Proposed Residential Development Noise Impact Assessment

Woolley Colliery Road, Darton, Barnsley

Gleeson Developments Limited

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Basis of Report

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1.0 Introduction

Gleeson Developments Limited has appointed SLR Consulting Limited (SLR) to undertake a noise impact assessment for a proposed residential development at Woolley Colliery Road, Darton, Barnsley (the Site).

This document has been prepared to support a full planning application with Barnsley Metropolitan District Council (BMDC) for the creation of 114 No. new residential dwellings.

This assessment has been prepared in review of noise impacts from transportation sources on the intended occupiers of the proposed development. It has been developed in accordance with Professional Practice Guidance (ProPG) Planning and Noise – New Residential Development (2017).

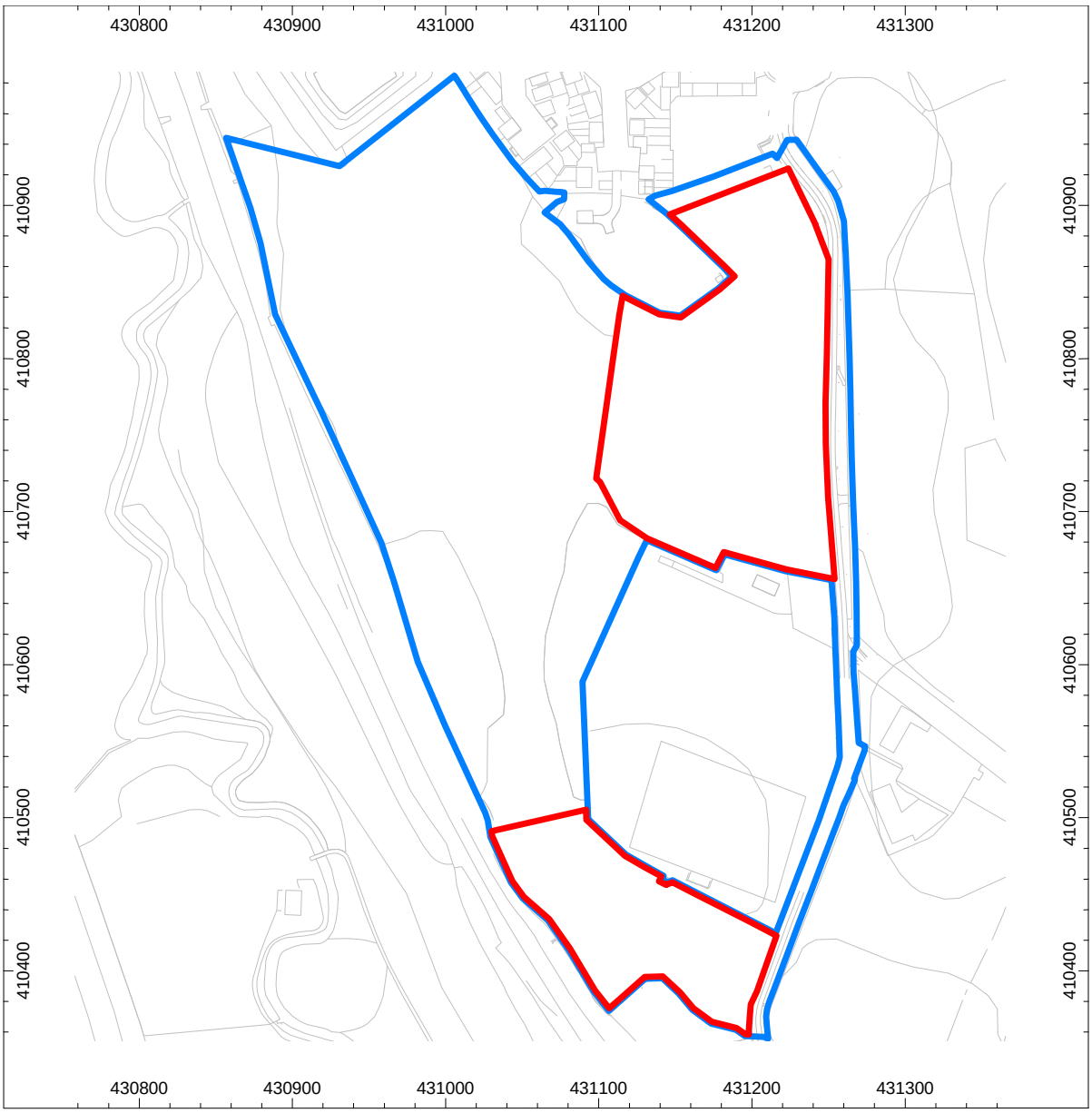
This report has been prepared and checked by suitably qualified persons as defined in Section 8.0. Whilst reasonable effort has been made to ensure that this report is easy to understand, it is technical in nature. To assist the reader, a glossary of terminology has been included in Appendix A.

2.0 Site Description

The development Site is situated on an area of open land to the west of Woolley Colliery Road, to the north of Barnsley.

Figure A below has been prepared to highlight two parcels of geolocated development land with red site boundary, amongst the wider ownership boundary shown blue.

Figure A: Site Location Plan



2.1 Incident Noise and Vibration Sources

The Site is bound by Woolley Colliery Road to the east as well as The Hallam Line railway to the southwest and beyond the redline boundary, defining the section of railway immediately north of Darton Station. The adjacent railway tracks reside at lower ground height compared to the Site. The M1 Motorway has been noted nominally 300 m to the southwest.

The Site surrounds a playing field encompassing Woolley Miners Welfare sports facilities, Barnsley Wooley Miners Cricket Club and North Gawber Colliery Football Club. Some level of community activity could therefore be expected from these facilities from regular club activities, including organised cricket and football.

Commercial premises occupied by Weighwell Engineering Ltd have also been noted in the area, on the opposite side of Woolley Colliery Road to the above-listed sports facilities. These commercial premises remain immediately adjacent to an existing residential property (Former Woolley PH Site, Woolley Colliery Road, as approved under application 2010/1351).

The proposal for new residential dwellings at least 100 m away would not encroach these commercial premises compared to the status quo, inferring that matters of incident commercial noise, or Agent of Change considerations (see Section 3.2.1), would not be prevailing for the proposed residential scheme.

The main sources of incident noise have been considered as transportation sources defined by rail and road traffic routes in the area. Alongside, the Hallam Line has been considered possible to provide quantifiable vibration impact of the proposed scheme, therefore the assessment human exposure to railway vibration has been included within this assessment as an informative.

2.2 Proposed Development

Appendix B has included proposed scheme development plans.

The scheme has comprised two land parcels to the east of the Site with frontage to Woolley Colliery Road, split centrally about the playing fields of Woolley Miners Welfare sports facilities.

The proposed development has proposed 114 No. new dwellings, as:

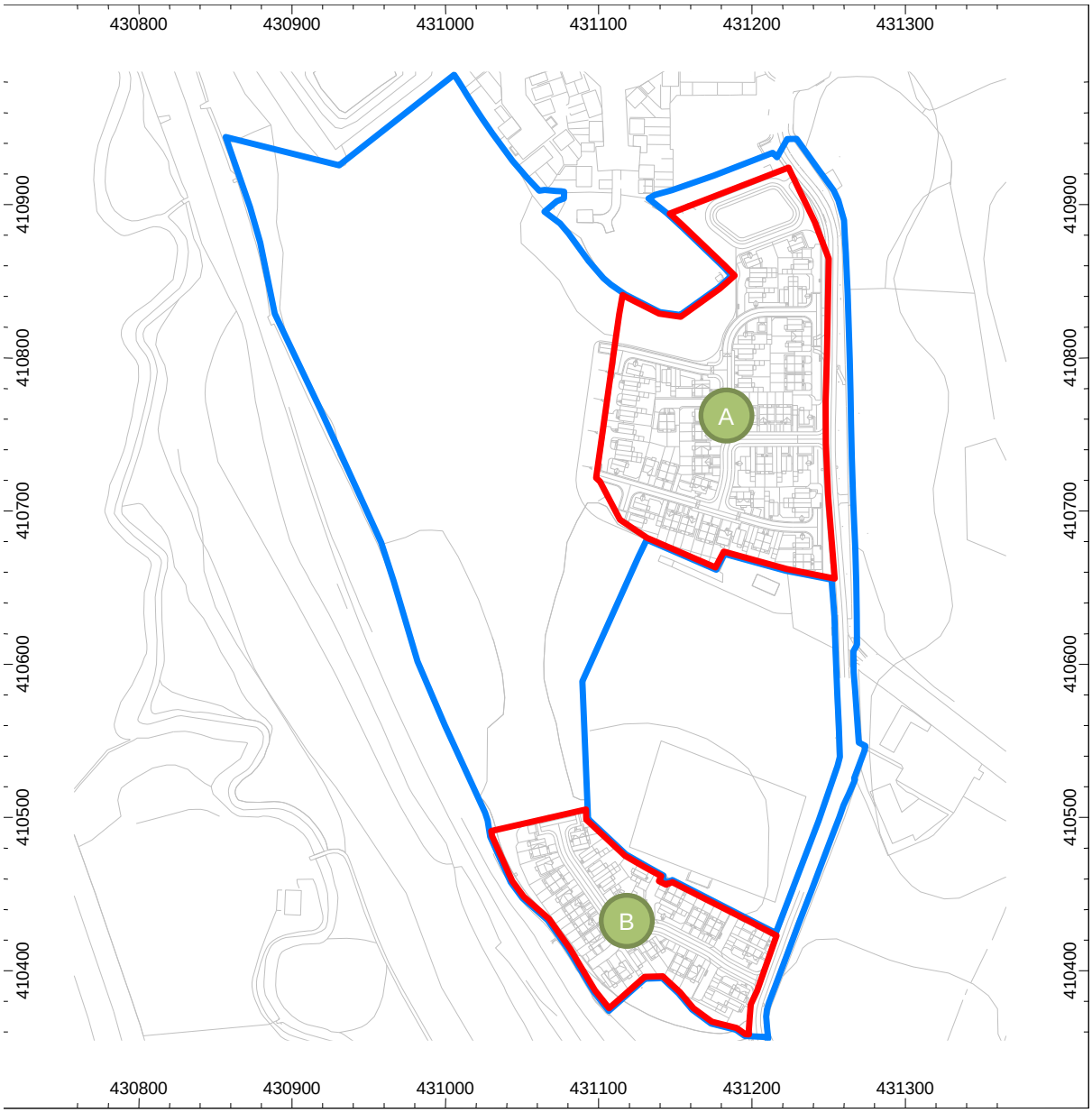
Site A. 72 No. new residential dwellings with a single access route leading west from Woolley Colliery Road, north of the playing fields and sports facilities.

Site B. 42 No. new residential dwellings with a single access route leading west from Woolley Colliery Road, south of the playing fields and sports facilities.

This noise assessment has been based on the highlighted development proposals as obtained at the earliest opportunity of development planning.

The below Figure B has been considered as part of this noise impact assessment, highlighting Sites A and B for completeness.

