

wardell-armstrong.com

ENERGY AND CLIMATE CHANGE
ENVIRONMENT AND SUSTAINABILITY
INFRASTRUCTURE AND UTILITIES
LAND AND PROPERTY
MINING AND MINERAL PROCESSING
MINERAL ESTATES
WASTE RESOURCE MANAGEMENT



NUVU DEVELOPMENT LIMITED

LAND OFF LICKERS LANE WHISTON

NOISE ASSESSMENT REPORT

SEPTEMBER 2023

DATE ISSUED: September 2023
JOB NUMBER: GM11373
REPORT NUMBER: 0004
VERSION: V2.1
STATUS: Final

NUVU DEVELOPMENT LIMITED

LAND OFF LICKERS LANE WHISTON

SEPTEMBER 2023

PREPARED BY:

Alex Sharp Acoustic Consultant



REVIEWED BY:

Matt Wilson Associate Director



APPROVED BY:

P.P. Mark Dawson Technical Director



This report has been prepared by Wardell Armstrong LLP with all reasonable skill, care and diligence, within the terms of the Contract with the Client. The report is confidential to the Client and Wardell Armstrong LLP accepts no responsibility of whatever nature to third parties to whom this report may be made known.

No part of this document may be reproduced without the prior written approval of Wardell Armstrong LLP.



CONTENTS

EXECUTIVE SUMMARY	1
1 INTRODUCTION.....	2
1.1 Lickers Lane, Whiston.....	2
2 ASSESSMENT METHODOLOGY.....	3
2.1 Scope of Works	3
2.2 Attended Noise Survey.....	3
2.3 Noise Model.....	3
2.4 National Planning Legislation and guidance.....	3
2.5 Local Authority Consultation	3
2.6 Details of Noise Survey.....	4
2.7 Existing Measured Noise Levels	6
3 ASSUMPTIONS, LIMITATIONS AND UNCERTAINTY.....	7
3.1 Introduction	7
3.2 Assumptions	7
3.3 Limitations	7
3.4 Uncertainty	7
4 DETAILS OF NOISE MODEL.....	8
4.1 Introduction	8
4.2 Noise Model Set-up	8
5 NOISE IMPACT ASSESSMENT	9
5.1 Introduction	9
5.2 Guideline noise values to be achieved	9
5.3 Assessment of Daytime Noise Levels in Outdoor Amenity Space	9
5.4 Assessment of Daytime Noise Levels in Living Rooms and Bedrooms.....	9
5.5 Assessment of Night-time Noise Levels Bedrooms	10
5.6 Assessment of Maximum Night-time Noise Levels Bedrooms	10
6 MITIGATION	11
6.1 Introduction	11
6.2 External amenity areas.....	11
6.3 Internal noise levels.....	11
7 CONCLUSION.....	14

APPENDICES

Appendix A – Policy, Standards and Guidance

Appendix B – Recorded data

Appendix C – Plots requiring Mitigation

DRAWINGS	TITLE	SCALE
GM11373-001	Daytime Noise Contours Across the Undeveloped Site	1:2000
GM11373-002	Daytime Façade Noise Level Across the Developed Site	1:2000
GM11373-003	Night-time Façade Noise Levels Across the Developed Site	1:2000
GM11373-004	Max Façade Noise Levels Across the Developed Site	1:2000
GM11373-005	Livingroom Façade Mitigation	1:2000
GM11373-006	Bedroom Façade Mitigation	1:2000

EXECUTIVE SUMMARY

Wardell Armstrong LLP has carried out a noise assessment as part of a reserved matters application for a proposed residential development on land off Lickers Lane, Whiston.

This assessment considers the potential noise impact from existing noise sources affecting the consented development site. This assessment considers the land brought forward by Novu Development Limited, part of the wider Halsnead Garden Village.

This assessment utilises data that was collected in August 2023. This assessment has been carried out in accordance with current guidance and includes general recommendations based on the principles of good acoustic design and, where appropriate, on an indicative plot-by-plot basis with reference to the most recent masterplan.

Noise modelling has been undertaken to confirm the appropriate mitigation strategy for the development. The noise mitigation scheme outlined in this report should be followed to ensure that noise level guidelines are met within all proposed dwellings.

Noise should not be a barrier to the Proposed Development and it should be possible to discharge Condition 34 of the planning outline planning approval [20/00399/OUT].

1 INTRODUCTION

1.1 Lickers Lane, Whiston

1.1.1 By instruction from Nuvu Development Limited (NDL) Wardell Armstrong LLP (WA) was commissioned to undertake a noise assessment to accompany a reserved matters application for a residential development on Land off Lickers Lane, Whiston.

1.1.2 As part of the outline planning decision [20/00399/OUT], Condition 34 refers to noise:

'Any subsequent reserved matters application seeking approval for "Appearance" or "layout" shall include an updated Noise Assessment taking into account the proposed layout and how future residents may be impacted upon from nearby land uses. If the Noise Assessment identifies that mitigation is required, the agreed mitigation shall be installed in accordance with a timescale which has been agreed in writing with the local planning authority before any dwellings are occupied.'

1.1.3 As this planning condition does not make reference to thresholds, it is assumed that the conditions require the sound levels to be in accordance with the levels defined in the legislation and guidance as stated in section 2.4 below and those defined in the planning application report for the site.

1.1.4 The proposed development will comprise up to 254 dwellings and associated infrastructure on land of circa 6.8 Ha net developable area.

1.1.5 The site is on the southern edge of the town of Whiston. To the north the site is bound by Lickers Lane. To the east the site is bound by open agricultural land. To the south the site is bound by Halsnead Park caravan park with the M62 beyond. To the west the site is bound by open land with residential development beyond.

1.1.6 The proposed development site is a part of a larger development on Halsnead Park, with several other developments occurring on land surrounding the site. Noise modelling undertaken to inform this assessment includes indicative mitigation provided by 3rd Party phases of the wider Halsnead Park development.

1.1.7 This report predicts the noise levels at the façades of the proposed residential development and in private amenity spaces and identifies the required specification of noise mitigation to be installed to protect residential amenity. It is intended that this report will be sufficient to allow the discharge of Condition 34 of the decision notice [20/00399/OUT], dated 1st August 2023.

2 ASSESSMENT METHODOLOGY

2.1 Scope of Works

- 2.1.1 The scope of this noise assessment comprises a consideration of transportation and commercial noise at the proposed residential dwellings and specification of mitigation in order to discharge Planning Condition 34.

2.2 Attended Noise Survey

- 2.2.1 As part of this assessment, WA carried out a noise monitoring over a period of 24-hours to determine the current baseline noise levels at the development site. Further details of the of the monitoring methodology can be found in Section 3 of this report.

2.3 Noise Model

- 2.3.1 Noise modelling using SoundPLAN has been undertaken to predict, the propagation of sound across the developed site. Modelling is described in Section 4 of this report.

2.4 National Planning Legislation and guidance

- 2.4.1 The potential noise impacts on noise sensitive areas on the proposed development site have been assessed with reference to the following:

- British Standard 8233:2014, Guidance on sound insulation and reduction for buildings. (BS8233)
- Professional Practice and guidance on Planning & Noise 2017 (ProPG)

- 2.4.2 Full details of the guidance used to support this assessment are provided in Appendix A.

2.5 Local Authority Consultation

- 2.5.1 Knowsley Council was contacted on the 28th of July 2023 to agree a monitoring methodology. An Environmental Protection Officer responded on the 5th of June 2023 detailing the guidance documents to be followed, both of which are listed in Section 2.4 above.

2.6 Details of Noise Survey

2.6.1 WA carried out a noise survey to obtain updated baseline sound levels at the development site between the 8th and the 9th of August 2023.

2.6.2 During the survey, three measurements were taken on the northern, southern and western edges of site. Table 1 below shows the locations and durations of the measurements. The locations of the measurement locations can also be seen in drawing GM11373-001.

2.6.3 Measurements were taken at three locations:

- ML1 was at Windy Arbor Road. Ambient noise sources were dominated by traffic flow on the surrounding road network, with Windy Arbor Road prominent both day and night.
- ML2 was at Lickers Lane in the northwestern part of the proposed development site. Ambient noise sources were dominated by traffic flow on the surrounding road network, with Licker Lane prominent both day and night.
- ML3 was off Hall Lane adjacent to the M62. Noise from the M62 was dominant at all times. Data measured at ML3 is to inform noise modelling and is not representative of the southern extent of the development site.

Table 1: site measurements locations				
ML	Grid Ref (x,y)	Start	End	Type
1	346790 390327	09/08/23, 12:00	10/08/23 12:40	Unattended
2	347135.74 390501.21	09/08/23, 10:20	10/08/23, 12:50	Unattended
3	349121.55 389521.58	09/08/23, 12:29	09/08/23, 15:30	Attended

2.6.4 The weather during the survey was: Average temperature 15°C with lows of 10°C and highs of 25°C, wind speeds below 5mph, with cloud cover ranging from 0-30% while on site.

2.6.5 The noise measurements were made using three Class 1, integrating sound level meters. The microphones were mounted vertically on tripods 1.5m above the ground and more than 3.5 metres from any other reflecting surfaces. The sound level meters were calibrated to a reference level of 94dB at 1kHz both before, and on completion of, the noise survey. No significant drift in calibration was measured during the survey. Table 2 below shows details of the noise monitoring equipment used during the survey and the exact locations are shown on Drawing GM11373-001.

Table 2: Monitoring Equipment				
ML	Equipment	Manufacturer	Type	Serial number
1	SLM	01dB	Fusion	10717
	Calibrator	01dB	Cal21	34254647
2	SLM	01dB	Fusion	12639
	Calibrator	Cirrus	CR:515	64738
3	SLM	01dB	Fusion	10711
	Calibrator	01dB	Cal21	34254653

2.6.6 For the purpose of this assessment daytime hours are taken to be 0700 to 2300 hours and night-time hours to be 2300 to 0700 hours.

2.6.7 A-weighted¹ L_{eq}^2 noise levels were measured to comply with the requirements of BS8233. A-weighted L_{90}^3 and L_{10}^4 noise levels, together with the maximum and minimum sound pressure levels, were also measured to provide additional information. The measured noise levels are set out in full in Appendix B.

2.6.8 A site walkover allowed observations and notes to be made of the significant noise sources which contribute to the measured levels. Road noise from the M62 was the dominant source across the site.

¹ A' Weighting An electronic filter in a sound level meter which mimics the human ear's response to sounds at different frequencies under defined conditions.

