



Noise Impact Assessment

C11024

Land to South of Sketchley Lane, Hinckley

Prepared for

Charles Church

Davidson House, Meridian East

Meridian Business Park

Leicester

LE19 1WZ

April 2024

Omnia ref: C11024/NIA/1.3



ISO Accredited Certification (UKAS)



DOCUMENT VERSION	DOCUMENT DATE	OWNER
1	October 2021	Principal Acoustic Consultant

Quality Assurance

Issue/revision	Issue 1	Revision 1	Revision 2	Revision 3
Remarks	Draft for comment	Draft for comment	Draft for comment	
Date	November 2023	April 2024	April 2024	
Prepared by	Martyn Parker	John Goodwin MIOA	John Goodwin MIOA	
Signature				
Position	Senior Acoustic Consultant	Director	Director	
Checked by	John Goodwin MIOA	Martyn Parker	Martyn Parker	
Signature				
Position	Director	Senior Acoustic Consultant	Senior Acoustic Consultant	
Project number	C11024/NIA/1.0	C11024/NIA/2.0	C11024/NIA/3.0	

North

Office 4, No.3 Fulwood,
3 Caxton Road, Preston,
PR2 9ZZ
01772 963 024

Midlands

Office 203, St Nicholas House,
31 Park Row, Nottingham
NG1 1FQ
0115 7043 492

South

Suite 1, Pure Offices, One Port
Way, Port Solent,
Portsmouth, PO6 4TY
01489 808 088

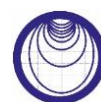
We are a UK wide, truly joined up and fully collaborative multi-disciplinary engineering and environmental consultancy.



Ecology



Acoustics



Geotechnical



Geo-environmental



Air Quality

Executive Summary	
Site Address	Land South of Sketchley Lane, Hinckley
The Noise Impact Assessment has determined that that standard thermal double glazing which provides a sound reduction of at least 30dB Rw+Ctr will be suitable for the Site. Additionally, various living room and bedroom windows will require alternative ventilation as per the schedule set out in Appendices IV and V of this Assessment. With regards to the external amenity areas the Assessment has determined that during the daytime, that all garden areas fall below the adopted 55dB LAeq,16hr criteria noise level, as such, no mitigation measures are required. This Assessment has shown that with regards to commercial noise, the rated level of noise falls below the typical background sound level the closest proposed receptor for the daytime and night-time period which affords the following outcome according to BS4142: <i>‘Where the rating level does not exceed the background sound level, this is an indication of the specific sound source having a low impact, depending on the context.’</i> This Assessment has considered noise levels generated by events taking place at the adjacent hotel and appropriate noise mitigation has been recommended in order to ensure that noise level within garden areas and bedrooms do not exceed the adopted noise criteria levels. The assessment has been based upon robust and worst-case assumptions and demonstrates that, assuming the implementation of the recommended mitigation measures, the site shall be suitable for purpose.	

Table of Contents

1	INTRODUCTION.....	6
1.1	Background	6
1.2	Site Location and Proposed Development	6
1.3	Acronyms	6
1.4	Limitations	6
1.5	Confidentiality	7
2	POLICY & GUIDANCE.....	8
2.1	National Planning Policy Framework & National Planning Practice Guidance	8
2.2	BS8233:2014 'Guidance on sound insulation and noise reduction for buildings'	10
2.3	World Health Organisation's (WHO) 'Guidelines for Community Noise'	11
2.4	Acoustic Ventilation and Overheating: Residential Design Guide (AVO Guide) 2020	11
2.5	BS4142:2014+A1:2019 'Methods for rating and assessing industrial and commercial sound'	13
2.6	Hinckley & Bosworth Borough Council's Environmental Health Department	15
2.7	Stantec Noise Impact Assessment (Ref: 332010596/100, dated January 2022)	16
2.8	Further Consultation with Hinckley & Bosworth Borough Council's Environmental Health Department	18
3	NOISE SURVEYS.....	20
3.1	Road Traffic Noise Survey – A5 Watling Street	20
3.2	Commercial Noise Survey	20
3.3	Background Sound Survey	21
3.4	Noise Survey Equipment	21
4	NOISE IMPACT ASSESSMENT	23
4.1	Road Traffic Noise	23
4.2	Commercial Noise	24
4.3	Music & Entertainment Noise – Sketchley Grange Hotel & Spa	25
5	MITIGATION	29
5.1	Road Traffic - Internal Noise Levels	29
5.2	Road Traffic - External Noise Levels	29
5.3	Music & Entertainment Noise – Sketchley Grange Hotel & Spa	29
6	CONCLUSION.....	34

APPENDICES

Appendix I	Limitations
Appendix II	Glossary of Acoustic Terminology
Appendix III	Figures
Appendix IV	Daytime Façade Noise Levels – Road Traffic
Appendix V	Night-time Façade Noise Levels – Road Traffic

1 INTRODUCTION

1.1 Background

Omnia was instructed by Persimmon Homes North Midlands to prepare a Noise Impact Assessment ('the Assessment') for a proposed residential development on a parcel of land located to the south of Sketchley Lane in Burbage, Hinckley LE10, to be referred to hereafter as 'the Site'.

It is understood that the Site will include for 125 residential units.

The Site has a number of potentially significant noise sources within the vicinity, including the A5 Watling Street to the south west, the Sketchley Grange hotel and spa to the north and a number of commercial units off Watling Drive and Watling Close to the north west.

Outline planning permission was granted for the development in January 2023 (Appeal Ref APP/K2420/W/22/3301735) the following condition relates to noise:

'7. Reserved matters applications relating to layout, scale and appearance shall be accompanied by a scheme for protecting the proposed dwellings from noise from the road network and the nearby hotel. The agreed scheme shall be implemented in full prior to the first occupation of any dwelling.'

This Assessment has been undertaken to identify and assess any surrounding noise-generating activities which may have the potential to adversely impact the proposed noise-sensitive development. Accordingly, this Assessment has been completed with due regard to the National Planning Policy Framework and its associated National Planning Policy Guidance. In addition, various British Standard and guidance documents exist which are applicable to the assessment of noise impacts and these are detailed in Section 2.

This Assessment has been updated to include an assessment for the adjacent Sketchley Grange Hotel & Spa using the findings of a Noise Impact Assessment issued by Stantec (Land off Sketchley Lane, Burbage, Leicestershire - Noise Impact Assessment, dated January 2022). This update has been requested by the Environmental Health Officer at Hinckley & Bosworth Borough Council.

1.2 Site Location and Proposed Development

The Site occupies a parcel of land to the south of Sketchley Lane in Burbage, Hinckley LE10.

It is understood that the Site will include for 125 residential units.

This assessment has been undertaken with due regard to the supplied planning layout shown on the following planning drawing:

- *Drawing issued by The Greenfield Design Partnership*

The Site Layout is shown in Figure 1 of Appendix III.

1.3 Acronyms

All acronyms used within this report are defined in the Glossary presented in Appendix II.

1.4 Limitations

The limitations of this report are presented in Appendix I.

1.5 Confidentiality

This report has been prepared solely for the use of the Client. Should any third party wish to use or rely upon the contents of the report, written approval must be sought from Omnia; a charge may be levied against such approval.

2 POLICY & GUIDANCE

2.1 National Planning Policy Framework & National Planning Practice Guidance

The Government updated the National Planning Policy Framework (NPPF) and its associated National Planning Practice Guidance (NPPG) on 5th September 2023. Together, the NPPF and NPPG set out what the Government expects of local authorities. The overall aim is to ensure the planning system allows land to be used for new homes and jobs, while protecting valuable natural and historic environments.

The NPPG adds further context to the NPPF and it is intended that the two documents should be read together.

Noise needs to be considered when new developments may create additional noise and when new developments would be sensitive to the prevailing acoustic environment. When preparing local or neighbourhood plans, or taking decisions about new development, there may also be opportunities to consider improvements to the acoustic environment.

Local planning authorities' plan-making and decision making should take account of the acoustic environment and in doing so consider:

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

In line with the Explanatory Note of the Noise Policy Statement for England, this would include identifying whether the overall effect of the noise exposure (including the impact during the construction phase wherever applicable) is, or would be, above or below the significant observed adverse effect level and the lowest observed adverse effect level for the given situation.

The Observed Effect Levels are as follows:

- Significant observed adverse effect level: This is the level of noise exposure above which significant adverse effects on health and quality of life occur;
- Lowest observed adverse effect level: this is the level of noise exposure above which adverse effects on health and quality of life can be detected; and
- No observed effect level: this is the level of noise exposure below which no effect at all on health or quality of life can be detected.

Table 2.1 summarises the noise exposure hierarchy, based on the likely average response.

Table 2.1 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	Observed adverse effect	Mitigate and reduce to a minimum

	because of the noise. Potential for some reported sleep disturbance. Affects the acoustic character of the area such that there is a perceived change in the quality of life.		
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 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 subjective nature of noise means that there is not a simple relationship between noise levels and the impact on those affected. This will depend on how various factors combine in any particular situation.

These factors include:

- The source and absolute level of the noise together with the time of day it occurs. Some types and level of noise will cause a greater adverse effect at night than if they occurred during the day – this is because people tend to be more sensitive to noise at night as they are trying to sleep. The adverse effect can also be greater simply because there is less background noise at night;
- For non-continuous sources of noise, the number of noise events, and the frequency and pattern of occurrence of the noise;
- The spectral content of the noise and the general character of the noise. The local topology and topography should also be taken into account along with the existing and, where appropriate, the planned character of the area.

More specific factors to consider when relevant:

- Where applicable, the cumulative impacts of more than one source should be taken into account along with the extent to which the source of noise is intermittent and of limited duration;
- Consideration should also be given to whether adverse internal effects can be completely removed by closing windows and, in the case of new residential development, if the proposed mitigation relies on windows being kept closed most of the time. In both cases a suitable alternative means of ventilation is likely to be necessary. Further information on ventilation can be found in the Building Regulations; and,
- If external amenity spaces are an intrinsic part of the overall design, the acoustic environment of those spaces should be considered so that they can be enjoyed as intended.

2.2 BS8233:2014 'Guidance on sound insulation and noise reduction for buildings'

Noise Criteria Limits

The scope of this standard is the provision of recommendations for the control of noise in and around buildings. It suggests appropriate criteria and limits for different situations, which are primarily intended to guide the design of new buildings or refurbished buildings undergoing a change of use, rather than to assess the effect of changes in the external noise climate.

The standard suggests suitable internal noise levels within different types of buildings, including dwellings, as shown in Table 2.2.

Table 2.2 BS8233:2014 Internal Target Noise Levels

Criterion	Typical Situation	Design $L_{Aeq,T}$ (dB)
Suitable resting / sleeping conditions	Living Room	35
	Bedroom*	30
*For a reasonable standard in bedrooms at night, individual noise events (measured with fast time weighting) should not exceed 45dB L_{max}		

BS8233 goes on to recommend noise levels for gardens as follows:

"It is desirable that the external noise level does not exceed 50dB $L_{Aeq,T}$, with an upper guideline value of 55dB $L_{Aeq,T}$ which would be acceptable in noisier environments. However, it is also recognised that these guideline values are not achievable in all circumstances where development might be desirable. In higher noise areas, such as city centres or urban areas adjoining the strategic transport network, a compromise between elevated noise levels and other factors might be warranted".

BS8233 goes on to say:

"In such a situation, development should be designed to achieve the lowest practicable levels in these external amenity spaces but should not be prohibited".

Ventilation Requirements

Where a partially open window cannot be relied upon to provide an adequate level of sound insulation performance, it is necessary to consider alternative ventilation for habitable rooms. Section 8.4.5.4 within BS8233 states:

"The Building Regulations' supporting documents on ventilation [48, 49, 50] recommend that habitable rooms in dwellings have background ventilation. Where openable windows cannot be relied upon for this ventilation, trickle ventilators can be used and sound attenuating types are available. However, windows may remain openable for rapid or purge ventilation, or at the occupant's choice.

Alternatively, acoustic ventilation units (see 7.7.2 below) are available for insertion in external walls. These can provide sound reduction comparable with double glazed windows. However, ducted systems with intakes on the quiet side of the building might be required in very noisy situations, or where appearance rules out through-the-wall fans."

Section 7.7.2 states:

"NOTE 5 If relying on closed windows to meet the guide values, there needs to be an appropriate alternative ventilation that does not compromise the façade insulation or the resulting noise level."

2.3 World Health Organisation's (WHO) 'Guidelines for Community Noise'

The WHO 'Guidelines for Community Noise' offers advice with regard to setting noise criteria applicable to sleep disturbance. Section 4.2.3 specifies:

'If the noise is not continuous, L_{Amax} or SEL are used to indicate the probability of noise-induced awakenings. Effects have been observed at individual L_{Amax} exposures of 45 dB or less. Consequently, it is important to limit the number of noise events with a L_{Amax} exceeding 45 dB.'

The guidelines go on to state:

'At night, sound pressure levels at the outside façades of the living spaces should not exceed 45 dB L_{Aeq} and 60 dB L_{Amax} , so that people may sleep with bedroom windows open. These values have been obtained by assuming that the noise reduction from outside to inside with the window partly open is 15 dB.'

The sound insulation performance value of 15dB for a façade containing a partially open window accords with the guidance offered in BS8233:2014.

The guidelines reference a study by Vallet & Vernet, 1991, which concluded that:

'For a good sleep, it is believed that indoor sound pressure levels should not exceed approximately 45 dB $L_{AF,max}$ more than 10-15 times per night.'

Accordingly, this assessment has utilised the 10th highest measured maximum noise level from the night-time period and allows for an assessment of a typical maximum noise level in determining façade sound insulation performance.

2.4 Acoustic Ventilation and Overheating: Residential Design Guide (AVO Guide) 2020

The Acoustics, Ventilation and Overheating Residential Design Guide (Version 1.1) was issued in January 2020 by the Association of Noise Consultants (ANC) and the Institute of Acoustics (IOA). This document provides guidance on the interdependence between acoustics, ventilation and overheating.

The AVO guide recommends a two-level approach to assess the potential impact of noise ingress through windows that have been opened to mitigate overheating and also noise from any mechanical services used to provide comfort cooling. The level 1 assessment relates to incident environmental noise levels across a proposed site, it is used to define "risk categories" for each building façade based on these levels. Below are the tables 2.3 and 2.4 are directly from AVO 2020 upon which this assessment is based.

Risk category for Level 1 assessment ^[Note 5]	Potential Effect without Mitigation	Recommendation for Level 2 assessment
$L_{Aeq, T}$ ^[Note 3] during 07:00 - 23:00 $L_{Aeq, 8hr}$ during 23:00 - 07:00 65 dB High 60 dB Medium 55 dB Low 50 dB Negligible 45 dB	Increasing risk of adverse effect	Recommended Optional
	Use of opening windows as primary means of mitigating overheating is not likely to result in adverse effect	Not required

Internal ambient noise level ^[Note 2]			Examples of Outcomes ^[Note 5]	
$L_{Aeq,T}$ ^[Note 3] during 07:00 – 23:00 ^[Note 4]	$L_{Aeq,th}$ during 23:00 – 07:00	Individual noise events during 23:00 – 07:00 ^[Note 4]		
> 50 dB	> 42 dB	Normally exceeds 65 dB $L_{A,max}$	Noise causes a material change in behaviour e.g. having to keep windows closed most of the time	Avoiding certain activities during periods of intrusion. 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.
 Increasing noise level			Increasing likelihood of impact on reliable speech communication during the day or sleep disturbance at night	At higher noise levels, more significant behavioural change is expected and may only be considered suitable if occurring for limited periods. As noise levels increase, small behaviour changes are expected e.g. turning up the volume on the television; speaking a little more loudly; having to close windows for certain activities, for example ones which require a high level of concentration. Potential for some reported sleep disturbance. Affects the acoustic environment inside the dwelling such that there is a perceived change in quality of life. At lower noise levels, limited behavioural change is expected unless conditions are prevalent for most of the time. ^[Note 6]
			Do not normally exceed $L_{A,max}$ 45 dB more than 10 times a night	Noise can be heard, but does not cause any change in behaviour
≤ 35 dB	≤ 30 dB			

Table 2.5: AVO guide ADF system definition

ADF System	External noise ingress considerations	Mechanical system noise considerations	Approximate guideline free-field external noise limits. ^[Note 1]
1 or 2	Noise ingress is likely to be defined by the performance of the background ventilators (trickle vents), windows and other façade elements. Note that use of System 1, relying on the use of open trickle vents without opening windows may give rise to poor indoor air quality in airtight dwellings outside the winter period.	For System 1, intermittent kitchen and bathroom fans should have suitable noise levels to meet the guidelines in Table 3-4. System 2 has no mechanical components.	With standard double glazing and two trickle vents: • $\sim L_{Aeq,16h}$ 56 dB day • $\sim L_{Aeq,8h}$ 51 dB night • L_{Amax} not normally exceeding ~ 67 dB more than 10x per night With high performing acoustic glazing and two 'acoustic' trickle vents: • $\sim L_{Aeq,16h}$ 66 dB day • $\sim L_{Aeq,8h}$ 61 dB night • L_{Amax} not normally exceeding ~ 80 dB more than 10x per night
3	Noise ingress is likely to be defined by the performance of the background ventilators (trickle vents), windows and other façade elements. ADF advises that: "controllable background ventilators having a minimum equivalent area of 2,500 mm² should be fitted in each room, except wet rooms..."	This could be a centralised or decentralised MEV system. Guideline levels are shown in Table 3-4. For a centralised system, the location of the fan is important for structure-borne and airborne noise. System noise may affect living rooms and bedrooms as well as the rooms in which the extract inlets are located i.e. wet rooms. For a decentralised system, there are individual fans extracting from each bathroom, toilet, kitchen and utility room. The noise effects on adjacent living rooms and bedrooms should be considered. ^[Note 2]	With standard double glazing and trickle vent: • $\sim L_{Aeq,16h}$ 58 dB day • $\sim L_{Aeq,8h}$ 53 dB night • L_{Amax} not normally exceeding ~ 69 dB more than 10x per night With high performing acoustic glazing and an 'acoustic' trickle vent: • $\sim L_{Aeq,16h}$ 68 dB day • $\sim L_{Aeq,8h}$ 63 dB night • L_{Amax} not normally exceeding ~ 83 dB more than 10x per night
4	No trickle vents required. Consider noise ingress through other façade elements.	MVHR is a centralised system ducted to supply outlets in living rooms and bedrooms as well as to extracts in wet rooms. Guideline levels are shown in Table 3-4. The unit location is important for structure-borne and airborne noise. Consider ducted noise, particularly to bedrooms. Consider also cross-talk sound transmission via ducts. ^[Note 2]	With standard double glazing and no trickle vent: • $\sim L_{Aeq,16h}$ 62 dB day • $\sim L_{Aeq,8h}$ 57 dB night • L_{Amax} not normally exceeding ~ 76 dB more than 10x per night With high performing acoustic glazing: • $\sim L_{Aeq,16h}$ 73 dB day • $\sim L_{Aeq,8h}$ 68 dB night • L_{Amax} not normally exceeding ~ 90 dB more than 10x per night N.B. With secondary glazing higher sound insulation may be achieved.