Figure B: Proposed Development



3.0 Planning and Noise Guidance

3.1 Noise Policy Statement for England (NPSE)

Inter alia, the NPSE *"seeks to clarify the underlying principles and aims in existing policy documents, legislation and guidance that relate to noise".* The aims and this statement apply to all forms of noise including environmental noise, neighbour noise and neighbourhood noise. These noise types are qualified from the NPSE as follows:

- "Environmental noise" includes noise from transportation sources.
- "Neighbour noise" includes noise from inside and outside people's homes; and
- "Neighbourhood noise" which includes noise arising from within the community such as industrial and entertainment premises, trade and business premises, construction sites and noise in the street.

The Statement sets out the long-term vision of the Government's noise policy, which is to *"promote good health and a good quality of life through the effective management of noise within the context of policy on sustainable development."*

It is recognised that the statement expresses the long-term desired policy outcome, whereby using the words of "promote" and "good" recognises that it is not possible to have a single objective noise-based measure that is either mandatory or applicable to all sources of noise in all situations.

The concept of the "effective management of noise" applies to all types of noise and that the solution could be more than simply minimising the noise.

The NPSE provides definitions of health and quality of life as follows:

> *"2.12 The World Health Organisation defines health as a state of complete physical, mental and social well-being and not merely the absence of disease or infirmity, and recognises the enjoyment of the highest attainable standard of health as one of the fundamental rights of every human being.*
>
> *2.13 It can be argued that quality of life contributes to our standard of health. However, in the NPSE it has been decided to make a distinction between "quality of life" which is a subjective measure that refers to people's emotional, social and physical wellbeing and "health" which refers to physical and mental wellbeing.*
>
> *2.14 It is recognised that noise exposure can cause annoyance and sleep disturbance both of which impact on quality of life. It is also agreed by many experts that annoyance and sleep disturbance can give rise to adverse health effects. The distinction that has been made between 'quality of life' effects and 'health' effects recognises that there is emerging evidence that long term exposure to some types of transport noise can additionally cause an increased risk of direct health effects. The Government intends to keep research on the health effects of long-term exposure to noise under review in accordance with the principles of the NPSE."*

The policy promotes the effective management and control of noise, within the context of Government policy on sustainable development and includes three aims to:

- avoid significant adverse impacts on health and quality of life;
- mitigate and minimise adverse impacts on health and quality of life; and
- where possible, contribute to the improvements of health and quality of life.

This Statement adopts established concepts from toxicology that are currently being applied to noise impacts. This concept details effect levels, at which an exposure may be classified

into a specific category. The classification categories as detailed within the NPSE are as follows:

- No Observed Effect Level (NOEL) - the level below which no effect can be detected. Below this level no detectable effect on health and quality of life due to noise can be established;
- Lowest Observable Adverse Effect Level (LOAEL) - the level above which adverse effects on health and quality of life can be detected; and
- Significant Observed Adverse Effect Level (SOAEL) - the level above which significant adverse effects on health and quality of life occur.

The second aim of the NPSE to *"mitigate and minimise adverse impacts on health and quality of life"* refers to the situation where noise impact lies somewhere between the LOAEL and SOAEL. This requires that all reasonable steps are taken to mitigate adverse effects on health and quality of life while accounting for the guiding principles of sustainable development. The NPSE states *"this does not mean that such adverse effects cannot occur".*

In defining the upper limit of SOAEL the NPSE states that *"it is not possible to have a single objective noise-based measure that defines SOAEL that is applicable to all source of noise in all situations. Consequently, the SOAEL is likely to be different for difference noise sources, for different receptor and at different times…"*. Consequently, values of SOAEL will differ between sources and situations.

3.2 National Planning Policy Framework (NPPF)

The National Planning Policy Framework (NPPF) was introduced by The Department for Communities and Local Government in March 2012, with the latest revision dated 19th 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 Section 15 conserving and enhancing the natural environment, the NPPF states the requirement to prevent unacceptable environmental impacts including noise:

> *"180. Planning policies and decisions should contribute to and enhance the natural and local environment by: …*
>
> *e) preventing new and existing development from contributing to, being put at unacceptable risk from, or being adversely affected by, unacceptable levels of soil, air, water or noise pollution or land instability…"*

Paragraph 191 of the NPPF further provides commentary on noise as follows:

> *"191. Planning policies and decisions should also ensure that new development is appropriate for its location taking into account the likely effects (including cumulative effects) of pollution on health, living conditions and the natural environment, as well as the potential sensitivity of the site or the wider area to impacts that could arise from the development. In doing so they should:*
>
> *a) 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*[69]

b) identify and protect tranquil areas which have remained relatively undisturbed by noise and are prized for their recreational and amenity value for this reason…"

Foot Note 69 - See Explanatory Note to the Noise Policy Statement for England (Department for Environment, Food & Rural Affairs, 2010).

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.

3.2.1 Agent of Change Principle

The Agent of Change principle has been defined in recent revisions of the NPPF to explain that new development should not result in unreasonable restrictions being placed on existing and established businesses. The onus for mitigation for any new development has been required to lie with the developer, rather than the business.

Paragraph 193 of the NPPF has been noted to state:

"Planning policies and decisions should ensure that new development can be integrated effectively with existing businesses and community facilities (such as places of worship, pubs, music venues and sports clubs). Existing businesses and facilities should not have unreasonable restrictions placed on them as a result of development permitted after they were established. Where the operation of an existing business or community facility could have a significant adverse effect on new development (including changes of use) in its vicinity, the applicant (or 'agent of change') should be required to provide suitable mitigation before the development has been completed."

This principle has been deemed necessary to follow for the proposed residential development near to existing commercial sources. The guidance has provided that residential development should be suitably mitigated against commercial uses, to support the coexistence of noise-sensitive and noise-generating uses.

3.3 Planning Practice Guidance – Noise (PPGN)

PPGN provides guidance on how planning can manage potential noise impacts in new development, with interpretation and implementation of planning policy contained in the NPPF and NPSE. This was introduced in 2014 with the most recent version issued in July 2019.

The PPGN noise exposure hierarchy table introduces a new threshold of the NOAEL no observed adverse effect level, being between the NOEL and LOAEL and where the noise has no adverse effect where exposure to it does not cause any change in behaviour, attitude or other physiological response.

The PPGN clearly established whether noise is likely to be a concern, following policy statements and requirements of the NPSE and NPPF with additional categorisation and guidance as follows:

"At the lowest extreme, when noise is not perceived to be present, there is by definition no effect. As the noise exposure increases, it will cross the 'no observed effect' level. However, the noise has no adverse effect so long as the exposure does not cause any change in behaviour, attitude or other physiological responses of those affected by it. The noise may slightly affect the acoustic character of an area but not to the extent there is a change in quality of life. If the noise exposure is at this level no specific measures are required to manage the acoustic environment.

As the exposure increases further, it crosses the 'lowest observed adverse effect' level boundary above which the noise starts to cause small changes in behaviour

and attitude, for example, having to turn up the volume on the television or needing to speak more loudly to be heard. The noise therefore starts to have an adverse effect and consideration needs to be given to mitigating and minimising those effects (taking account of the economic and social benefits being derived from the activity causing the noise).

Increasing noise exposure will at some point cause the 'significant observed adverse effect' level boundary to be crossed. Above this level the noise causes a material change in behaviour such as keeping windows closed for most of the time or avoiding certain activities during periods when the noise is present. If the exposure is predicted to be above this level the planning process should be used to avoid this effect occurring, for example through the choice of sites at the plan-making stage, or by use of appropriate mitigation such as by altering the design and layout. While such decisions must be made taking account of the economic and social benefit of the activity causing or affected by the noise, it is undesirable for such exposure to be caused.

At the highest extreme, noise exposure would cause extensive and sustained adverse changes in behaviour and / or health without an ability to mitigate the effect of the noise. The impacts on health and quality of life are such that regardless of the benefits of the activity causing the noise, this situation should be avoided."

It is qualified further to the above statements that the word "level" does not necessarily refer to a single value of noise exposure and that several factors may need to be considered to determine what noise would amount to an adverse or significant adverse effect. Specifically stating:

"Although the word 'level' is used here, this does not mean that the effects can only be defined in terms of a single value of noise exposure. In some circumstances adverse effects are defined in terms of a combination of more than one factor such as noise exposure, the number of occurrences of the noise in a given time period, the duration of the noise and the time of day the noise occurs."

PPGN also provides additional guidance in what is required from the agent of change following circumstances described by Paragraph 193 of the NPPF. It states that the agent of change must *"define clearly the mitigation being proposed to address any potential significant adverse effects that are identified"*.

The guidance also provides there are four broad types of mitigation including:

- *"engineering: reducing the noise generated at source and/or containing the noise generated;*
- *layout: where possible, optimising the distance between the source and noise-sensitive receptors and/or incorporating good design to minimise noise transmission through the use of screening by natural or purpose built barriers, or other buildings;*
- *using planning conditions/obligations to restrict activities allowed on the site at certain times and/or specifying permissible noise levels differentiating as appropriate between different times of day, such as evenings and late at night, and;*
- *mitigating the impact on areas likely to be affected by noise including through noise insulation when the impact is on a building."*

Use of toxicology thresholds of NOEL, LOAEL and SOAEL for the assessment of noise impacts is reinforced within PPGN, which includes a noise exposure hierarchy table to define human perception at these effect levels, as titled *"when noise could be a concern"* and shown below in Table A.

Table A: 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 difficulty in getting back to sleep. Quality of life diminished due to change in acoustic character of the area.	Significant Observed Adverse Effect	Avoid
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 and 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.

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

Table B: 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 $L_{Amax(F)*}$
*Not normally exceeded more than 10 times per night.			

3.4.1 Application for Commercial Sources

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 guidance has advocated the methodology of BS 4142[1] in establishing the impact of industrial and/or commercial sound. If rated as lower than adverse subject to context following BS 4142, its contribution may be included in the degree of risk established for the Site. If considered to be dominant, such as being rated at least adverse subject to context following BS 4142, then the ProPG risk assessment should not be applied to the industrial or commercial noise component. In low-risk cases a subjective judgement of dominance has

[1] British Standard BS 4142:2014 +A1:2019 Methods for Rating and Assessing Industrial and Commercial Sound.

been advocated as sufficient, based on the audibility of the industrial and/or commercial sound.

The assessment method of ProPG has been applied to the residential development to understand the risks and design requirements to mitigate the proposal from environmental noise sources. Where commercial impacts have been viewed satisfied by the design of the scheme and remain less than adverse including context, then the ProPG Stage 1 risk assessment allows that any commercial impacts may be included within its assessment.

> *"In the special case where industrial and/or commercial noise is present on the Site but is "not dominant" (i.e. where the impact would be rated as lower than adverse (subject to context) if a BS4142:2014 assessment was to be carried out), its contribution may be included in the noise level used to establish the degree of risk in Stage 1 and may also be included in the consideration of Stage 2 Element 2 Internal Noise Level Guidelines (and if included, this should be clearly stated)."*

3.4.2 Acoustics Ventilation and Overheating Guide (2020)

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.

3.5 Human Exposure to Vibration within Buildings

The British Standard 6472-1:2008 Guide to evaluation of human exposure to vibration in buildings – Part 1 vibration sources other than blasting (BS 6472-1), offers guidance on vibration criteria within buildings. Vibrations may cause reactions ranging from 'just perceptible', through 'concern' to 'alarm' and 'discomfort'. The subjective response varies widely and is a function of situation, information, time of day and duration.