² L_{eqs} Equivalent continuous noise level; the steady sound pressure which contains an equivalent quantity of sound energy as the time-varying sound pressure levels.

³ L_{90} The noise level which is exceeded for 90% of the measurement period.

⁴ L_{10} The noise level which is exceeded for 10% of the measurement period.

2.6.9 The measurements are representative of the observed noise sources affecting the site. This allows for a robust noise impact assessment.

2.7 Existing Measured Noise Levels

2.7.1 For this assessment daytime hours are between 0700hrs and 2300hrs and night-time hours are between 2300hrs and 0700hrs. For each period, the measured values have been logarithmically averaged to give a representative single A-weighted noise level i.e., $L_{Aeq,T}$, also known as the ambient noise levels. In accordance with ProPG, the maximum night-time noise level has been determined by using the tenth highest $L_{Amax,F}$ level.

2.7.2 Table 3 displays a representative, averaged, existing baseline noise level at the measurement locations. The integer results have been displayed .

Table 3: Results from baseline survey				
Position	$L_{Aeq\ 16h}$ Day (dB)	$L_{Aeq\ 8h}$ Night (dB)	10 th highest $L_{Amax,F}$ (dB)	L_{A10} (dB)
ML1	65	59	79	69
ML2	62	55	78	66
ML3*	78	74	-	-
*Data extrapolated from 3 hour measurement using CRTN and TRL methodology				

3 ASSUMPTIONS, LIMITATIONS AND UNCERTAINTY

3.1 Introduction

3.1.1 The Assessment is affected by the following assumptions and limitations.

3.2 Assumptions

3.2.1 The following assumptions have been made:

- An open window provides around 13 dB noise attenuation.
- temperature of 10°C, 70% humidity, and 1013.3mbar air pressure for the purposes of the model

3.3 Limitations

3.3.1 The following limitations affect this report:

- Attenuation provided by other 3rd party phases of the wider Halsnead Park development, excluding the Taylor Wimpey development site are provided in block form, based on the August 2020 Design and Access Statement.

3.4 Uncertainty

3.4.1 To reduce the level of uncertainty within the assessment, the following steps have been taken:

- In accordance with guidance, the microphones were mounted vertically on tripods 1.5m above the ground. Monitoring locations were more than 3.5 metres from reflecting surfaces (excluding the ground);
- The distance between the identified sources and nearest site boundary has been measured from scale plans of the proposed development;
- The daytime and night-time noise levels have been analysed over 10-minute periods;
- The night-time maximum noise levels have been analysed over 1-minute periods.
- The results of each measurement period were reported to the nearest dB (rounding up at 0.5);
- Noise measurements were made using three Class 1, integrating sound level meters and each was calibrated prior to and following the noise survey, no significant drift in calibration was recorded.

4 DETAILS OF NOISE MODEL

4.1 Introduction

4.1.1 This section of the report sets out the details of the methodologies used to prepare the noise model so that existing sources of noise affecting the site can be accurately predicted over the site.

4.2 Noise Model Set-up

4.2.1 The assessment of the propagation of sound across the developed site has been undertaken using the noise modelling software SoundPLAN version 8.2.

4.2.2 SoundPLAN software uses geographical information to create a model of the study area on which to generate noise contours and includes objects that affect the propagation of noise such as buildings and topography.

4.2.3 SoundPLAN model uses the noise prediction methodology set out in ISO 9613-2:1996 'Attenuation of sound during propagation outdoors'. The noise modelling produces noise contour plans demonstrating the levels of road traffic and industrial noise across the site.

4.2.4 The model has an assumed temperature of 10°C, 70% humidity, and 1013.3mbar air pressure. The intervening ground surrounding the site is agricultural land, hence the use of 0.6 as the term to represent ground absorption (where 0 = completely absorbent and 1 = completely reflective).

4.2.5 The proposed layout of the Taylor Wimpey development to the southwest of site has been included in the model. This allows a more accurate calculation of the noise from the M62 to be carried out, as it propagates across the Taylor Wimpey. development before it reaches the proposed Lickers Lane development.

4.2.6 The following noise sources have been included in the noise model:

- Lickers Lane
- M62
- Windy Arbor Road

5 NOISE IMPACT ASSESSMENT

5.1 Introduction

5.1.1 This section discusses the predicted noise in gardens and at facades of the development as proposed, using the housing layout provided by NDL [33678-MR-DWG-03 Rev LL].

5.2 Guideline noise values to be achieved

5.2.1 Condition 34 does not define levels to be achieved, however typical guideline levels from ProPG and BS8233, as defined below, are accepted in the outline application and appropriate for the purpose of this discharge report.

5.2.2 The levels are as follows:

- | | |
|---------------------------------------|-------------------------|
| • External Living space (0700 – 2300) | 50 – 55dB $L_{Aeq,16h}$ |
| • Living Rooms (0700 – 2300) | 35dB $L_{Aeq,16h}$ |
| • Bedrooms (0700 – 2300) | 35dB $L_{Aeq,16h}$ |
| • Bedrooms (2300 – 0700) | 30dB $L_{Aeq,8h}$ |
| • Bedrooms (2300 – 0700) | 45dB $L_{Amax,f}$ |

5.2.3 The maximum noise level in bedrooms should be exceeded no more than 10 times per night.

5.3 Assessment of Daytime Noise Levels in Outdoor Amenity Space

5.3.1 SoundPLAN noise modelling has been used to calculate the noise levels in outdoor areas during the daytime. The calculated levels are summarised in Drawing GM11373-001. The figure identifies the required fence heights to ensure that daytime noise levels in gardens are mitigated to below 55dB. The modelling confirms that all fences throughout the development need to be no higher than 1.8m.

5.3.2 Specification of acoustic fencing is given in Section 6 below.

5.4 Assessment of Daytime Noise Levels in Living Rooms and Bedrooms

5.4.1 SoundPLAN noise modelling has been used to calculate the noise levels at the façades of proposed dwellings during the daytime. The calculated levels are summarised in Drawing GM11373-002.

5.4.2 In accordance with BS8233, the internal noise level in living rooms and bedrooms during the daytime should be no more than 35dB(A) $L_{Aeq,16hour}$. Assuming an open window provides approximately 13dB of attenuation, the façade of any sensitive room where levels exceed 48dB $L_{Aeq,16h}$, might require windows to be closed to attenuate the noise,, and an alternative form of ventilation should therefore be provided.

5.5 Assessment of Night-time Noise Levels Bedrooms

5.5.1 SoundPLAN noise modelling has been used to calculate the noise levels at proposed dwellings during the night-time. The calculated average noise levels at the façades of the proposed developments during the night-time are summarised in Drawing GM11373-003

5.5.2 In accordance with BS8233, the internal noise level in bedrooms at night should achieve 30dB(A) $L_{Aeq,8hour}$. Assuming an open window provides approximately 13dB of attenuation, the façade of any sensitive room where levels exceed 43dB $L_{Aeq,8h}$, might require windows to be closed to attenuate the noise, and an alternative form of ventilation should therefore be provided.

5.6 Assessment of Maximum Night-time Noise Levels Bedrooms

5.6.1 SoundPLAN noise modelling has been used to calculate the typical maximum noise levels at proposed dwellings during the night-time. The calculated noise levels at the façades of the properties, during the night-time are summarised in Drawing GM11373-004.

5.6.2 In accordance with BS8233, the internal noise level in bedrooms at night should not exceed 45dB(A) $L_{Af,Max}$, more than 10 times per night. Assuming an open window provides approximately 13dB of attenuation, the façade of any sensitive room where levels exceed 58dB $L_{Amax,f}$, might require windows to be closed to attenuate the noise, and an alternative form of ventilation should therefore be provided.

5.6.3 Specification of glazing and ventilation mitigation is discussed in Section 6 below.

6 MITIGATION

6.1 Introduction

6.1.1 This section of the assessment considers the mitigation measures required to achieve a good level of amenity in the residential areas of the proposed development as required by Condition 34. The noise levels are those set out in BS8233:2014 '*Guidance on sound insulation and noise reduction for buildings*'

6.1.2 The layout of the final site design has been carefully considered in relation to the principles of good acoustic design. The mitigation presented here relates to building envelope mitigation, including plot boundary fencing, to protect private amenity space.

6.2 External amenity areas

6.2.1 Plot boundary fences will typically be 1.8m in height.

6.2.2 Figure 1 (Drawing GM11373-001) shows that no fencing will be required of a height greater than the standard 1.8m in order to meet the external criterion of 55dB $L_{Aeq,16h}$.

6.2.3 The construction of all fences between the development and the roads should be suitable to prevent transmission of noise through the structure of the fence. This will require the fence to be constructed with a surface density of not less than 15kg/m² which should be retained throughout the lifetime of the structure. The construction should be such that no gaps occur between or beneath fence panels and of material that will be unlikely to warp over time, which might allow gaps to form.

6.3 Internal noise levels

6.3.1 Where facades are identified that will require windows to be closed, a specification for the glazing and alternative means of ventilation has been identified.

6.3.2 The internal noise levels have been calculated using octave band composite SRI break-in calculations. External noise levels have been taken from calculated levels of walls that face Lickers Lane and therefore have the highest noise exposure. Values have been taken at both the ground floor and the first floor.

- 6.3.3 Noise break-in calculations have been conducted to outline the requirements for glazing and ventilation to achieve an $L_{Aeq\ 16h}$ of 35dB during the day, an $L_{Aeq\ 8h}$ of 30dB during the night, and an $L_{Amax,F}$ of 45dB no more than 10 times per night.
- 6.3.4 Noise break-in calculations have been carried out for the worst affected plots to determine the level of noise mitigation required, to achieve the internal noise guideline levels in BS8233. The results are shown as figures attached to this report.
- 6.3.5 Therefore, with reference to the façade maps shown in Drawings GM11373-002 to 004 which show the incident sound level at each façade across the development site for the daytime, night-time periods, the glazing and ventilation requirements of each façade of the proposed development are shown in Table 4 below.

Table 4: Mitigation Strategy for the Proposed Development		
Façade Map Colour Key	Glazing	Ventilation
	Any	Open Window
	4/12/4	Greenwood 2500EAW.AC1

- 6.3.6 Proposed mitigation for living room (ground floor) facades is shown on Drawing GM11373-005. Proposed mitigation for bedroom (1st floor) facades is shown on Drawing GM11373-006.
- 6.3.7 From the computer modelling, in reference to drawings GM11373-005 and GM11373-006, the plots that require mitigation are collated in Appendix C (plot numbers in reference to plot layout '33678-MR-M-DWG-03MM-Feasibility').
- 6.3.8 Alternative glazing or ventilation methods to those shown in Table 4 can be used, but the performance should be equal to or superior to the glazing and ventilation specification described above. The performance of the glazing and ventilation shown is detailed in Table 5.