2.5 BS4142:2014+A1:2019 'Methods for rating and assessing industrial and commercial sound'

This standard describes methods for rating and assessing sound of an industrial or commercial nature which includes:

- Sound from industrial and manufacturing processes;
- Sound from fixed installations which comprise mechanical and electrical plant and equipment;
- Sound from the loading and unloading of goods and materials at industrial and / or commercial premises; and,
- Sound from mobile plant and vehicles that is an intrinsic part of the overall sound emanating from processes or premises, such as that from forklift trucks, or that from train or ship movements on or around an industrial or commercial Site.

The procedure detailed in the standard compares the measured or predicted noise level 'the specific noise level' from any of the above detailed noise sources with the background sound level at a residential dwelling. The measured background sound level at a receptor should be reliable and should not necessarily ascertain a lowest measured background sound level, but rather to quantify what is 'typical.'

The specific noise level also acknowledges the following reference time intervals depending upon whether the noise source operates during daytime or night-time periods:

- Daytime (07:00 - 23:00): 1 hour; and
- Night-time (23:00 - 07:00): 15 minutes.

There are a number of 'penalties' which can be attributed to the specific sound level, either subjectively or objectively, depending upon the 'acoustic features' of the sound level under investigation as follows. These penalties vary in their weighting depending upon the severity of the acoustic feature, as follows (with regards to the subject method):

Tonality

- +2dB: where the tonality is just perceptible;
- +4dB: where the tonality is clearly perceptible; and
- +6dB: where the tonality is highly perceptible.

Impulsivity

- +3dB: where the impulsivity is just perceptible;
- +6dB: where the impulsivity is clearly perceptible; and
- +9dB: where the impulsivity is highly perceptible.

Intermittency

- +3dB: where the intermittency is readily distinctive against the acoustic environment.

Where the assessment is carried out using the objective method, the tonality penalty is either 0dB or 6dB and the impulsivity penalty can range from 0dB up to 9dB in increments of 1dB, depending on the level of impulsivity identified.

In addition to the above acoustic features, there is a penalty for 'other sound characteristics' of +3dB where a sound exhibits characteristics that are neither tonal nor impulsive, though is readily distinctive against the acoustic environment.

BS4142 goes on to state that the rating level is equal to the specific sound level if there are no such features present or expected to be present.

Assessment of the rating level relative to the background noise level can yield the following commentary:

- Typically, the greater this difference (between the rating level and the background sound level), the greater the magnitude of impact;
- A difference of around +10dB or more is likely to be an indication of a significant adverse impact, depending on the context;

- A difference of around +5dB is likely to be an indication of an adverse impact, depending on the context; and
- The lower the rating level is relative to the measured background sound level, the less likely it is that the specific sound source will have an adverse impact. Where the rating level does not exceed the background sound level, this is an indication of the specific sound source having a low impact.

Whilst the amended 2019 Standard does make various references to it not being intended to assess noise impacts at indoor locations, section 1.1 does state 'The methods described in this British Standard use outdoor sound levels to assess the likely effects of sound on people who might be inside or outside a dwelling or premises used for residential purposes upon which sound is incident'. Example 6 in the Standard states 'In addition to the rating/background sound level comparison shown in Table A.6, the primary concern is the potential for disturbance of residents who could be sleeping with open bedroom windows. Other guidance, such as BS 8233, might also be applicable in this instance'.

With the above in mind, and for a clear need to ensure that any potential commercial or industrial noise impacts at the building façade do not give rise to internal noise level which causes sleep disturbance in bedrooms, this Assessment will ensure that the predicted rating level (specific sound level including any character corrections) does not exceed 30dB in bedrooms.

2.6 Hinckley & Bosworth Borough Council's Environmental Health Department

The following consultation was provided to Hinckley & Bosworth Borough Council on 31st October 2023:

'We have been appointed by a client to undertake a Noise Impact Assessment in support for a proposed residential development at Sketchley Lane in Burbage, Hinckley. A review of on-line mapping indicates that the proposed residential dwellings are likely to be impacted by noise from road traffic vehicles using the A5 which is located to the south of the site, as well as the Sketchley Spa and hotel to the northwest and a number of commercial units to the west of the site.'

Professional Consult will complete the following noise surveys:

<i>Noise Measurement Position 1:</i>	<i>A 24-hour road traffic noise survey will be completed for road traffic vehicles using the A5.</i>
<i>Noise Measurement Position 2:</i>	<i>A noise survey will be completed for any noise associated with the commercial units to the west; and</i>
<i>Noise Measurement Position 3:</i>	<i>A noise survey will be completed for any noise associated with the Sketchley Spa and Hotel.</i>
<i>Background Sound Survey:</i>	<i>A background sound survey will be completed on Site in an area representative of the proposed dwellings.</i>

Professional Consult will complete the following assessment:

<i>Road Traffic Noise:</i>	<i>An assessment of road traffic noise will be completed in line with the guidance and noise criteria levels presented in BS8233:2014; and</i>
<i>Commercial Noise:</i>	<i>An assessment of any audible commercial noise associated with the commercial units as well as the spa and hotel will be assessed in line with the criteria presented in BS4142:2014+A1:2019.</i>

Where exceedances of any noise criteria are identified, Professional Consult will recommend appropriate and reasonable noise mitigation measures to ensure that the noise level criteria will not be exceeded at the proposed residential dwellings.

If you have any comments, then please do advise at your earliest convenience.'

Consultee comments were received from Environmental Health which stated:

I have concerns relating to the potential for noise from the hotel to impact upon future residents- particularly those dwellings sharing a boundary with the hotel. The previous Noise Impact Assessment produced by Stantec measured noise from an event that included music at the hotel and made recommendations to mitigate noise. I am aware that the hotel caters for weddings and that music may be played externally at such events (and has led to complaints historically) The report also included a breakdown and assessment of plant used in connection with the pool/spa/kitchen at the site (the kitchen extract has also led to historic complaints).

The Noise Impact Assessment needs to take into account plant and music noise levels that may not have been audible during the monitoring period. Recent satellite imagery of the site shows a large structure on the boundary with the hotel which may be creating a barrier for plant noise that may well be an issue to future residents. The development is bringing sensitive receptors closer to noise sources and this needs to be managed.

Further consultation was provided to Environmental Health on 21st March 2024 which stated:

'We have been appointed to consider the comments made in relation to the Noise Impact Assessment that we have issued with Omnia Consulting. As I am sure you are aware, we did not measure any noise associated with music or patron noise breakout from the adjacent hotel, however the previously issued Stantec Noise Impact Assessment has measured noise levels on the boundary of the hotel – I have attached their Noise Impact Assessment for your ease of reference.

I propose that a scheme of noise mitigation is included within the scheme, specifically for Plots 92 – 100 which have gardens facing the hotel (and the area where Stantec measured noise from the hotel).

In terms of noise criteria for this updated assessment, I propose that the measured ambient noise level at LT3 (59dB daytime) does not exceed the lowest measured ambient daytime noise level from any other measurement position (LT4, 50dB daytime). This noise level can be reduced by means of an acoustic fence.

With regards to night-time noise levels, the measured noise levels of 55dB LAeq and 68dB LMax,fast on the boundary will be taken as those being incident at the closest proposed bedroom windows and a scheme of noise mitigation, for bedrooms, will be implemented for Plots 92 – 100. Any noise mitigation will ensure that the internal noise criteria presented in BS8233:2014 will not be exceeded.

It is understood that the client has a degree of urgency in getting this matter resolved, so I will call you tomorrow morning to discuss this approach.'

A response was received on 21st March 2024 which stated:

'I have attached a revised NIA for the site- I'm not sure whether you have had sight of that. This version includes music noise levels.'

2.7 Stantec Noise Impact Assessment (Ref: 332010596/100, dated January 2022)

With regards to assessing noise levels from music emanating from the adjacent hotel, the Stantec Noise Impact Assessment ('the Stantec Assessment') has suggested the following noise criteria limits:

'NANR45: Procedure for the Assessment of Low Frequency Noise Complaints, Revision 1 December 2011

To assist with the assessment of entertainment noise from the neighbouring hotel, guidance from NANR45: Procedure for the Assessment of Low Frequency Noise Complaints been considered.

NANR45 was produced to assist Environmental Health practitioners in handling complaints relating to low frequency noise (LFN), excluding LFN relating to traffic and entertainment sources.

The procedure detailed in NANR45 is intended to assist in the evaluation of existing problems and is not intended as a means of predicting when disturbance might occur. However, in the absence of industry standard guidance with respect to LFN, it is considered that if the assessed sound falls below criteria curve, this is a positive indication that the assessed sound is unlikely to cause LFN complaints.

The document details a methodology for assessing complaints which refers to third octave band criteria between 10 Hz and 160 Hz. At frequencies below 31.5 Hz the criteria are based on the average threshold of audibility for steady sounds.

The methodology compares the measured LFN at the location of the complainant with the third octave band criteria between 10 Hz and 160 Hz. Where the measured LFN exceeds the criteria, then this suggests that there may be an actionable complaint.

The LFN criteria reference values are detailed in Table 2.2.

Table 2.2: Low Frequency Noise Criteria												
Low Frequency Noise Reference Criterion (Leq,T) at Third Octave Band Centre Frequency (Hz)												
10	12.5	16	20	25	31.5	40	50	63	80	100	125	160
92	87	83	74	64	56	49	43	42	40	38	36	34

The procedure described above has been used to consider the impact of low frequency entertainment noise from the adjacent hotel.

Music and Entertainment Noise

With regards to planning policy guidance, there are no specific fixed limits or guidance on assessment methodologies that can be applied to noise associated with entertainment noise.

Criteria outlined within BS 8233:2014 and World Health Organisation are based on single A-weighted target values. This may not be considered appropriate for music noise intrusion, because the impact of the bass elements of the noise will still impact on the site without exceeding the dB(A) limit.

Therefore, entertainment noise from the adjacent hotel has been assessed against Noise Rating (NR) curves. These provide an absolute value in each octave band. Although there is no direct relationship between dBA and NR, B2 8233 suggests the following approximate relationship.

$$NR \approx dBA - 6$$

Based on this approximation and the absolute A-weighted levels defined in Table 2.2 a NR of 25 corresponds to the LOAEL with the SOAEL 5 dB above.

Maximum noise levels have also been assessed using a similar methodology. A NR 40 corresponds to the LOAEL with the SOAEL 5 dB above.

Table 2.4 details the proposed assessment criteria for the development based on the proceeding sections. The following criteria are subject to the approval of Hinckley and Bosworth Borough Council.'

Table 2.4: Proposed LOAEL and SOAEL for Entertainment Noise	
Level	Internal Ambient Noise Levels
	Night-time (23:00 to 07:00 hours)
LOAEL	NR 25 dB Leq,15minutes NR 40 dB L _F Max Equal to LFN Reference Curve
SOAEL	NR 30 dB Leq,15minutes NR 45 dB L _F Max 5 dB above LFN Reference Curve

2.8 Further Consultation with Hinckley & Bosworth Borough Council's Environmental Health Department

Following a review of the Stantec Assessment, the following consultation was provided to the EHO Hinckley & Bosworth Borough Council on 4th April 2024:

'Thanks for the updated Noise Impact Assessment from Stantec.

The Stantec report has measured octave band noise levels on the boundary of the Site with the hotel as follows:

Table 5.1: Summary of Attended Sound Survey Results

Description	Octave Band Centre Frequency (Hz)								dBA
	63	125	250	500	1k	2k	4k	8k	
Music Noise (dB Leq)	74	71	55	46	46	40	34	31	56
Music Noise (dB LAFMax)	81	78	64	60	53	49	47	42	60

Table 5.2: Summary of Attended Sound Survey Results – Low Frequencies

Description	1/3 Octave Band Centre Frequency (Hz)												dBA
	12.5	16	20	25	31.5	40	50	63	80	100	125	160	
Music Noise (dB Leq)	52	51	51	52	49	50	57	71	69	65	62	52	56

Using the above noise level data, we will update the Noise Impact Assessment as follows:

Assessment of Internal Noise Levels Against NR Criteria

The Stantec Assessment has proposed the below NR noise criteria:

Table 2.4: Proposed LOAEL and SOAEL for Entertainment Noise

Level	Internal Ambient Noise Levels
	Night-time (23:00 to 07:00 hours)
LOAEL	NR 25 dB Leq, 15minutes NR 40 dB L _F Max Equal to LFN Reference Curve
SOAEL	NR 30 dB Leq, 15minutes NR 45 dB L _F Max 5 dB above LFN Reference Curve

We will ensure that noise levels within bedrooms (applicable for the night-time period) do not exceed NR25 (average noise) and NR40 (maximum noise) both of which accord with LOAEL. The assessment will be run with windows closed and open and where exceedances are found for either situation, appropriate noise mitigation measures will be recommended.

Assessment of Internal Noise Levels Against NANR45 Low Frequency Noise Criteria

The Stantec Assessment has proposed the use of the following noise criteria presented in NANR45:

Table 2.2: Low Frequency Noise Criteria

Low Frequency Noise Reference Criterion ($L_{eq,T}$) at Third Octave Band Centre Frequency (Hz)												
10	12.5	16	20	25	31.5	40	50	63	80	100	125	160
92	87	83	74	64	56	49	43	42	40	38	36	34

We will ensure that noise levels within bedrooms do not exceed the above noise criteria with windows closed and open and where exceedances are found for either situation, appropriate noise mitigation measures will be recommended.

Assessment of External Noise Levels in Garden Areas

The Stantec Assessment has not recommended any noise criteria for the assessment of music/entertainment noise in garden areas. Accordingly, I have reviewed the existing daytime ambient noise levels measured from their noise survey and the lowest existing ambient noise level across the Site is 50dB LAeq,16hr. This noise level also accords with the lower external noise criteria level presented in BS8233/World Health Organisation for noise levels in outdoor amenity areas of proposed dwellings and so I propose that this noise level is not exceeded in any garden area, due to music/entertainment noise emanating from the hotel premises. Where exceedances of this noise criteria are found, appropriate noise mitigation measures will be recommended.

I trust that the above criteria looks sensible and gives you a sufficient level of confidence in assessing the music and entertainment noise associated with the hotel. Nevertheless, if you have any comments then please advise at your earliest convenience.

At the time of issuing this Assessment, no response had been received.

3 NOISE SURVEYS

3.1 Road Traffic Noise Survey – A5 Watling Street

Omnia has conducted a Road Traffic Noise Survey in order to measure the level of noise generated by vehicles using the A5. The noise survey took place over the following period:

- 10:00 to 13:00 on 8th November 2023.

The following location was chosen for the survey:

- Noise Measurement Position 1 (NMP1): Omnia undertook a road traffic noise measurement at 7.5m from the centre of the A5 in free-field conditions at a height of 1.5m above local ground level.

A summary of the measured sound pressure levels are presented below.

Table 3.1 Summary of Measured Road Traffic Noise Levels

Period Start Time	Average Measured Sound Pressure Levels, Free-Field (dB)		10 th highest $L_{Amax,fast}$
	$L_{Aeq,T}$	$L_{A10,T}$	
12/10/22 12:30	62.0	64.8	85.9
12/10/22 13:30	62.4	65.2	
12/10/22 14:30	64.9	66.9	
$L_{Aeq,16hr}$ as calculated from CRTN	75.6		
$L_{Aeq,8hr}$ as calculated from CRTN and TRL Document	66.1		

The L_{Amax} parameter tabulated is obtained by outputting the $L_{Amax,f}$ parameter for each 10 second period during the 3 hour noise survey. These are ordered in declining intensity and the 10th highest value selected.

3.2 Commercial Noise Survey

Omnia has conducted a series of commercial noise measurements for the neighbouring commercial uses over the following period:

- 10:20 to 12:45 on 8th November 2023.

The following location was chosen for the survey:

- Noise Measurement Position 2 (NMP2): Omnia undertook source noise measurements of various commercial noise sources along the boundary of the Site with the neighbouring commercial uses in free-field conditions at a height of 1.5m above local ground level.

A summary of the measured sound pressure levels are presented below.

Table 3.2 Summary of Measured Commercial Noise Levels

Noise Source	Measured Noise Level, $L_{Aeq,T}$ (dB)	Measurement Distance (m)	Notes
Fan (Source 1)	69.4	2	Noise source is located 1m above ground
Fan (Source 2)	61.1	5	Noise source is located 1m above ground
Pump (Source 3)	52.7	9	Noise source is located 2m above ground

During the attended noise survey no fixed plant noise was audible on site from the hotel located to the north.