BS 6472-1 provides guidance using the metric of Vibration Dose Values (VDVs), correlating human exposure to where complaints are probable. VDVs may be used to assess the severity of impulsive and intermittent vibration, such as experienced from blasting at quarries or from rail traffic, and steady vibration such as from a busy road or fixed plant. The adoption of the VDV parameter is based on social studies undertaken in the 1980s and early 1990s into human response to vibration. BS 6472 requires that the VDV is determined for 16-hour daytime (07:00 – 23:00) and 8-hour night-time (23:00 – 07:00) periods.

VDV is measured in each of the three whole-body orthogonal axes and the maximum from the three axes is used. Where the vibration conditions are constant or regularly repeated throughout the day and assessment is based on measured data, only one representative period need be measured, and the 16-hour daytime (or 8-hour night-time) overall VDV level may be calculated from the shortened measurement using appropriate formulae.

For the assessment of building vibration with respect to human response, the predicted or measured VDV are compared to thresholds within Section 6 of BS 6472-1. When the appropriately weighted vibration measurements or predictions have been used to derive the VDV for day or night at the relevant places of interest, their significance in terms of human response for people in those places can be derived; against the probability that the VDV might result in adverse comment by those who experience it.

Table C: Various Probabilities of Adverse Comment within Residential Buildings

Place and Time	Low Probability of Adverse Comment, VDV $ms^{-1.75}$	Adverse Comment Possible, VDV $ms^{-1.75}$	Adverse Comment Probable, VDV $ms^{-1.75}$
Residential Buildings 16 h day	0.2 – 0.4 [a]	0.4 – 0.8	0.8 – 1.6 [b]
Residential Buildings 8 h night	0.1 – 0.2 [a]	0.2 – 0.4	0.4 – 0.8 [b]
[a] Adverse comment is not expected below this range. [b] Adverse comment is very likely above this range.			

For measurements in accordance with BS 6472-1, considering internal excitation, the measurement position should be made at or near to where most adverse comment would be generated. This measurement position is generally comparable to an equivalent entry point into the proposed receiver space, where the distance from the proposed source and the proposed foundation structure is similar.

3.6 Local Plan Allocation and Former Outline Approval

The Site has been allocated for residential use within the Barnsley Local Plan 2016[2] under reference HS1 Former Woolley Colliery.

A former planning application reference 2022/0619 was provided for *"Outline planning application for the erection of up to 115 houses with all matters reserved except for access"* and according to planning history was *"approved subject to legal agreement*".

Of note, a noise and vibration assessment[3] was provided within the above-listed application which provided in summary, that minimal acoustic controls could be used to support proposed residential development based on incident transportation noise.

The development Site has therefore been previously viewed suitable for residential use for a similar quantity of dwellings within the planned proposal of Appendix B. Notwithstanding, the following works have been considered necessary in relation to the specific development proposed within allocation HS1. This has encompassed an updated environmental survey in the following Section.

[2] https://www.barnsley.gov.uk/media/17249/local-plan-adopted.pdf

[3] Woolley Colliery Road, Darton S75 5HY Noise assessment 784-B038941. Prepared for Rouse Homes by Tetra Tech Limited, August 2022.

4.0 Environmental Survey Summary

The following section has referred to a study of environmental sound levels carried out between Thursday 18th and Monday 22nd July 2024. This has included consideration of sound level measurements to characterise the incident sources of noise affecting the proposed development.

4.1 Weather Conditions

Weather conditions were viewed to be acceptable for environmental measurements.

Data from the weather station deployed during the study has been provided in Appendix C to explain a range of favourable conditions. Average wind speeds fell at or below 2 m/s, temperatures ranged from 11 – 27 °C and there was an absence of rainfall.

The prevailing wind direction during the study was south-easterly, as providing a positive vector from local road traffic of Woolley Colliery Road, or neutral vector with respect to the local Hallam Line or distant M1.

4.2 Equipment and Measurements

Sound pressure level measurements were carried out using the following equipment listed in Table D, confirming to Class 1 acoustic accuracy for sound level meters and matched calibrators.

The sound level meter was calibrated before the measurements using the handheld acoustic calibrator and further checked upon completion of the survey. No significant drift was observed with calibration offsets of ≤ 0.2 dB. The calibration chain of equipment has been maintained traceably to national standards, no greater than one year for sound calibrators and two years for sound level meters.

The vibration seismograph holds manufacturers calibration that has been maintained traceably to national standards, no greater than two years.

Table D: Sound Monitoring Equipment

#	Description	Manufacturer	Type	Serial Number	Laboratory Calibration Date	Certificate Number
1	Sound Level Meter	Cirrus	CR:171B	G068726	26/07/2023	196042
	Microphone	Cirrus	MK:224	216365A		196042
	Outdoor kit	Cirrus	MK170	o307	10/01/2024	206405
	Calibrator	Cirrus	CR:515	102979	20/11/2023	203083
2	Sound Level Meter	Cirrus	CR:831B	C171175FF	29/09/2022	180853
	Pre-Amplifier	Cirrus	CR:200C	2188		180853
	Microphone	Cirrus	MK:224	210918D		180824
3	Sound Level Meter	Cirrus	CR:171B	G303356	08/12/2023	204430
	Microphone	Cirrus	MK:224	214834D		204436
	Outdoor kit	Cirrus	MK172	2356	08/12/2023	204430
	Calibrator	Cirrus	CR:515	97641	08/12/2023	204416

#	Description	Manufacturer	Type	Serial Number	Laboratory Calibration Date	Certificate Number
	Weather Station	Davis Instruments	6250UK	MT220531011	-	-
4	Sound Level Meter	Norsonic	NOR140	1403010	06/09/2022	41885
	Pre-Amplifier	Norsonic	NOR1209	21575		41885
	Microphone	Norsonic	NOR1225	271137		41884
	Calibrator	Norsonic	NOR1251	31875	08/08/2023	45073
	Seismograph	Vibrock	V9000	2190	24/04/2024	4242190

Sound pressure levels were measured on Sites A and B with respect to incident noise sources and proposed development housing locations. Each monitoring location was free-field, 1.5 m above ground for sound with vibration transducers levelled and weighted at ground level. The location and purpose of each measurement has been described below:

- Location 1 (Site A): sound monitoring microphone was placed approximately 12 m from edge of nearside carriageway of Woolley Colliery Road, to understand the exposure of road traffic noise along the east of the Site A, with clear line of sight to the road.
- Location 2 (Site A): sound monitoring microphone was nominally 12 m inside the west boundary of the Site A and approximately 130 m west of Woolley Colliery Road, to understand noise exposure towards the southwest corner boundary adjacent to the neighbouring playing field.
- Location 3 (Site B): sound monitoring microphone was placed approximately 4 m from edge of nearside carriageway of Woolley Colliery Road to understand noise exposure along the east of the Site B, with clear line of sight to the road and neighbouring playing fields.
    - A weather station was also located adjacent to the sound monitoring equipment at Location 1.
- Location 4 (Site B): sound monitoring microphone was nominally 12 m inside the southwest boundary of Site B, within a clearing, and approximately 25 m north of the Hallam Line, to understand noise exposure towards the south boundary.
    - The seismograph was placed at ground level at Location 4.

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

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

The following vibration index has also been reported, defining Vibration Dose Value ($m/s^{1.75}$):

- VDV(t) – the vibration dose value reported over the entire measurement period t.

Graphical results describing unattended data have been provided for the above-listed sound level metrics at 15-minute histories within Appendix C.

The on-site monitoring Locations have been shown on the plan of Figure C below.

Figure C: Baseline Monitoring Locations

4.3 Sound Climate

A full witnessed log of events has been obtained to describe main sound sources incident on the Site during times of site attendance. Routine audio recordings were otherwise recorded to retrospectively understand the prevailing sound climate in unattended conditions for Locations 1 and 3.

Observations in and around the Site have included the following notes summarised below:

- Distant road traffic noise from M1 was present at all Locations with vehicles passing along Woolley Colliery Road at low speed, particularly for Locations 1 and 3.
- Sound from the natural environment included birdsong, insects and vegetation rustling.
- Intermittent noise was noted from occasional passing trains at Location 4.

- Distant community noises including people in the street or neighbouring residential locations noted for Locations 1 and 3. An extraneous event local to the microphone of Location 3 (19/07/2024 19:15) was atypical.
- No sounds of an industrial or commercial nature were readily discernible at any point around the Site to warrant further consideration or specific noise assessment.

4.3.1 Dominance of Industrial and Commercial Sound

A site walkaround at different times of attendance (in addition to the post-measurement review of audio recordings), has highlighted that industrial and commercial sound was "not present" on the application Site during times of environmental surveying.

Any audible noise emission from such sources must be considered with respect to noise impact assessment under the NPPF and Agent of Change.

From site observations, industrial or commercial sound was considered 'not dominant' in the sound climate. In low-risk cases such as the witnessed case, a subjective judgement of dominance has been advocated as sufficient, based on the audibility of the industrial and/or commercial sound, in following of ProPG guidance per Section 3.4.1.

4.4 Baseline Survey Results

4.4.1 Period Sound Levels

Period average summaries for the purposes of transportation noise considerations have been provided within Table E below.

Table E: Summary of Period Average Sound Levels

Date Range	Location	Period	Time HH:MM	Average Equivalent Level, dB $L_{Aeq,T}$	Maximum Night Level*, dB $L_{Amax(F)}$
Thursday 18/07/2024 to Monday 22/07/2024	1	Day	07:00 – 23:00	52 – 54	-
		Night	23:00 – 07:00	47 – 51	63 – 64
	2	Day	07:00 – 23:00	49 – 52	-
		Night	23:00 – 07:00	42 – 50	56 – 64
	3	Day	07:00 – 23:00	60 – 61**	-
		Night	23:00 – 07:00	51 – 54	75 – 76
	4	Day	07:00 – 23:00	53 – 57	-
		Night	23:00 – 07:00	48 – 54	57 – 63
* Not normally exceeded 10 times per night, based on time history of dB $L_{Amax(F)}$.					
** Excluding extraneous measurement event 19/07/2024 19:15.					

Night-time levels at Locations 1 and 3 have been established from the period between 23:00 – 07:00, with all data of maxima reviewed in terms of 2-minute dB $L_{Amax(F)}$ values, with the 10th highest reported, to accord with an opinion paper of a suitable method[4].

[4] Paxton, B. Conlan, N et al. Assessing Lmax for residential developments: the AVO guide approach. Proceedings of the Institute of Acoustics. Volume 41, Part 1, 2019.

Those values at Locations 2 and 4 have shown consistent night maxima based on the available 15-minute time history. A recent IOA Paper[5] described that the result of this approach would be expected within 2 dB of the short-term data per night. It has been acknowledged that the derivation of dB $L_{Amax(F)}$ for assessment purposes would not be particularly critical on the resulting scheme, where the difference between dB $L_{Amax(F)}$ and dB $L_{Aeq,8h}$ for Locations 1, 2 and 4 has been noted less than 15 dB.

A difference of greater than 15 dB between dB $L_{Amax(F)}$ and dB $L_{Aeq,8h}$ night values at Locations 3, has promoted the significance of maximum sound levels beyond the average equivalent levels within residential design. This has been viewed most important for Site B Plots closest to Woolley Colliery Road with road traffic noise causing higher night maxima.