Table 5: Mitigation Specification (dB)								
Hz	63	125	250	500	1000	2000	4000	8000
Glazing 4/12/4	18	24	20	25	23	29	35	35
Ventilation Greenwood 2500EAW.AC1	32	39	38	29	47	43	40	40

- 6.3.9 Any acoustic ventilation proposed at the site should, as a minimum, comply with the applicable Building Regulations at the time. This may include both Building Regulations Approved Document F - Volume 1: Dwellings - Requirement F1: Means of ventilation and Building Regulations Approved Document O – Overheating.
- 6.3.10 Therefore, we would recommend that any proposed ventilation strategy is confirmed with a mechanical engineer prior to installation.

7 CONCLUSION

- 7.1.1 Wardell Armstrong LLP has carried out an assessment for 254 proposed dwellings on Land off Lickers Lane, Whiston in order to discharge planning Condition 34 of decision notice [20/00399/OUT].
- 7.1.2 The resultant noise levels have been assessed against the guideline values suggested by BS8233 and ProPG.
- 7.1.3 The assessment demonstrates that adequate glazing together with an alternative means of ventilation would be required for some of facades over the development as defined in drawings GM11373-005 and GM11373-006.
- 7.1.4 The noise in external amenity areas will meet the external criterion of 55dBA when close boarded fencing of 1.8m is used throughout the site.
- 7.1.5 If the mitigation scheme is followed, the development will be compliant with the requirements of the decision notice and Condition 34 can be discharged.

APPENDICES

Appendix A

Policy, Standards and Guidance

Policy, Standards and Guidance

Appendix A

A.1 National Planning Policy Framework

In September 2023 the 'National Planning Policy Framework' (NPPF) was amended as the current planning policy guidance within England.

Paragraph 185 of the NPPF states:

'Planning policies and decisions should also ensure that new development is appropriate for its location taking in 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 impact 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 impact on health and the quality of life;
- 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'...

Paragraph 187 of the NPPF states:

'Planning policies and decisions should ensure that new development can be integrated with existing business 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.'

A.2 Noise Policy Statement for England

With regard to 'significant adverse impacts on health and the quality of life' the NPPF refers to the 'Noise Policy Statement for England' (NPSE).

The Noise Policy Statement for England refers to the World Health Organisation when discussing noise impacts and introduces observed effect levels which are based on established concepts from toxicology that are applied to noise impacts by WHO.

Three levels are defined as follows:

‘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.

LOAEL – Lowest Observed Adverse Effect Level

- This is the level above which adverse effects on health and quality of life can be detected.

SOAEL – Significant Observed Adverse Effect Level

- This is the level above which significant adverse effects on health and quality of life occur’.

The first aim of the NPSE states that significant adverse effects on health and quality of life should be avoided. The second aim refers to the situation where the impact lies somewhere between LOAEL and SOAEL, and it requires that all reasonable steps are taken to mitigate and minimise the adverse effects of noise. However, this does not mean that such adverse effects cannot occur.

A.3 Planning Practice Guidance – Noise

The Planning Practice Guidance (PPG) provides further detail about how the effect levels can be recognised. Above the NOEL noise becomes noticeable, however it has no adverse effect as it does not cause any change in behaviour or attitude. Once noise crosses the LOAEL threshold it begins 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 further might cause the SOAEL threshold to be crossed. If the exposure is above this level the planning process should be used to avoid the effect occurring by use of appropriate mitigation such as by altering the design and layout. Such decisions must be made taking account of the economic and social benefit of the activity causing the noise, but it is undesirable for such exposure to be caused. At the highest extreme the situation should be prevented from occurring regardless of the benefits which might arise. Table A.1 summarises the noise exposure hierarchy.

Table A.1 - National Planning Practice Guidance noise exposure hierarchy			
Perception	Examples of Outcomes	Increasing Effect Level	Action
Not noticeable	No Effect	No Observed Effect	No specific measures required
Noticeable 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
Lowest Observed Adverse Effect Level			
Noticeable 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 non-awakening sleep disturbance. Affects the acoustic character of the area such that there is a perceived change in the quality of life.	Observed Adverse Effect	Mitigate and reduce to a minimum
Significant Observed Adverse Effect Level			
Noticeable 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
Noticeable 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

The PPG summarises the approach to be taken when assessing noise. It accepts that noise can override other planning concerns, but states:

“Neither the Noise Policy Statement for England nor the National Planning Policy Framework (which reflects the Noise Policy Statement) expects noise to be considered in isolation, separate from the economic, social and other

environmental dimensions of proposed development”

A.4 *ProPG: Planning & Noise Professional Practice Guidance on Planning & Noise*

ProPG Planning and Noise provides professional practice guidance in relation to new residential development exposed to noise from transport sources. It provides practitioners with a recommended approach to the management of noise within the planning system in England.

The guidance reflects the Government’s overarching National Planning Policy Framework, the Noise Policy Statement for England, and Planning Practice Guidance (including PPG-Noise) and draws on other authoritative sources of guidance. It provides advice for Local Planning Authorities and developers, and their professional advisors, on achieving good acoustic design in and around new residential developments.

A.5 *British Standard 8233:2014 Guidance on sound insulation and noise reduction for buildings*

British Standard 8233 “Guidance on sound insulation and noise reduction for buildings” 2014, suggests the following guideline noise levels and states that they are based on guidelines issued by the World Health Organisation;

- 35 dB L_{Aeq} (16 hour) during the day time in noise sensitive rooms
- 30 dB L_{Aeq} (8 hour) during the night time in bedrooms
- 45 dB $L_{Amax,F}$ during the night time in bedrooms
- 50 dB L_{Aeq} (16 hour) desirable external noise levels for amenity space such as gardens and patios
- 55 dB L_{Aeq} (16 hour) upper guideline value which would be acceptable in noisier environments.

In addition, for internal noise levels it states;

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

Furthermore, with regard to external noise, the Standard states;

“However, it is also recognised that these guideline values are not achievable in all circumstances where development might be desirable. In higher noise areas, such as city centres or urban areas adjoining the strategic transport network, a

compromise between elevated noise levels and other factors, such as the convenience of living in these locations or making efficient use of land resources to ensure development needs can be met, might be warranted. In such a situation, development should be designed to achieve the lowest practicable levels in these external amenity spaces, but should not be prohibited”.

A.6 Guidance on Assessment of Road Traffic Noise

The Department of Transport’s memorandum, “Calculation of Road Traffic Noise” (CRTN), 1998 defines a shortened measurement procedure which is used to calculate the $L_{A10,18\text{hour}}$ noise level from a measured 3 hour period. The method requires the measurement of noise over 3 consecutive hours between 1000 and 1700 hours.

From the measured 3 hour period, the arithmetic average of the three $L_{A10,1\text{Hour}}$ measurements is taken. The $L_{A10,18\text{Hour}}$ noise level is then determined using the following calculation method;

- $L_{A10,18\text{Hour}} = L_{A10,3\text{hour}} - 1$

The document “*Converting the UK traffic noise index $L_{A10,18h}$ to EU noise indices for noise mapping*” by P G Abbott and P M Nelson (The TRL Method) provides a calculation method to convert the calculated $L_{A10,18\text{Hour}}$ into a daytime L_{Aeq} as described below.

- $L_{\text{day}} = 0.95 \times L_{A10,18\text{hour}} + 1.44\text{dB}$

The calculation for the night-time period is shown below.

- $L_{\text{night}} = 0.90 \times L_{A10,18\text{hour}} - 3.77$
- $L_{\text{night}} = 0.90 \times L_{A10,18\text{hour}} - 3.77$

Appendix B

Recorded data

Appendix B -Recorded Data

ML1

File	20230809_115116_000000_1.CMG				
Periods	10m				
Start	12:00:00				
End	12:40:00				
Location	Blue_Fusion				
Weighting	A				
Data type	Leq				
Unit	dB				
Period					
start	Leq	Lmax	L90	L10	
12:00:00	00:10:00	65.3	77.5	47.6	69.6
12:10:00	00:10:00	63.2	77.2	47.3	68.5
12:20:00	00:10:00	64.8	76.7	49.6	69.1
12:30:00	00:10:00	64.6	76.8	48.5	68.8
12:40:00	00:10:00	64.7	75.1	50.2	69.2
12:50:00	00:10:00	64.2	76.4	47.9	68.8
13:00:00	00:10:00	64.4	74.1	49	69
13:10:00	00:10:00	66.2	88.3	46.3	69.7
13:20:00	00:10:00	64.6	83	47.1	68.7
13:30:00	00:10:00	64.5	76.2	48.1	68.9
13:40:00	00:10:00	64	81.7	46.9	67.7
13:50:00	00:10:00	64.5	77.4	48.6	68.5
14:00:00	00:10:00	64.1	73.7	48.1	69.1
14:10:00	00:10:00	65.2	76.2	48.5	69.9
14:20:00	00:10:00	66.3	87.5	48.1	69.6
14:30:00	00:10:00	65.3	75.2	48.7	69.6
14:40:00	00:10:00	66.3	87.8	46	69.5
14:50:00	00:10:00	65	75.5	49	69.5
15:00:00	00:10:00	65	76.6	46.6	69.7
15:10:00	00:10:00	64.6	76.2	46.8	69.4
15:20:00	00:10:00	65.9	85.1	46.1	69.1
15:30:00	00:10:00	64.7	75.9	47.9	69.1
15:40:00	00:10:00	65	74.1	48.3	69.6
15:50:00	00:10:00	64.7	75	49	69.3
16:00:00	00:10:00	65.4	79.4	47.9	69.6
16:10:00	00:10:00	66	76.6	48.3	70.2
16:20:00	00:10:00	70.1	93.8	45.7	70.4
16:30:00	00:10:00	65.1	74.4	43.6	69.8
16:40:00	00:10:00	73.3	99.2	47.1	69.5
16:50:00	00:10:00	64.9	74.7	44.8	69.4
17:00:00	00:10:00	65.3	75.8	44.9	70
17:10:00	00:10:00	65.8	75.7	44.7	70
17:20:00	00:10:00	65	74.8	47.9	69.4
17:30:00	00:10:00	64.7	74.1	48.4	69.1