3.3 Background Sound Survey

Omnia has conducted a background sound survey in the absence of any commercial noise over the following period:

- 16:15, 7th November to 09:45, 8th November 2023.

The following location was chosen for the survey:

- Noise Measurement Position 3 (NMP3): Omnia undertook a background sound survey to the south east of the development in free-field conditions at a height of 1.5m above local ground level. The dominant noise source at this location was from road traffic using the A5.

A summary of the measured background sound levels are presented below.

Table 3.3 Summary of Measured Background Noise Levels

Period	Measured Range & (Mode Average) Noise Levels
	$L_{A90,T}$
Daytime	50 - 59 (54)
Night-time	43 - 58 (47)

3.4 Noise Survey Equipment

The following equipment was used for the Noise Surveys.

Table 3.4 Noise Measurement Equipment

Measurement Position	Equipment Description	Manufacturer & Type No	Serial No.	Calibration Due Date
NMP1 + NMP3	Sound Level Meter	01dB Fusion	11755	29 June 2024
	Pre-amplifier	01dB PRE22	1707173	
	Microphone	GRAS 40CE	291693	

	Calibrator	01dB CAL-31	84086	27 June 2024
NMP2	Sound Level Meter	01dB Fusion	12038	14 March 2025
	Pre-amplifier	01dB PRE22	2113007	
	Microphone	GRAS 40CE	330801	
	Calibrator	01dB CAL-31	87280	02 July 2024

The sound level meters were field calibrated prior to and following the noise surveys and there was no drift beyond the allowable limit of 1dB.

During the noise surveys the weather conditions were conducive to the measurement of environmental noise, i.e. wind speeds of no more than 5m/s and dry conditions.

4 NOISE IMPACT ASSESSMENT

4.1 Road Traffic Noise

In order to accurately assess road traffic noise across the Site, a 3D Noise Model has been constructed using the modelling software CadnaA.

The following assumptions, inputs and considerations have been included in the model:

- Planning Layout Drawing as described in Section 1;
- Existing buildings that provide shielding from any of the noise sources have been included in the model;
- Noise Measurement Position 1 has been used to calibrate the noise model;
- A reflection order of 2 has been used in all calculations;
- Building heights are as supplied by the client; and
- Noise levels generated using ISO 9613-1 and ISO 9613-2 "Acoustics – Attenuation of sound during propagation outdoors" as incorporated into CadnaA software.

External Noise Impact in Garden Areas of Proposed Dwellings

In order to assess noise levels in external amenity areas across the Site, a grid noise map was calculated in the noise model. The grid noise map shows that all garden areas fall below the adopted 55dB LAeq,16hr criteria noise level. Figure 2 of Appendix III shows the grid noise map.

Internal Noise Impact for Proposed Dwellings

With regards internal noise levels, BS8233:2014 suggests that standard thermal double glazing will afford 33dB Rw of sound reduction, however this is for the pink noise spectrum and the same configuration will afford 30dB Rw+Ctr for average noise levels from road traffic noise and so this value has been used to calculate internal noise levels. With regard to the maximum noise level (LAmax,fast), the value of 33dB Rw has been used. BS8233:2014 also goes on to recommend that a partially open window provides approximately 13dB of attenuation.

Professional Consult uses a library database of glazing configurations issued by Saint Gobain and the glazing configuration 6mm glass / 12mm air space / 6mm glass affords 30dB Rw +Ctr and 33dB Rw respectively.

Appendix IV calculates the average daytime noise levels at the various facades of the plots and determines the requirement for upgraded glazing or alternative ventilation. Appendix IV indicates that standard thermal double glazing will be adequate in controlling external noise to meet the internal noise criteria limits and a number of living rooms will require alternative ventilation.

Appendix V calculates the average night-time noise levels at the various facades of the plots and determines the requirement for upgraded glazing or alternative ventilation. Appendix V indicates that standard thermal double glazing will be adequate in controlling external noise to meet the internal noise criteria limits and a number of bedrooms will require alternative ventilation.

It is also necessary to consider maximum noise levels for the night-time period in addition to the average noise levels. The measured 10th highest maximum noise level was 85.9dB at 7.5m and the Site closest boundary to the road lies at 200m and so the calculated noise level at the closest point of the Site is 57.4dB. Allowing 13dB for an open window suggests an internal noise level of 44.4dB which is 0.6dB below the internal target noise criteria level of 45dB. This calculation is worst-case as the houses facing the A5. As such, the specification of any acoustic trickle ventilators is not required based on the maximum road traffic noise level. Furthermore, standard thermal double glazing will be adequate in controlling maximum noise levels.

4.2 Commercial Noise

It is necessary to calculate sound power levels for inclusion in the noise model and so a specific noise level can be calculated at the closest residential dwellings and Table 4.1 presents the sound power levels.

Table 4.1 Calculation of Sound Power Levels

Noise Source	Measured Noise Level, $L_{Aeq,T}$ (dB)	Measurement Distance (m)	Calculated Sound Power Level, L_{WA} (dB)
Fan (Source 1)	69.4	2	83.4
Fan (Source 2)	61.1	5	83.1
Pump (Source 3)	52.7	9	79.8

A noise model has been constructed in order to calculate noise levels at the building facades. The following inputs have been included in the model:

- *Proposed Scheme Layout;*
- *Site elevations have been taken as existing using 1m LiDar data that has been converted into 1m contours;*
- *Existing buildings or features that provide shielding from the road have been included in the model;*
- *A reflection order of 2 has been used in all calculations; and*
- *Noise levels generated using ISO 9613-1 and ISO 9613-2 "Acoustics – Attenuation of sound during propagation outdoors" as incorporated into CadnaA software.*

Figures 2 and 3 in Appendix 3 show the grid noise maps which indicate the predicted level of noise at the closest receptor (Plot 92), as follows:

Receptor R1 (Daytime): 25.2dB $L_{Aeq,1hr}$
Receptor R1 (Night-time): 28.0dB $L_{Aeq,15mins}$

The following has been considered in determining if any acoustic features exist in the predicted noise level at the closest residential receptors:

- *Tonality: In determining if any tones exist in the measured noise levels, the methodology set out in BS4142:2014 has been followed using the subjective method;*
- *Impulsivity: In determining if any impulsiveness is evident in the measured noise levels, the methodology set out in BS4142:2014 has been followed using the subjective method;*
- *Intermittency: Whether or not the measured operations turn on or off during the assessment reference periods; and*
- *Other sound characteristics: Where no penalties are allocated for the above features, but there will be an audible noise at the closest receptor.*

Table 4.2 allocates the character corrections.

Table 4.2 Application of Character Corrections

Noise Source	Tonality Correction (dB)	Impulsivity Correction (dB)	Intermittency Correction (dB)	Other Sound Characteristics Correction (dB)
Fan (Source 1)	+2	0	0	0
Fan (Source 2)	+2	0	0	0

Pump (Source 3)	+2	0	0	0
Highest Overall Character	+2	0	0	0
Total Character Correction	+2			

Table 4.2 has included for 'just perceptible' tonality from the proposed mechanical and electrical plant. It is expected that any intermittency of the plant will not be discernible above the existing ambient ($L_{Aeq,T}$) noise climate and impulsivity is not considered to be applicable for such mechanical plant.

Table 4.3 completes the BS4142 Assessment.

Table 4.3 BS4142 Assessment

Receptor	Period	Calculated Specific Noise Level at Receptor, $L_{Aeq,T}$ (dB)	Total Overall Character Correction (dB)	Calculated Rated Level, $L_{A,r}$ (dB)	Typical Background Sound Level ($L_{A90,15mins}$) (dB)	Difference +/- (dB)
R1	Daytime	25.2	2	27.2	44	-16.8
	Night-time	28.0	2	30.0	36	-6.0

Table 4.3 indicates that the rated level of noise falls below the typical background sound level the closest proposed receptor for the daytime and night-time period which affords the following outcome according to BS4142:

'Where the rating level does not exceed the background sound level, this is an indication of the specific sound source having a low impact, depending on the context.'

4.3 Music & Entertainment Noise – Sketchley Grange Hotel & Spa

Low Frequency Noise (NANR45) Assessment

Table 4.4 calculates the internal noise level with windows closed, at Plot 92, using the Stantec noise levels measured on the Site boundary. The calculation has also used the sound reduction performance noise level data from the Stantec Assessment.

Table 4.4 NANR45 Assessment – Windows Closed

	Measured Third Octave Centre Frequency (Hz) (dB)											
	12.5	16	20	25	31.5	40	50	63	80	100	125	160
Measured Music Noise Level	52	51	51	52	49	50	57	71	70	69	65	62
Noise Measurement Distance (m)	25	25	25	25	25	25	25	25	25	25	25	25
Distance to Receptor (m)	41	41	41	41	41	41	41	41	41	41	41	41

Calculated Specific Noise Level at Receptor (dB)	47.7	46.7	46.7	47.7	44.7	45.7	52.7	66.7	65.7	64.7	60.7	57.7
Closed Window SRI	10.0	10.0	10.0	10.0	10.0	15.0	19.0	20.0	21.0	22.0	23.0	22.0
Calculated Internal Noise Level	37.7	36.7	36.7	37.7	34.7	30.7	33.7	46.7	44.7	42.7	37.7	35.7
Night-time Noise Criteria	87	83	74	64	56	49	43	42	40	38	36	34
Difference +/-	-49.3	-46.3	-37.3	-26.3	-21.3	-18.3	-9.3	+4.7	+4.7	+4.7	+1.7	+1.7

Table 4.4 indicates exceedances of the internal low frequency noise level criteria, at certain frequencies, and so the following section considers appropriate noise mitigation.

Table 4.5 calculates the internal noise level with windows open, at Plot 92, using the Stantec noise levels measured on the Site boundary. The sound reduction performance of an open window has been taken as 0dB given the very low frequencies considered.

Table 4.5 NANR45 Assessment – Windows Open

	Measured Third Octave Centre Frequency (Hz) (dB)											
	12.5	16	20	25	31.5	40	50	63	80	100	125	160
Measured Music Noise Level	52	51	51	52	49	50	57	71	70	69	65	62
Noise Measurement Distance (m)	25	25	25	25	25	25	25	25	25	25	25	25
Distance to Receptor (m)	41	41	41	41	41	41	41	41	41	41	41	41
Calculated Specific Noise Level at Receptor (dB)	47.7	46.7	46.7	47.7	44.7	45.7	52.7	66.7	65.7	64.7	60.7	57.7
Open Window SRI	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Calculated Internal Noise Level	47.7	46.7	46.7	47.7	44.7	45.7	52.7	66.7	65.7	64.7	60.7	57.7
Night-time Noise Criteria	87	83	74	64	56	49	43	42	40	38	36	34
Difference +/-	-39.3	-36.3	-27.3	-16.3	-11.3	-3.3	+9.7	+24.7	+25.7	+26.7	+24.7	+23.7

Table 4.5 indicates exceedances of the internal low frequency noise level criteria, at certain frequencies, and so the following section considers appropriate noise mitigation.

Noise Rating Criteria Assessment

Noise rating criteria relates to the assessment of linear octave band noise levels within rooms and the Stantec Assessment has provided criteria for the night-time period within bedrooms for both the average (NR25 criteria) and maximum (NR40 criteria) noise levels.

Table 4.6 calculates the internal average and maximum noise levels with windows closed, at Plot 92, using the Stantec noise levels measured on the Site boundary. The calculation has also used the sound reduction performance noise level data from the Stantec Assessment.

Table 4.6 Noise Rating Criteria Assessment – Windows Closed

	Parameter	Measured Octave Centre Frequency (Hz) (dB)						
		63	125	250	500	1000	2000	4000
Measured Music Noise Level	Leq	74	71	55	46	46	40	34
Noise Measurement Distance (m)		25	25	25	25	25	25	25
Distance to closest dwelling (m)		41	41	41	41	41	41	41
Calculated Noise Level at Dwelling Façade		69.7	66.7	50.7	41.7	41.7	35.7	29.7
Closed Window SRI		19.0	24.0	23.0	30.0	33.0	33.0	30.0
Calculated Internal Noise Level		50.7	42.7	27.7	11.7	8.7	2.7	-0.3
NR25 Criteria		55	44	35	29	25	22	20
Difference +/-		-4.3	-1.3	-7.3	-17.3	-16.3	-19.3	-20.3
Measured Music Noise Level	(LAFMax)	81	78	64	60	53	49	47
Noise Measurement Distance (m)		25	25	25	25	25	25	25
Distance to closest dwelling (m)		41	41	41	41	41	41	41
Calculated Noise Level at Dwelling Façade		76.7	73.7	59.7	55.7	48.7	44.7	42.7
Closed Window SRI		19.0	24.0	23.0	30.0	33.0	33.0	30.0
Calculated Internal Noise Level		57.7	49.7	36.7	25.7	15.7	11.7	12.7
NR40 Criteria		55	44	35	29	25	22	20
Difference +/-		+2.7	+5.7	+1.7	-3.3	-9.3	-10.3	-7.3

Table 4.6 indicates exceedances of the NR40 noise level criteria, at certain frequencies, and so the following section considers appropriate noise mitigation.

Table 4.7 calculates the internal average and maximum noise levels with windows open, at Plot 92, using the Stantec noise levels measured on the Site boundary.

Table 4.7 Noise Rating Criteria Assessment – Windows Open

	Parameter	Measured Octave Centre Frequency (Hz) (dB)						
		63	125	250	500	1000	2000	4000
Measured Music Noise Level	Leq	74	71	55	46	46	40	34
Noise Measurement Distance (m)		25	25	25	25	25	25	25
Distance to closest dwelling (m)		41	41	41	41	41	41	41
Calculated Noise Level at Dwelling Façade		69.7	66.7	50.7	41.7	41.7	35.7	29.7
Open Window SRI		13	13	13	13	13	13	13

Calculated Internal Noise Level		56.7	53.7	37.7	28.7	28.7	22.7	16.7
NR25 Criteria		55	44	35	29	25	22	20
Difference +/-		+1.7	+9.7	+2.7	-0.3	+3.7	+0.7	-3.3
Measured Music Noise Level		81	78	64	60	53	49	47
Noise Measurement Distance (m)		25	25	25	25	25	25	25
Distance to closest dwelling (m)		41	41	41	41	41	41	41
Calculated Noise Level at Dwelling Façade	(LAFMax)	76.7	73.7	59.7	55.7	48.7	44.7	42.7
Open Window SRI		13	13	13	13	13	13	13
Calculated Internal Noise Level		63.7	60.7	46.7	42.7	35.7	31.7	29.7
NR40 Criteria		67	57	49	44	40	37	35
Difference +/-		-3.3	+3.7	-2.3	-1.3	-4.3	-5.3	-5.3

Table 4.7 indicates exceedances of the NR40 noise level criteria, at certain frequencies, and so the following section considers appropriate noise mitigation.

External Noise Level Assessment

The measured broadband (LAeq,T) noise level on the Site boundary is 56dB and the adopted noise criteria limit is 50dB and so the most appropriate method for reducing noise is the installation of an acoustic fence on the Site boundary and this will be considered in the following section.

5 MITIGATION

5.1 Road Traffic - Internal Noise Levels

The previous section has indicated that standard thermal double glazing which provides a sound reduction of at least 30dB Rw+Ctr will be suitable for the Site. Additionally, various living room and bedroom windows will require alternative ventilation as per the schedule set out in Appendices IV and V of this Assessment which accord with the requirements of the AVO Design Guide.

Where System 1 & 2 alternative ventilation is required for habitable rooms, then ventilation can be achieved by using a window-frame mounted acoustic trickle ventilator as follows:

- Greenwoods EAR42W (affords up to 42dB Dn,e,w +Ctr).

Please see below for the plots that require System 1 or 2 based on the worst-case façade level:

Daytime

- Plot 37 – Living Room;
- Plots 47 to 56 – Living Room;
- Plots 64 to 72 – Living Room;
- Plots 73 and 74 – Living Room; and
- Plots 81 to 103 – Living Room.

Night-Time

- Plot 48 to 50 – Bedroom;
- Plots 64 to 68 – Bedroom; and
- Plots 79 to 95 – Bedroom.

With mitigation in place, it is concluded that the NOAEL is achieved which would be noticeable and not intrusive resulting in the following:

‘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.’

5.2 Road Traffic - External Noise Levels

The previous section determined that during the daytime, that all garden areas fall below the adopted 55dB LAeq,16hr criteria noise level, as such, no mitigation measures are required.

5.3 Music & Entertainment Noise – Sketchley Grange Hotel & Spa

Low Frequency Noise (NANR45) Assessment

The previous section has shown that, with windows closed, there are exceedances of a number of third octave bands and so upgraded glazing is required. Calculation indicates that any bedroom window, with either full or partial line of sight to the hotel, located within 71m of the hotel will require the upgraded glazing specification detailed in Table 5.1 below.

Table 5.1 NANR45 Assessment – Windows Closed

	Measured Third Octave Centre Frequency (Hz) (dB)											
	12.5	16	20	25	31.5	40	50	63	80	100	125	160
Measured Music Noise Level	52	51	51	52	49	50	57	71	70	69	65	62
Noise Measurement	25	25	25	25	25	25	25	25	25	25	25	25

Distance (m)												
Distance to Receptor (m)	41	41	41	41	41	41	41	41	41	41	41	41
Calculated Specific Noise Level at Receptor (dB)	47.7	46.7	46.7	47.7	44.7	45.7	52.7	66.7	65.7	64.7	60.7	57.7
Closed Window SRI*	10.0	10.0	10.0	10.0	10.0	15.0	19.0	27.4	28.0	28.0	29.8	29.8
Calculated Internal Noise Level	37.7	36.7	36.7	37.7	34.7	30.7	33.7	39.3	37.7	36.7	30.9	27.9
Night-time Noise Criteria	87	83	74	64	56	49	43	42	40	38	36	34
Difference +/-	-49.3	-46.3	-37.3	-26.3	-21.3	-18.3	-9.3	-2.7	-2.3	-1.3	-5.1	-6.1
*Recommended glazing is Saint Gobain glass with configuration 10/9/6.4A which has a round reduction performance of 39dB Rw (35dB Rw +Ctr)												

Table 5.1 indicates that with the upgraded glazing configuration, the NANR45 noise criteria levels are not exceeded.