4.4.2 Period Vibration Dose

Unattended measurements of acceleration, dose and frequency values were recorded over the survey period at Location 4. These have been summarised as the range of VDV per orthogonal axis within Table F below.

Table F: Summary of Period Average Vibration Dose Values

Date Range	Location	Period	Time HH:MM	VDV $ms^{-1.75}$		
				X	Y	Z
Thursday 18/07/2024 to Monday 22/07/2024	4	Day	07:00 – 23:00	0.002	0.002 - 0.004	0.004 - 0.007
		Night	23:00 – 07:00	0.002	0.003 - 0.004	0.002 - 0.003

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[5] Conlan, N. Wei, W. et al. Empirical relationship between L_{night} and L_{Amax}. Proceedings of the Institute of Acoustics. Volume 43, Part 1, 2021.

5.0 Vibration Assessment

5.1 Vibration Impact Assessment

A vibration impact assessment has been provided within this section following the requirements British Standard 6472-1. It has been provided as an informative, precautionary approach to development, with the adjacent Hallam Line identified within Section 0.

The following Table G considers the highest day and night period VDVs where the values for the relevant assessment periods have been extracted from the measurement instrumentation without modification.

Table G: Probability of Adverse Comment within Residential Buildings, VDV

Location	Time	VDV $ms^{-1.75}$			Impact as defined by BS 6472-1
		X	Y	Z	
5	16 h Day	0.002	0.004	0.007	Adverse comment is not expected
	8 h night	0.002	0.004	0.003	

Vibrations during the daytime were generally dominant in the vertical Z-axis perpendicular to the ground, with lesser vibrations in the X-axis and Y-axis, respectively parallel and perpendicular to the Hallam Line.

For the assessment of vibration within buildings, there is a change that occurs with the properties of vibrations when they pass from the open ground into a building. The presence of the building foundations and response characteristics of the building provide a transfer function, typically as a function of frequency.

In general terms, vibration levels reduce from the free-field situation into foundations of a building due to the change in medium from the soil type to the structure. Typically, a heavier building causes a greater coupling loss where the transmission factor is also dependant on the soil type. Vibration levels then can then further change with floor height and position within a room. The two factors generally apply as attenuation (e.g. ground surface to foundation, floor-to-floor) or amplification (e.g. floor resonances) from the free-field measurement to inside a building, where the assessment of human response relates.

Any guideline values that might be used to predict trends with vibration attenuation and amplification may not always be observed in practice. In the simplest of approximations, there could be no net effect for a transfer function when considering a typical, single-family dwelling. This generalisation does not negate the need for numerical modelling and particularly so where vibration could cause a concern.

The findings of this investigation have determined that vibration levels correlate to minor rail traffic activity where “adverse comment is not expected” during day and night periods. Consequently, there are no specific mitigation measures required to control incident vibration on the proposed development buildings, when considering any reasonable change in vibration that could be instated from the placement of new dwellings.

6.0 ProPG Assessment

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

6.1 Transportation Noise Model

A noise model has been developed using the results of Table E of this report to define the sound level outside of each façade of the residential development. The modelling has used industry standard calculation software CadnaA, as implementing UK standard calculation protocols including the Calculation of Road Traffic Noise (CRTN, 1988).

The model has been developed assuming mixed ground (G = 0.5) and reflection order of 2, with building façade pressure levels shown as free-field points at 1.5 m and + 3.0 m per floor level, corresponding to respective ground and upper floor levels.

Modelling has shown parity within the upper results of Table E, by placing receivers in model space. The following noise level plots of Figure D to Figure G below have been created for respective day and night time periods, based on the calibrated noise model, to show exposure for each plot of the development with the scheme ‘as proposed’. This has included the development building with façade evaluation tool highlighting exposure by colours on building façades, generally aligning with the risk hierarchy of ProPG.

It should be noted that no noise model has been created to explain night maxima across the Site given that propagation from a line source would not occur in the same manner for average equivalent and maximum noise levels.

Maximum noise measurements from Location 3 can be directly applied to the first row of houses along Woolley Colliery Road. For the rest of the development, a nominal 10 dB reduction can be expected due to shielding provided by the first row as well as a general 6 dB per doubling of distance from each road traffic noise source. Aside from Plots 73 – 76 and 112 – 114 about Location 3, maximum sound levels have not generally influenced the resulting mitigation for this assessment.

Figure D: Noise Exposure Per Building Façade – Site A Day

Figure E: Noise Exposure Per Building Façade – Site B Day

Figure F: Noise Exposure Per Building Façade – Site A Night

Figure G: Noise Exposure Per Building Façade – Site B Night

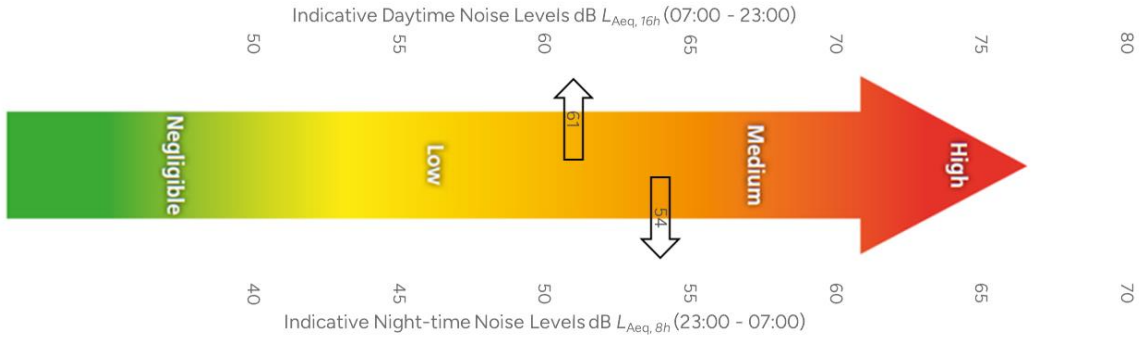
6.2 Stage 1 – Initial Risk Assessment

The following period sound pressure levels of Table H have been used for an initial site risk assessment according to Stage 1 of ProPG. Figure F provides an indication of risk in accordance with the ProPG noise risk hierarchy.

Table H: Summary Assessment of Worst-Case External Noise Levels, dB

Location	Period	Hours	Indicative Noise Level
Plot 73 east façade (worst-case re. Location 3)	Daytime	07:00 – 23:00	61 dB $L_{Aeq,16h}$
	Night-Time	23:00 – 07:00	54 $L_{Aeq,8h}$ 76 dB $L_{Amax(F)}$

Figure H: ProPG Indicative Risk Assessment



The dominant sound across the Site was noted from the transportation sources locally from Woolley Colliery Road and distant from the M1, with highest levels and potentially greatest impacts estimated due to proximity to local roads. Further consideration at night has been given due to maximum sound levels from passing vehicles, where associated 'medium risk' occurs according to ProPG as follows:

> *"As noise levels increase, the site is likely to be less suitable from a noise perspective and any subsequent application may be refused unless a good acoustic design process is followed and is demonstrated in an ADS which confirms how the adverse impacts of noise will be mitigated and minimised, and which clearly demonstrate that a significant adverse noise impact will be avoided in the finished development."*

Most of the development has been considered to fall within 'low risk' noise levels, where ProPG notes that:

> *At low noise levels, the site is likely to be acceptable from a noise perspective provided that a good acoustic design process is followed and is demonstrated in an ADS which confirms how the adverse impacts of noise will be mitigated and minimised in the finished development".*

Commercial activities were not witnessed at any stage of site attendance and so have been considered "not dominant" on the proposed development. The assessment of ProPG risk has therefore included any negligible contribution from commercial sources, where commensurate mitigating means have related to local and distant transportation noise.

6.3 Stage 2 – Full Assessment

6.3.1 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 to avoid unreasonable acoustic conditions and prevent those which are unacceptable. The following processes have been considered as part of Good Acoustic Design (GAD) principles on this Site, in following of ProPG.

Given the dominant source as Woolley Colliery Road providing the range of measured sound levels across the developing land space, there has been considered useful acoustic benefit in moving residential rooms of the proposal away from this source in Site B.

The orientation of proposed plots has resulted in parallel and perpendicular dwellings to Woolley Colliery Road. It has been encouraged as part of GAD to face dwelling frontage towards incident sources as far as possible, affording a linear frontage to the east (front) towards Woolley Colliery Road. By implementing such layout and orientation, this has created consistent, rear facing and shielded amenity spaces using the intervening buildings as local shields. Perpendicular dwellings at the front have been considered to cause 3 dB reduction of incident sound given limited (e.g. 90 degree) sight to Woolley Colliery Road.

The plan layouts of each dwelling type have not been reviewed in this assessment. It has been acknowledged that ‘good acoustic design’ generally requires facing less-sensitive rooms (i.e. kitchens, utility rooms and bathrooms) towards the dominant incident noise sources. For residential houses of at least three-bedrooms, it has been considered unavoidable that some bedrooms would normally remain facing towards the incident noise sources.

It has been understood that all proposed dwellings are to be formed by traditional means with masonry insulated façades, along with an insulated and tiled roof. The sound insulation of these components has been deemed least consequential to resulting internal ambient noise levels, where the acoustic performance of glazing and ventilation elements will typically remain as dictating.

6.3.2 Internal Noise Level Guidelines

ProPG has provided a summary of internal noise level guidelines as part of Stage 2 assessment that have been replicated in Table B of this assessment. The method adopted to achieve suitable internal noise level guidelines has been based upon information contained within the recent ANC publication, The AVO Guide. This has provided an approach as to how the competing aspects of thermal and acoustic comfort can be managed and has been written to reflect the requirements of ProPG and overarching planning requirements.

Given the initial and worst-case site risk assessment as medium risk, it has been considered commensurate to judge suitable façade components in terms of glazing and ventilation components, where calculations have been carried out in single figure decibel values.

The range of whole dwelling ventilation strategies for development has been taken from The Building Regulations 2010 Approved Document F Volume 1: Dwellings Requirement F1: Means of Ventilation (2021 edition) (ADF). An outline appraisal for suitability in the worst-case has been provided using Table B2 of the AVO Guide, in Table I below.

Table I: Outline Appraisal of Different Ventilation Strategies (Worst-Case)

Ventilation strategy according to ADF	Typical windows and vent	Higher acoustic performance windows and vent
Intermittent extract fans	✗	✓
Passive stack ventilation	✗	✓
Continuous mechanical extract (CMEV)	✗	✓
Continuous mechanical supply and extract with heat recovery (MVHR)	✗	✓

It should be considered as part of good acoustic design that minimising the quantity of penetrations through a building façade should be favoured in higher noise level areas. A continuous mechanical extract (CMEV) ventilation strategy has therefore been necessitated for the worst-case plots of development in context to site-wide, Plots 73 – 76 and 112 – 114 of Site B. For all other areas, the ventilation strategy has not been viewed critical.

For any mechanical ventilation system, the ducted routes should face away from the incident noise source. This provision would reduce noise travelling into the habitable room via the ductwork. Where this is not possible the intake and exhaust ducts should incorporate appropriate attenuation to control intrusive noise to meet the criteria in Table B.

