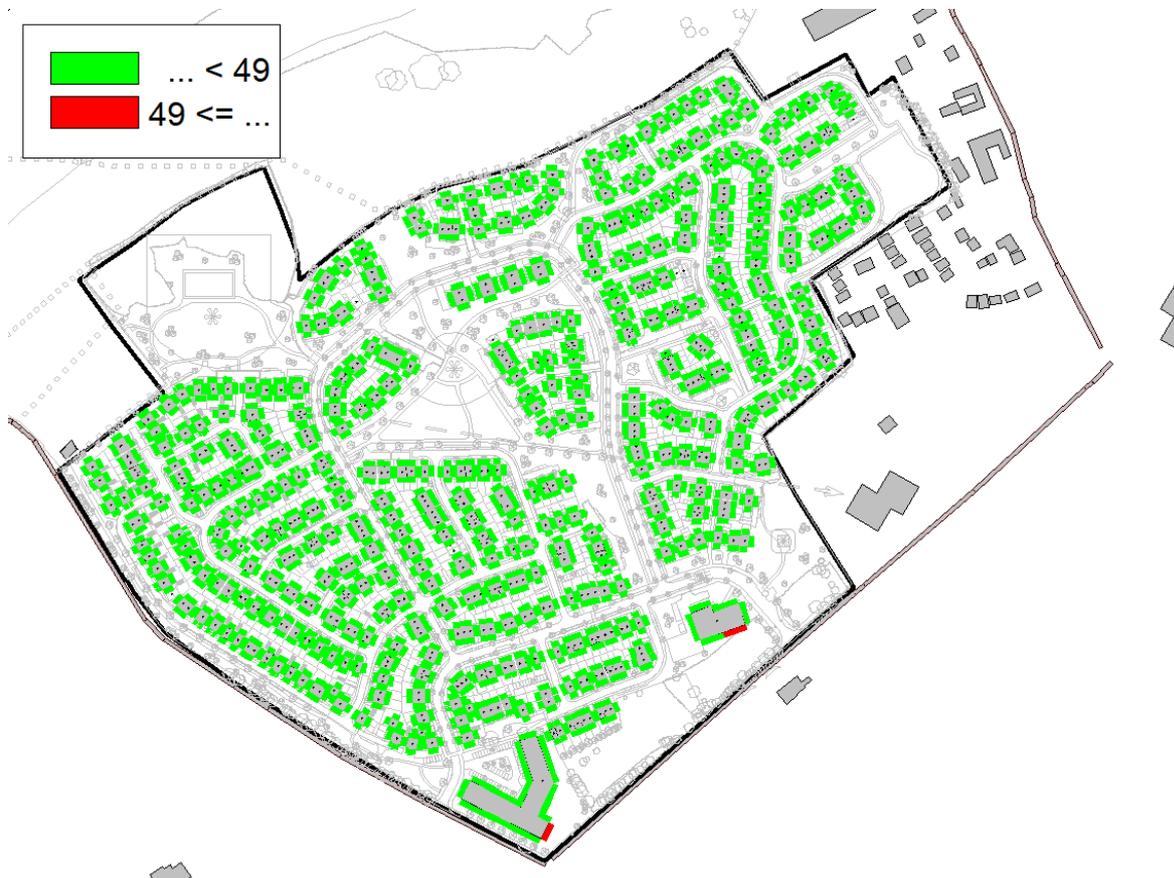
For high overheating risk sites (such as the Proposed Development site) ADO indicates that the insertion loss for an open window sufficiently open to control temperature in the overheating condition via the simplified assessment methodology would be no more than 9dB equivalent to a window opening area of 13% of the floor area of the bedroom.

Therefore, for the internal noise levels above to be met with windows open, the external ambient night-time noise level limit is **49 dB L_{Aeq}** and the external maximum noise level limit during the night-time is **64 dB L_{Amax}** .

7.2 Night-Time Ambient Noise Level Assessment

Figure 7-1 shows the night-time external façade ambient noise level $L_{Aeq,8hr}$ at the dwellings considered in this assessment.

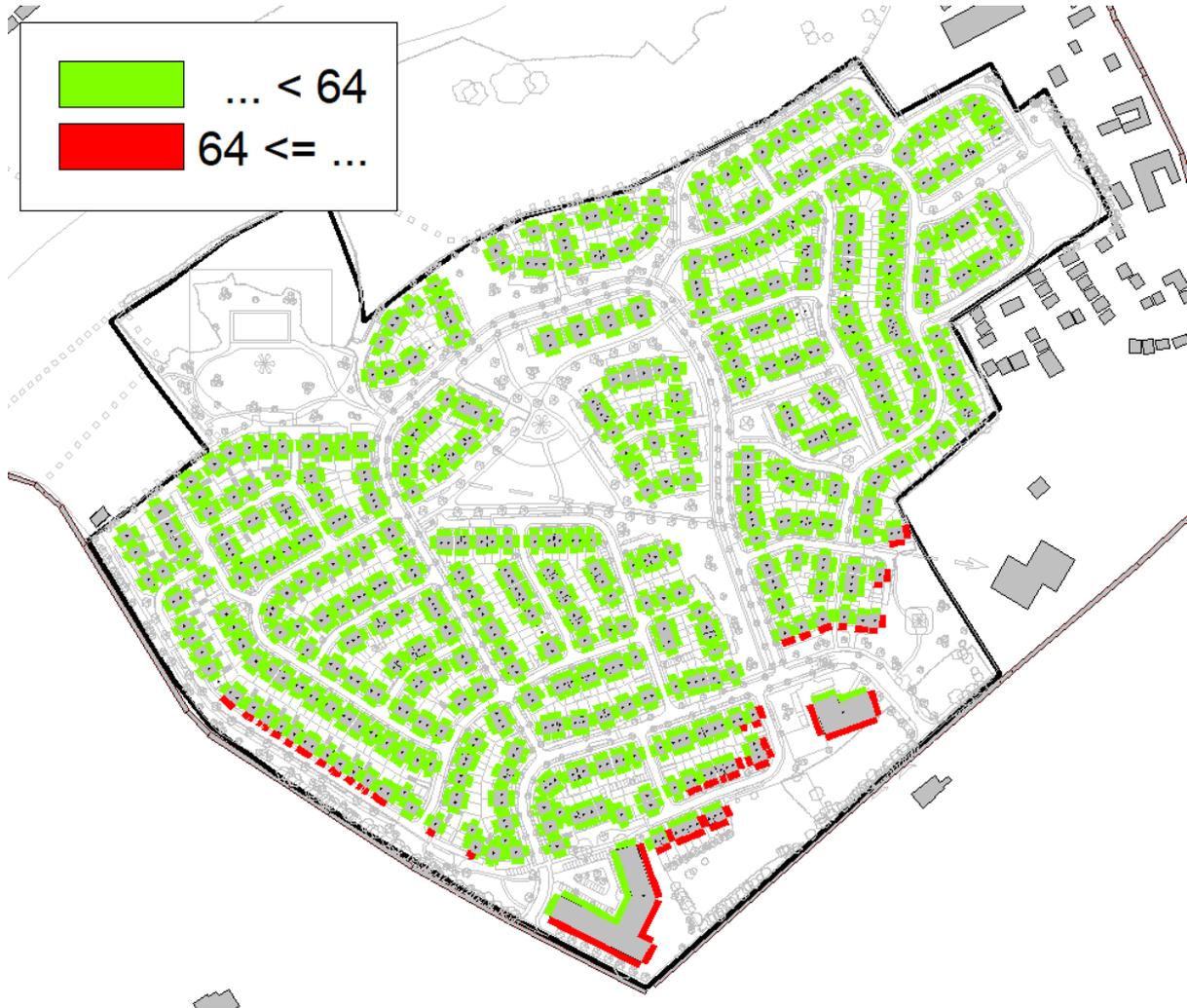
Figure 7-1 Night-time External Façade Ambient Noise Level $L_{Aeq,8hr}$ at dwellings, dB