The previous section has shown that, with windows open, there are exceedances of a number of third octave bands and Table 5.2 calculates the distance required, from the hotel, at which point no alternative ventilation is required.

Table 5.2 NANR45 Assessment – Windows Open

	Measured Third Octave Centre Frequency (Hz) (dB)											
	12.5	16	20	25	31.5	40	50	63	80	100	125	160
Measured Music Noise Level	52	51	51	52	49	50	57	71	70	69	65	62
Noise Measurement Distance (m)	25	25	25	25	25	25	25	25	25	25	25	25
Distance to Receptor (m)	890	890	890	890	890	890	890	890	890	890	890	890
Calculated Specific Noise Level at Receptor (dB)	21.0	20.0	20.0	21.0	18.0	19.0	26.0	40.0	39.0	38.0	34.0	31.0
Open Window SRI*	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Calculated Internal Noise Level	21.0	20.0	20.0	21.0	18.0	19.0	26.0	40.0	39.0	38.0	34.0	31.0
Night-time Noise Criteria	87	83	74	64	56	49	43	42	40	38	36	34
Difference +/-	-66.0	-63.0	-54.0	-43.0	-38.0	-30.0	-17.0	-2.0	-1.0	0.0	-2.0	-3.0

*Recommended glazing is Saint Gobain glass with configuration 10/9/6.4A which has a round reduction performance of 39dB Rw (35dB Rw +Ctr)

Table 5.2 indicates that any bedroom window located within 890m of the hotel, with either full or partial line of sight to the hotel, will require alternative ventilation.

Hinckley & Bosworth Borough Council have requested that, where alternative ventilation is recommended, this is in the form of upgraded mechanical ventilation and not passive ventilation, ie trickle ventilators. Accordingly, the plots requiring alternative ventilation are as follows:

- Any bedrooms of Plots 91 – 116 on the northern boundary of the Site, with full or partial line of sight to the Hotel.

Noise Rating Criteria Assessment

The previous section has shown that there will be an exceedance of the NR40 noise criteria level for the internal maximum noise levels with bedroom windows closed and so upgraded glazing will be necessary in order to control this. Further calculation indicates that any bedroom window, with full or partial line of sight to the hotel, located within 79m of the hotel will experience an exceedance and will require upgraded glazing.

For the purposes of this Assessment, the recommended upgraded glazing configuration previously identified for the NANR45 Assessment will be used and Table 5.3 details the calculation.

Table 5.3 Noise Rating Criteria Assessment – Windows Closed

	Parameter	Measured Octave Centre Frequency (Hz) (dB)						
		63	125	250	500	1000	2000	4000
Measured Music Noise Level	(LAFMax)	81	78	64	60	53	49	47
Noise Measurement Distance (m)		25	25	25	25	25	25	25
Distance to closest dwelling (m)		41	41	41	41	41	41	41
Calculated Noise Level at Dwelling Façade		76.7	73.7	59.7	55.7	48.7	44.7	42.7
Closed Window SRI		27.4	29.8	26.6	34.1	40.9	46.5	52.6
Calculated Internal Noise Level		49.3	43.9	33.1	21.6	7.8	-1.8	-9.9
NR40 Criteria		55	44	35	29	25	22	20
Difference +/-		-5.7	-0.1	-1.9	-7.4	-17.2	-23.8	-29.9

Table 5.3 indicates that the previously recommended upgraded glazing will be adequate in controlling noise levels so the NR40 noise criteria is not exceeded.

The previous section has shown that with windows open, there will be an exceedance of both the NR25 and NR40 noise criteria levels and Table 5.4 calculates the distance required, from the hotel, at which point no alternative ventilation is required.

Table 5.4 Noise Rating Criteria Assessment – Windows Open

	Parameter	Measured Octave Centre Frequency (Hz) (dB)						
		63	125	250	500	1000	2000	4000
Measured Music Noise Level	Leq	74	71	55	46	46	40	34
Noise Measurement Distance (m)		25	25	25	25	25	25	25
Distance to closest dwelling (m)		125	125	125	125	125	125	125

Calculated Noise Level at Dwelling Façade		60.0	57.0	41.0	32.0	32.0	26.0	20.0
Open Window SRI		13.0	13.0	13.0	13.0	13.0	13.0	13.0
Calculated Internal Noise Level		47.0	44.0	28.0	19.0	19.0	13.0	7.0
NR25 Criteria		55	44	35	29	25	22	20
Difference +/-		-8.0	0.0	-7.0	-10.0	-6.0	-9.0	-13.0
Measured Music Noise Level	(LAFMax)	81	78	64	60	53	49	47
Noise Measurement Distance (m)		25	25	25	25	25	25	25
Distance to closest dwelling (m)		125	125	125	125	125	125	125
Calculated Noise Level at Dwelling Façade		67.0	64.0	50.0	46.0	39.0	35.0	33.0
Open Window SRI		13.0	13.0	13.0	13.0	13.0	13.0	13.0
Calculated Internal Noise Level		54.0	51.0	37.0	33.0	26.0	22.0	20.0
NR40 Criteria		67	57	49	44	40	37	35
Difference +/-		-13.0	-6.0	-12.0	-11.0	-14.0	-15.0	-15.0

Table 5.3 indicates that any bedroom window located within 125m of the hotel, with either full or partial line of sight to the hotel, will require alternative ventilation.

Hinckley & Bosworth Borough Council have requested that, where alternative ventilation is recommended, this is in the form of upgraded mechanical ventilation and not passive ventilation, ie trickle ventilators. Accordingly, the plots requiring alternative ventilation are as follows:

- Any bedrooms of Plots 91 – 116 on the northern boundary of the Site, with full or partial line of sight to the Hotel.

External Noise Level Assessment

The previous section has shown that the measured broadband (LAeq,T) noise level on the Site boundary is 56dB which exceed the adopted 50dB noise criteria level.

It is understood that Site level will be 1.5m below the land of the hotel and so this has been taken into account when calculating the required noise barrier height.

Calculation of the barrier path-difference has allowed for a source noise height of 4m (1.5m increase in ground level height above Site ground level in addition to the noise source at the hotel being 2.5m above ground) and a receiver height of 1.8m in the closest garden area. The distance from the hotel façade to the Site boundary is 25m and the distance from the boundary to the centre of the garden area is 5m. Calculation indicates that a noise barrier will need to be 2.7m in height and will be comprised of a 1.5m high retaining wall with a 1.2m high acoustic barrier positioned on top. The 1.2m high noise barrier component, if constructed from timber, will need to have a minimum mass of 15kg/m² and be free from holes.

It is recommended that the noise barrier is adopted for Plots 91 – 99 which have line of sight to the area of the hotel where music noise / event noise can take place.

Summary of Required Noise Mitigation Measures for Hotel Music & Entertainment Noise

Any bedroom window, with either full or partial line of sight to the hotel, within 71m of the hotel will require the following upgraded glazing.

Table 5.5 Recommended Upgraded Glazing

Typical Configuration	Single Figure Sound Reduction (dB)			Octave Band Sound Reduction Hz (dB)						
	Rw	+C	+Ctr	63	125	250	500	1000	2000	4000
10 (9) 6.4A	39	38	35	27.4	29.8	26.6	34.1	40.9	46.5	52.6

The above recommended glazing configuration is the minimum recommended and a higher performing glazing specification may be used.

Any bedroom window located within 890m of the hotel, with either full or partial line of sight to the hotel, will require alternative ventilation.

Hinckley & Bosworth Borough Council have requested that, where alternative ventilation is recommended, this is in the form of upgraded mechanical ventilation and not passive ventilation, ie trickle ventilators. Accordingly, the plots requiring alternative ventilation are as follows:

- Any bedrooms of Plots 91 – 116 on the northern boundary of the Site, with full or partial line of sight to the Hotel.

An acoustic fence with a minimum height of 2.7m shall be included along the Site boundary (Figure 6 in Appendix 3) of Plots 92 - 99 with the hotel. The noise barrier will need to have a minimum mass of 15kg/m² and be free from holes.

6 CONCLUSION

Omnia has been commissioned by Persimmon Homes North Midlands to provide a Noise Impact Assessment for a proposed residential development for a parcel of land south of Setchley Lane in Hinckley.

The Site has a number of potentially significant noise sources within the vicinity, including the A5 Watling Street to the south west, the Sketchley Grange hotel and spa to the north and a number of commercial units off Watling Drive and Watling Close to the north west.

Outline planning permission was granted for the development in January 2023 (Appeal Ref APP/K2420/W/22/3301735) the following condition relates to noise:

'7. Reserved matters applications relating to layout, scale and appearance shall be accompanied by a scheme for protecting the proposed dwellings from noise from the road network and the nearby hotel. The agreed scheme shall be implemented in full prior to the first occupation of any dwelling.'

The Noise Impact Assessment has been completed with due regard to the requirements as stated within BS8233:2014. A CadnaA noise model has been constructed including all significant noise sources, existing buildings and with full topography. The noise model has been used to predict the noise levels within the external amenity areas as well as incident upon the facades of the proposed residential development due to noise associated with the road traffic and commercial sound.

The Noise Impact Assessment has determined that that standard thermal double glazing which provides a sound reduction of at least 30dB Rw+Ctr will be suitable for the Site. Additionally, various living room and bedroom windows will require alternative ventilation as per the schedule set out in Appendices IV and V of this Assessment.

With regards to the external amenity areas the Assessment has determined that during the daytime, that all garden areas fall below the adopted 55dB LAeq,16hr criteria noise level, as such, no mitigation measures are required.

This Assessment has shown that with regards to commercial noise, the rated level of noise falls below the typical background sound level the closest proposed receptor for the daytime and night-time period which affords the following outcome according to BS4142:

'Where the rating level does not exceed the background sound level, this is an indication of the specific sound source having a low impact, depending on the context.'

This Assessment has considered noise levels generated by events taking place at the adjacent hotel and appropriate noise mitigation has been recommended in order to ensure that noise level within garden areas and bedrooms do not exceed the adopted noise criteria levels.

The assessment has been based upon robust and worst-case assumptions and demonstrates that, assuming the implementation of the recommended mitigation measures, the site shall be suitable for purpose.

END OF REPORT

APPENDIX I
LIMITATIONS

1. This report and its findings should be considered in relation to the terms of reference and objectives agreed between Omnia and the Client as indicated in Section 1.3.
2. For the work, reliance has been placed on publicly available data obtained from the sources identified. The information is not necessarily exhaustive and further information relevant to the site may be available from other sources. When using the information, it has been assumed it is correct. No attempt has been made to verify the information.
3. This report has been produced in accordance with current UK policy and legislative requirements for land and groundwater contamination, which are enforced, by the local authority and the Environment Agency. Liabilities associated with land contamination are complex and requires advice from legal professionals.
4. During the site walkover reasonable effort has been made to obtain an overview of the site conditions. However, during the site walkover no attempt has been made to enter areas of the site that are unsafe or present a risk to health and safety, are locked, barricaded, overgrown, or the location of the area has not been made known or accessible.
5. Access considerations, the presence of services and the activities being carried out on the site limited the locations where sampling locations could be installed and the techniques that could be used.
6. Site sensitivity assessments have been made based on available information at the time of writing and are ultimately for the decision of the regulatory authorities.
7. Where mention has been made to the identification of Japanese Knotweed and other invasive plant species and asbestos or asbestos-containing materials this is for indicative purposes only and do not constitute or replace full and proper surveys.
8. The executive summary, conclusions and recommendations sections of the report provide an overview and guidance only and should not be specifically relied upon without considering the context of the report in full.
9. Omnia cannot be held responsible for any use of the report or its contents for any purpose other than that for which it was prepared. The copyright in this report and other plans and documents prepared by Omnia is owned by them and no such plans or documents may be reproduced, published or adapted without written consent. Complete copies of this may, however, be made and distributed by the client as is expected in dealing with matters related to its commission. Should the client pass copies of the report to other parties for information, the whole report should be copied, but no professional liability or warranties shall be extended to other parties by OEC in this connection without their explicit written agreement there to by Omnia.
10. New information, revised practices or changes in legislation may necessitate the re-interpretation of the report, in whole or in part.

APPENDIX II

GLOSSARY OF ACOUSTIC TERMINOLOGY

Noise is defined as unwanted sound. Human ears are able to respond to sound in the frequency range 20 Hz (deep bass) to 20,000 Hz (high treble) and over the audible range of 0 dB (the threshold of perception) to 140 dB (the threshold of pain). The ear does not respond equally to different frequencies of the same magnitude, but is more responsive to mid- frequencies than to lower or higher frequencies. To quantify noise in a manner that approximates the response of the human ear, a weighting mechanism is used. This reduces the importance of lower and higher frequencies, in a similar manner to the human ear.

Furthermore, the perception of noise may be determined by a number of other factors, which may not necessarily be acoustic. In general, the impact of noise depends upon its level, the margin by which it exceeds the background level, its character and its variation over a given period of time. In some cases, the time of day and other acoustic features such as tonality or impulsiveness may be important, as may the disposition of the affected individual. Any assessment of noise should give due consideration to all of these factors when assessing the significance of a noise source.

The most widely used weighting mechanism that best corresponds to the response of the human ear is the 'A'-weighting scale. This is widely used for environmental noise measurement, and the levels are denoted as dB(A) or LAeq, LA90 etc., according to the parameter being measured.

The decibel scale is logarithmic rather than linear, and hence a 3 dB increase in sound level represents a doubling of the sound energy present. Judgement of sound is subjective, but as a general guide a 10 dB(A) increase can be taken to represent a doubling of loudness, whilst an increase in the order of 3 dB(A) is generally regarded as the minimum difference needed to perceive a change under normal listening conditions.

An indication of the range of sound levels commonly found in the environment is given in the following table.

Table A1: Typical Sound Pressure Levels

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

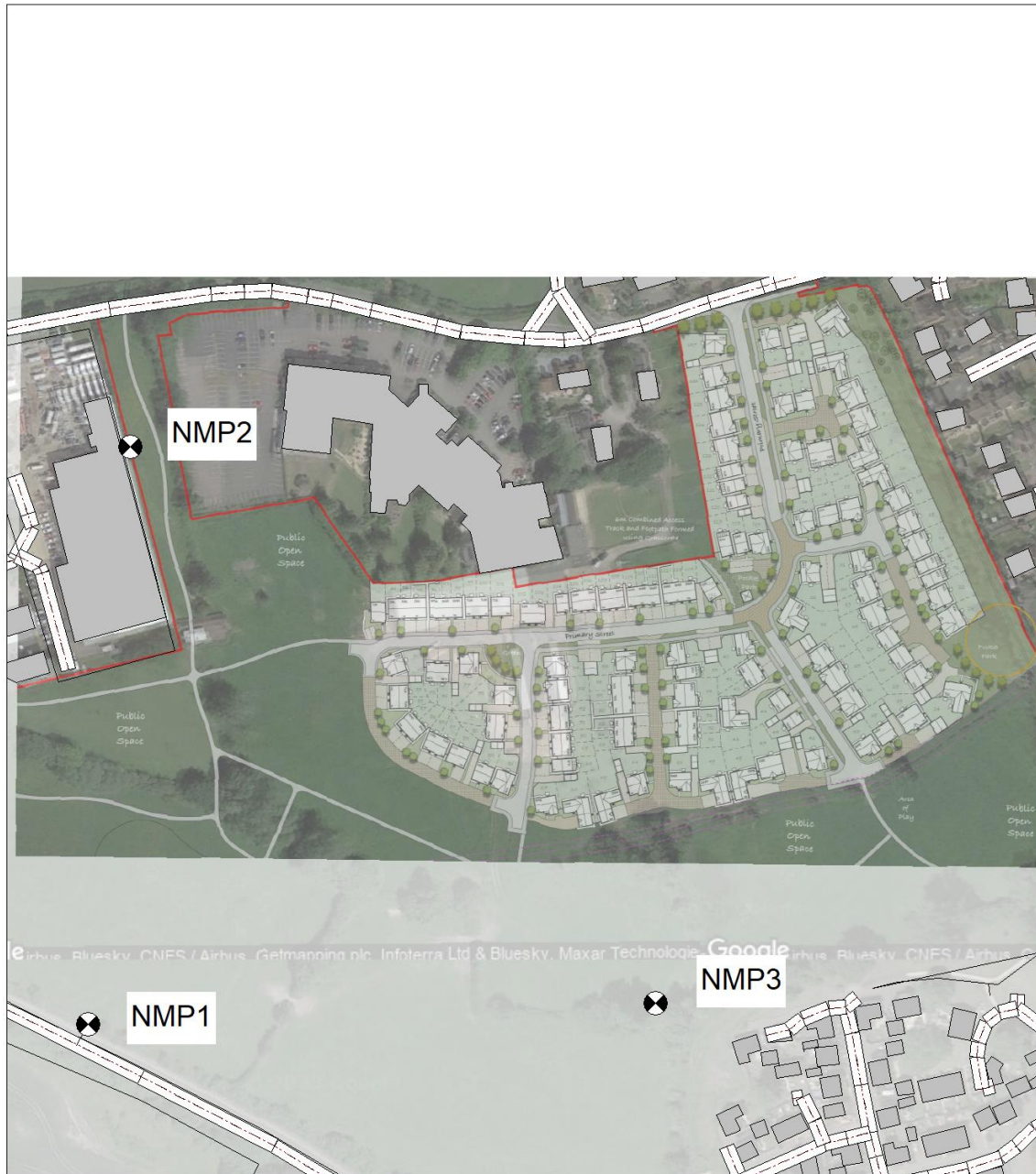
Table A2: Terminology

Descriptor	Explanation
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 (2×10^{-5} Pa).
dB(A)	A-weighted decibel. This is a measure of the overall level of sound across the audible spectrum with a frequency weighting (i.e. 'A' weighting) to compensate for the varying sensitivity of the human ear to sound at different frequencies.
$L_{Aeq, T}$	L_{Aeq} is defined as the notional steady sound level which, over a stated period of time (T), would contain the same amount of acoustical energy as the A – weighted fluctuating sound measured over that period.
L_{Amax}	L_{Amax} 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.
L_{10} & L_{90}	If a non-steady noise is to be described it is necessary to know both its level and the degree of fluctuation. The L_n indices are used for this purpose, and the term refers to the level exceeded for n% of the time. Hence L_{10} is the level exceeded for 10% of the time and as such can be regarded as the 'average maximum level'. Similarly, L_{90} is the 'average minimum level' and is often used to describe the background noise. It is common practice to use the L_{10} index to describe traffic noise.
Free-field Level	2A sound field determined at a point away from reflective surfaces other than the ground with no significant contributions due to sound from other reflective surfaces. Generally as measured outside and away from buildings.
Fast	A time weighting used in the root mean square section of a sound level meter with a 125millisecond time constant.
Slow	A time weighting used in the root mean square section of a sound level meter with a 1000millisecond time constant.