The following specifications have been based on calculations to the detailed method in section G2.1 of BS 8233 (equivalent to the method in BS EN 12354-3). 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 C and C_{tr}. The relevant spectrum adaptation term C_{tr} has been confirmed by visual comparison to measured spectra.

Table J: Specifications for Windows and Ventilators

Example Location (Figure I, Figure J)	Element	Specification	Typical Configuration
1. A standard house type.	Windows	≥ 27 dB $R_w + C_{tr}$	4 mm double glazing standard glass types (e.g. 4-16-4).
	Background ventilator	≥ 30 dB $D_{ne,w} + C_{tr}$	Standard* window trickle vent as rated.
2. A standard house type with acoustic trickle vents.	Windows	≥ 27 dB $R_w + C_{tr}$	4 mm double glazing standard glass types (e.g. 4-16-4).
	Background ventilator	≥ 39 dB $D_{ne,w} + C_{tr}$	Acoustic* window trickle vent as rated.
3. A non-standard house type with uprated windows, single acoustic trickle vents and CME ventilation strategy. **	Windows	≥ 33 dB $R_w + C_{tr}$	4/8.8 mm double glazing standard/acoustic glass types (e.g. 4-12-8.8lam).
	Background ventilator	≥ 41 dB $D_{ne,w} + C_{tr}$	Single** acoustic window trickle vent as rated.

* This specification has relied upon no greater than 2 No. ventilators per habitable room.

** Plots 73 – 76 and 112 – 114 only. In this case, single trickle ventilator accounted per habitable room on east façade, with entire plot adopting CME ventilation. If more than one ventilator is used per habitable room, then the specification would need to increase by a factor 10 x log10 (n) where n = ventilator quantity.

Figure I: Illustration of Sound Insulation Scheme – Site A

Figure J: Illustration of Sound Insulation Scheme – Site B

The specification for sound insulation across the scheme has been provided in Figure I and Figure J above. It has been illustrated that the highest specification (Scheme 3) is limited only to those façades of Plots closest to Woolley Colliery Road, Plots 73 – 76 and 112 – 114.

6.3.3 Overheating Risk

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 impacts the acoustic conditions and whether a more-informed strategy is required in the mitigation of overheating.

The advice in this section has so far considered the internal ambient noise level with closed windows under Building Regulations ventilation conditions. The AVO guide has informed that acoustic assessments should also be formed for the overheating ventilation condition, which in the first instance has been considered with open windows.

A simplistic insertion loss of 13 dB has been initially considered from external free field to internal reverberant levels through an open window, as part of AVO Stage 1 approach. It has been acknowledged that acoustic losses for a fully open window may be much less and in the region of 4 – 9 dB depending on the Overheating Risk Location.

On this basis the following summary of Table K has been provided as an initial consideration of the worst-affected façades with both closed and open windows. Use of a 9 dB external to internal loss follows the Simplified Method for a Moderate Risk Location as per Section 4 of the following Guide[6].

Table K: Estimated IANLs from Different Ventilation Conditions

Level 1 Risk Assessment following the AVO Guide			Internal Ambient Noise Levels (IANLs)		
Location	**Windows**	**Ventilation Condition**	**Day dB $L_{Aeq,16h}$**	**Night dB $L_{Aeq,8h}$**	**Max dB $L_{Amax(F)}$**
Plots 73 - 76 and 112 - 114 east bedroom (Worst-case)	Closed vents open	Building	29	22	44
	Partially open	Overheating	48	41	63
	Fully open		52	45	67
Plot 19 east bedroom (Site A Worst-Case)	Closed vents open	Building	27	24	36
	Partially open	Overheating	42	39	51
	Fully open		46	43	55
Plot 2 south bedroom (inset typical)	Closed vents open	Building	25	22	36
	Partially open	Overheating	36	33	47
	Fully open		40	37	51

In case of closed windows, building ventilation conditions have been shown to provide suitable internal ambient noise levels following ProPG and AVO, given that predicted values in Table K do not exceed those in Table B.

[6] Guide to Demonstrating Compliance with the Noise Requirements of Approved Document O, July 2022, v1.0

In the case of partially or fully open windows, the above listed sound levels have been compared against the simplified requirements for meeting Building Regulations Approved Document O: Overheating[7], provided at ≤ 40 dB $L_{Aeq,T}$ and 55 dB $L_{Amax(F)}$ at night (23:00 – 07:00) in all areas of the Site.

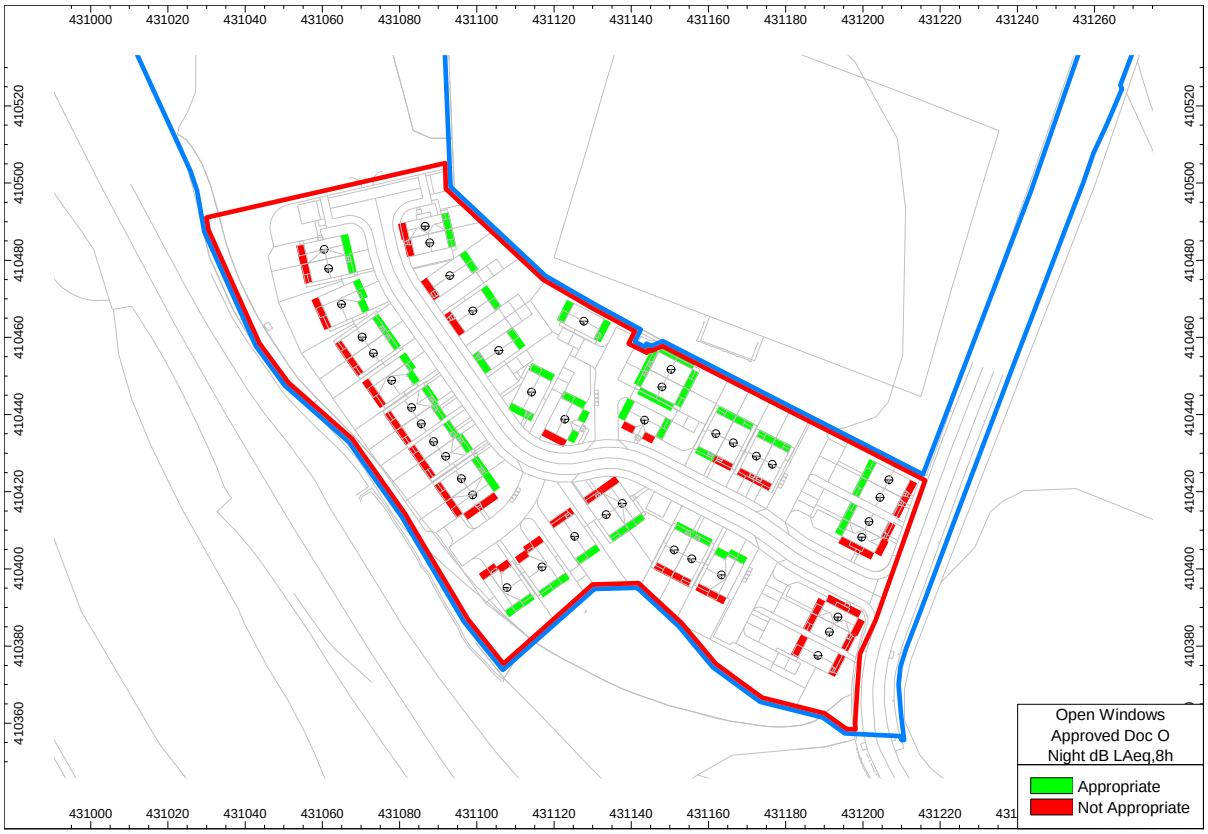
It has been considered that measurements to the front of the Sites A and B were constrained by local transportation sources of Woolley Colliery Road. With the intervening development in-situ, it has been considered that achieving suitable IANL conditions with open windows (whether fully or partially open) would typically be possible for all façades not directly adjacent to the road.

Figure K and Figure L below have been prepared to demonstrate where additional provisions would be required in first floor areas of the scheme to achieve compliance with ADO, where opening windows in accordance with a simplified method could not be appropriate.

Figure K: ADO Simplified Method Suitability – Site A Night (First Floor)

[7] The Building Regulations 2010 Requirement O1: Overheating mitigation, 2021 Edition. As applicable to a building notice or full planning application submitted after 15th June 2022.

Figure L: ADO Simplified Method Suitability – Site B Night (First Floor)



To achieve compliance with ADO, opening windows in accordance with a simplified method would not be appropriate where shown red in Figure K and Figure L, such that a more informed strategy would be necessary.

As part of this, a full overheating assessment should be provided for all the Plot types and their orientation within the scheme.

6.3.3.1 Potential Mitigation Strategy

From discussions with Gleeson Developments technical department, it has been understood that mechanical ventilation fans would likely be used to provide overheating airflow rates where opening windows may not be feasible due to external noise ingress.

In these instances, the noise from the mechanical system combined with the noise entering the building through supply and/or extract ducting must not compromise the IANL conditions of a bedroom beyond 40 dB $L_{Aeq,T}$ and 55 dB $L_{Amax(F)}$ at night (23:00 – 07:00).

The location for any mechanical apertures has been considered most suitable on the west and north façades or roof of any proposed dwellings, as facing away from respective incident sources of Woolley Colliery Road, M1 and Hallam Line railway. Further calculations on mechanical noise levels from the ducted system may also therefore be necessary to consider further in accordance with a suitable method (such as CIBSE[8]).

[8] CIBSE Guide B4:2016. Noise and Vibration Control for Building Services Systems. The Chartered Institution of Building Services Engineers, June 2016.

6.3.4 External Noise Level Guidelines

Amenity areas have been provided within the scheme as private gardens within Plots of the development.

Most of these residential gardens have been expected to fall below the ProPG guidance range of 50 – 55 dB $L_{Aeq,16h}$ where rear facing and protected by the intervening residential plots, away from transportation sources.

In the worst-case, gardens have been positioned to the south extent of Site B, Plots 92 – 103, as allowing greatest noise exposure to the M1 and Hallam Line in this direction. In these cases, summary assessment data of Location 4 / Table E has indicated that the extreme south could remain marginally above the ProPG guidance limit of 50 – 55 dB $L_{Aeq,16h}$ if left unmitigated. A marginal exceedance of up to 3 dB has been considered, based on both measured data as well as noise modelling.

With the inclusion of basic boundary screening, such as standard garden fencing, all plots of the development have been considered to comfortably comply with the ProPG guidance to provide suitably protected, quiet and tranquil outdoor space within this development, within ProPG guidance limit of 50 – 55 dB $L_{Aeq,16h}$.

The use of acoustic boundary fencing has not been viewed a requirement anywhere within the proposed scheme.

7.0 Conclusions

This document has been prepared for Gleeson Developments Limited by SLR Consulting Limited to support a proposed residential development on Woolley Colliery Road, Darton, Barnsley.

Stage 1 assessment in accordance with ProPG has provided that the site is influenced by dominant transportation noise. The initial site noise risk assessment has been categorised in the worst case as 'medium risk' on the future occupants of the new noise sensitive development because of road traffic from Woolley Colliery Road, M1 Motorway and rail traffic along The Hallam Line. Commercial activity noises have not been observed about the Site and considered "not dominant" further to Agent of Change considerations and in accordance with ProPG.