7.3 Night-Time Maximum Noise Level Assessment

Figure 7-2 shows the night-time external façade ambient noise level $L_{Aeq,8hr}$ at the dwellings considered in this assessment.

Figure 7-2: Night-time External Façade Max Noise Level $L_{Aeq,8hr}$ at dwellings, dB



7.4 Façade Compliance

The sound level results above have been used to identify which facades will be suitable for natural ventilation via openable windows. Figure 7-3 below identifies the dwellings where the L_{Aeq} and/or L_{Amax} limits are exceeded highlighted in red. These facades will require alternative ventilation to an open window. All other facades identify where openable windows are suitable for ventilation.



Figure 7-3: Façade Compliance



Options to control noise ingress will likely depend on some form of mechanical or mechanically assisted means to facilitate sufficient air changes.

Options could include:

- Reversible heat pumps to provide a cooling function.
- Adiabatic cooling attachments associated with MVHR.
- Oversized MVHR to provide a higher air change rates during overheating risk periods.
- Boosted Purge Fan Provision with MVHR to facilitate air changes.

The above would ultimately be subject to detailed design, and it is assumed an ADO Stage 2 assessment including TM59 thermal modelling would be undertaken at the appropriate design stage to inform suitable design strategies.

In general terms it is considered that there are feasible methods to achieve acoustically suitable control of overheating subject to a good acoustic design process.

It is considered that overheating is now controlled by a building regulation, and that demonstrating feasibility and describing potential options for the development is now sufficient at planning, and pre planning stage.



8.0 External Amenity Noise Level Assessment

8.1 Overview

It is generally accepted that private amenity spaces i.e. gardens, should have an area within them such that daytime noise levels are below the lower guideline value of ≤ 50 dB $L_{Aeq,16h}$ to provide a suitable climate for leisure and relaxation, and not exceed an upper limit of 55 dB $L_{Aeq,16h}$.

However, it is not necessarily essential for the entire garden to achieve this, nor is it often practical in environments with relatively high prevailing noise levels to do so. Indeed BS 8233:2014 states that:

“the acoustic environment of external amenity areas that are an intrinsic part of the overall design should always be assessed and noise levels should ideally not be above the range 50 – 55 dB $L_{Aeq,16hr}$ ”. The standard continues... “These guideline values may not be achievable in all circumstances where development might be desirable. In such a situation, development should be designed to achieve the lowest practicable noise levels in these external amenity spaces but should not be prohibited.”

8.2 Amenity Space

The below noise model (**Figure 8-1**) presents the area within the development boundary proposed for amenity, considering the proposed buildings in-situ acting as screening from key noise sources and no other mitigation in situ.

The Figure shows that predicted noise levels in the majority of amenity areas across the Site are likely to fall below 55 dB achieving the criteria stated in BS 8233 and ProPG.

Figures 8-2 and **8-3** detail plots where further mitigation may be required in the form of a localised garden acoustic barrier.

The barrier has been included as:

- Have no gaps at the bottom or between the posts / panels.
- have deep V tongue and grooves to counteract any expansion or contraction and stop gaps appearing.
- Be at least 10kg/m² in density.
- Be 2m high.



Figure 8-1: Prediction of Unmitigated Amenity Space Noise Levels – dB L_{Aeq,16h}