APPENDIX III

FIGURE

Figure 1 – Site Layout and Noise Measurement Positions



Title : Proposed Site Layout and
Noise Measurement Positions

Figure 1

Built by: MP

Date : 28/11/2023

Checked by: JG

Figure 2 – Daytime Grid Noise Map -Road Traffic

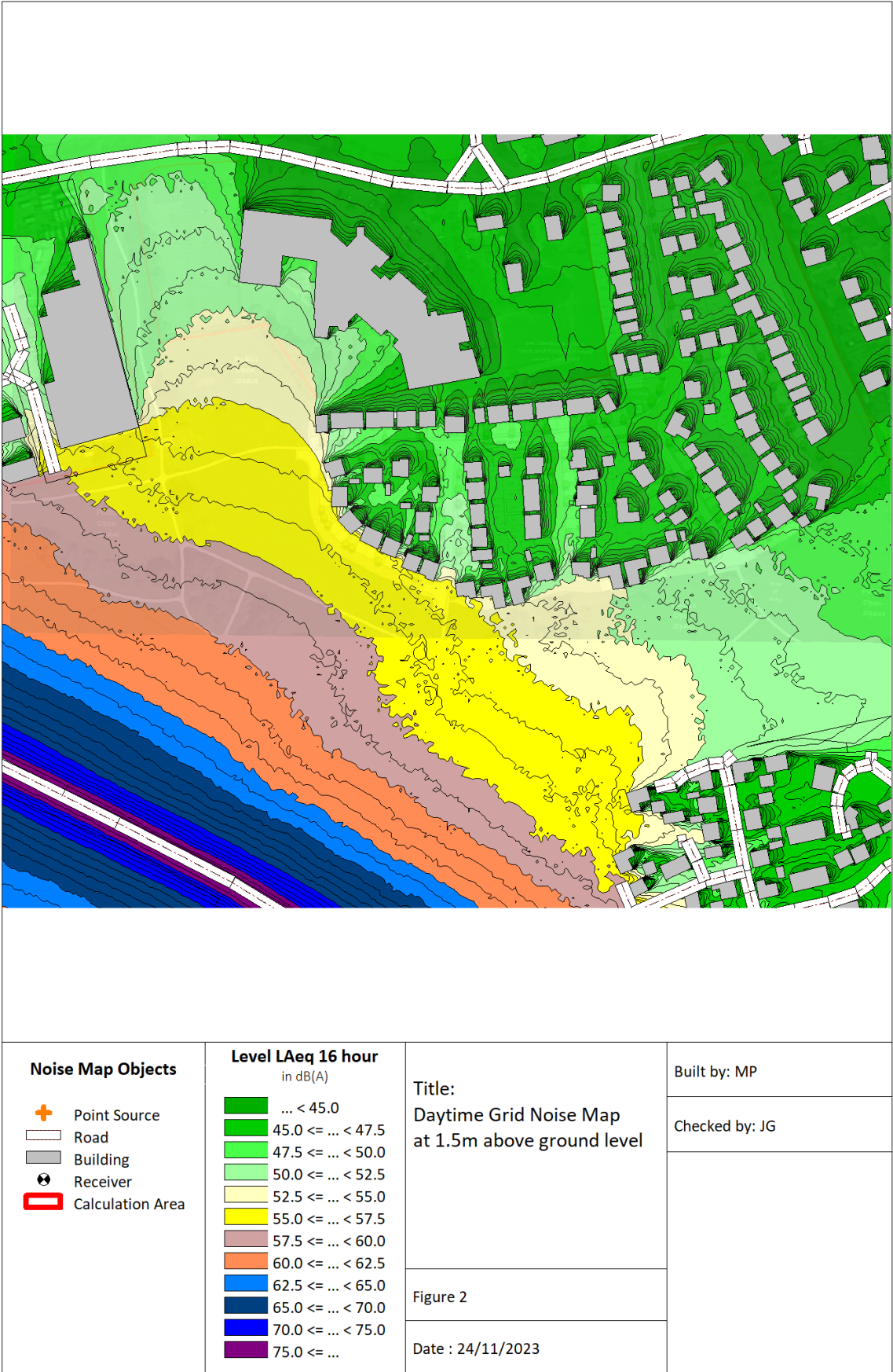


Figure 3 – Night-Time Grid Noise Map – Road Traffic

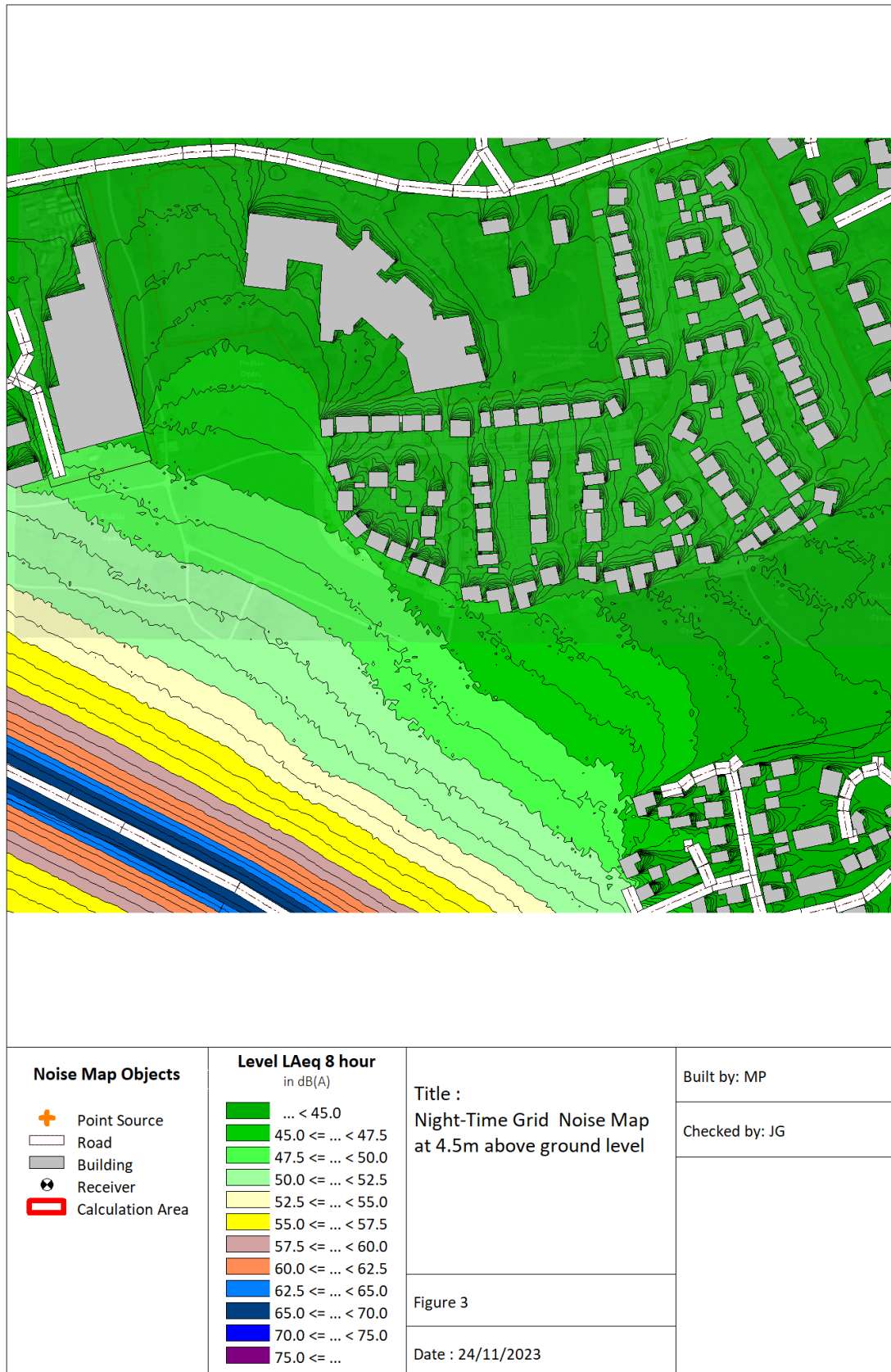
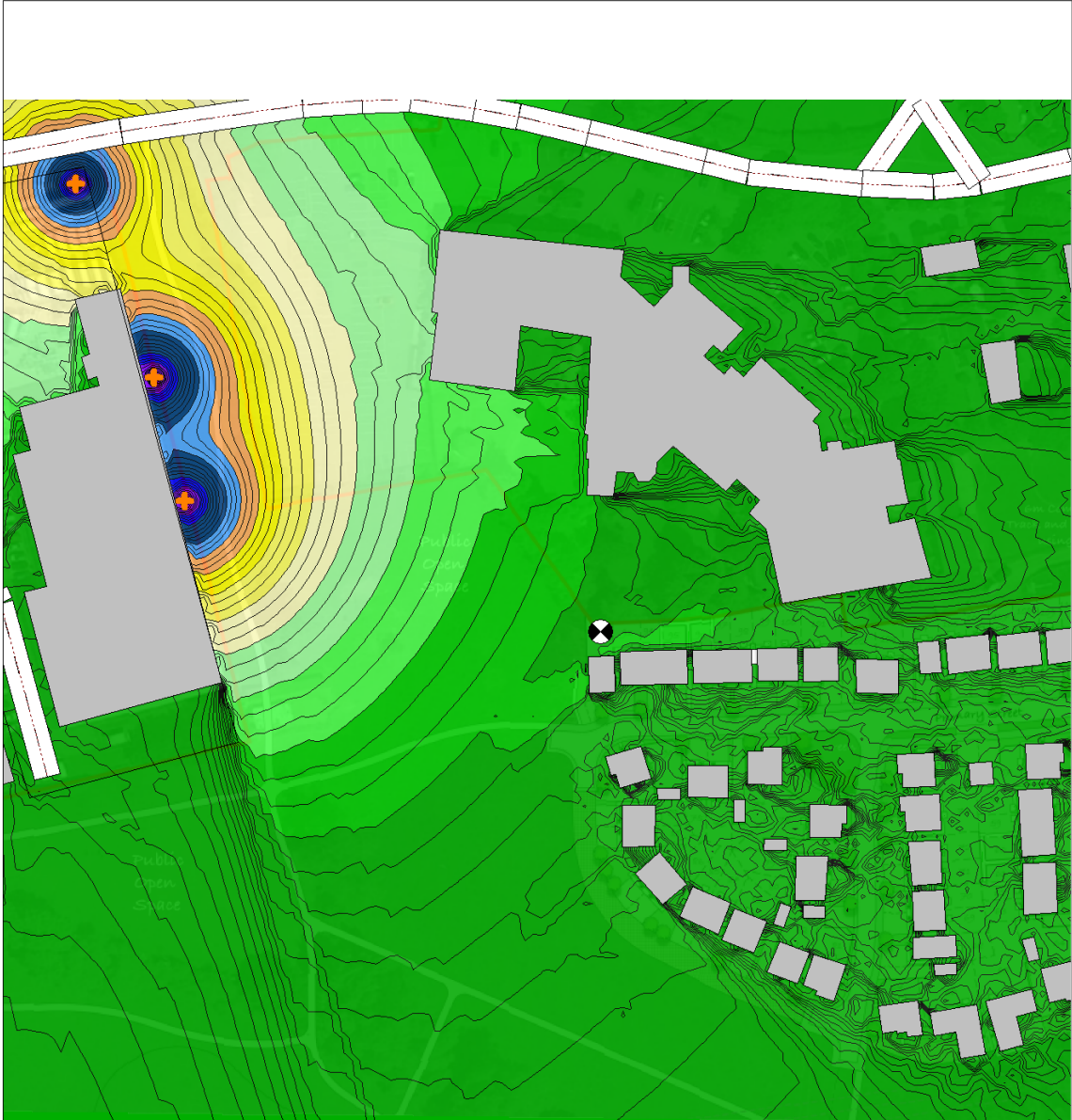
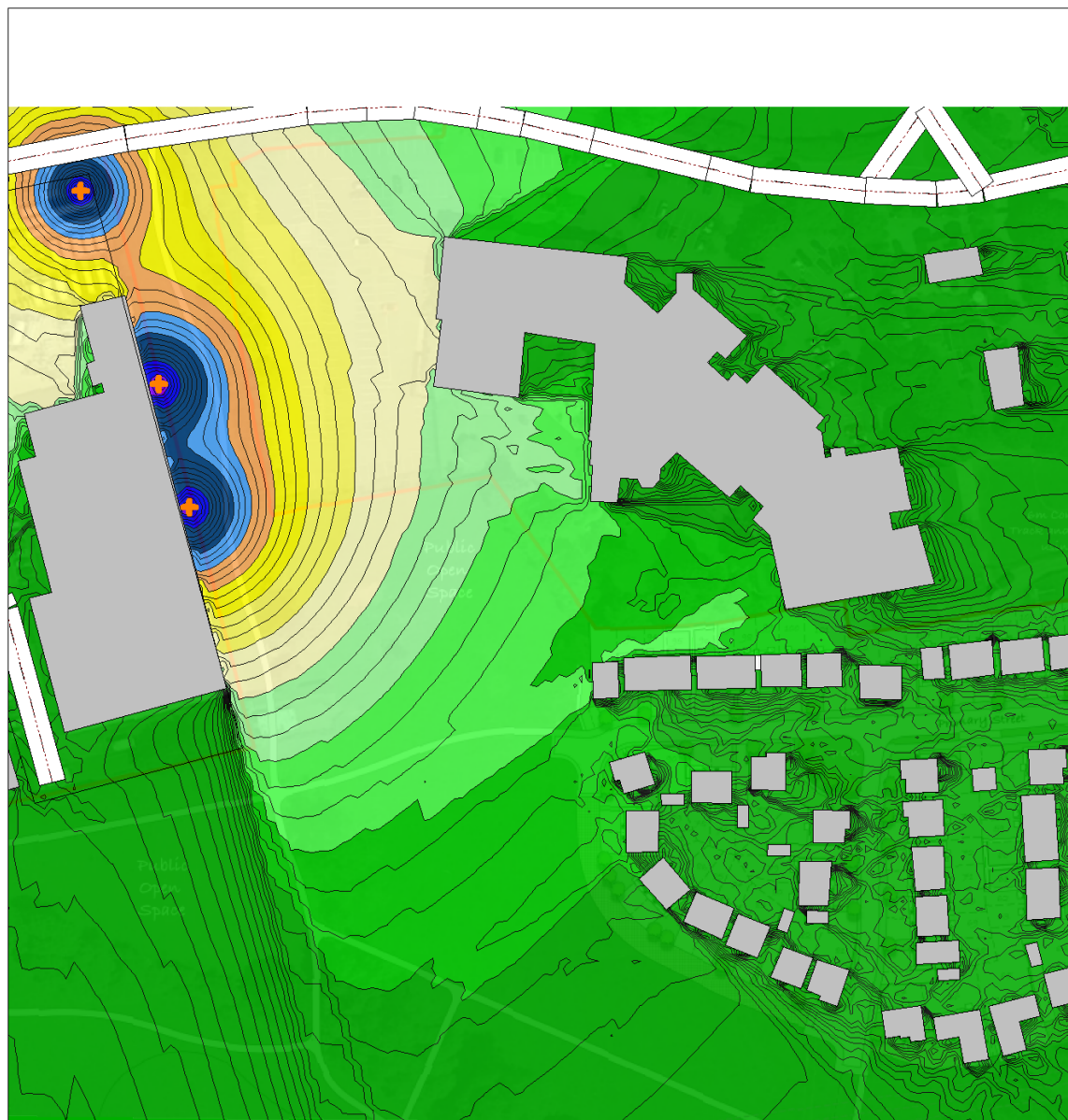


Figure 4 – Daytime Grid Noise Map - Commercial



Noise Map Objects + Point Source Road Building ⊗ Receiver Calculation Area	Level LAeq 1 hour in dB(A) ... < 26.0 26.0 ≤ ... < 29.0 29.0 ≤ ... < 32.0 32.0 ≤ ... < 35.0 35.0 ≤ ... < 38.0 38.0 ≤ ... < 41.0 41.0 ≤ ... < 44.0 44.0 ≤ ... < 47.0 47.0 ≤ ... < 50.0 50.0 ≤ ... < 53.0 53.0 ≤ ... < 56.0 56.0 ≤ ... < 59.0 59.0 ≤ ...
---	--