Appendix B

17:40:00	00:10:00	65.3	74.1	49.7	69.5
17:50:00	00:10:00	65.5	77.6	47	70.2
18:00:00	00:10:00	64.7	76	46.3	69.1
18:10:00	00:10:00	66.7	87.8	46.4	69.1
18:20:00	00:10:00	64.5	73.6	48	69
18:30:00	00:10:00	63.9	73.3	45.3	68.7
18:40:00	00:10:00	64.6	74.4	47.6	68.9
18:50:00	00:10:00	64.3	74.1	46.7	68.9
19:00:00	00:10:00	64.3	74.2	45.9	68.8
19:10:00	00:10:00	64.1	74	44.4	69.2
19:20:00	00:10:00	64.3	74.1	45.5	68.7
19:30:00	00:10:00	64.3	74.1	45.5	69
19:40:00	00:10:00	64.7	79	44.8	69.4
19:50:00	00:10:00	64.4	77.4	44.4	69.3
20:00:00	00:10:00	62.4	73.5	43.1	67.9
20:10:00	00:10:00	63.8	75.6	44.8	68.8
20:20:00	00:10:00	62.3	73.5	42.8	67.6
20:30:00	00:10:00	63.2	74.6	45.1	67.9
20:40:00	00:10:00	67.4	90.1	42.4	68.3
20:50:00	00:10:00	62.3	74.4	40.8	67.4
21:00:00	00:10:00	66.7	91	43.7	68
21:10:00	00:10:00	62	74.2	41.6	67.3
21:20:00	00:10:00	60.9	71.8	43.3	66.4
21:30:00	00:10:00	62.5	73.2	42.3	67.2
21:40:00	00:10:00	61.1	73.2	39.5	66.7
21:50:00	00:10:00	60.8	74.9	38.8	66.5
22:00:00	00:10:00	61	73.7	40.5	66.4
22:10:00	00:10:00	60.7	71.3	38.3	66.1
22:20:00	00:10:00	59.5	73.8	36.9	63.2
22:30:00	00:10:00	56.6	73.1	36.4	59.4
22:40:00	00:10:00	58	72.8	36.6	61.1
22:50:00	00:10:00	58.3	75.3	34.7	61.1
23:00:00	00:10:00	58.1	73.9	33.5	60.5
23:10:00	00:10:00	59.3	74.3	32.6	64.6
23:20:00	00:10:00	57.5	72.7	31.9	58.7
23:30:00	00:10:00	57	73.2	33.1	57.9
23:40:00	00:10:00	55.3	75.8	31	50.9
23:50:00	00:10:00	56.8	73.8	32.1	58.4
00:00:00	00:10:00	57.9	74.8	32.6	59.2
00:10:00	00:10:00	56.4	75.1	32.4	57.4
00:20:00	00:10:00	61.7	86.5	33.6	57.2
00:30:00	00:10:00	54.6	71.6	32.6	52.8
00:40:00	00:10:00	55.5	72.5	35.2	54.6
00:50:00	00:10:00	55.6	71.1	33.8	54.1
01:00:00	00:10:00	54.2	73.5	33.1	52.1
01:10:00	00:10:00	53.3	74.5	33	50.2
01:20:00	00:10:00	51.4	72.7	35.6	45.2
01:30:00	00:10:00	52.4	73.8	36.9	48.2

Appendix B

01:40:00	00:10:00	53.8	72.3	37.4	50.7
01:50:00	00:10:00	47.9	67.5	40.4	48.2
02:00:00	00:10:00	52.7	72.8	43.2	48.7
02:10:00	00:10:00	56.3	76	38.3	52.1
02:20:00	00:10:00	51.3	73.5	40.6	49.4
02:30:00	00:10:00	53.2	76.3	40.5	49
02:40:00	00:10:00	56.5	75.1	41.5	55.3
02:50:00	00:10:00	54.9	73.2	43.6	51.1
03:00:00	00:10:00	55.7	73.5	43	54.2
03:10:00	00:10:00	55	73.5	42.3	52.8
03:20:00	00:10:00	56.6	76.8	43.6	54.3
03:30:00	00:10:00	54.7	73.7	44.2	53
03:40:00	00:10:00	55.8	74.7	45	53.9
03:50:00	00:10:00	54.4	71.9	45.4	53.5
04:00:00	00:10:00	57.6	75.9	45.2	56.6
04:10:00	00:10:00	55.9	72.7	46.8	54.2
04:20:00	00:10:00	56.2	74.9	46.9	54.8
04:30:00	00:10:00	55.7	73.3	47	54.2
04:40:00	00:10:00	56.7	73.6	48.2	56.4
04:50:00	00:10:00	57.6	75.5	48.7	55.1
05:00:00	00:10:00	59	76.8	50.4	58.8
05:10:00	00:10:00	59.9	77.6	51.8	59.8
05:20:00	00:10:00	61.7	75.9	52.7	63.9
05:30:00	00:10:00	62.1	75.8	54.8	64.7
05:40:00	00:10:00	63.2	78.3	55.5	67.5
05:50:00	00:10:00	63.7	79.4	54.9	68
06:00:00	00:10:00	63.6	77.7	56	67.2
06:10:00	00:10:00	63.5	75.5	57.5	66.9
06:20:00	00:10:00	64.5	75.8	57.6	68.7
06:30:00	00:10:00	65.5	75.8	57.9	70.3
06:40:00	00:10:00	65.7	75.1	58.3	70.2
06:50:00	00:10:00	64.9	75.3	56.8	69.7
07:00:00	00:10:00	65.4	75	55.7	70.5
07:10:00	00:10:00	64.9	76.8	53.9	69.7
07:20:00	00:10:00	65.3	76.1	54.1	70
07:30:00	00:10:00	65.4	74.7	53.7	70.2
07:40:00	00:10:00	66.1	75	52.7	70.8
07:50:00	00:10:00	65.1	74.1	51.8	70
08:00:00	00:10:00	64.5	78.1	50.9	69.2
08:10:00	00:10:00	65.7	75.6	51.8	70.3
08:20:00	00:10:00	65.8	77.7	52.6	70.1
08:30:00	00:10:00	65	75.3	52.1	69
08:40:00	00:10:00	65.7	80.6	52.3	69.8
08:50:00	00:10:00	64.7	76.2	52.9	69.3
09:00:00	00:10:00	66	88.1	52.4	68.6
09:10:00	00:10:00	64.8	77.1	52.6	69.5
09:20:00	00:10:00	64.4	75.1	52.8	69.1
09:30:00	00:10:00	63.7	74.4	52.8	68.8

Appendix B

09:40:00	00:10:00	63.4	75.9	52.5	67.6
09:50:00	00:10:00	64.5	75.3	52.4	68.9
10:00:00	00:10:00	65.3	80.4	52.6	69.3
10:10:00	00:10:00	64.3	75.3	52.2	69
10:20:00	00:10:00	64.5	78.7	52.8	68.9
10:30:00	00:10:00	63.9	75	53.8	68.3
10:40:00	00:10:00	66.9	89.3	54.8	68.7
10:50:00	00:10:00	64.5	75.1	54.3	69.2
11:00:00	00:10:00	64.8	81.2	55.4	69.2
11:10:00	00:10:00	64	75.6	54.4	68.8
11:20:00	00:10:00	63.8	75.7	53.9	68.3
11:30:00	00:10:00	65	76.2	54.2	69.4
11:40:00	00:10:00	64.4	78.8	54.2	68.5
11:50:00	00:10:00	64	77	53.9	68.2
12:00:00	00:10:00	63.9	74.4	54.5	68.4
12:10:00	00:10:00	65.1	79	54.8	69.4
12:20:00	00:10:00	65.2	77.3	54.4	70
12:30:00	00:10:00	64.4	75.7	53.7	68.7

Appendix B

ML2

File	20230809_101619_000000_1.CMG					
Periods	10m					
Start	10:20:00					
End	12:50:00					
Location	MY_LOC					
Weighting	A					
Data type	Leq					
Unit	dB					
Period						
start		Leq	Lmax	L90	L10	
10:20:00	00:10:00	61.3	75	45.5	66	
10:30:00	00:10:00	58.8	72.9	45.4	62.5	
10:40:00	00:10:00	60.4	75.9	45.6	64.8	
10:50:00	00:10:00	61.6	73.5	45.4	66.5	
11:00:00	00:10:00	60.1	74.2	44.4	65	
11:10:00	00:10:00	61.5	72.8	46.6	66.8	
11:20:00	00:10:00	61.3	75.2	46.9	65.9	
11:30:00	00:10:00	59.9	74.1	45.8	64.3	
11:40:00	00:10:00	61.1	75.4	45.6	65.8	
11:50:00	00:10:00	62.5	82.2	44.4	66.2	
12:00:00	00:10:00	62.7	80	45.4	66.8	
12:10:00	00:10:00	62.1	80.8	46.2	65.6	
12:20:00	00:10:00	60.6	77.8	45.7	64	
12:30:00	00:10:00	60.9	73.3	46.1	65.5	
12:40:00	00:10:00	62.1	75.3	47.2	66.6	
12:50:00	00:10:00	61.9	74.2	46.8	66.7	
13:00:00	00:10:00	63.7	83.8	47.2	66.2	
13:10:00	00:10:00	65.6	73	59.2	69	
13:20:00	00:10:00	61.7	74.2	54.4	65.3	
13:30:00	00:10:00	63.9	78.4	53.8	67.9	
13:40:00	00:10:00	61	73.6	49.6	65.5	
13:50:00	00:10:00	62.3	72.2	48.6	67.4	
14:00:00	00:10:00	63.2	78.3	50	67.8	
14:10:00	00:10:00	68.7	80	51.6	72.7	
14:20:00	00:10:00	68.7	78.8	51.8	72.6	
14:30:00	00:10:00	66.2	81.4	53.4	69.1	
14:40:00	00:10:00	64.7	75.6	55	68.6	
14:50:00	00:10:00	62.1	74.6	48	66.5	
15:00:00	00:10:00	61	73	46.9	65.2	
15:10:00	00:10:00	61.7	72.6	47.5	66.4	
15:20:00	00:10:00	61.9	75.1	46.7	66.5	
15:30:00	00:10:00	64.7	84.4	46.1	68.3	
15:40:00	00:10:00	60.9	76.5	45.2	65.3	
15:50:00	00:10:00	62.5	76.5	46.9	67.4	
16:00:00	00:10:00	63.1	74.3	47.9	67.5	
16:10:00	00:10:00	63	76.5	45.7	67.6	