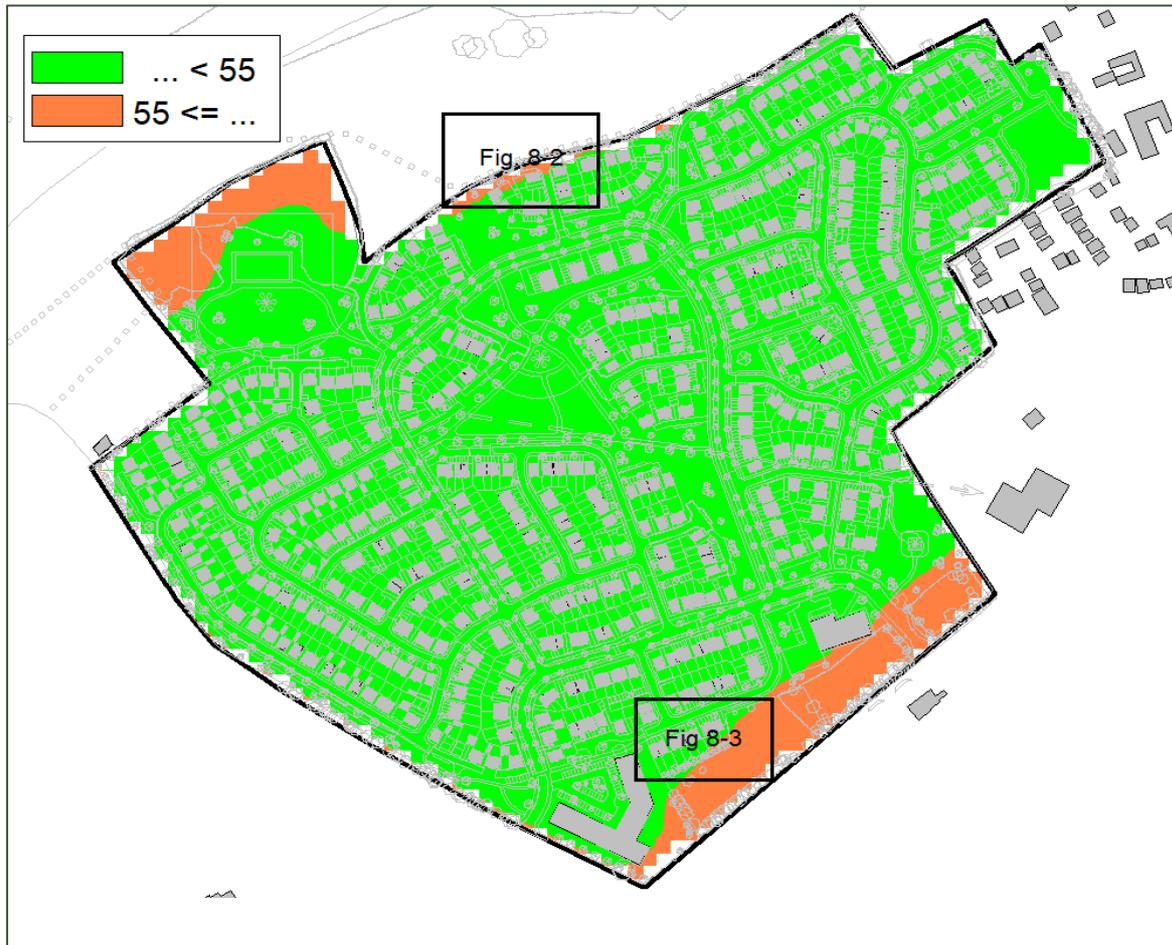


Figure 8-2: Prediction of Mitigated Amenity Space Noise Levels. Plots in need of