Figure 5 – Night-Time Grid Noise Map -Commercial



Noise Map Objects  Point Source  Road  Building  Receiver  Calculation Area	Level LAeq 15 min in dB(A)  ... < 26.0  26.0 <= ... < 29.0  29.0 <= ... < 32.0  32.0 <= ... < 35.0  35.0 <= ... < 38.0  38.0 <= ... < 41.0  41.0 <= ... < 44.0  44.0 <= ... < 47.0  47.0 <= ... < 50.0  50.0 <= ... < 43.0  43.0 <= ... < 56.0  56.0 <= ... < 60.0  60.0 <= ...	Title : Night-Time Grid Noise Map at 4.5m above ground level	Built by: MP
		Checked by: JG	
		Figure 5	
		Date : 24/11/2023	

Figure 6 – Acoustic Barrier Location for Hotel



APPENDIX IV

DAYTIME FAÇADE NOISE LEVELS – ROAD TRAFFIC

(Living Rooms)

Table A3: Daytime Façade Levels

Plot	Storey	Façade Direction	Calculated LAeq, 16hr at Façade (dB)	Calculated Noise Level Inside Room (30dB reduction) (dB)	Difference with Criteria (35dB) +/-	Required Sound Insulation Performance for Glazing (Rw +Ctr) (dB)	Commentary on Required Glazing	Calculated Internal Noise Level with a Partially Open Window (dB)	Alternative Ventilation Required?	Acoustics Ventilation & Overheating Assessment - Appropriate AD-F System	Example Alternative Ventilation Scheme
Plot 1	GF	SE	40.2	10.2	-24.8	5	Standard thermal glazing	27.2	No	N/A	Alternative Ventilation not Required
Plot 1	GF	NE	34.7	4.7	-30.3	0	Standard thermal glazing	21.7	No	N/A	Alternative Ventilation not Required
Plot 1	GF	NW	37.5	7.5	-27.5	3	Standard thermal glazing	24.5	No	N/A	Alternative Ventilation not Required
Plot 1	GF	SW	42.1	12.1	-22.9	7	Standard thermal glazing	29.1	No	N/A	Alternative Ventilation not Required
Plot 2	GF	W	41.8	11.8	-23.2	7	Standard thermal glazing	28.8	No	N/A	Alternative Ventilation not Required
Plot 2	GF	S	43.1	13.1	-21.9	8	Standard thermal glazing	30.1	No	N/A	Alternative Ventilation not Required
Plot 2	GF	E	35.5	5.5	-29.5	1	Standard thermal glazing	22.5	No	N/A	Alternative Ventilation not Required
Plot 2	GF	N	35.2	5.2	-29.8	0	Standard thermal glazing	22.2	No	N/A	Alternative Ventilation not Required
Plot 3	GF	W	43.6	13.6	-21.4	9	Standard thermal glazing	30.6	No	N/A	Alternative Ventilation not Required
Plot 3	GF	S	43.7	13.7	-21.3	9	Standard thermal glazing	30.7	No	N/A	Alternative Ventilation not Required
Plot 3	GF	E	35.8	5.8	-29.2	1	Standard thermal glazing	22.8	No	N/A	Alternative Ventilation not Required
Plot 3	GF	N	35.4	5.4	-29.6	0	Standard thermal glazing	22.4	No	N/A	Alternative Ventilation not Required
Plot 4	GF	W	43.8	13.8	-21.2	9	Standard thermal glazing	30.8	No	N/A	Alternative Ventilation not Required
Plot 4	GF	S	43.8	13.8	-21.2	9	Standard thermal glazing	30.8	No	N/A	Alternative Ventilation not Required
Plot 4	GF	E	35.8	5.8	-29.2	1	Standard thermal glazing	22.8	No	N/A	Alternative Ventilation not Required
Plot 4	GF	N	36.3	6.3	-28.7	1	Standard thermal glazing	23.3	No	N/A	Alternative Ventilation not Required
Plot 5	GF	W	38.1	8.1	-26.9	3	Standard thermal glazing	25.1	No	N/A	Alternative Ventilation not Required
Plot 5	GF	S	42.9	12.9	-22.1	8	Standard thermal glazing	29.9	No	N/A	Alternative Ventilation not Required
Plot 5	GF	E	36.1	6.1	-28.9	1	Standard thermal glazing	23.1	No	N/A	Alternative Ventilation not Required
Plot 5	GF	N	35.6	5.6	-29.4	1	Standard thermal glazing	22.6	No	N/A	Alternative Ventilation not Required
Plot 6	GF	S	42.5	12.5	-22.5	8	Standard thermal glazing	29.5	No	N/A	Alternative Ventilation not Required
Plot 6	GF	W	41.2	11.2	-23.8	6	Standard thermal glazing	28.2	No	N/A	Alternative Ventilation not Required
Plot 6	GF	N	35.9	5.9	-29.1	1	Standard thermal glazing	22.9	No	N/A	Alternative Ventilation not Required
Plot 6	GF	E	35.3	5.3	-29.7	0	Standard thermal glazing	22.3	No	N/A	Alternative Ventilation not Required
Plot 7	GF	SE	38.8	8.8	-26.2	4	Standard thermal glazing	25.8	No	N/A	Alternative Ventilation not Required
Plot 7	GF	NE	35.6	5.6	-29.4	1	Standard thermal glazing	22.6	No	N/A	Alternative Ventilation not Required
Plot 7	GF	NW	37	7	-28	2	Standard thermal glazing	24	No	N/A	Alternative Ventilation not Required
Plot 7	GF	SW	42.8	12.8	-22.2	8	Standard thermal glazing	29.8	No	N/A	Alternative Ventilation not Required
Plot 8	GF	SW	42.2	12.2	-22.8	7	Standard thermal glazing	29.2	No	N/A	Alternative Ventilation not Required
Plot 8	GF	SE	38.6	8.6	-26.4	4	Standard thermal glazing	25.6	No	N/A	Alternative Ventilation not Required
Plot 8	GF	NE	35.7	5.7	-29.3	1	Standard thermal glazing	22.7	No	N/A	Alternative Ventilation not Required
Plot 8	GF	NW	37.9	7.9	-27.1	3	Standard thermal glazing	24.9	No	N/A	Alternative Ventilation not Required
Plot 9	GF	SW	43.6	13.6	-21.4	9	Standard thermal glazing	30.6	No	N/A	Alternative Ventilation not Required
Plot 9	GF	SE	39.9	9.9	-25.1	5	Standard thermal glazing	26.9	No	N/A	Alternative Ventilation not Required
Plot 9	GF	NE	35.4	5.4	-29.6	0	Standard thermal glazing	22.4	No	N/A	Alternative Ventilation not Required
Plot 9	GF	NW	37	7	-28	2	Standard thermal glazing	24	No	N/A	Alternative Ventilation not Required
Plot 12	GF	W	44.1	14.1	-20.9	9	Standard thermal glazing	31.1	No	N/A	Alternative Ventilation not Required
Plot 12	GF	S	44.5	14.5	-20.5	10	Standard thermal glazing	31.5	No	N/A	Alternative Ventilation not Required
Plot 12	GF	E	36.1	6.1	-28.9	1	Standard thermal glazing	23.1	No	N/A	Alternative Ventilation not Required
Plot 12	GF	N	36.6	6.6	-28.4	2	Standard thermal glazing	23.6	No	N/A	Alternative Ventilation not Required
Plot 13	GF	W	45.3	15.3	-19.7	10	Standard thermal glazing	32.3	No	N/A	Alternative Ventilation not Required

Plot 13	GF	N	37.7	7.7	-27.3	3	Standard thermal glazing	24.7	No	N/A	Alternative Ventilation not Required
Plot 13	GF	E	37.1	7.1	-27.9	2	Standard thermal glazing	24.1	No	N/A	Alternative Ventilation not Required
Plot 13	GF	S	45.5	15.5	-19.5	11	Standard thermal glazing	32.5	No	N/A	Alternative Ventilation not Required
Plot 14	GF	W	40.7	10.7	-24.3	6	Standard thermal glazing	27.7	No	N/A	Alternative Ventilation not Required
Plot 14	GF	S	44.8	14.8	-20.2	10	Standard thermal glazing	31.8	No	N/A	Alternative Ventilation not Required
Plot 14	GF	E	36.5	6.5	-28.5	2	Standard thermal glazing	23.5	No	N/A	Alternative Ventilation not Required
Plot 14	GF	N	37.7	7.7	-27.3	3	Standard thermal glazing	24.7	No	N/A	Alternative Ventilation not Required
Plot 15	GF	W	39.7	9.7	-25.3	5	Standard thermal glazing	26.7	No	N/A	Alternative Ventilation not Required
Plot 15	GF	S	45	15	-20	10	Standard thermal glazing	32	No	N/A	Alternative Ventilation not Required
Plot 15	GF	E	36.7	6.7	-28.3	2	Standard thermal glazing	23.7	No	N/A	Alternative Ventilation not Required
Plot 15	GF	N	37.7	7.7	-27.3	3	Standard thermal glazing	24.7	No	N/A	Alternative Ventilation not Required
Plot 16	GF	SE	38.5	8.5	-26.5	4	Standard thermal glazing	25.5	No	N/A	Alternative Ventilation not Required
Plot 16	GF	NE	35.6	5.6	-29.4	1	Standard thermal glazing	22.6	No	N/A	Alternative Ventilation not Required
Plot 16	GF	NW	38.9	8.9	-26.1	4	Standard thermal glazing	25.9	No	N/A	Alternative Ventilation not Required
Plot 16	GF	SW	42.8	12.8	-22.2	8	Standard thermal glazing	29.8	No	N/A	Alternative Ventilation not Required
Plot 17	GF	SE	41.4	11.4	-23.6	6	Standard thermal glazing	28.4	No	N/A	Alternative Ventilation not Required
Plot 17	GF	NE	35.9	5.9	-29.1	1	Standard thermal glazing	22.9	No	N/A	Alternative Ventilation not Required
Plot 17	GF	NW	37.3	7.3	-27.7	2	Standard thermal glazing	24.3	No	N/A	Alternative Ventilation not Required
Plot 17	GF	SW	43.5	13.5	-21.5	9	Standard thermal glazing	30.5	No	N/A	Alternative Ventilation not Required
Plot 18	GF	SW	43.8	13.8	-21.2	9	Standard thermal glazing	30.8	No	N/A	Alternative Ventilation not Required
Plot 18	GF	SE	38.7	8.7	-26.3	4	Standard thermal glazing	25.7	No	N/A	Alternative Ventilation not Required
Plot 18	GF	NE	35.7	5.7	-29.3	1	Standard thermal glazing	22.7	No	N/A	Alternative Ventilation not Required
Plot 18	GF	NW	39	9	-26	4	Standard thermal glazing	26	No	N/A	Alternative Ventilation not Required
Plot 19	GF	SW	43.7	13.7	-21.3	9	Standard thermal glazing	30.7	No	N/A	Alternative Ventilation not Required
Plot 19	GF	SE	39.6	9.6	-25.4	5	Standard thermal glazing	26.6	No	N/A	Alternative Ventilation not Required
Plot 19	GF	NE	35.7	5.7	-29.3	1	Standard thermal glazing	22.7	No	N/A	Alternative Ventilation not Required
Plot 19	GF	NW	38.1	8.1	-26.9	3	Standard thermal glazing	25.1	No	N/A	Alternative Ventilation not Required
Plot 20	GF	SW	43.9	13.9	-21.1	9	Standard thermal glazing	30.9	No	N/A	Alternative Ventilation not Required
Plot 20	GF	SE	38.8	8.8	-26.2	4	Standard thermal glazing	25.8	No	N/A	Alternative Ventilation not Required
Plot 20	GF	NE	36.2	6.2	-28.8	1	Standard thermal glazing	23.2	No	N/A	Alternative Ventilation not Required
Plot 20	GF	NW	38.2	8.2	-26.8	3	Standard thermal glazing	25.2	No	N/A	Alternative Ventilation not Required
Plot 21	GF	SW	44	14	-21	9	Standard thermal glazing	31	No	N/A	Alternative Ventilation not Required
Plot 21	GF	SE	39.9	9.9	-25.1	5	Standard thermal glazing	26.9	No	N/A	Alternative Ventilation not Required
Plot 21	GF	NE	36.3	6.3	-28.7	1	Standard thermal glazing	23.3	No	N/A	Alternative Ventilation not Required
Plot 21	GF	NW	37.3	7.3	-27.7	2	Standard thermal glazing	24.3	No	N/A	Alternative Ventilation not Required
Plot 22	GF	SW	43.9	13.9	-21.1	9	Standard thermal glazing	30.9	No	N/A	Alternative Ventilation not Required
Plot 22	GF	SE	41.6	11.6	-23.4	7	Standard thermal glazing	28.6	No	N/A	Alternative Ventilation not Required
Plot 22	GF	NE	36.2	6.2	-28.8	1	Standard thermal glazing	23.2	No	N/A	Alternative Ventilation not Required
Plot 22	GF	NW	38.1	8.1	-26.9	3	Standard thermal glazing	25.1	No	N/A	Alternative Ventilation not Required
Plot 23	GF	SW	43.7	13.7	-21.3	9	Standard thermal glazing	30.7	No	N/A	Alternative Ventilation not Required
Plot 23	GF	SE	43.2	13.2	-21.8	8	Standard thermal glazing	30.2	No	N/A	Alternative Ventilation not Required
Plot 23	GF	NE	35.9	5.9	-29.1	1	Standard thermal glazing	22.9	No	N/A	Alternative Ventilation not Required
Plot 23	GF	NW	39.1	9.1	-25.9	4	Standard thermal glazing	26.1	No	N/A	Alternative Ventilation not Required
Plot 24	GF	W	45.5	15.5	-19.5	11	Standard thermal glazing	32.5	No	N/A	Alternative Ventilation not Required
Plot 24	GF	S	45.4	15.4	-19.6	10	Standard thermal glazing	32.4	No	N/A	Alternative Ventilation not Required
Plot 24	GF	E	39.1	9.1	-25.9	4	Standard thermal glazing	26.1	No	N/A	Alternative Ventilation not Required

Plot 24	GF	N	36.3	6.3	-28.7	1	Standard thermal glazing	23.3	No	N/A	Alternative Ventilation not Required
Plot 25	GF	SW	45.1	15.1	-19.9	10	Standard thermal glazing	32.1	No	N/A	Alternative Ventilation not Required
Plot 25	GF	SE	43	13	-22	8	Standard thermal glazing	30	No	N/A	Alternative Ventilation not Required
Plot 25	GF	NE	36.3	6.3	-28.7	1	Standard thermal glazing	23.3	No	N/A	Alternative Ventilation not Required
Plot 25	GF	NW	40	10	-25	5	Standard thermal glazing	27	No	N/A	Alternative Ventilation not Required
Plot 26	GF	SW	45.9	15.9	-19.1	11	Standard thermal glazing	32.9	No	N/A	Alternative Ventilation not Required
Plot 26	GF	SE	44.3	14.3	-20.7	9	Standard thermal glazing	31.3	No	N/A	Alternative Ventilation not Required
Plot 26	GF	NE	36.3	6.3	-28.7	1	Standard thermal glazing	23.3	No	N/A	Alternative Ventilation not Required
Plot 26	GF	NW	39.7	9.7	-25.3	5	Standard thermal glazing	26.7	No	N/A	Alternative Ventilation not Required
Plot 27	GF	SW	44.9	14.9	-20.1	10	Standard thermal glazing	31.9	No	N/A	Alternative Ventilation not Required
Plot 27	GF	SE	41.6	11.6	-23.4	7	Standard thermal glazing	28.6	No	N/A	Alternative Ventilation not Required
Plot 27	GF	NE	36.3	6.3	-28.7	1	Standard thermal glazing	23.3	No	N/A	Alternative Ventilation not Required
Plot 27	GF	NW	40.6	10.6	-24.4	6	Standard thermal glazing	27.6	No	N/A	Alternative Ventilation not Required
Plot 28	GF	SE	42.5	12.5	-22.5	8	Standard thermal glazing	29.5	No	N/A	Alternative Ventilation not Required
Plot 28	GF	NE	36.7	6.7	-28.3	2	Standard thermal glazing	23.7	No	N/A	Alternative Ventilation not Required
Plot 28	GF	NW	39.2	9.2	-25.8	4	Standard thermal glazing	26.2	No	N/A	Alternative Ventilation not Required
Plot 28	GF	SW	45	15	-20	10	Standard thermal glazing	32	No	N/A	Alternative Ventilation not Required
Plot 29 - 30	GF	W	45.8	15.8	-19.2	11	Standard thermal glazing	32.8	No	N/A	Alternative Ventilation not Required
Plot 29 - 30	GF	NW	39.8	9.8	-25.2	5	Standard thermal glazing	26.8	No	N/A	Alternative Ventilation not Required
Plot 29 - 30	GF	NE	36.8	6.8	-28.2	2	Standard thermal glazing	23.8	No	N/A	Alternative Ventilation not Required
Plot 29 - 30	GF	SE	41.5	11.5	-23.5	7	Standard thermal glazing	28.5	No	N/A	Alternative Ventilation not Required
Plot 31	GF	W	45.1	15.1	-19.9	10	Standard thermal glazing	32.1	No	N/A	Alternative Ventilation not Required
Plot 31	GF	S	42	12	-23	7	Standard thermal glazing	29	No	N/A	Alternative Ventilation not Required
Plot 31	GF	E	37	7	-28	2	Standard thermal glazing	24	No	N/A	Alternative Ventilation not Required
Plot 31	GF	N	38.1	8.1	-26.9	3	Standard thermal glazing	25.1	No	N/A	Alternative Ventilation not Required
Plot 32	GF	W	45.3	15.3	-19.7	10	Standard thermal glazing	32.3	No	N/A	Alternative Ventilation not Required
Plot 32	GF	S	44.7	14.7	-20.3	10	Standard thermal glazing	31.7	No	N/A	Alternative Ventilation not Required
Plot 32	GF	E	38.5	8.5	-26.5	4	Standard thermal glazing	25.5	No	N/A	Alternative Ventilation not Required
Plot 32	GF	N	37.5	7.5	-27.5	3	Standard thermal glazing	24.5	No	N/A	Alternative Ventilation not Required
Plot 33	GF	SE	43	13	-22	8	Standard thermal glazing	30	No	N/A	Alternative Ventilation not Required
Plot 33	GF	NE	36.5	6.5	-28.5	2	Standard thermal glazing	23.5	No	N/A	Alternative Ventilation not Required
Plot 33	GF	NW	43.4	13.4	-21.6	8	Standard thermal glazing	30.4	No	N/A	Alternative Ventilation not Required
Plot 33	GF	SW	45.9	15.9	-19.1	11	Standard thermal glazing	32.9	No	N/A	Alternative Ventilation not Required
Plot 34	GF	SW	45.7	15.7	-19.3	11	Standard thermal glazing	32.7	No	N/A	Alternative Ventilation not Required
Plot 34	GF	SE	40.4	10.4	-24.6	5	Standard thermal glazing	27.4	No	N/A	Alternative Ventilation not Required
Plot 34	GF	NE	36.7	6.7	-28.3	2	Standard thermal glazing	23.7	No	N/A	Alternative Ventilation not Required
Plot 34	GF	NW	40.3	10.3	-24.7	5	Standard thermal glazing	27.3	No	N/A	Alternative Ventilation not Required
Plot 34	GF	SW	45.5	15.5	-19.5	11	Standard thermal glazing	32.5	No	N/A	Alternative Ventilation not Required
Plot 35	GF	SW	47.1	17.1	-17.9	12	Standard thermal glazing	34.1	No	N/A	Alternative Ventilation not Required
Plot 35	GF	SE	42.1	12.1	-22.9	7	Standard thermal glazing	29.1	No	N/A	Alternative Ventilation not Required
Plot 35	GF	NE	36.8	6.8	-28.2	2	Standard thermal glazing	23.8	No	N/A	Alternative Ventilation not Required
Plot 35	GF	NW	39.4	9.4	-25.6	4	Standard thermal glazing	26.4	No	N/A	Alternative Ventilation not Required
Plot 36	GF	SW	45.9	15.9	-19.1	11	Standard thermal glazing	32.9	No	N/A	Alternative Ventilation not Required
Plot 36	GF	SE	43.2	13.2	-21.8	8	Standard thermal glazing	30.2	No	N/A	Alternative Ventilation not Required
Plot 36	GF	NE	36.8	6.8	-28.2	2	Standard thermal glazing	23.8	No	N/A	Alternative Ventilation not Required
Plot 36	GF	NW	40.3	10.3	-24.7	5	Standard thermal glazing	27.3	No	N/A	Alternative Ventilation not Required