The findings of a vibration study according to BS 6472-1 have determined that vibration dose values correlate to minor rail traffic activity where "adverse comment is not expected" during day and night periods. Consequently, there are no specific mitigation measures required to control incident vibration on the proposed development buildings, when considering any reasonable change in vibration that could be instated from the placement of new dwellings.

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 against the proposed scheme layout. It has been realised that suitable internal and external amenity standards can be readily achieved by the development.

A scheme of transportation noise control has been provided for various plots at the boundary of the Site and nearest to transportation sources, as including:

- An uprated scheme of façade insulation for habitable living rooms and bedrooms, per Table J, Figure I and Figure J, encompassing commensurate acoustic specifications for glazing and trickle ventilators across three schemes of sound insulation.
    - In the worst-case Scheme 3 for Plots 73 – 76 and 112 – 114, a CME building ventilation strategy has been recommended along with acoustic specifications for glazing and a single trickle acoustic ventilator per habitable room.
- Additional provisions for overheating ventilation in bedrooms, per Figure K and Figure L, to overcome potential adverse effects if fully opening bedroom windows at night.

On the basis that design guidance within this report has been adopted, it follows that any significant adverse noise impacts will be avoided in the finished development as to accord with overarching national and local planning requirements for new residential development.

A recommendation is made to the decision maker to grant with noise conditions where necessary to ensure that significant adverse effects will be avoided for the proposed dwellings, by use of a commensurate scheme of control as outlined within this report.

8.0 Closure

The assessment has required a suitable level of technical ability and has been undertaken by a Suitably Qualified Person (SQP). An individual with all the following credentials has been considered a SQP for this assessment:

- Has a minimum of three years' verifiable experience (within the last five years) of providing noise impact assessments in planning. Such experience has clearly demonstrated a practical understanding of factors affecting acoustics in relation to the proposed development use and in the built environment in general, including acting in an advisory capacity to provide recommendations and design advice in planning, and;
- Holds a recognised acoustic qualification and membership of an appropriate professional body. The primary professional body for acoustics in the UK is the Institute of Acoustics.

This assessment has been led and managed by a SQP as defined above.

Where some elements of the assessment (e.g. measurements) have been carried out by an acoustician who does not meet the requirements above, this has been undertaken with the direct guidance and supervision of a SQP who has reviewed, agreed and overseen the measurement methodology and any results obtained.

The SQP confirms that the relevant measurements and calculations:

- Represent good industry practice in accordance with available guidance.
- Are appropriate given the development being assessed and scope of works proposed.
- Avoid invalid, biased and exaggerated claims.

The checker and author of this document confirm that they both comply with the definition of a SQP defined in this Section.

Regards,

SLR Consulting Limited

Steve Skingle, BSc. (Hons) PgDip MIOA MAES
Principal Acoustic Consultant

Vince Taylor, BSc. (Hons) MSc. MIOA
Technical Director

Appendix A Glossary of Terminology

Proposed Residential Development Noise Impact Assessment

Woolley Colliery Road, Darton, Barnsley

Gleeson Developments Limited

SLR Project No.: 402.065375.00001

23 October 2024

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 0dB (the threshold of hearing) to over 120dB. 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

A.1 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 µPa).

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 Ln indices are used for this purpose, and the term refers to the level exceeded for n% of the time. Hence L10 is the level exceeded for 10% of the time and as such can be regarded as the 'average maximum level'. Similarly, L90 is the 'average minimum level' and is often used to describe the background noise. It is common practice to use the L10 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 Scheme Drawing

Proposed Residential Development Noise Impact Assessment

Woolley Colliery Road, Darton, Barnsley

Gleeson Developments Limited

SLR Project No.: 402.065375.00001

23 October 2024

Woolley Colliery Road, Darton, Barnsley

gleeson

NORTH

PARCEL A

PARCEL B

Sports Facility

Residential Development

Full Application Land

Rev	By	Note	Date

Status	Planning
	Sketch Planning Tender Construction As Built

PRA Architecture

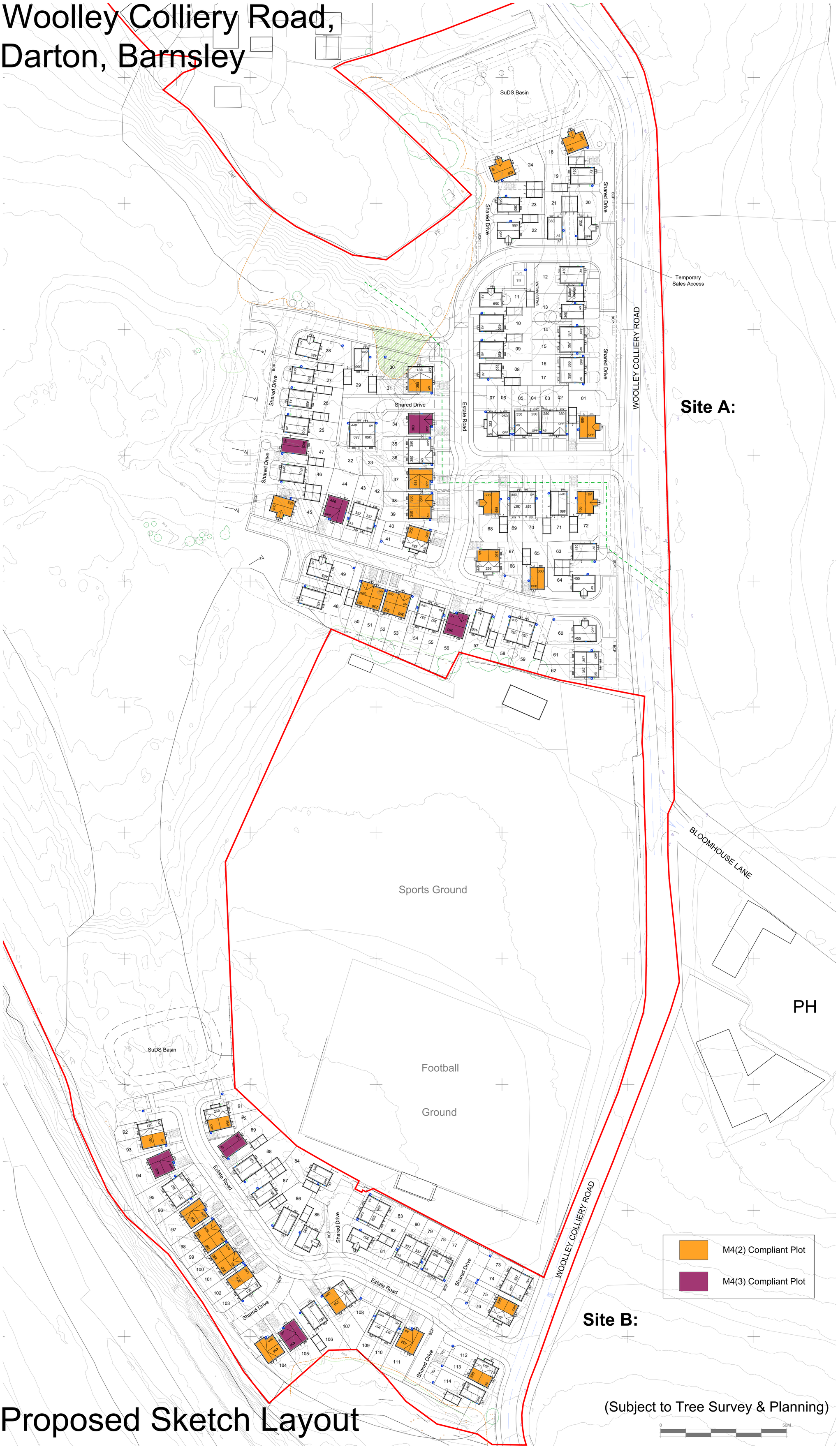
55 The Tannery . Lawrence Street . York . YO10 3WH T:01904 653772
E:mail@pra-architecture.com W: www.pra-architecture.com

PROJECT	Woolley Colliery Road, Darton, Barnsley		
TITLE	Residential Development Location plan		
CLIENT	Gleeson		
DATE	15.03.24	SCALE	1:1250@A3
DRAWING	1329.02	REVISION	-
DRAWN	PB	CHECKED	SH

Residential Development Location Plan

Woolley Colliery Road, Darton, Barnsley

gleeson



Site A:

Site A:

Housetype: M4(2)

			Sqft:	No:	
250	Greystones	2B 2St	753	09	17%
253	Tallow	2B 2St	753	03	
350	Glin	3B 2St	904	13	
351	Cranford	3B 2St	904	01	33%
357	Rosemount	3B 2St	904	10	
359	Clifden	3B 2St	984	02	
360	Milford	3B 2St	919	07	
362	M4(3)	3B 2St		01	17%
363	M4(3)	3B 2St		02	
450	Dalkey	4B 2St	1156	11	
454	Blessington	4B 2St	1149	01	33%
455	Bantry	4B 2St	1138	11	
456	M4(3)	4B 2St		01	
		Total:		**72**	

Nett Developable:
2.075Ha / 5.13 Acres

(34.70 DPH)

Site B:

Housetype: M4(2)

			Sqft:	No:	
250	Greystones	2B 2St	753	07	24%
253	Tallow	2B 2St	753	03	
350	Glin	3B 2St	904	07	
351	Cranford	3B 2St	904	03	43%
357	Rosemount	3B 2St	904	08	
359	Clifden	3B 2St	984	01	
360	Milford	3B 2St	919	03	
362	M4(3)	3B 2St		01	12%
450	Dalkey	4B 2St	1156	03	
454	Blessington	4B 2St	1149	03	
455	Bantry	4B 2St	1138	01	21%
456	M4(3)	4B 2St		02	
		Total:		**42**	

Nett Developable:
1.093Ha / 2.70 Acres

(38.43 DPH)

Combined:

Housetype: M4(2)

			Sqft:	No:	
250	Greystones	2B 2St	753	16	19%
253	Tallow	2B 2St	753	06	
350	Glin	3B 2St	904	20	
351	Cranford	3B 2St	904	04	37%
357	Rosemount	3B 2St	904	18	
359	Clifden	3B 2St	984	03	
360	Milford	3B 2St	919	10	
362	M4(3)	3B 2St		02	15%
363	M4(3)	3B 2St		02	
450	Dalkey	4B 2St	1156	14	
454	Blessington	4B 2St	1149	04	
455	Bantry	4B 2St	1138	12	29%
456	M4(3)	4B 2St		03	
		Total:		**114**	

Gross Site Area:
12.27Ha / 30.32 Acres

Nett Developable:
3.168Ha / 7.83 Acres

(35.98 DPH)

Rev	By	Note	Date
C	SH	Sales Arena amend following client review and feedback.	18.09.24
B	PB	Plot 114 moved away from RPA.	19.08.24
A	SH	Tree survey information overlaid, layout amended to reduce impact on tree group to northernmost boundary.	12.08.24

Status	Planning				
	Sketch	Planning	Tender	Construction	As Built

M4(2) Compliant Plot

M4(3) Compliant Plot

Site B:

(Subject to Tree Survey & Planning)

0 50M

PRA Architecture

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PROJECT	Woolley Colliery Road, Darton, Barnsley		
TITLE	Proposed Sketch Layout		
CLIENT	Gleeson		
DATE	31.07.24	SCALE	1:500@A0
DRAWING	1329.05	REVISION	C
DRAWN	SH	CHECKED	SH