Further Mitigation – dB $L_{Aeq,16h}$

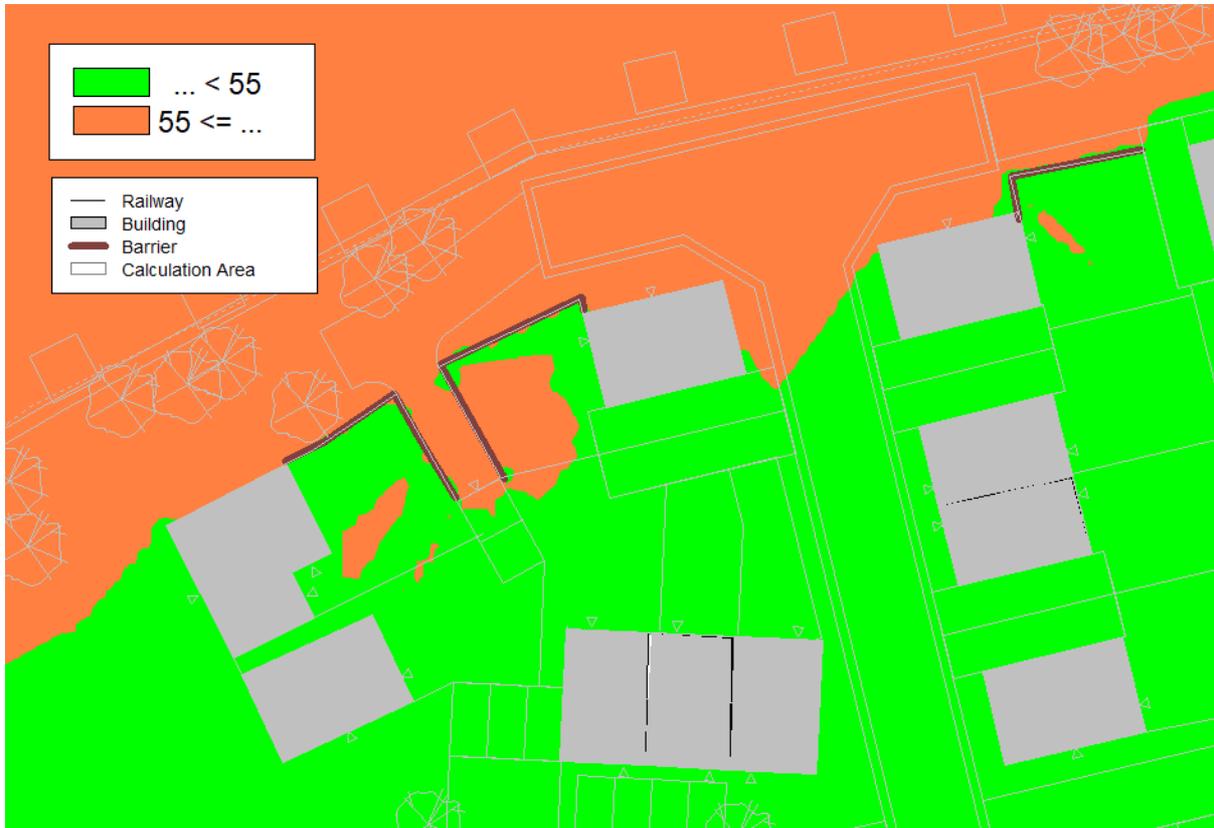
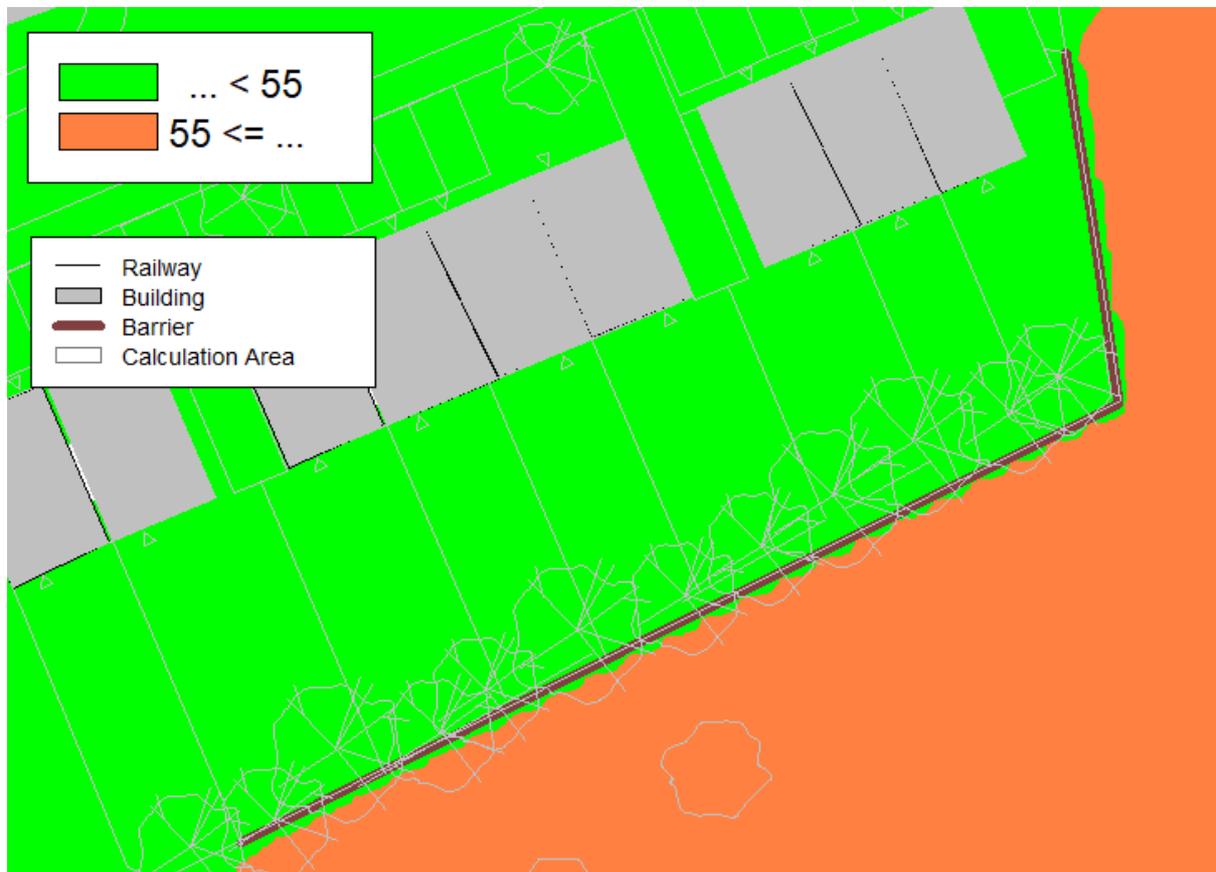