Plot 37	GF	SW	49.7	19.7	-15.3	15	Standard thermal glazing	36.7	Yes	ADF Systems 1 or 2	Acoustic-grade Trickle Ventilator
Plot 37	GF	NW	41.7	11.7	-23.3	7	Standard thermal glazing	28.7	No	N/A	Alternative Ventilation not Required
Plot 37	GF	NE	37	7	-28	2	Standard thermal glazing	24	No	N/A	Alternative Ventilation not Required
Plot 37	GF	SE	48.5	18.5	-16.5	14	Standard thermal glazing	35.5	Yes	ADF Systems 1 or 2	Acoustic-grade Trickle Ventilator
Plot 38	GF	SW	38.3	8.3	-26.7	3	Standard thermal glazing	25.3	No	N/A	Alternative Ventilation not Required
Plot 38	GF	SE	45.6	15.6	-19.4	11	Standard thermal glazing	32.6	No	N/A	Alternative Ventilation not Required
Plot 38	GF	NE	36.9	6.9	-28.1	2	Standard thermal glazing	23.9	No	N/A	Alternative Ventilation not Required
Plot 38	GF	NW	42.1	12.1	-22.9	7	Standard thermal glazing	29.1	No	N/A	Alternative Ventilation not Required
Plot 39	GF	SE	47.4	17.4	-17.6	12	Standard thermal glazing	34.4	No	N/A	Alternative Ventilation not Required
Plot 39	GF	SW	42.1	12.1	-22.9	7	Standard thermal glazing	29.1	No	N/A	Alternative Ventilation not Required
Plot 39	GF	NW	41.1	11.1	-23.9	6	Standard thermal glazing	28.1	No	N/A	Alternative Ventilation not Required
Plot 39	GF	NE	36.5	6.5	-28.5	2	Standard thermal glazing	23.5	No	N/A	Alternative Ventilation not Required
Plot 10 - 11	GF	E	36.3	6.3	-28.7	1	Standard thermal glazing	23.3	No	N/A	Alternative Ventilation not Required
Plot 10 - 11	GF	N	35.9	5.9	-29.1	1	Standard thermal glazing	22.9	No	N/A	Alternative Ventilation not Required
Plot 10 - 11	GF	W	44	14	-21	9	Standard thermal glazing	31	No	N/A	Alternative Ventilation not Required
Plot 10 - 11	GF	S	44	14	-21	9	Standard thermal glazing	31	No	N/A	Alternative Ventilation not Required
Plot 40	GF	S	44.6	14.6	-20.4	10	Standard thermal glazing	31.6	No	N/A	Alternative Ventilation not Required
Plot 40	GF	E	38.3	8.3	-26.7	3	Standard thermal glazing	25.3	No	N/A	Alternative Ventilation not Required
Plot 40	GF	N	38.6	8.6	-26.4	4	Standard thermal glazing	25.6	No	N/A	Alternative Ventilation not Required
Plot 40	GF	W	46.6	16.6	-18.4	12	Standard thermal glazing	33.6	No	N/A	Alternative Ventilation not Required
Plot 41 - 42	GF	SE	44.8	14.8	-20.2	10	Standard thermal glazing	31.8	No	N/A	Alternative Ventilation not Required
Plot 41 - 42	GF	NE	37.2	7.2	-27.8	2	Standard thermal glazing	24.2	No	N/A	Alternative Ventilation not Required
Plot 41 - 42	GF	NW	41.3	11.3	-23.7	6	Standard thermal glazing	28.3	No	N/A	Alternative Ventilation not Required
Plot 41 - 42	GF	SW	45.5	15.5	-19.5	11	Standard thermal glazing	32.5	No	N/A	Alternative Ventilation not Required
Plot 43	GF	S	46.5	16.5	-18.5	12	Standard thermal glazing	33.5	No	N/A	Alternative Ventilation not Required
Plot 43	GF	E	39.6	9.6	-25.4	5	Standard thermal glazing	26.6	No	N/A	Alternative Ventilation not Required
Plot 43	GF	N	37.9	7.9	-27.1	3	Standard thermal glazing	24.9	No	N/A	Alternative Ventilation not Required
Plot 43	GF	W	45.9	15.9	-19.1	11	Standard thermal glazing	32.9	No	N/A	Alternative Ventilation not Required
Plot 44	GF	SW	45.8	15.8	-19.2	11	Standard thermal glazing	32.8	No	N/A	Alternative Ventilation not Required
Plot 44	GF	SE	43.9	13.9	-21.1	9	Standard thermal glazing	30.9	No	N/A	Alternative Ventilation not Required
Plot 44	GF	NE	37.2	7.2	-27.8	2	Standard thermal glazing	24.2	No	N/A	Alternative Ventilation not Required
Plot 44	GF	NW	40.9	10.9	-24.1	6	Standard thermal glazing	27.9	No	N/A	Alternative Ventilation not Required
Plot 45	GF	SW	46.3	16.3	-18.7	11	Standard thermal glazing	33.3	No	N/A	Alternative Ventilation not Required
Plot 45	GF	SE	44.3	14.3	-20.7	9	Standard thermal glazing	31.3	No	N/A	Alternative Ventilation not Required
Plot 45	GF	NE	37.3	7.3	-27.7	2	Standard thermal glazing	24.3	No	N/A	Alternative Ventilation not Required
Plot 45	GF	NW	41.5	11.5	-23.5	7	Standard thermal glazing	28.5	No	N/A	Alternative Ventilation not Required
Plot 46	GF	W	50.6	20.6	-14.4	16	Standard thermal glazing	37.6	Yes	ADF Systems 1 or 2	Acoustic-grade Trickle Ventilator
Plot 46	GF	N	39.7	9.7	-25.3	5	Standard thermal glazing	26.7	No	N/A	Alternative Ventilation not Required
Plot 46	GF	E	38.2	8.2	-26.8	3	Standard thermal glazing	25.2	No	N/A	Alternative Ventilation not Required
Plot 46	GF	S	51.2	21.2	-13.8	16	Standard thermal glazing	38.2	Yes	ADF Systems 1 or 2	Acoustic-grade Trickle Ventilator
Plot 47	GF	S	50.1	20.1	-14.9	15	Standard thermal glazing	37.1	Yes	ADF Systems 1 or 2	Acoustic-grade Trickle Ventilator
Plot 47	GF	W	41.9	11.9	-23.1	7	Standard thermal glazing	28.9	No	N/A	Alternative Ventilation not Required
Plot 47	GF	N	40.8	10.8	-24.2	6	Standard thermal glazing	27.8	No	N/A	Alternative Ventilation not Required
Plot 47	GF	E	39.1	9.1	-25.9	4	Standard thermal glazing	26.1	No	N/A	Alternative Ventilation not Required
Plot 48	GF	W	43.5	13.5	-21.5	9	Standard thermal glazing	30.5	No	N/A	Alternative Ventilation not Required
Plot 48	GF	S	52.8	22.8	-12.2	18	Standard thermal glazing	39.8	Yes	ADF Systems 1 or 2	Acoustic-grade Trickle Ventilator

Plot 48	GF	E	39.2	9.2	-25.8	4	Standard thermal glazing	26.2	No	N/A	Alternative Ventilation not Required
Plot 48	GF	N	40.2	10.2	-24.8	5	Standard thermal glazing	27.2	No	N/A	Alternative Ventilation not Required
Plot 49	GF	S	53.2	23.2	-11.8	18	Standard thermal glazing	40.2	Yes	ADF Systems 1 or 2	Acoustic-grade Trickle Ventilator
Plot 49	GF	E	39.4	9.4	-25.6	4	Standard thermal glazing	26.4	No	N/A	Alternative Ventilation not Required
Plot 49	GF	N	38.9	8.9	-26.1	4	Standard thermal glazing	25.9	No	N/A	Alternative Ventilation not Required
Plot 49	GF	W	52.1	22.1	-12.9	17	Standard thermal glazing	39.1	Yes	ADF Systems 1 or 2	Acoustic-grade Trickle Ventilator
Plot 50	GF	S	53.4	23.4	-11.6	18	Standard thermal glazing	40.4	Yes	ADF Systems 1 or 2	Acoustic-grade Trickle Ventilator
Plot 50	GF	E	43	13	-22	8	Standard thermal glazing	30	No	N/A	Alternative Ventilation not Required
Plot 50	GF	N	39.3	9.3	-25.7	4	Standard thermal glazing	26.3	No	N/A	Alternative Ventilation not Required
Plot 50	GF	W	52.2	22.2	-12.8	17	Standard thermal glazing	39.2	Yes	ADF Systems 1 or 2	Acoustic-grade Trickle Ventilator
Plot 51 - 53	GF	S	48	18	-17	13	Standard thermal glazing	35	No	N/A	Alternative Ventilation not Required
Plot 51 - 53	GF	E	40.3	10.3	-24.7	5	Standard thermal glazing	27.3	No	N/A	Alternative Ventilation not Required
Plot 51 - 53	GF	N	38.5	8.5	-26.5	4	Standard thermal glazing	25.5	No	N/A	Alternative Ventilation not Required
Plot 51 - 53	GF	W	49.1	19.1	-15.9	14	Standard thermal glazing	36.1	Yes	ADF Systems 1 or 2	Acoustic-grade Trickle Ventilator
Plot 54	GF	S	41.9	11.9	-23.1	7	Standard thermal glazing	28.9	No	N/A	Alternative Ventilation not Required
Plot 54	GF	W	48.9	18.9	-16.1	14	Standard thermal glazing	35.9	Yes	ADF Systems 1 or 2	Acoustic-grade Trickle Ventilator
Plot 54	GF	N	38.2	8.2	-26.8	3	Standard thermal glazing	25.2	No	N/A	Alternative Ventilation not Required
Plot 54	GF	E	41.1	11.1	-23.9	6	Standard thermal glazing	28.1	No	N/A	Alternative Ventilation not Required
Plot 55	GF	W	48.1	18.1	-16.9	13	Standard thermal glazing	35.1	Yes	ADF Systems 1 or 2	Acoustic-grade Trickle Ventilator
Plot 55	GF	S	41.9	11.9	-23.1	7	Standard thermal glazing	28.9	No	N/A	Alternative Ventilation not Required
Plot 55	GF	E	40	10	-25	5	Standard thermal glazing	27	No	N/A	Alternative Ventilation not Required
Plot 55	GF	N	38.4	8.4	-26.6	3	Standard thermal glazing	25.4	No	N/A	Alternative Ventilation not Required
Plot 56	GF	W	48.4	18.4	-16.6	13	Standard thermal glazing	35.4	Yes	ADF Systems 1 or 2	Acoustic-grade Trickle Ventilator
Plot 56	GF	S	44.8	14.8	-20.2	10	Standard thermal glazing	31.8	No	N/A	Alternative Ventilation not Required
Plot 56	GF	E	38.2	8.2	-26.8	3	Standard thermal glazing	25.2	No	N/A	Alternative Ventilation not Required
Plot 56	GF	N	39	9	-26	4	Standard thermal glazing	26	No	N/A	Alternative Ventilation not Required
Plot 56	GF	W	45.8	15.8	-19.2	11	Standard thermal glazing	32.8	No	N/A	Alternative Ventilation not Required
Plot 56	GF	S	42.5	12.5	-22.5	8	Standard thermal glazing	29.5	No	N/A	Alternative Ventilation not Required
Plot 56	GF	E	43.9	13.9	-21.1	9	Standard thermal glazing	30.9	No	N/A	Alternative Ventilation not Required
Plot 56	GF	N	38.8	8.8	-26.2	4	Standard thermal glazing	25.8	No	N/A	Alternative Ventilation not Required
Plot 58 - 60	GF	S	41.9	11.9	-23.1	7	Standard thermal glazing	28.9	No	N/A	Alternative Ventilation not Required
Plot 58 - 60	GF	W	46.9	16.9	-18.1	12	Standard thermal glazing	33.9	No	N/A	Alternative Ventilation not Required
Plot 58 - 60	GF	N	38.5	8.5	-26.5	4	Standard thermal glazing	25.5	No	N/A	Alternative Ventilation not Required
Plot 58 - 60	GF	E	41.7	11.7	-23.3	7	Standard thermal glazing	28.7	No	N/A	Alternative Ventilation not Required
Plot 61 - 63	GF	W	46.6	16.6	-18.4	12	Standard thermal glazing	33.6	No	N/A	Alternative Ventilation not Required
Plot 61 - 63	GF	S	47.6	17.6	-17.4	13	Standard thermal glazing	34.6	No	N/A	Alternative Ventilation not Required
Plot 61 - 63	GF	E	41.4	11.4	-23.6	6	Standard thermal glazing	28.4	No	N/A	Alternative Ventilation not Required
Plot 61 - 63	GF	N	38.6	8.6	-26.4	4	Standard thermal glazing	25.6	No	N/A	Alternative Ventilation not Required
Plot 64	GF	S	52.5	22.5	-12.5	18	Standard thermal glazing	39.5	Yes	ADF Systems 1 or 2	Acoustic-grade Trickle Ventilator
Plot 64	GF	E	40.1	10.1	-24.9	5	Standard thermal glazing	27.1	No	N/A	Alternative Ventilation not Required
Plot 64	GF	N	43	13	-22	8	Standard thermal glazing	30	No	N/A	Alternative Ventilation not Required
Plot 64	GF	W	50	20	-15	15	Standard thermal glazing	37	Yes	ADF Systems 1 or 2	Acoustic-grade Trickle Ventilator
Plot 65	GF	W	49.7	19.7	-15.3	15	Standard thermal glazing	36.7	Yes	ADF Systems 1 or 2	Acoustic-grade Trickle Ventilator
Plot 65	GF	S	54.4	24.4	-10.6	19	Standard thermal glazing	41.4	Yes	ADF Systems 1 or 2	Acoustic-grade Trickle Ventilator
Plot 65	GF	E	40.5	10.5	-24.5	6	Standard thermal glazing	27.5	No	N/A	Alternative Ventilation not Required
Plot 65	GF	N	41.4	11.4	-23.6	6	Standard thermal glazing	28.4	No	N/A	Alternative Ventilation not Required