Proposed Sketch Layout

Appendix C Survey Summary Results

Proposed Residential Development Noise Impact Assessment

Woolley Colliery Road, Darton, Barnsley

Gleeson Developments Limited

SLR Project No.: 402.065375.00001

23 October 2024

Figure C1: Time History Graph, Sound Pressure Level – Location 1

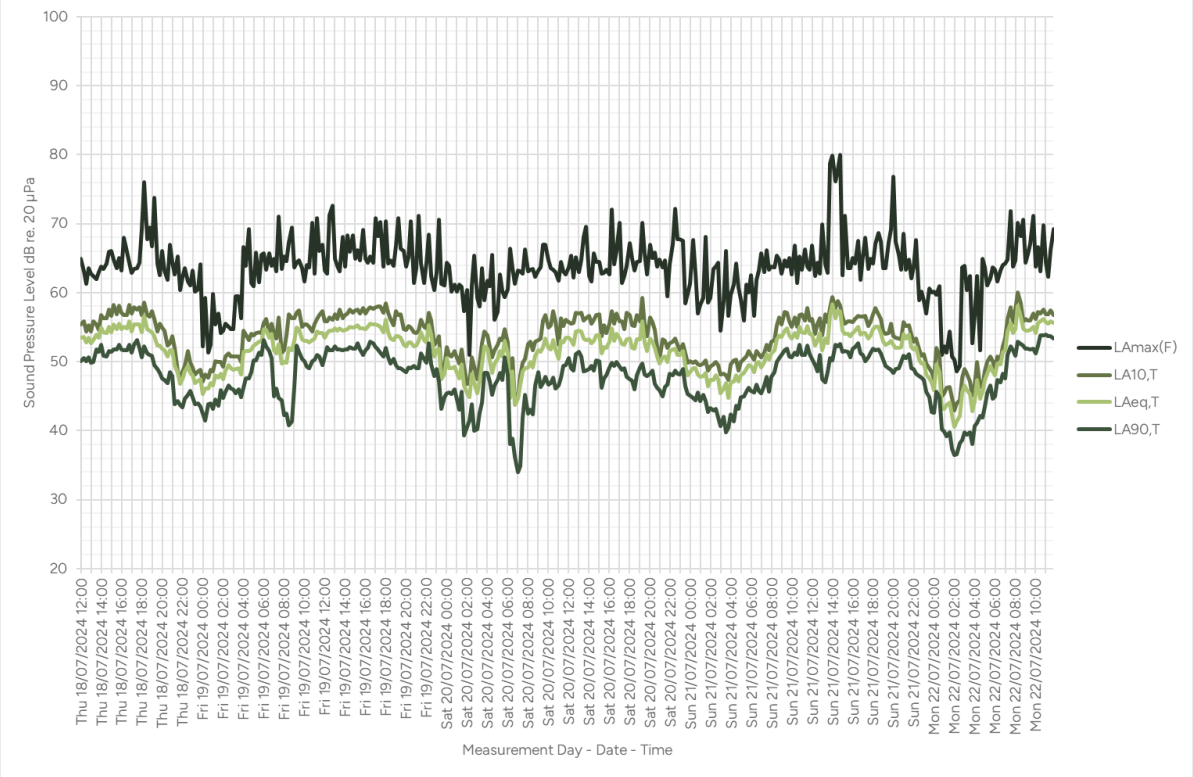


Figure C2: Time History Graph, Sound Pressure Level – Location 2

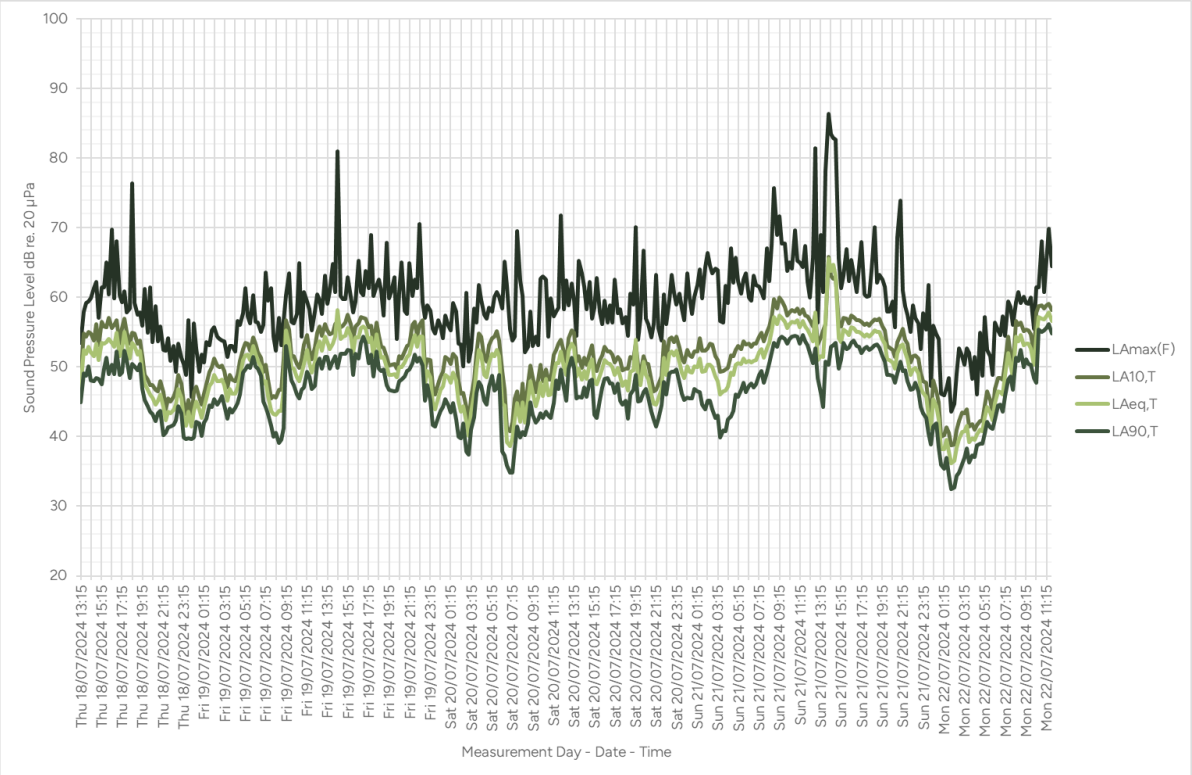