Figure 8-3: Prediction of Unmitigated Amenity Space Noise Levels. Plots in need of Further Mitigation – dB $L_{Aeq,16h}$



9.0 Mechanical Plant and Services Atmospheric Design Noise Limits

9.1 Overview-Plant and Services Provision

The proposed development may incorporate building services plant which can potentially vent to external locations or have externally located plant items.

These can produce audible noise and may require noise control measures (and potentially vibration control dependent on location).

Therefore, to protect existing sensitive receptors in the vicinity the below noise design limits should be adhered to for residential plant and services servicing houses and apartment, (such as air source heat pumps (ASHP), Mechanical Ventilation and Heat Recovery (MVHR) or Mechanical Extract Ventilation (MEV)).

Based upon review of the survey data captured, survey location 4 is indicated as having typically lower median dB $L_{A90,T}$ background sound levels these are summarised in **Table 9-1** below.

Table 9-1: Typical Background Sound Levels

Period	Median dB $L_{A90,T}$
Daytime 07:00-23:00	33.7
Night-time 23:00-07:00	26.1

It is therefore proposed to control daytime building plant and services emissions as per **Table 9-2** below across the site to protect residential amenity at the nearest existing NSR.

BS 4142:2014+A1:2019 states that the following should be considered:

- typically, the greater the difference, the greater the magnitude of the impact;
- a difference of around +10 dB or more is likely to be an indication of a significant adverse impact, depending on the context;
- a difference of around +5 dB is likely to be an indication of an adverse impact, depending on the context; and
- 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. It is an indication that the specific sound source has a low impact, depending on the context.

Based on the above a noise limit equal to background has been proposed. It is recommended that during the detailed design stage this level be discussed and approved by the EHO.

Table 9-2: Derived BS 4142 Plant and Services Design Noise Limits-Existing Dwellings

Period	Proposed External dB $L_{Ae,T}$ BS 4142 Design Criterion*
Daytime 07:00-23:00	34
Night-time 23:00-07:00	26



*Rounded to nearest whole number

Based on the guidance provided, if plant and services were designed to the above design rating level limit would also constitute a “Low Impact” when assessed in accordance with BS 4142 on the basis that:

“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 level, this is an indication that the specific sound source will have a low impact, depending on the context“



10.0 Conclusions

Miller Homes Ltd., Vistry Group and Countryside Properties have appointed SLR Consulting Limited to undertake a noise assessment to support a proposed residential development on land at Blackmoorfoot Road, Huddersfield.

In accordance with ProPG, the daytime and night-time external noise levels for the majority of the Site are predicted to be low risk. Night-time max levels are considered to be high risk.

A Stage 2 assessment in accordance with ProPG has reviewed a good acoustic design process, internal ambient noise levels, external amenity areas and other matters. Commensurate design specifications have been established considering current industry guidance. It has been realised that suitable internal and external amenity standards can be readily achieved by the scheme.

An ADO assessment has been undertaken with the majority of the Site suitable for openable windows. A figure has been provided detailing those properties predicted to require further mitigation measures.

An external amenity area assessment has been conducted which predicted that the majority of the Site is likely to fall below 55 dB. A small number of external amenity areas have been predicted to exceed the criteria and therefore further mitigation in the form of localised garden acoustic barriers is likely to be required.

Based on the measured background levels future plant noise limits have been recommended.

Overall the Site is deemed suitable for development with appropriate design and mitigation measures in place.



Appendix A

Glossary of Terminology

The human ear can detect a very wide range of pressure fluctuations, which are perceived as sound. In order to express these fluctuations in a manageable way, a logarithmic scale called the decibel, or dB scale is used. The decibel scale typically ranges from 0 dB (the threshold of hearing) to over 120 dB. An indication of the range of sound levels commonly found in the environment is given in the following table.