Appendix B

16:20:00	00:10:00	61.3	71.4	44	66.4
16:30:00	00:10:00	63	76.4	45.3	67.5
16:40:00	00:10:00	62.6	73	43.9	67.2
16:50:00	00:10:00	62.8	72.9	47.6	67.5
17:00:00	00:10:00	62.3	72.9	44.7	67.2
17:10:00	00:10:00	62.8	74.7	46.5	67.2
17:20:00	00:10:00	62.8	75	48.2	67.2
17:30:00	00:10:00	63.4	74	45.6	68
17:40:00	00:10:00	62.4	72.7	47.2	67.4
17:50:00	00:10:00	62.7	76.5	45.8	66.7
18:00:00	00:10:00	62.4	77.2	44.9	66.5
18:10:00	00:10:00	62.4	73.5	46.5	66.9
18:20:00	00:10:00	61.3	73.5	45.9	65.5
18:30:00	00:10:00	61.3	75.8	45.6	65.8
18:40:00	00:10:00	61.7	74.7	45.1	66.2
18:50:00	00:10:00	61.9	77.9	41.8	66.7
19:00:00	00:10:00	60.7	73.3	43.5	65.5
19:10:00	00:10:00	61.7	75.5	42.9	66.6
19:20:00	00:10:00	61.1	72.9	41.9	66.3
19:30:00	00:10:00	61.6	73.9	43.3	66
19:40:00	00:10:00	62.8	78	43.9	66.8
19:50:00	00:10:00	62.8	79.5	42.4	66.7
20:00:00	00:10:00	60	75.7	43	64.3
20:10:00	00:10:00	59.5	70.6	42.1	64
20:20:00	00:10:00	61.7	74.5	41.1	65.9
20:30:00	00:10:00	59.4	75.8	43.2	63.1
20:40:00	00:10:00	60.9	75.4	43.5	65.3
20:50:00	00:10:00	60.2	73.3	36.9	64.4
21:00:00	00:10:00	59.7	73.6	42.1	64.5
21:10:00	00:10:00	59.7	77.4	43.6	63.5
21:20:00	00:10:00	58.6	73.2	42.1	62.3
21:30:00	00:10:00	57.6	73.3	38.3	62.4
21:40:00	00:10:00	54.9	70.6	35.6	58.5
21:50:00	00:10:00	59.1	74.1	38	62.9
22:00:00	00:10:00	57.2	71.7	35.9	61.2
22:10:00	00:10:00	56.3	71.3	32.8	60.9
22:20:00	00:10:00	55.1	73.3	32.4	57.1
22:30:00	00:10:00	52.3	68.3	32	54.2
22:40:00	00:10:00	51.3	67.6	32	51.8
22:50:00	00:10:00	57.6	76.2	29.3	59.9
23:00:00	00:10:00	48.9	65.8	28.4	50.8
23:10:00	00:10:00	53.1	72	27.8	54
23:20:00	00:10:00	55.1	73.4	26.5	52.7
23:30:00	00:10:00	51	69.7	26.7	49.8
23:40:00	00:10:00	53.6	77.4	25.9	46.1
23:50:00	00:10:00	60.4	84.6	27.2	54.3
00:00:00	00:10:00	51.5	72.2	27.4	42.5
00:10:00	00:10:00	47.9	66	28.4	47.5

Appendix B

00:20:00	00:10:00	53	69.9	29.4	50.3
00:30:00	00:10:00	50.1	69.1	29.8	44.4
00:40:00	00:10:00	48.4	67.3	31.5	48.3
00:50:00	00:10:00	47.6	68.9	32	46.1
01:00:00	00:10:00	47	67.7	30	44.7
01:10:00	00:10:00	44.3	62.5	30.2	42.4
01:20:00	00:10:00	34	39	31.6	35.7
01:30:00	00:10:00	49.4	71.6	33.7	41
01:40:00	00:10:00	49.1	67.7	33.2	43.9
01:50:00	00:10:00	47.6	68.7	35.6	46.2
02:00:00	00:10:00	47.7	70.5	38.1	43.1
02:10:00	00:10:00	55.3	76.4	34.6	46.7
02:20:00	00:10:00	53.3	77.7	37.4	43.7
02:30:00	00:10:00	41	47.1	37.2	43.3
02:40:00	00:10:00	48.3	69.3	38.5	45.9
02:50:00	00:10:00	49.2	68.3	39.1	45.8
03:00:00	00:10:00	57.6	81.5	38.8	46.9
03:10:00	00:10:00	47.1	68.7	39.3	44.4
03:20:00	00:10:00	46.5	66	39.6	44.8
03:30:00	00:10:00	47.2	67.9	39.1	44.7
03:40:00	00:10:00	46.9	63.7	40.7	46.7
03:50:00	00:10:00	51.5	71.9	40.5	46.1
04:00:00	00:10:00	53.1	74	40.5	49.8
04:10:00	00:10:00	46.2	60.1	41.1	47.3
04:20:00	00:10:00	45.7	58.1	41.1	47.5
04:30:00	00:10:00	47.5	66.9	41	47.3
04:40:00	00:10:00	55.7	76.7	43.9	51.1
04:50:00	00:10:00	51.9	71.9	44.1	53.8
05:00:00	00:10:00	55.1	73.7	45.5	55.4
05:10:00	00:10:00	53.2	71	48	51.9
05:20:00	00:10:00	52.5	67.4	48.3	52.7
05:30:00	00:10:00	56.4	73.3	49.7	56.6
05:40:00	00:10:00	56.3	73	50.4	55.8
05:50:00	00:10:00	58.9	79.4	50.2	56.3
06:00:00	00:10:00	58.4	73.7	51.2	61.9
06:10:00	00:10:00	59.5	72.5	53.2	61.8
06:20:00	00:10:00	62.1	79.1	53.6	63.5
06:30:00	00:10:00	61.5	76.6	54.6	64.6
06:40:00	00:10:00	62	75	53.6	65.8
06:50:00	00:10:00	60.3	74.4	51.7	64.7
07:00:00	00:10:00	61.9	75.4	51.9	66.5
07:10:00	00:10:00	60.5	73.6	51.3	63.8
07:20:00	00:10:00	61.5	77.2	50.5	65.1
07:30:00	00:10:00	62.6	74.5	50.1	67.2
07:40:00	00:10:00	60.9	74	49	65.7
07:50:00	00:10:00	63.3	75.9	48.2	68.5
08:00:00	00:10:00	62.2	76.8	47.5	66.9
08:10:00	00:10:00	63.2	74.6	49.4	68.2

Appendix B

08:20:00	00:10:00	62.3	75	48.9	67.1
08:30:00	00:10:00	62.7	73.3	49.1	67.6
08:40:00	00:10:00	62.1	78.2	49.1	66.4
08:50:00	00:10:00	62	73.5	48.2	67.4
09:00:00	00:10:00	63.4	75.5	48.6	67.2
09:10:00	00:10:00	62.9	78.8	48.9	67.4
09:20:00	00:10:00	61.5	73.4	48.9	65.9
09:30:00	00:10:00	61.9	74.4	49.3	66.4
09:40:00	00:10:00	61.1	74.1	48.6	65.9
09:50:00	00:10:00	63.4	81.2	49	68
10:00:00	00:10:00	62.1	72.5	48.7	67.1
10:10:00	00:10:00	62.2	72.9	49.2	66.8
10:20:00	00:10:00	61.8	77.6	48.7	66
10:30:00	00:10:00	61.1	75.4	49.1	65.7
10:40:00	00:10:00	60.4	75.6	50.3	64.7
10:50:00	00:10:00	62.8	77	50	67.5
11:00:00	00:10:00	60.5	72.8	50.7	65.1
11:10:00	00:10:00	61.3	74.8	51.6	65.2
11:20:00	00:10:00	61.9	73.4	50.8	66
11:30:00	00:10:00	61.7	74.8	51	66.2
11:40:00	00:10:00	60.6	75.2	50.7	64.5
11:50:00	00:10:00	60.5	73	50.1	65.3
12:00:00	00:10:00	61.8	72.2	51	66.5
12:10:00	00:10:00	62.9	80	51.6	66.9
12:20:00	00:10:00	61.4	74.3	51	66
12:30:00	00:10:00	61	73.7	50.1	66.1
12:40:00	00:10:00	61.6	75.3	51.3	66

Appendix B

ML3

File 20230809_122811_153000.cmg
 Periods 1m
 Start 12:29:00
 End 15:30:00
 Location MY_LOC
 Weighting A
 Data type Leq
 Unit dB

Period start	Leq	Lmax	L90	L10
12:29:00 00:01:00	79.8	83.5	75.7	82.3
12:30:00 00:01:00	78.9	82.7	76.3	81.1
12:31:00 00:01:00	80	83.4	75.3	82.2
12:32:00 00:01:00	80.2	83.1	76.7	82.1
12:33:00 00:01:00	79.7	82.7	76.9	81.7
12:34:00 00:01:00	79.8	82.7	77.3	81.6
12:35:00 00:01:00	78.9	82.5	75.7	81.6
12:36:00 00:01:00	79.3	82.5	75.1	81.8
12:37:00 00:01:00	78.7	83.5	74.6	81.5
12:38:00 00:01:00	78.6	81.6	75.8	80.5
12:39:00 00:01:00	80.1	82.3	77.2	81.5
12:40:00 00:01:00	79.7	82.9	77.2	82
12:41:00 00:01:00	79.3	82.4	73	81.6
12:42:00 00:01:00	80.2	83.4	76.9	82
12:43:00 00:01:00	78.9	84.3	76	81
12:44:00 00:01:00	79.2	82.8	73.9	81.9
12:45:00 00:01:00	80.1	84.2	77.4	81.7
12:46:00 00:01:00	78.9	81.5	75.7	80.9
12:47:00 00:01:00	81.2	84	78.3	82.7
12:48:00 00:01:00	78.1	83.2	73.1	80.6
12:49:00 00:01:00	79.8	83	76.7	81.7
12:50:00 00:01:00	77.9	81.1	74.6	79.9
12:51:00 00:01:00	78.5	82.8	72.6	81.1
12:52:00 00:01:00	80.5	83	78.8	81.6
12:53:00 00:01:00	79.3	82.4	76.1	81.7
12:54:00 00:01:00	79.6	82	77	81.1
12:55:00 00:01:00	81	82.9	78	82.4
12:56:00 00:01:00	79.8	83.4	77	81.9
12:57:00 00:01:00	80.4	84.3	76.6	82.2
12:58:00 00:01:00	78.8	82.8	74.9	81.5
12:59:00 00:01:00	78.9	82.1	76.4	80.8
13:00:00 00:01:00	77.2	82	74.4	79.2
13:01:00 00:01:00	79.2	83.9	75.7	80.9
13:02:00 00:01:00	79.4	82.3	77.3	81.1
13:03:00 00:01:00	79.7	84.5	76.8	81.3
13:04:00 00:01:00	79.3	82.2	74.8	81.4