Figure C3: Time History Graph, Sound Pressure Level – Location 3

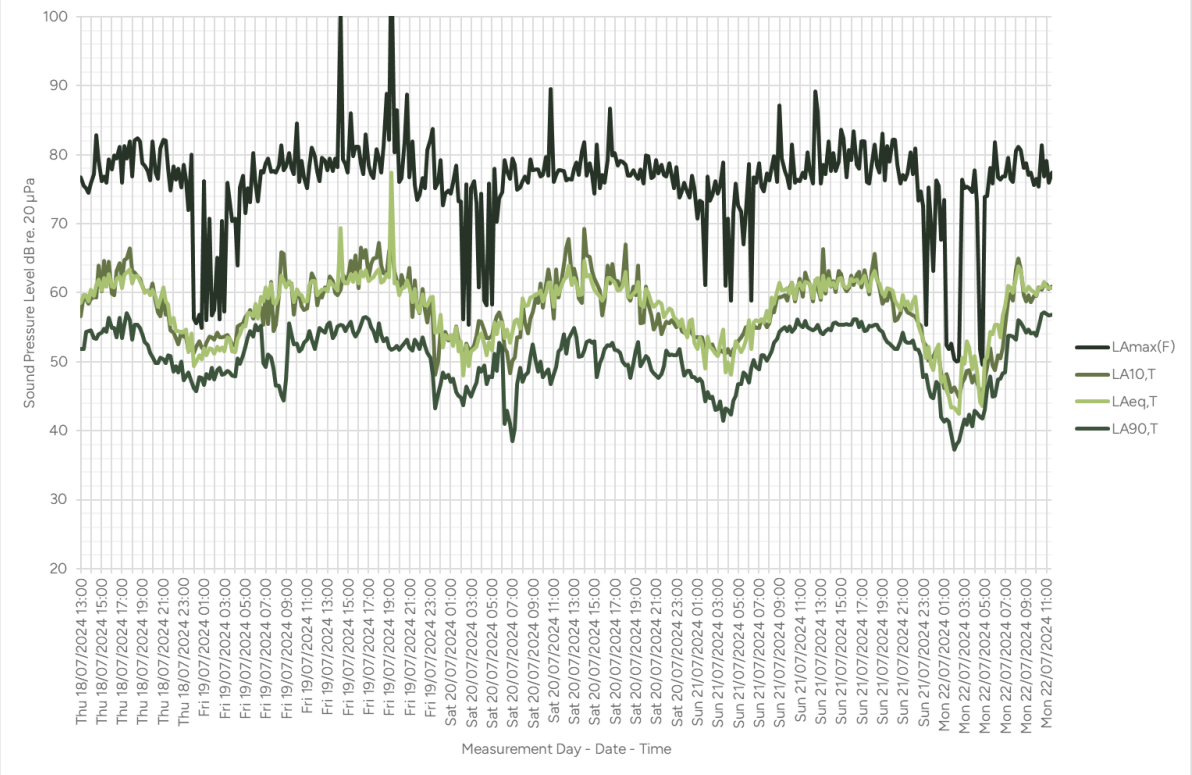


Figure C4: Time History Graph, Sound Pressure Level – Location 4

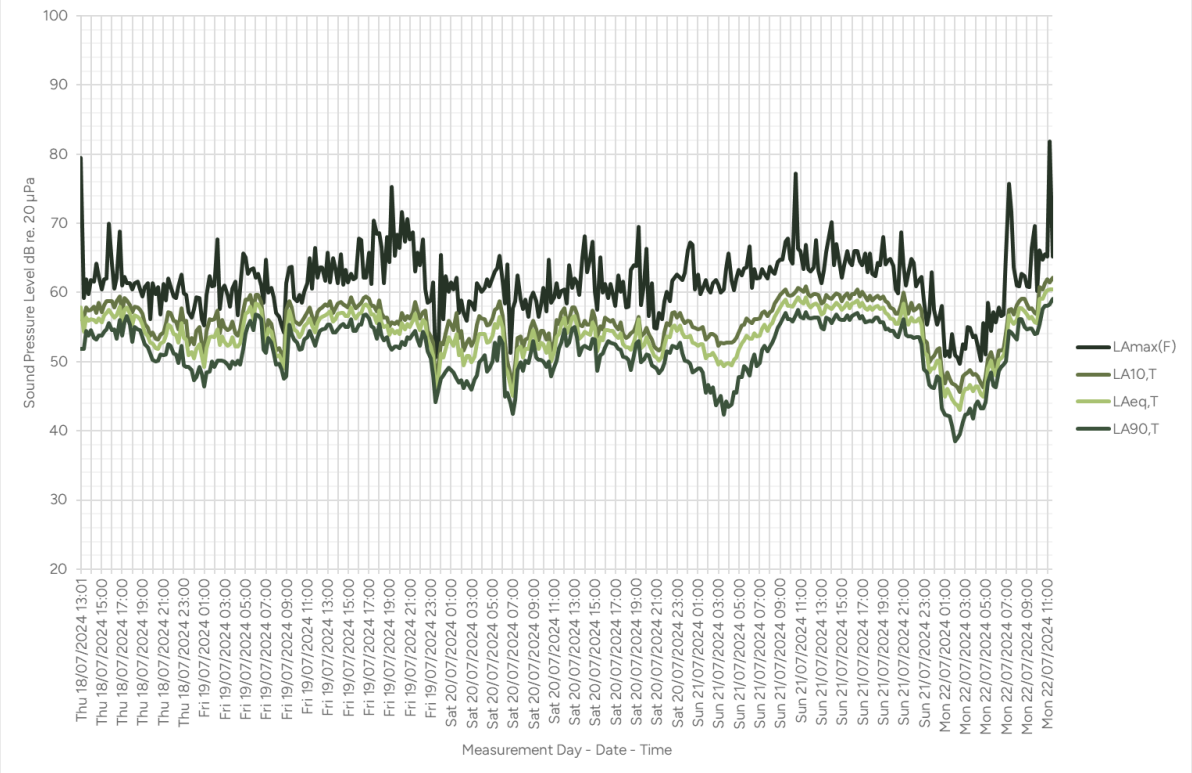


Figure C5: Time History Graph, Weather Conditions

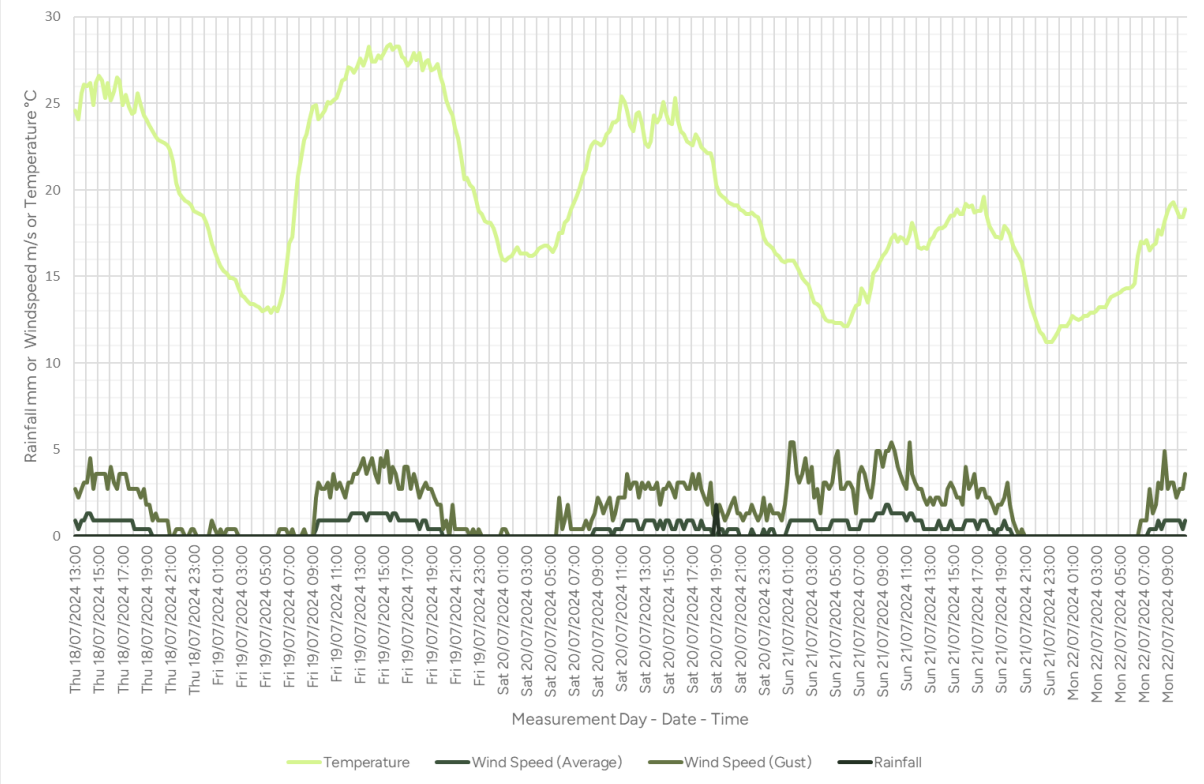
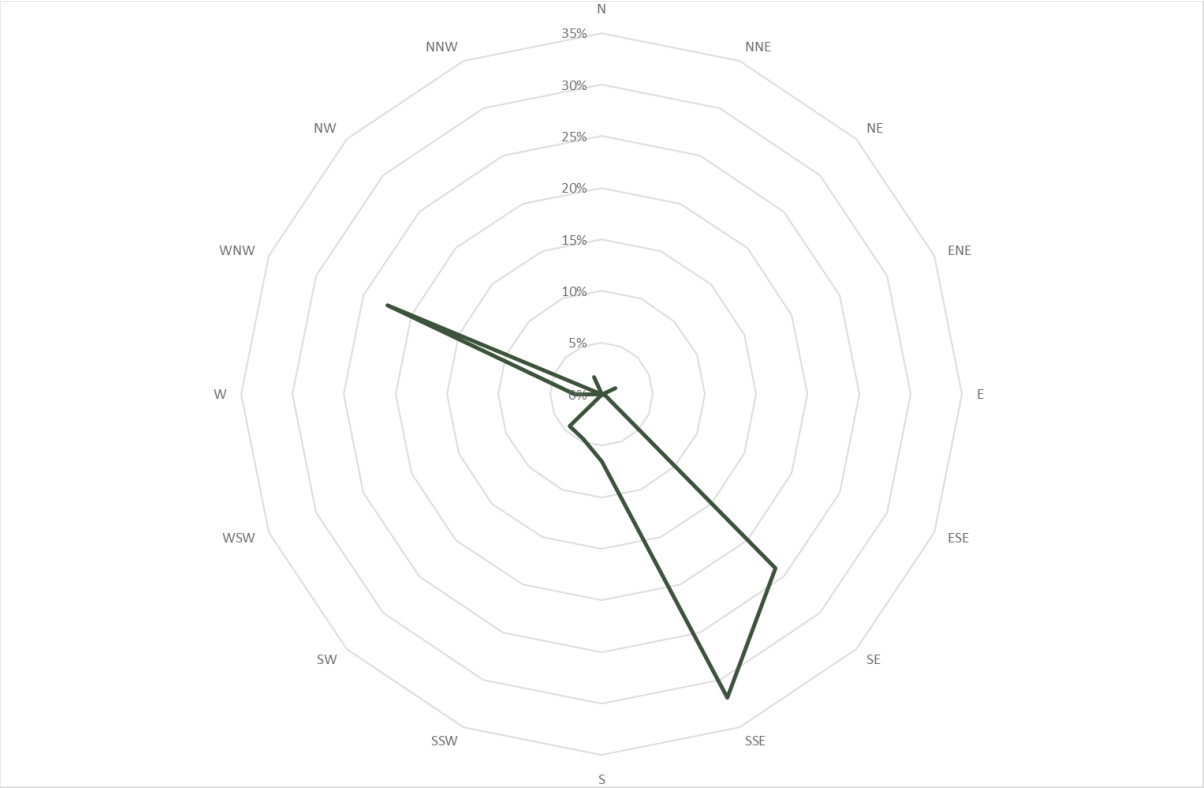
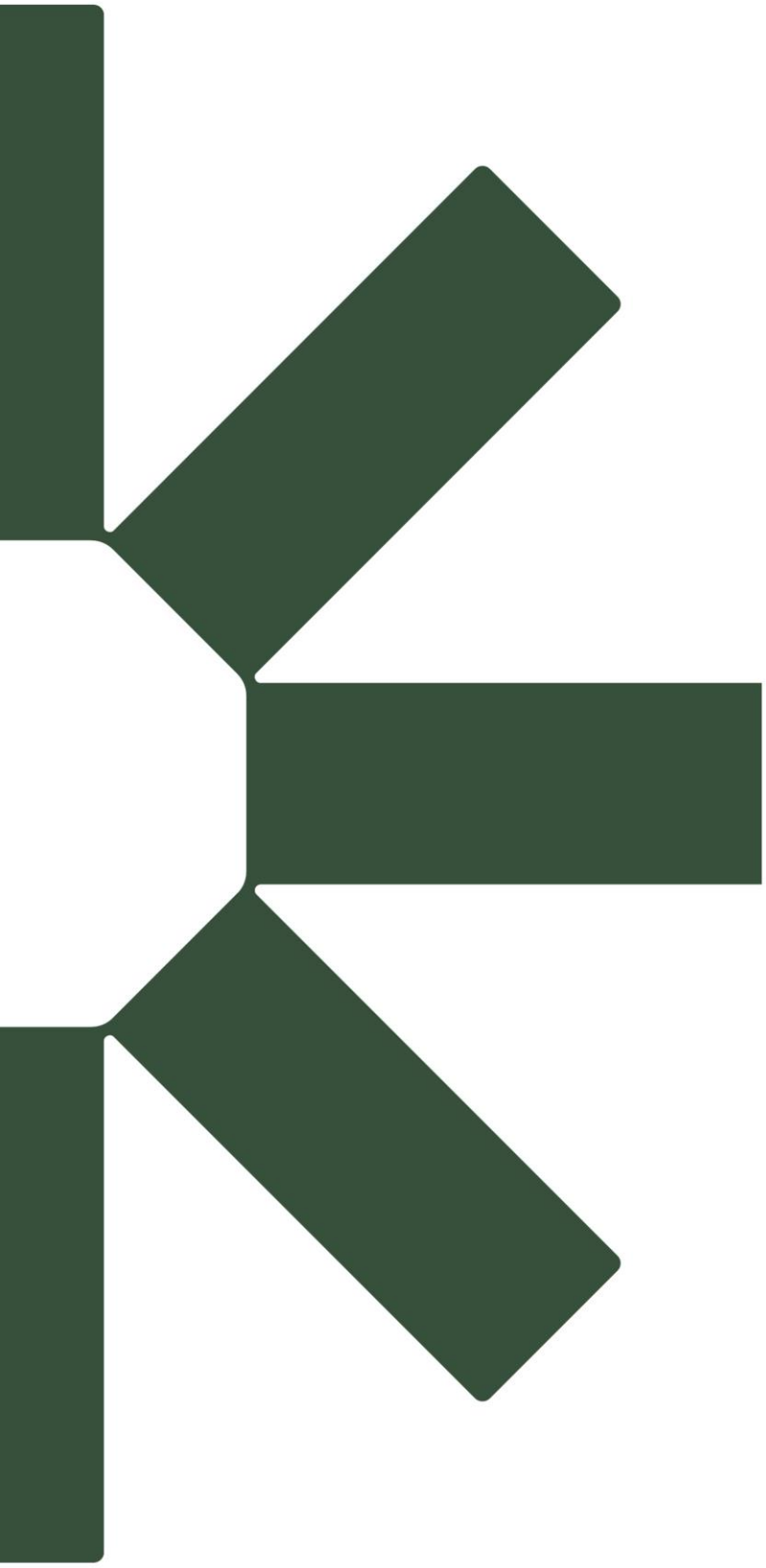


Figure C6: Wind Direction Polar Plot





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