Table A-1: Sound Levels Commonly Found in the Environment

Sound Level	Location
0 dB(A)	Threshold of hearing
20 to 30 dB(A)	Quiet bedroom at night
30 to 40 dB(A)	Living room during the day
40 to 50 dB(A)	Typical office
50 to 60 dB(A)	Inside a car
60 to 70 dB(A)	Typical high street
70 to 90 dB(A)	Inside factory
100 to 110 dB(A)	Burglar alarm at 1m away
110 to 130 dB(A)	Jet aircraft on take off
140 dB(A)	Threshold of Pain

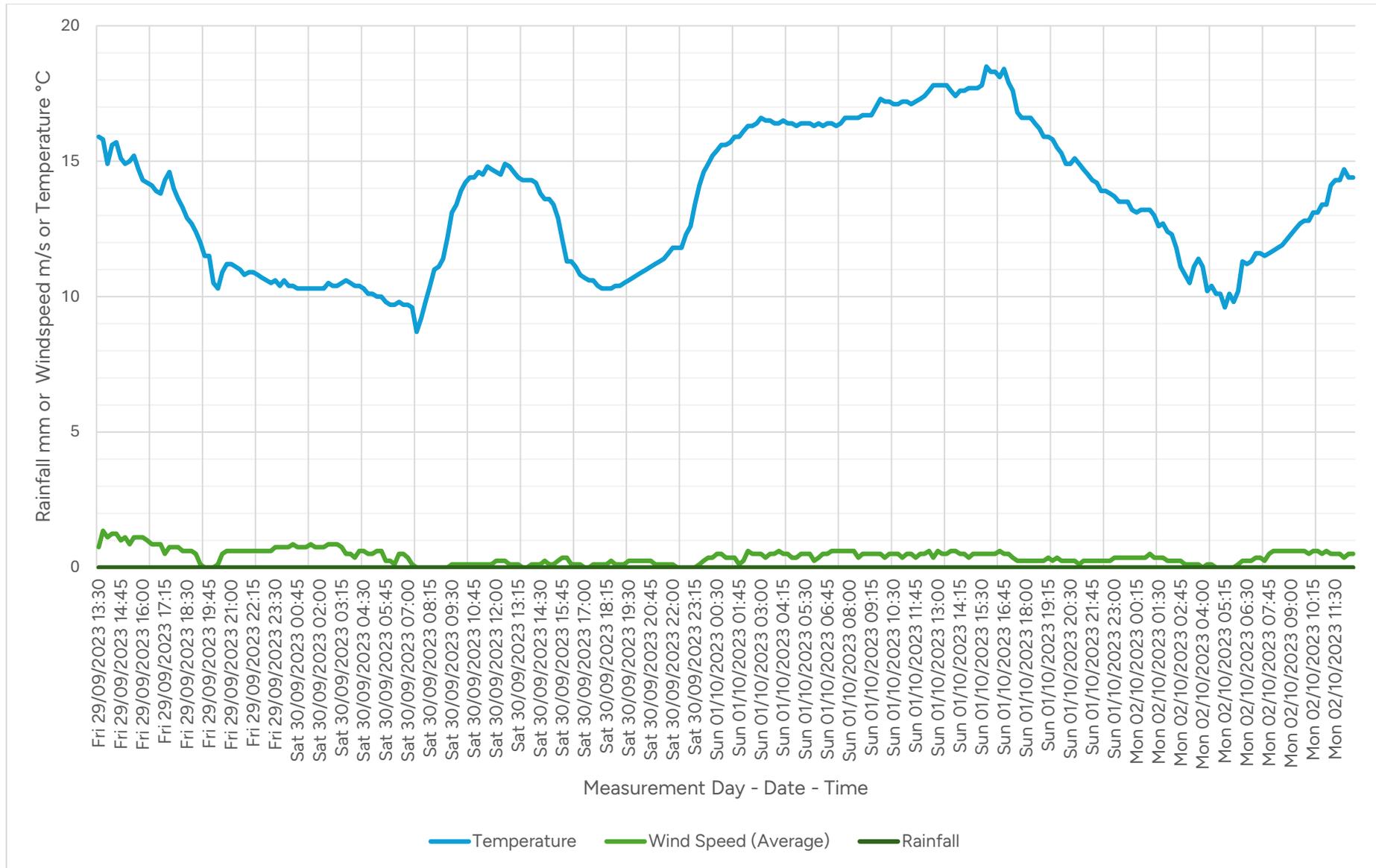
Acoustic Terminology

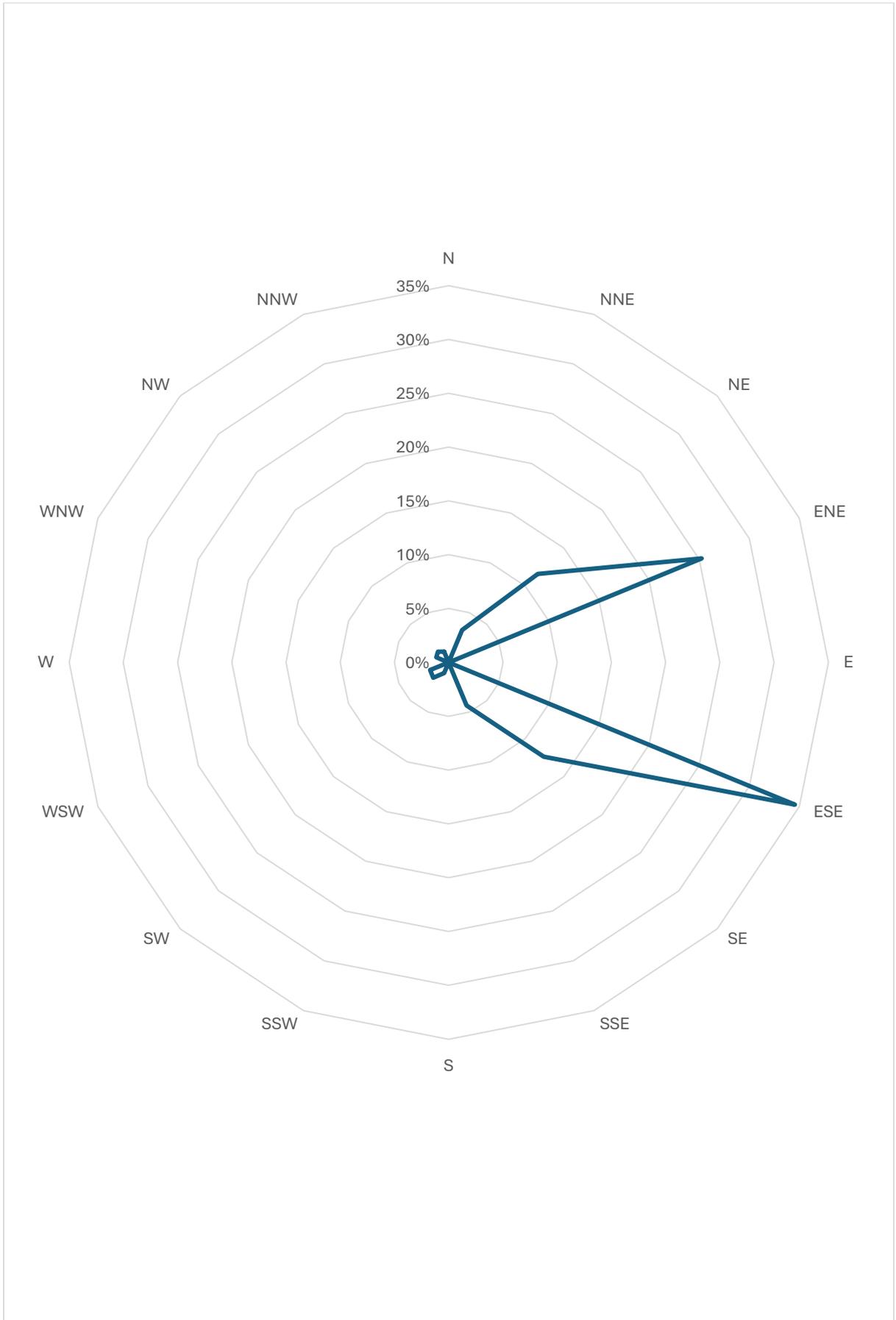
dB (decibel)	The scale on which sound pressure level is expressed. It is defined as 20 times the logarithm of the ratio between the root-mean-square pressure of the sound field and a reference pressure (of 20 μ Pa).
dB(A)	A-weighted decibel. This is a measure of the overall level of sound across the audible spectrum with a frequency weighting (i.e. 'A' weighting) to compensate for the varying sensitivity of the human ear to sound at different frequencies.
$L_{Aeq, T}$	$L_{Aeq, T}$ is defined as the notional steady sound level which, over a stated period T, would contain the same amount of acoustical energy as the A-weighted fluctuating sound measured over that period.
$L_{A10, T}$ & L_{A90}	If a non-steady noise is to be described it is necessary to know both its level and the degree of fluctuation. The L_n indices are used for this purpose, and the term refers to the level exceeded for n% of the time. Hence L_{10} is the level exceeded for 10 % of the time and as such can be regarded as the 'average maximum level'. Similarly, L_{90} is the 'average minimum level' and is often used to describe the background noise. It is common practice to use the L_{10} index to describe traffic noise.
$L_{Amax(F)}$	$L_{Amax(F)}$ is the maximum A-weighted sound pressure level recorded over the period stated. L_{Amax} is sometimes used in assessing environmental noise where occasional loud noises occur, which may have little effect on the overall L_{eq} noise level but will still affect the noise environment. Unless described otherwise, it is measured using the 'fast' sound level meter response.