Appendix B

13:05:00	00:01:00	79.1	82.3	76	81.2
13:06:00	00:01:00	80	82.8	75.8	81.9
13:07:00	00:01:00	79.3	81.9	76.5	81
13:08:00	00:01:00	78.6	81.9	75.2	81
13:09:00	00:01:00	79.5	83.2	75.3	81.3
13:10:00	00:01:00	78.9	82.2	74.6	81.1
13:11:00	00:01:00	79.2	82.4	76.2	81
13:12:00	00:01:00	79.1	81.3	76.5	80.9
13:13:00	00:01:00	79.3	82.5	75	81.4
13:14:00	00:01:00	80.2	82.5	78.1	81.7
13:15:00	00:01:00	78.6	81.9	74.3	80.6
13:16:00	00:01:00	80.1	82.8	77.1	81.9
13:17:00	00:01:00	80.2	83.5	76.6	82.1
13:18:00	00:01:00	80.3	83.4	77.7	81.9
13:19:00	00:01:00	79.8	82.5	76.3	81.6
13:20:00	00:01:00	79.6	83.4	76.7	81.5
13:21:00	00:01:00	79.2	81.8	77	81.1
13:22:00	00:01:00	80.4	83	78.1	82.1
13:23:00	00:01:00	79.8	82.8	76.1	82
13:24:00	00:01:00	78.7	82.4	73.7	81.8
13:25:00	00:01:00	79.8	83.5	77.3	81.7
13:26:00	00:01:00	79.4	83.2	74.1	81.3
13:27:00	00:01:00	79.1	81.5	77.2	80.6
13:28:00	00:01:00	78.5	82	74.7	81.2
13:29:00	00:01:00	80.2	82.8	75.9	82.3
13:30:00	00:01:00	79.9	83.3	75.8	82.2
13:31:00	00:01:00	78.8	84	75.4	80.3
13:32:00	00:01:00	78.8	83.3	74	81.2
13:33:00	00:01:00	79.9	83	76.8	81.5
13:34:00	00:01:00	79.8	82	76.6	81.4
13:35:00	00:01:00	79.3	81.8	75.8	81.1
13:36:00	00:01:00	79.9	83.2	77.1	81.9
13:37:00	00:01:00	80	82.1	77.1	81.3
13:38:00	00:01:00	79	82	76.1	81
13:39:00	00:01:00	79.2	82.6	74.7	81.7
13:40:00	00:01:00	79.6	82.6	76.6	81.3
13:41:00	00:01:00	79.3	82.9	75.9	81.4
13:42:00	00:01:00	79.2	82.5	76.3	81.4
13:43:00	00:01:00	80.3	84.3	77.5	82.4
13:44:00	00:01:00	79.7	82.5	77.5	81.5
13:45:00	00:01:00	78.9	81.9	74.8	80.8
13:46:00	00:01:00	79	83.8	76.1	80.6
13:47:00	00:01:00	79.3	82.3	75.5	81.5
13:48:00	00:01:00	78.8	81	76.4	80.4
13:49:00	00:01:00	79.6	82.6	77.1	81.6
13:50:00	00:01:00	79.5	83.5	76.7	81.8
13:51:00	00:01:00	79.9	83.3	77.2	82.2
13:52:00	00:01:00	78.7	82.2	72.9	81.2

Appendix B

13:53:00	00:01:00	79.2	82.7	74.5	81.8
13:54:00	00:01:00	78.9	82.2	74.6	81.3
13:55:00	00:01:00	79.7	82.3	76.2	81.6
13:56:00	00:01:00	79.3	83.6	74.9	81.2
13:57:00	00:01:00	79.2	83.4	75.5	81.9
13:58:00	00:01:00	79.1	82.9	76.5	81.2
13:59:00	00:01:00	78.9	82.3	75.9	80.5
14:00:00	00:01:00	78.8	82.9	75.2	81.4
14:01:00	00:01:00	79.3	83.4	76.6	80.6
14:02:00	00:01:00	79.2	83.3	75.8	81.8
14:03:00	00:01:00	78.3	82.8	73.9	80.3
14:04:00	00:01:00	79.6	82.7	76.6	81.8
14:05:00	00:01:00	79.7	82.7	76.8	81.3
14:06:00	00:01:00	79.4	83.5	76.8	81.2
14:07:00	00:01:00	79.2	81.7	75.7	81
14:08:00	00:01:00	79.7	82.8	76.7	81.6
14:09:00	00:01:00	78.5	82.7	75.1	80.7
14:10:00	00:01:00	79.3	83	74.9	81.9
14:11:00	00:01:00	78.5	82.2	74.9	80.1
14:12:00	00:01:00	79.3	81.5	76.8	81
14:13:00	00:01:00	78.6	82.3	75	80.9
14:14:00	00:01:00	80	82.2	76	81.8
14:15:00	00:01:00	78.7	82.2	74.8	80.7
14:16:00	00:01:00	80.2	83.9	76.1	82.4
14:17:00	00:01:00	79	82.4	75	81
14:18:00	00:01:00	78.5	82	74.9	80.9
14:19:00	00:01:00	81.3	85.7	77.5	83.1
14:20:00	00:01:00	79.6	82.7	74.5	81.7
14:21:00	00:01:00	79.6	82.2	74.6	81.4
14:22:00	00:01:00	79.6	83.2	77.2	81.5
14:23:00	00:01:00	78.5	81.7	74	80.8
14:24:00	00:01:00	79.9	82	78.2	81.1
14:25:00	00:01:00	80.2	83.4	77.2	82.1
14:26:00	00:01:00	80.2	81.9	78.6	81.6
14:27:00	00:01:00	79.4	82.8	76.2	81.1
14:28:00	00:01:00	79.1	82.2	75.3	81.3
14:29:00	00:01:00	79.2	83.7	75.1	81.6
14:30:00	00:01:00	78.4	81.7	75.3	80.5
14:31:00	00:01:00	79.7	84.2	76.5	81.7
14:32:00	00:01:00	78.6	84.4	75.2	80
14:33:00	00:01:00	79.2	83.4	74.6	81.7
14:34:00	00:01:00	78.8	82.5	74.3	80.7
14:35:00	00:01:00	78.8	83.3	72.7	81.1
14:36:00	00:01:00	78.5	81.8	75.6	80.1
14:37:00	00:01:00	79	83.4	74	81.1
14:38:00	00:01:00	79.4	83.1	76	81
14:39:00	00:01:00	80.4	82.7	76.9	82.1
14:40:00	00:01:00	80.8	82.9	78.2	82.2

Appendix B

14:41:00	00:01:00	78.8	81.7	75.8	80.8
14:42:00	00:01:00	80.4	83.4	78	82.2
14:43:00	00:01:00	80.5	83.2	77.9	82.2
14:44:00	00:01:00	79.5	81.9	76.3	81.1
14:45:00	00:01:00	78.7	82	75.3	81.2
14:46:00	00:01:00	79	83.8	75.2	81.3
14:47:00	00:01:00	79.5	83.1	77.1	81.4
14:48:00	00:01:00	79.6	83.7	75.8	81.9
14:49:00	00:01:00	78.6	82	74.3	80.9
14:50:00	00:01:00	79.4	82.7	76.9	81.2
14:51:00	00:01:00	78.6	84.2	75.1	80.8
14:52:00	00:01:00	79	82	75.4	81
14:53:00	00:01:00	79.5	81.7	77	81.1
14:54:00	00:01:00	80.2	83.8	77.1	82.2
14:55:00	00:01:00	78.2	82.2	74.5	80.1
14:56:00	00:01:00	80.5	83.7	78	82.2
14:57:00	00:01:00	79.8	82.6	77.2	81.4
14:58:00	00:01:00	79.2	82.6	76.7	80.5
14:59:00	00:01:00	79.1	81.7	75.8	81
15:00:00	00:01:00	79.8	81.9	76.9	81.3
15:01:00	00:01:00	78	81.4	75.7	80.2
15:02:00	00:01:00	78.9	82.3	73.9	81.6
15:03:00	00:01:00	80.4	84	77.5	82.1
15:04:00	00:01:00	79.6	83.6	76.1	82.2
15:05:00	00:01:00	78.7	81.2	75	80.2
15:06:00	00:01:00	79.4	83.7	74.3	81.3
15:07:00	00:01:00	79.4	82.5	76.2	81.2
15:08:00	00:01:00	79.3	83.3	76	80.9
15:09:00	00:01:00	80.5	83.3	77.4	82.3
15:10:00	00:01:00	79.8	83	76.2	81.8
15:11:00	00:01:00	78.6	82.5	73.9	81.7
15:12:00	00:01:00	80.1	82.8	75.9	82
15:13:00	00:01:00	79.8	83.2	76.4	81.9
15:14:00	00:01:00	80.8	83.1	78.2	82.4
15:15:00	00:01:00	79.7	83.1	75.7	81.9
15:16:00	00:01:00	79.5	81.8	77.4	81
15:17:00	00:01:00	79.3	83.2	75.1	81.2
15:18:00	00:01:00	79.6	82.9	75.2	82.2
15:19:00	00:01:00	80.3	83.3	76.6	82.3
15:20:00	00:01:00	78.8	81.2	76	80.3
15:21:00	00:01:00	78.7	81.5	73.4	80.8
15:22:00	00:01:00	78.7	82	76.1	80.1
15:23:00	00:01:00	79.7	82.1	77.3	81.1
15:24:00	00:01:00	79.4	82.7	75.9	81.1
15:25:00	00:01:00	80.1	83.4	76.4	81.5
15:26:00	00:01:00	80.3	82.8	78	81.8
15:27:00	00:01:00	80	81.8	77.6	81.3
15:28:00	00:01:00	78.2	80.7	75	79.8