Appendix B Weather

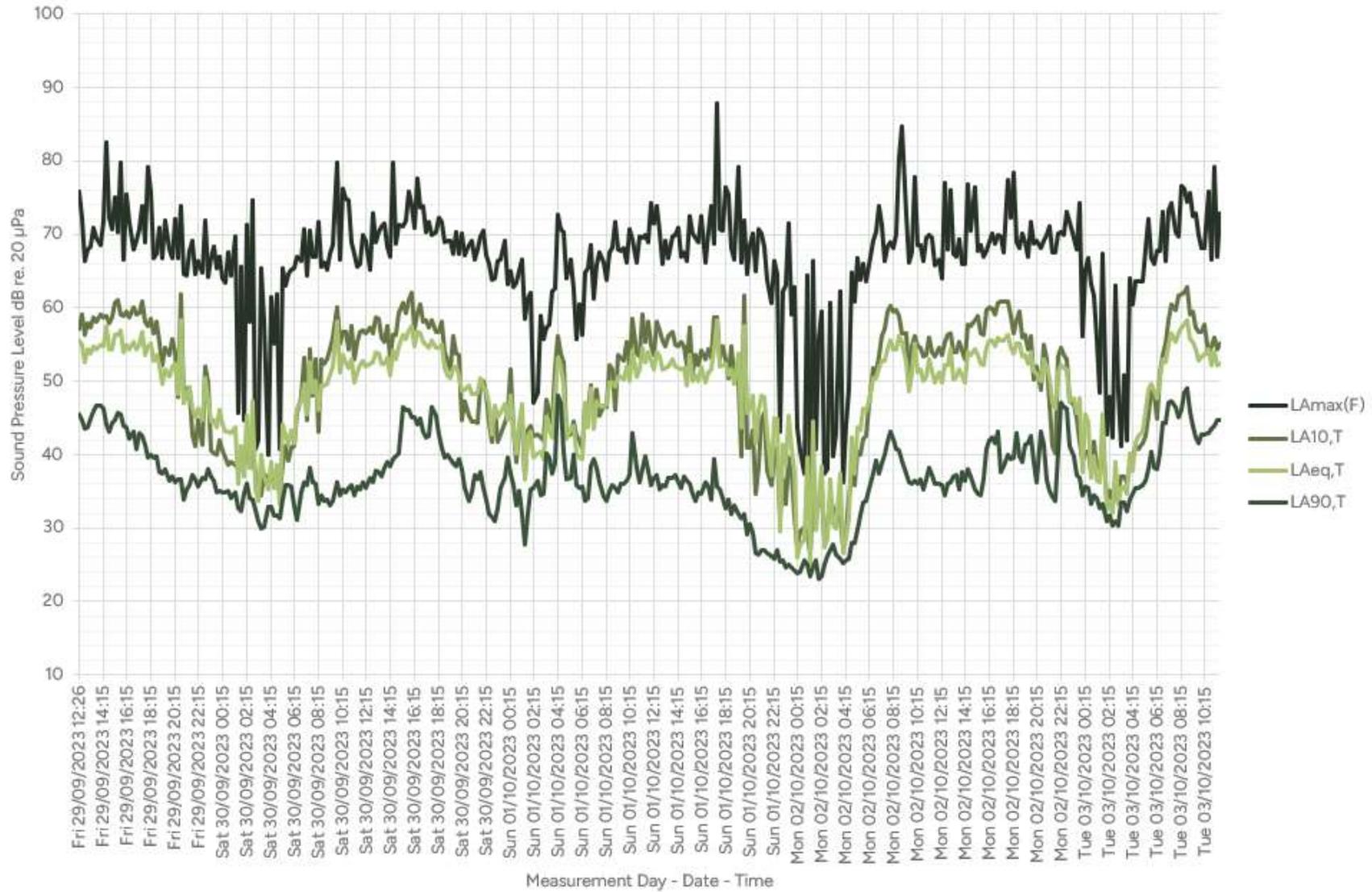




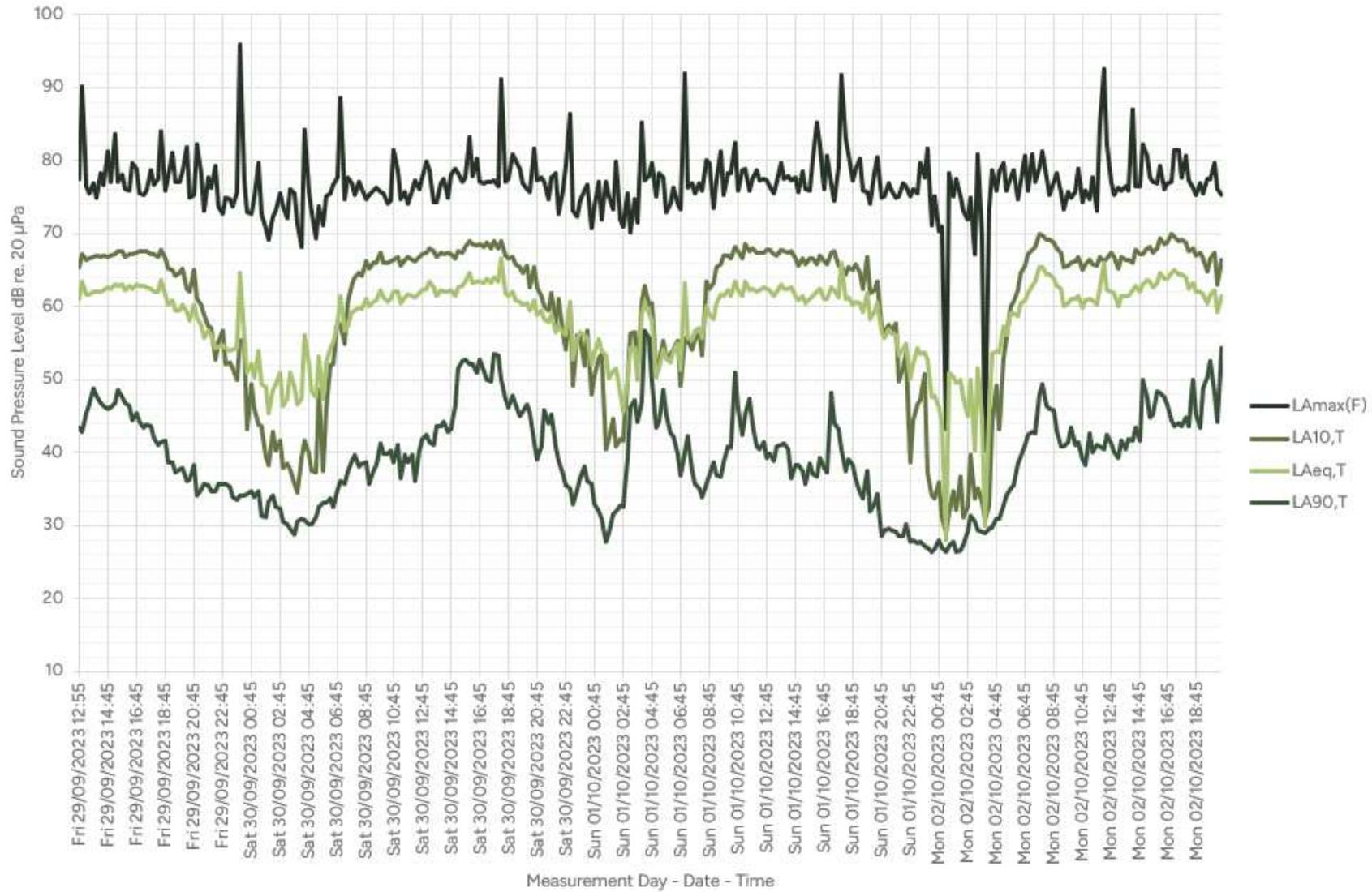


Appendix C Survey Data

Graph C-1: Location 1 Survey Data



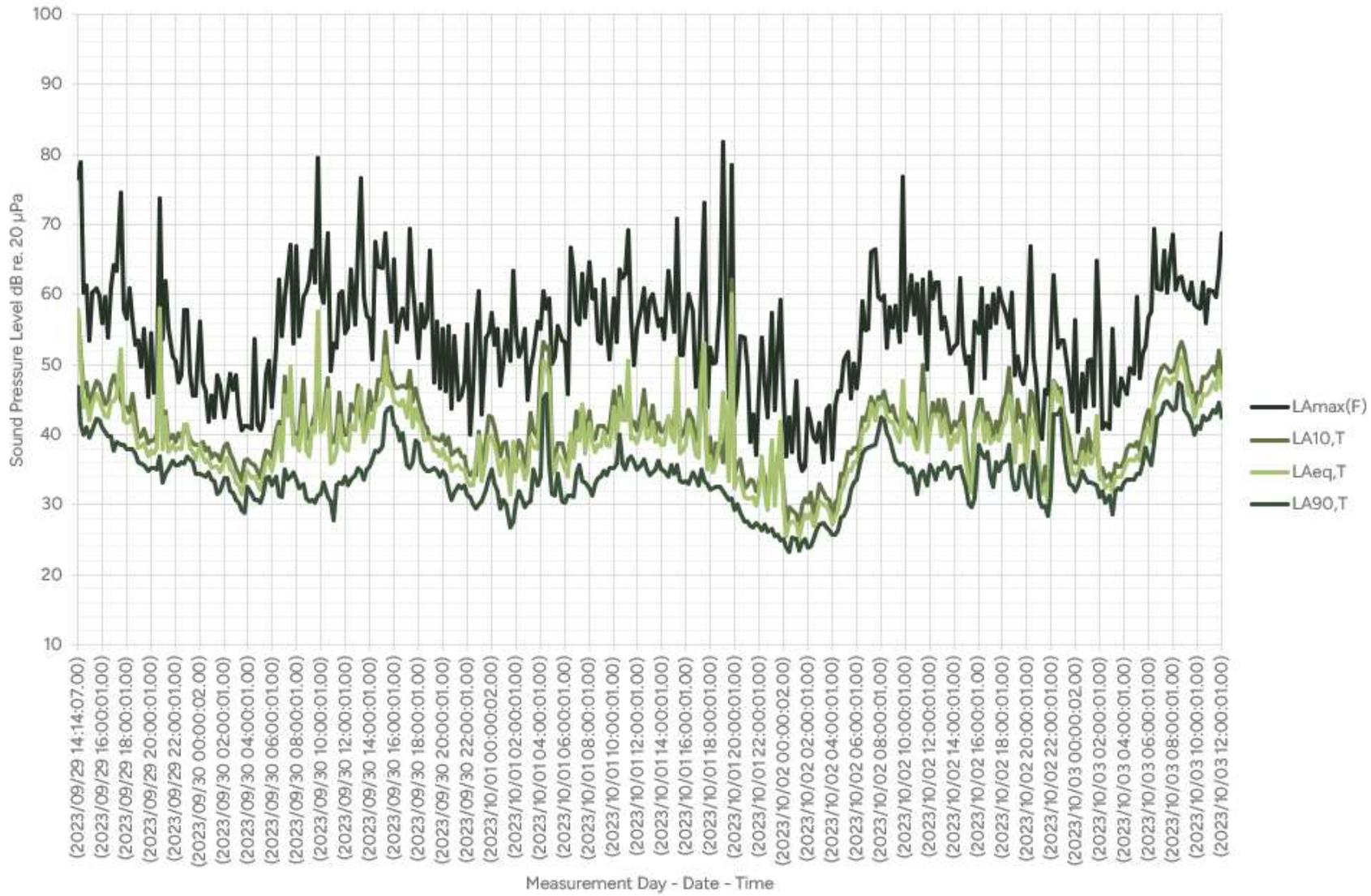