Appendix B

15:29:00	00:01:00	79.3	81.9	76.6	81.2
----------	----------	------	------	------	------

Appendix C

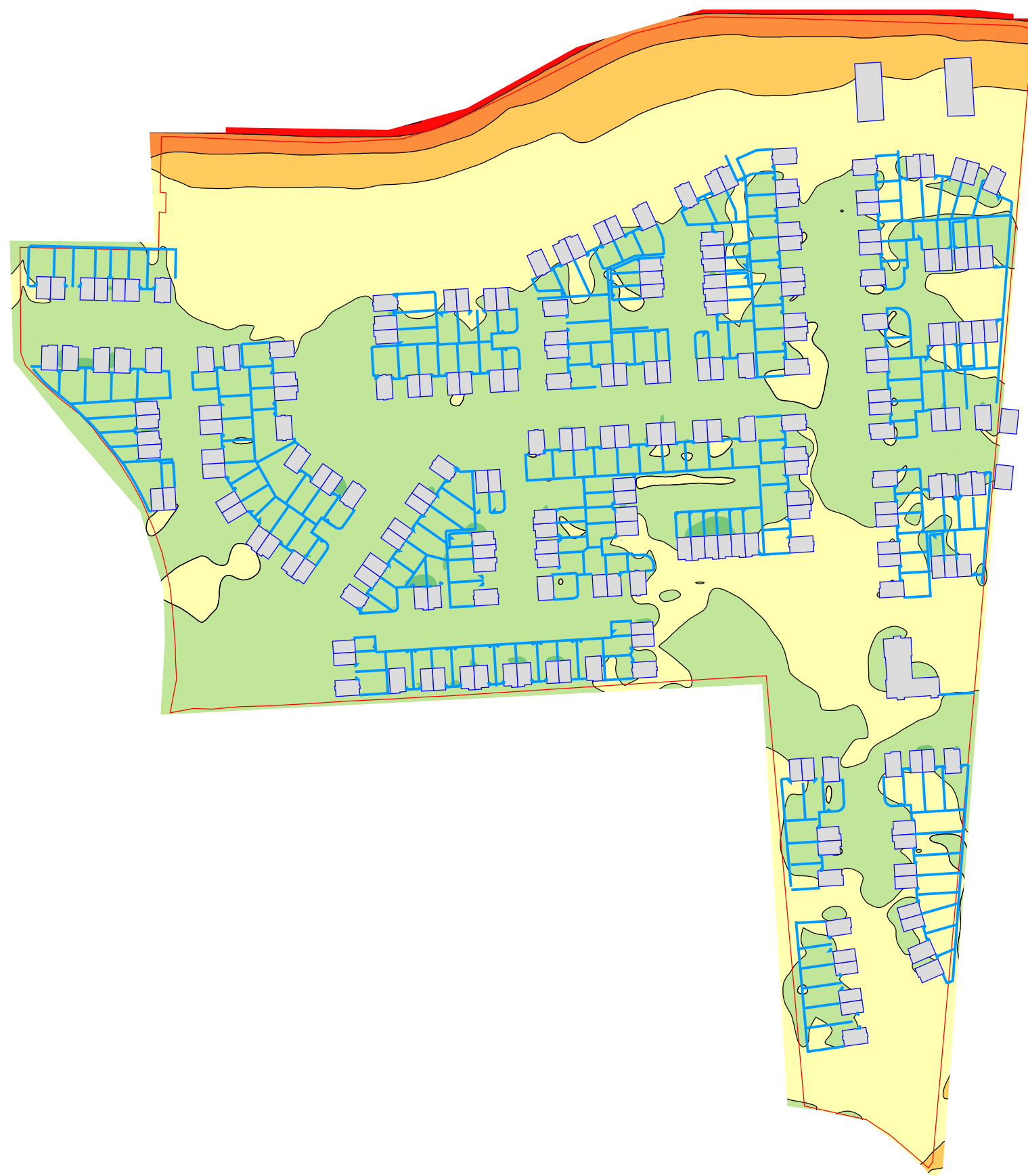
Plots requiring mitigation

Appendix C

Please note, all plot numbers that do not appear in this list do not require façade mitigation on any floor

Plot Number	Mitigation requirements	Plot Number	Mitigation requirements	Plot Number	Mitigation requirements	Appartment Buildings	Mitigation requirements
1	Ground Floor Only	109	Ground Floor Only	178	Ground Floor Only	225-254	Mitigation required
2	Ground Floor Only	110	Ground Floor Only	179	Ground Floor Only		
3	Ground Floor Only	111	Ground Floor Only	180	Ground Floor Only		
4	Ground Floor Only	112	Ground Floor Only	181	Ground Floor Only		
12	Ground and First Floor	113	Ground Floor Only	184	Ground Floor Only		
13	Ground Floor Only	114	Ground Floor Only	185	Ground Floor Only		
14	First Floor Only	115	Ground Floor Only	189	Ground Floor Only		
16	First Floor Only	116	Ground Floor Only	190	Ground and First Floor		
18	Ground and First Floor	117	Ground Floor Only	191	Ground and First Floor		
21	Ground Floor Only	118	Ground Floor Only	192	Ground and First Floor		
22	Ground Floor Only	119	Ground Floor Only	193	Ground and First Floor		
13	Ground Floor Only	120	Ground Floor Only	194	Ground and First Floor		
27	Ground Floor Only	121	Ground Floor Only	195	Ground and First Floor		
29	Ground Floor Only	123	Ground Floor Only	196	Ground and First Floor		
30	Ground Floor Only	126	Ground Floor Only	197	Ground and First Floor		
31	Ground Floor Only	127	Ground Floor Only	198	Ground and First Floor		
32	Ground Floor Only	128	Ground Floor Only	199	Ground and First Floor		
35	Ground Floor Only	129	Ground Floor Only	200	Ground and First Floor		
37	Ground Floor Only	130	Ground Floor Only	203	Ground and First Floor		
44	Ground Floor Only	131	Ground Floor Only	211	Ground and First Floor		
45	Ground Floor Only	132	Ground Floor Only	212	Ground Floor Only		
46	Ground Floor Only	133	Ground Floor Only	213	Ground Floor Only		
47	Ground Floor Only	134	Ground Floor Only	214	Ground Floor Only		
48	Ground Floor Only	135	Ground Floor Only	215	Ground and First Floor		
49	Ground Floor Only	136	Ground Floor Only	216	Ground Floor Only		
50	Ground Floor Only	137	Ground Floor Only	217	Ground Floor Only		
51	Ground Floor Only	138	Ground Floor Only	218	Ground Floor Only		
52	Ground Floor Only	139	Ground Floor Only	219	Ground Floor Only		
53	Ground Floor Only	140	Ground Floor Only	221	Ground Floor Only		
54	Ground Floor Only	141	Ground Floor Only	222	Ground Floor Only		
55	Ground Floor Only	142	Ground Floor Only				
60	Ground Floor Only	143	Ground Floor Only				
68	Ground Floor Only	144	Ground Floor Only				
71	Ground Floor Only	145	Ground Floor Only				
72	Ground Floor Only	146	Ground Floor Only				
75	Ground Floor Only	148	Ground Floor Only				
78	Ground Floor Only	151	Ground Floor Only				
79	Ground Floor Only	152	Ground Floor Only				
80	Ground Floor Only	153	Ground Floor Only				
82	Ground Floor Only	154	Ground Floor Only				
83	Ground Floor Only	155	Ground Floor Only				
87	Ground Floor Only	156	Ground Floor Only				
88	Ground Floor Only	157	Ground Floor Only				
89	Ground Floor Only	158	Ground Floor Only				
90	Ground Floor Only	159	Ground Floor Only				
91	Ground Floor Only	160	Ground Floor Only				
93	Ground Floor Only	163	Ground Floor Only				
94	Ground Floor Only	164	First Floor Only				
95	Ground Floor Only	166	Ground and First Floor				
96	Ground Floor Only	167	Ground and First Floor				
99	Ground Floor Only	168	Ground and First Floor				
100	Ground Floor Only	169	Ground and First Floor				
101	Ground Floor Only	170	Ground and First Floor				
102	Ground Floor Only	171	Ground and First Floor				
103	Ground Floor Only	172	Ground and First Floor				
104	Ground Floor Only	173	First Floor Only				
105	Ground Floor Only	174	First Floor Only				
106	Ground Floor Only	175	Ground Floor Only				
107	Ground Floor Only	176	Ground Floor Only				
109	Ground Floor Only						

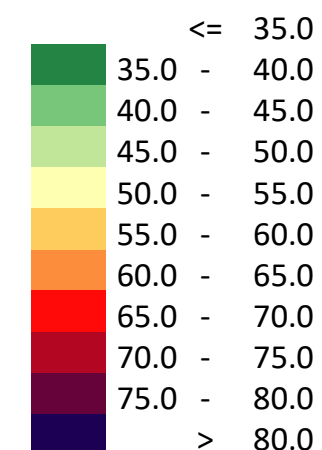
DRAWINGS



Key

- Site Boundary
- Buildings
- 1.8m Fence

Daytime L_{Aeq} 16hour dB



CLIENT: Your Housing group

PROJECT: Halsnead Park

TITLE: Figure 1 - Daytime Noise Contours Across the Developed Site

DRG NO: GM11373/001

REV: A

DRG SIZE: A3

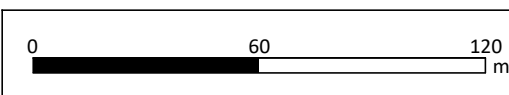
SCALE: 1:2000

DATE: 08/09/2023

DRAWN BY AS

CHECKED BY MW

APPROVED BY



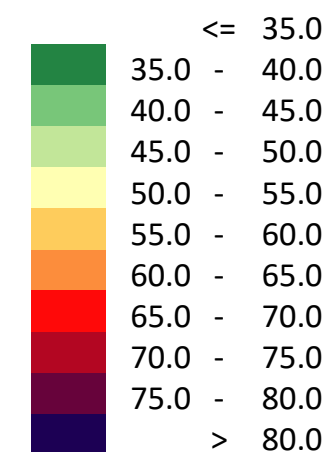
Contains Ordnance Survey data.
© Crown Copyright and database
right 2022



Key

- Site Boundary
- Fence

Daytime L_{Aeq} 16hour dB



CLIENT:

Your Housing group

PROJECT:

Halsnead Park

TITLE:

Figure 2 - Daytime facade Noise Levels Across the Developed Site

DRG NO:

GM11373/002

REV:

A

DRG SIZE:

A3

SCALE:

1:2000

DATE:

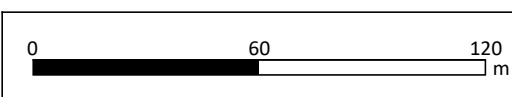
08/09/2023

DRAWN BY

AS

CHECKED BY

APPROVED BY



Contains Ordnance Survey data.
© Crown Copyright and database
right 2022

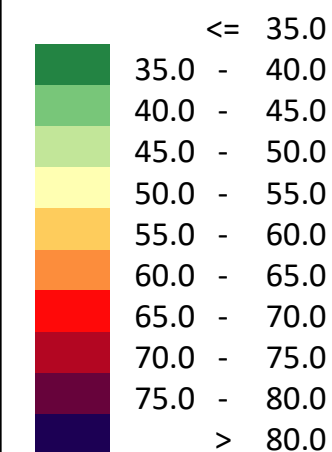




Key

- Site Boundary
- Fence

Night-time L_{Aeq} 8hour dB



CLIENT:

Your Housing group

PROJECT:

Halsnead Park

TITLE:

Figure 3 - Night-time Facade Noise Levels Across the Developed Site

DRG NO:

GM11373/003

REV:

A

DRG SIZE:

A3

SCALE:

1:2000

DATE:

08/09/2023

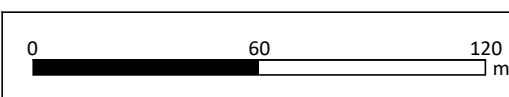
DRAWN BY

AS

CHECKED BY

MW

APPROVED BY



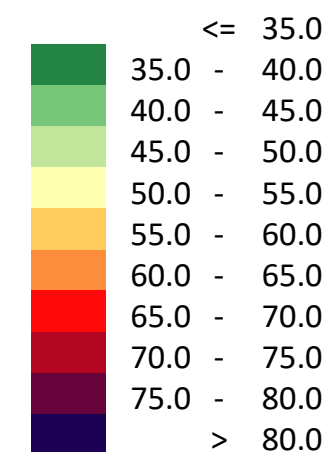
Contains Ordnance Survey data.
© Crown Copyright and database
right 2022



Key

- Site Boundary
- Fence

Night-time $L_{AF, Max}$ dB



CLIENT:

Your Housing group

PROJECT:

Halsnead Park

TITLE:

Figure 4 - Maximum Facade Noise Across the Developed Site

DRG NO:

GM11373/004

REV:

A

DRG SIZE:

A3

SCALE:

1:2000

DATE:

08/09/2023

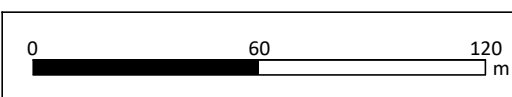
DRAWN BY

AS

CHECKED BY

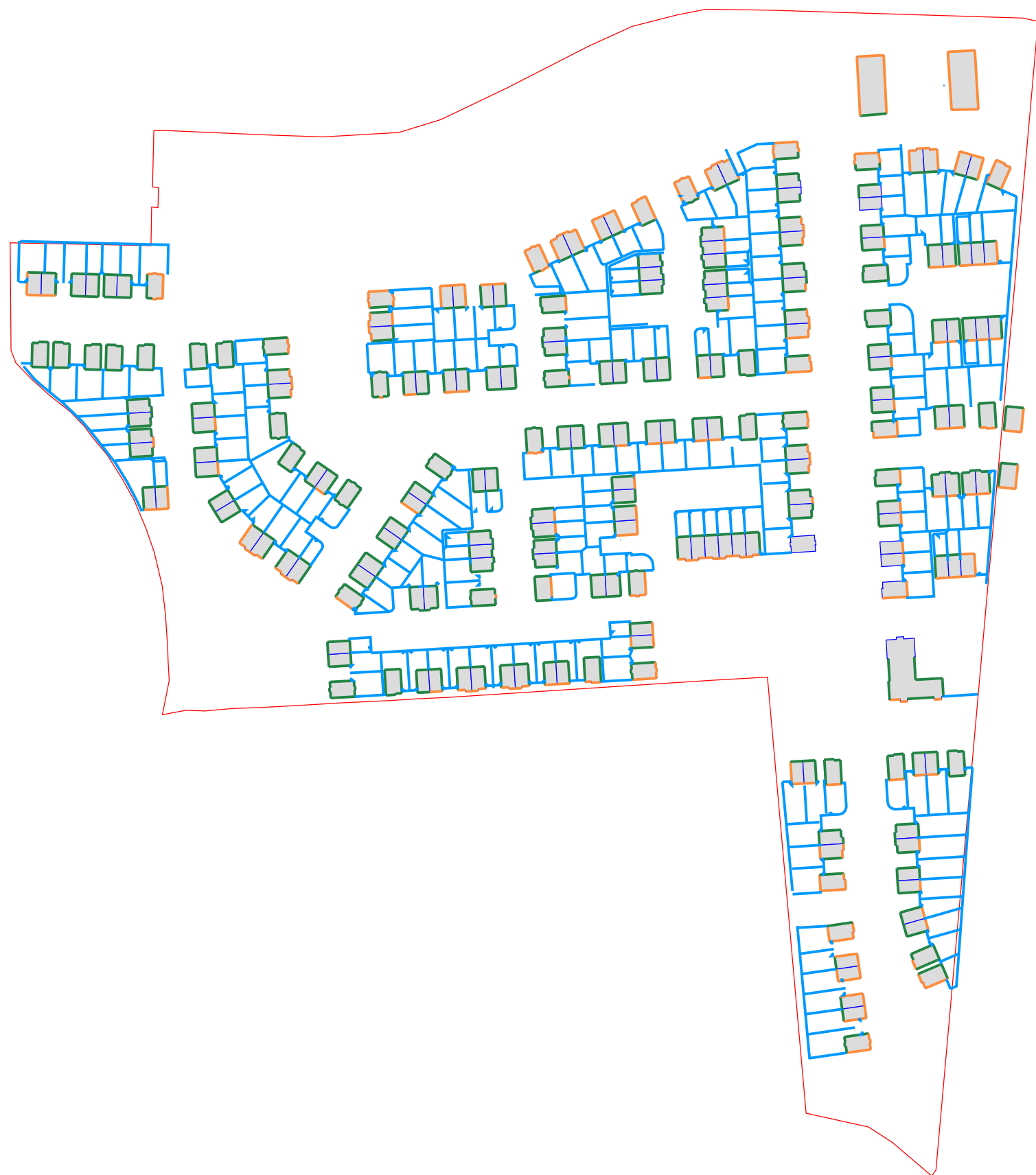
MW

APPROVED BY



Contains Ordnance Survey data.
© Crown Copyright and database
right 2022





Key

- Site Boundary
- Fence

Daytime L_{Aeq} 16hour dB

- $\leq$ 48.0 standrd glazing, open window
- $>$ 48.04/12/4, Greenwood 2500EAW.AC1

CLIENT: Your Housing group

PROJECT: Halsnead Park

TITLE: Figure 5 - Livingroom Facade Mitigation

DRG NO: GM11373/005

REV: A

DRG SIZE: A3

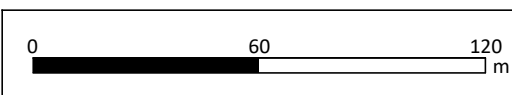
SCALE: 1:2000

DATE: 08/09/2023

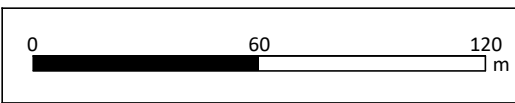
DRAWN BY AS

CHECKED BY MW

APPROVED BY



Contains Ordnance Survey data.
© Crown Copyright and database
right 2022



Contains Ordnance Survey data.
© Crown Copyright and database
right 2022

Key

- Site Boundary
- Fence

Night-time $L_{AF, Max}$ dB

- ≤ 58.0 standard glazing, open window
- $> 58.04/12/4$, Greenwood 2500EAW.AC1

CLIENT: Your Housing group

PROJECT: Halsnead Park

TITLE: Figure 6 - Bedroom Facade Mitigation

DRG NO: GM11373/006

REV: A

DRG SIZE: A3

SCALE: 1:2000

DATE: 08/09/2023

DRAWN BY AS

CHECKED BY MW

APPROVED BY



STOKE-ON-TRENT

Sir Henry Doulton House
Forge Lane
Etruria
Stoke-on-Trent
ST1 5BD
Tel: +44 (0)1782 276 700

BIRMINGHAM

Two Devon Way
Longbridge Technology Park
Longbridge
Birmingham
B31 2TS
Tel: +44 (0)121 580 0909

BOLTON

41-50 Futura Park
Aspinall Way
Middlebrook
Bolton
BL6 6SU
Tel: +44 (0)1204 227 227

BRISTOL

Temple Studios
Temple Gate
Redcliffe
Bristol
BS1 6QA
Tel: +44 (0)117 203 4477

BURY ST EDMUNDS

Armstrong House
Lamdin Road
Bury St Edmunds
Suffolk
IP32 6NU
Tel: +44 (0)1284 765 210

CARDIFF

Tudor House
16 Cathedral Road
Cardiff
CF11 9LJ
Tel: +44 (0)292 072 9191

CARLISLE

Marconi Road
Burgh Road Industrial Estate
Carlisle
Cumbria
CA2 7NA
Tel: +44 (0)1228 550 575

EDINBURGH

Great Michael House
14 Links Place
Edinburgh
EH6 7EZ
Tel: +44 (0)131 555 3311

GLASGOW

24 St Vincent Place
Glasgow
G1 2EU
Tel: +44 (0)141 428 4499

LEEDS

36 Park Row
Leeds
LS1 5JL
Tel: +44 (0)113 831 5533

LONDON

Third Floor
46 Chancery Lane
London
WC2A 1JE
Tel: +44 (0)207 242 3243

NEWCASTLE UPON TYNE

City Quadrant
11 Waterloo Square
Newcastle upon Tyne
NE1 4DP
Tel: +44 (0)191 232 0943

TRURO

Baldhu House
Wheal Jane Earth Science Park
Baldhu
Truro
TR3 6EH
Tel: +44 (0)187 256 0738

International office:

ALMATY

29/6 Satpaev Avenue
Hyatt Regency Hotel
Office Tower
Almaty
Kazakhstan
050040
Tel: +7(727) 334 1310