Graph C-2: Location 2 Survey Data

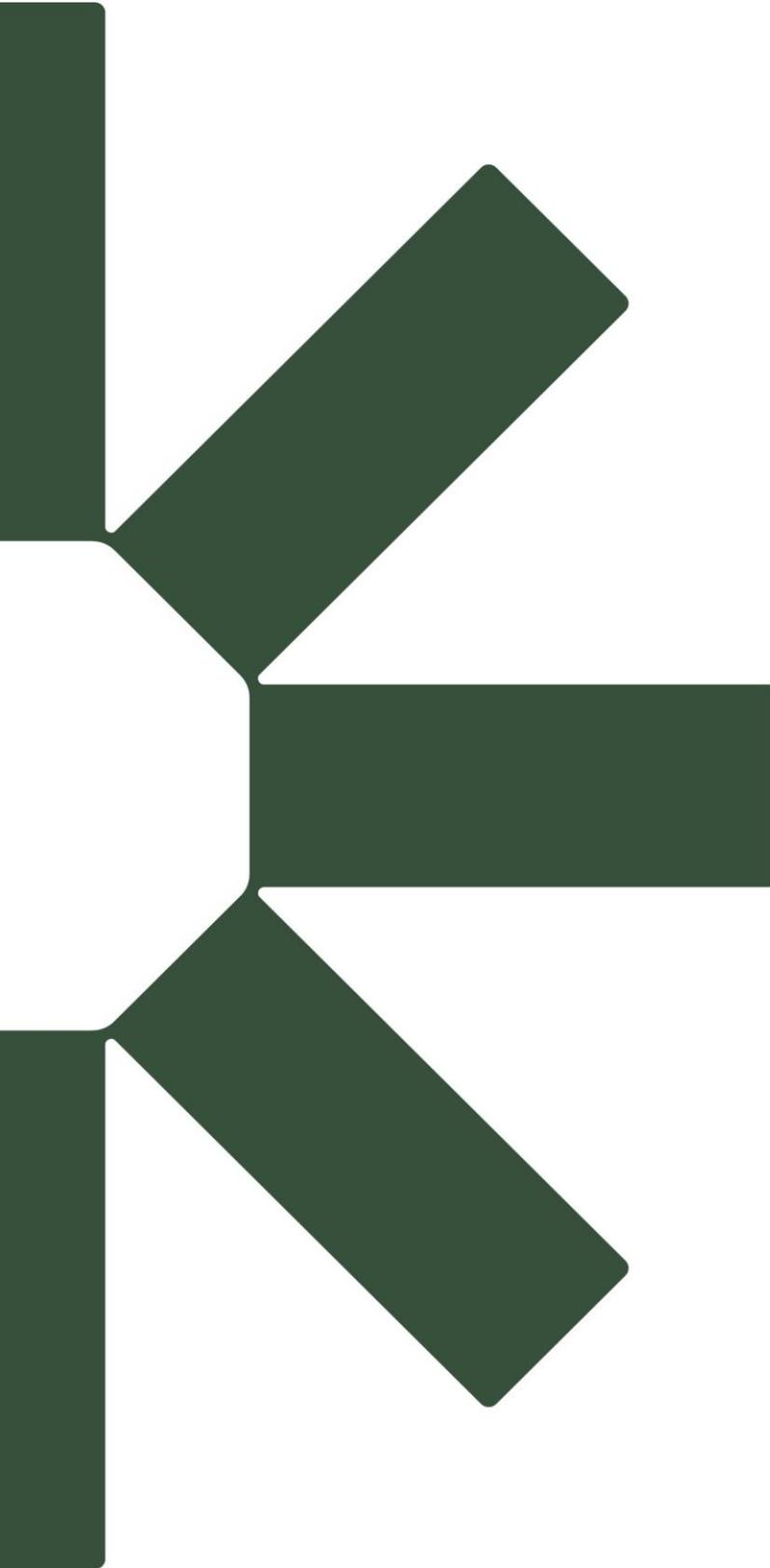


Graph C-3: Location 3 Survey Data



Graph C-4: Location 4 Survey Data





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