Plot 66	GF	S	54.9	24.9	-10.1	20	Standard thermal glazing	41.9	Yes	ADF Systems 1 or 2	Acoustic-grade Trickle Ventilator
Plot 66	GF	E	44.9	14.9	-20.1	10	Standard thermal glazing	31.9	No	N/A	Alternative Ventilation not Required
Plot 66	GF	N	39.6	9.6	-25.4	5	Standard thermal glazing	26.6	No	N/A	Alternative Ventilation not Required
Plot 66	GF	W	52.1	22.1	-12.9	17	Standard thermal glazing	39.1	Yes	ADF Systems 1 or 2	Acoustic-grade Trickle Ventilator
Plot 67	GF	E	46.5	16.5	-18.5	12	Standard thermal glazing	33.5	No	N/A	Alternative Ventilation not Required
Plot 67	GF	N	44.7	14.7	-20.3	10	Standard thermal glazing	31.7	No	N/A	Alternative Ventilation not Required
Plot 67	GF	W	54.3	24.3	-10.7	19	Standard thermal glazing	41.3	Yes	ADF Systems 1 or 2	Acoustic-grade Trickle Ventilator
Plot 67	GF	S	55.3	25.3	-9.7	20	Standard thermal glazing	42.3	Yes	ADF Systems 1 or 2	Acoustic-grade Trickle Ventilator
Plot 68	GF	W	50	20	-15	15	Standard thermal glazing	37	Yes	ADF Systems 1 or 2	Acoustic-grade Trickle Ventilator
Plot 68	GF	S	49.4	19.4	-15.6	14	Standard thermal glazing	36.4	Yes	ADF Systems 1 or 2	Acoustic-grade Trickle Ventilator
Plot 68	GF	E	41.7	11.7	-23.3	7	Standard thermal glazing	28.7	No	N/A	Alternative Ventilation not Required
Plot 68	GF	N	39.8	9.8	-25.2	5	Standard thermal glazing	26.8	No	N/A	Alternative Ventilation not Required
Plot 69 - 70	GF	S	42.4	12.4	-22.6	7	Standard thermal glazing	29.4	No	N/A	Alternative Ventilation not Required
Plot 69 - 70	GF	W	50	20	-15	15	Standard thermal glazing	37	Yes	ADF Systems 1 or 2	Acoustic-grade Trickle Ventilator
Plot 69 - 70	GF	N	39.1	9.1	-25.9	4	Standard thermal glazing	26.1	No	N/A	Alternative Ventilation not Required
Plot 69 - 70	GF	E	40.6	10.6	-24.4	6	Standard thermal glazing	27.6	No	N/A	Alternative Ventilation not Required
Plot 71 - 72	GF	S	42.8	12.8	-22.2	8	Standard thermal glazing	29.8	No	N/A	Alternative Ventilation not Required
Plot 71 - 72	GF	W	49.8	19.8	-15.2	15	Standard thermal glazing	36.8	Yes	ADF Systems 1 or 2	Acoustic-grade Trickle Ventilator
Plot 71 - 72	GF	N	39	9	-26	4	Standard thermal glazing	26	No	N/A	Alternative Ventilation not Required
Plot 71 - 72	GF	E	44.2	14.2	-20.8	9	Standard thermal glazing	31.2	No	N/A	Alternative Ventilation not Required
Plot 73	GF	S	43.4	13.4	-21.6	8	Standard thermal glazing	30.4	No	N/A	Alternative Ventilation not Required
Plot 73	GF	E	45.1	15.1	-19.9	10	Standard thermal glazing	32.1	No	N/A	Alternative Ventilation not Required
Plot 73	GF	N	39.2	9.2	-25.8	4	Standard thermal glazing	26.2	No	N/A	Alternative Ventilation not Required
Plot 73	GF	W	48.6	18.6	-16.4	14	Standard thermal glazing	35.6	Yes	ADF Systems 1 or 2	Acoustic-grade Trickle Ventilator
Plot 74	GF	S	41.5	11.5	-23.5	7	Standard thermal glazing	28.5	No	N/A	Alternative Ventilation not Required
Plot 74	GF	E	43.5	13.5	-21.5	9	Standard thermal glazing	30.5	No	N/A	Alternative Ventilation not Required
Plot 74	GF	N	38.7	8.7	-26.3	4	Standard thermal glazing	25.7	No	N/A	Alternative Ventilation not Required
Plot 74	GF	W	48.7	18.7	-16.3	14	Standard thermal glazing	35.7	Yes	ADF Systems 1 or 2	Acoustic-grade Trickle Ventilator
Plot 75 - 76	GF	S	47.7	17.7	-17.3	13	Standard thermal glazing	34.7	No	N/A	Alternative Ventilation not Required
Plot 75 - 76	GF	W	46.1	16.1	-18.9	11	Standard thermal glazing	33.1	No	N/A	Alternative Ventilation not Required
Plot 75 - 76	GF	N	38.7	8.7	-26.3	4	Standard thermal glazing	25.7	No	N/A	Alternative Ventilation not Required
Plot 75 - 76	GF	E	43.6	13.6	-21.4	9	Standard thermal glazing	30.6	No	N/A	Alternative Ventilation not Required
Plot 77	GF	S	47.7	17.7	-17.3	13	Standard thermal glazing	34.7	No	N/A	Alternative Ventilation not Required
Plot 77	GF	W	45.4	15.4	-19.6	10	Standard thermal glazing	32.4	No	N/A	Alternative Ventilation not Required
Plot 77	GF	N	39.4	9.4	-25.6	4	Standard thermal glazing	26.4	No	N/A	Alternative Ventilation not Required
Plot 77	GF	E	42.4	12.4	-22.6	7	Standard thermal glazing	29.4	No	N/A	Alternative Ventilation not Required
Plot 78	GF	S	47.9	17.9	-17.1	13	Standard thermal glazing	34.9	No	N/A	Alternative Ventilation not Required
Plot 78	GF	W	46.9	16.9	-18.1	12	Standard thermal glazing	33.9	No	N/A	Alternative Ventilation not Required
Plot 78	GF	N	39.1	9.1	-25.9	4	Standard thermal glazing	26.1	No	N/A	Alternative Ventilation not Required
Plot 78	GF	E	47.8	17.8	-17.2	13	Standard thermal glazing	34.8	No	N/A	Alternative Ventilation not Required
Plot 79 - 80	GF	N	39.3	9.3	-25.7	4	Standard thermal glazing	26.3	No	N/A	Alternative Ventilation not Required
Plot 79 - 80	GF	E	47.1	17.1	-17.9	12	Standard thermal glazing	34.1	No	N/A	Alternative Ventilation not Required
Plot 79 - 80	GF	S	47.5	17.5	-17.5	13	Standard thermal glazing	34.5	No	N/A	Alternative Ventilation not Required
Plot 79 - 80	GF	W	47.5	17.5	-17.5	13	Standard thermal glazing	34.5	No	N/A	Alternative Ventilation not Required
Plot 81	GF	W	49	19	-16	14	Standard thermal glazing	36	Yes	ADF Systems 1 or 2	Acoustic-grade Trickle Ventilator
Plot 81	GF	N	39	9	-26	4	Standard thermal glazing	26	No	N/A	Alternative Ventilation not Required

Plot 81	GF	E	52.1	22.1	-12.9	17	Standard thermal glazing	39.1	Yes	ADF Systems 1 or 2	Acoustic-grade Trickle Ventilator
Plot 81	GF	S	55.5	25.5	-9.5	21	Standard thermal glazing	42.5	Yes	ADF Systems 1 or 2	Acoustic-grade Trickle Ventilator
Plot 82	GF	S	56	26	-9	21	Standard thermal glazing	43	Yes	ADF Systems 1 or 2	Acoustic-grade Trickle Ventilator
Plot 82	GF	W	53.5	23.5	-11.5	19	Standard thermal glazing	40.5	Yes	ADF Systems 1 or 2	Acoustic-grade Trickle Ventilator
Plot 82	GF	N	39	9	-26	4	Standard thermal glazing	26	No	N/A	Alternative Ventilation not Required
Plot 82	GF	E	49.5	19.5	-15.5	15	Standard thermal glazing	36.5	Yes	ADF Systems 1 or 2	Acoustic-grade Trickle Ventilator
Plot 83	GF	S	56.3	26.3	-8.7	21	Standard thermal glazing	43.3	Yes	ADF Systems 1 or 2	Acoustic-grade Trickle Ventilator
Plot 83	GF	NW	49.1	19.1	-15.9	14	Standard thermal glazing	36.1	Yes	ADF Systems 1 or 2	Acoustic-grade Trickle Ventilator
Plot 83	GF	NE	39	9	-26	4	Standard thermal glazing	26	No	N/A	Alternative Ventilation not Required
Plot 83	GF	SE	51.3	21.3	-13.7	16	Standard thermal glazing	38.3	Yes	ADF Systems 1 or 2	Acoustic-grade Trickle Ventilator
Plot 84 - 85	GF	SW	56.3	26.3	-8.7	21	Standard thermal glazing	43.3	Yes	ADF Systems 1 or 2	Acoustic-grade Trickle Ventilator
Plot 84 - 85	GF	E	47.7	17.7	-17.3	13	Standard thermal glazing	34.7	No	N/A	Alternative Ventilation not Required
Plot 84 - 85	GF	NE	39	9	-26	4	Standard thermal glazing	26	No	N/A	Alternative Ventilation not Required
Plot 84 - 85	GF	NW	52.8	22.8	-12.2	18	Standard thermal glazing	39.8	Yes	ADF Systems 1 or 2	Acoustic-grade Trickle Ventilator
Plot 86 - 87	GF	SW	56.3	26.3	-8.7	21	Standard thermal glazing	43.3	Yes	ADF Systems 1 or 2	Acoustic-grade Trickle Ventilator
Plot 86 - 87	GF	SE	53.9	23.9	-11.1	19	Standard thermal glazing	40.9	Yes	ADF Systems 1 or 2	Acoustic-grade Trickle Ventilator
Plot 86 - 87	GF	NE	39	9	-26	4	Standard thermal glazing	26	No	N/A	Alternative Ventilation not Required
Plot 86 - 87	GF	NW	51	21	-14	16	Standard thermal glazing	38	Yes	ADF Systems 1 or 2	Acoustic-grade Trickle Ventilator
Plot 88 - 89	GF	W	54.8	24.8	-10.2	20	Standard thermal glazing	41.8	Yes	ADF Systems 1 or 2	Acoustic-grade Trickle Ventilator
Plot 88 - 89	GF	N	40.1	10.1	-24.9	5	Standard thermal glazing	27.1	No	N/A	Alternative Ventilation not Required
Plot 88 - 89	GF	E	41.5	11.5	-23.5	7	Standard thermal glazing	28.5	No	N/A	Alternative Ventilation not Required
Plot 88 - 89	GF	S	54.5	24.5	-10.5	20	Standard thermal glazing	41.5	Yes	ADF Systems 1 or 2	Acoustic-grade Trickle Ventilator
Plot 90	GF	W	54.7	24.7	-10.3	20	Standard thermal glazing	41.7	Yes	ADF Systems 1 or 2	Acoustic-grade Trickle Ventilator
Plot 90	GF	N	45.3	15.3	-19.7	10	Standard thermal glazing	32.3	No	N/A	Alternative Ventilation not Required
Plot 90	GF	E	41.6	11.6	-23.4	7	Standard thermal glazing	28.6	No	N/A	Alternative Ventilation not Required
Plot 90	GF	S	51.4	21.4	-13.6	16	Standard thermal glazing	38.4	Yes	ADF Systems 1 or 2	Acoustic-grade Trickle Ventilator
Plot 91 - 92	GF	S	53.7	23.7	-11.3	19	Standard thermal glazing	40.7	Yes	ADF Systems 1 or 2	Acoustic-grade Trickle Ventilator
Plot 91 - 92	GF	W	53.2	23.2	-11.8	18	Standard thermal glazing	40.2	Yes	ADF Systems 1 or 2	Acoustic-grade Trickle Ventilator
Plot 91 - 92	GF	N	38.9	8.9	-26.1	4	Standard thermal glazing	25.9	No	N/A	Alternative Ventilation not Required
Plot 91 - 92	GF	E	42.6	12.6	-22.4	8	Standard thermal glazing	29.6	No	N/A	Alternative Ventilation not Required
Plot 93 - 95	GF	S	51.3	21.3	-13.7	16	Standard thermal glazing	38.3	Yes	ADF Systems 1 or 2	Acoustic-grade Trickle Ventilator
Plot 93 - 95	GF	W	43.2	13.2	-21.8	8	Standard thermal glazing	30.2	No	N/A	Alternative Ventilation not Required
Plot 93 - 95	GF	N	38.9	8.9	-26.1	4	Standard thermal glazing	25.9	No	N/A	Alternative Ventilation not Required
Plot 93 - 95	GF	E	40.9	10.9	-24.1	6	Standard thermal glazing	27.9	No	N/A	Alternative Ventilation not Required
Plot 96 - 98	GF	W	42.6	12.6	-22.4	8	Standard thermal glazing	29.6	No	N/A	Alternative Ventilation not Required
Plot 96 - 98	GF	N	38.5	8.5	-26.5	4	Standard thermal glazing	25.5	No	N/A	Alternative Ventilation not Required
Plot 96 - 98	GF	E	41.2	11.2	-23.8	6	Standard thermal glazing	28.2	No	N/A	Alternative Ventilation not Required
Plot 96 - 98	GF	S	49.7	19.7	-15.3	15	Standard thermal glazing	36.7	Yes	ADF Systems 1 or 2	Acoustic-grade Trickle Ventilator
Plot 99 - 100	GF	W	42	12	-23	7	Standard thermal glazing	29	No	N/A	Alternative Ventilation not Required
Plot 99 - 100	GF	N	38.5	8.5	-26.5	4	Standard thermal glazing	25.5	No	N/A	Alternative Ventilation not Required
Plot 99 - 100	GF	E	41.7	11.7	-23.3	7	Standard thermal glazing	28.7	No	N/A	Alternative Ventilation not Required
Plot 99 - 100	GF	S	48.4	18.4	-16.6	13	Standard thermal glazing	35.4	Yes	ADF Systems 1 or 2	Acoustic-grade Trickle Ventilator
Plot 101	GF	S	48.8	18.8	-16.2	14	Standard thermal glazing	35.8	Yes	ADF Systems 1 or 2	Acoustic-grade Trickle Ventilator
Plot 101	GF	W	42.4	12.4	-22.6	7	Standard thermal glazing	29.4	No	N/A	Alternative Ventilation not Required
Plot 101	GF	N	38.3	8.3	-26.7	3	Standard thermal glazing	25.3	No	N/A	Alternative Ventilation not Required
Plot 101	GF	E	45.6	15.6	-19.4	11	Standard thermal glazing	32.6	No	N/A	Alternative Ventilation not Required

Plot 102 - 103	GF	W	46.9	16.9	-18.1	12	Standard thermal glazing	33.9	No	N/A	Alternative Ventilation not Required
Plot 102 - 103	GF	N	37.7	7.7	-27.3	3	Standard thermal glazing	24.7	No	N/A	Alternative Ventilation not Required
Plot 102 - 103	GF	E	40.9	10.9	-24.1	6	Standard thermal glazing	27.9	No	N/A	Alternative Ventilation not Required
Plot 102 - 103	GF	S	49.1	19.1	-15.9	14	Standard thermal glazing	36.1	Yes	ADF Systems 1 or 2	Acoustic-grade Trickle Ventilator
Plot 104	GF	S	47.2	17.2	-17.8	12	Standard thermal glazing	34.2	No	N/A	Alternative Ventilation not Required
Plot 104	GF	W	44.2	14.2	-20.8	9	Standard thermal glazing	31.2	No	N/A	Alternative Ventilation not Required
Plot 104	GF	N	38.6	8.6	-26.4	4	Standard thermal glazing	25.6	No	N/A	Alternative Ventilation not Required
Plot 104	GF	E	43.8	13.8	-21.2	9	Standard thermal glazing	30.8	No	N/A	Alternative Ventilation not Required
Plot 105 - 106	GF	W	44	14	-21	9	Standard thermal glazing	31	No	N/A	Alternative Ventilation not Required
Plot 105 - 106	GF	N	38.6	8.6	-26.4	4	Standard thermal glazing	25.6	No	N/A	Alternative Ventilation not Required
Plot 105 - 106	GF	E	42.2	12.2	-22.8	7	Standard thermal glazing	29.2	No	N/A	Alternative Ventilation not Required
Plot 105 - 106	GF	S	47.9	17.9	-17.1	13	Standard thermal glazing	34.9	No	N/A	Alternative Ventilation not Required
Plot 107 - 108	GF	W	45.5	15.5	-19.5	11	Standard thermal glazing	32.5	No	N/A	Alternative Ventilation not Required
Plot 107 - 108	GF	N	38.3	8.3	-26.7	3	Standard thermal glazing	25.3	No	N/A	Alternative Ventilation not Required
Plot 107 - 108	GF	E	40	10	-25	5	Standard thermal glazing	27	No	N/A	Alternative Ventilation not Required
Plot 107 - 108	GF	S	47.9	17.9	-17.1	13	Standard thermal glazing	34.9	No	N/A	Alternative Ventilation not Required
Plot 109 - 111	GF	W	42.2	12.2	-22.8	7	Standard thermal glazing	29.2	No	N/A	Alternative Ventilation not Required
Plot 109 - 111	GF	N	38.4	8.4	-26.6	3	Standard thermal glazing	25.4	No	N/A	Alternative Ventilation not Required
Plot 109 - 111	GF	E	39.9	9.9	-25.1	5	Standard thermal glazing	26.9	No	N/A	Alternative Ventilation not Required
Plot 109 - 111	GF	S	48	18	-17	13	Standard thermal glazing	35	No	N/A	Alternative Ventilation not Required
Plot 112 - 114	GF	W	45.8	15.8	-19.2	11	Standard thermal glazing	32.8	No	N/A	Alternative Ventilation not Required
Plot 112 - 114	GF	N	38.2	8.2	-26.8	3	Standard thermal glazing	25.2	No	N/A	Alternative Ventilation not Required
Plot 112 - 114	GF	E	39.3	9.3	-25.7	4	Standard thermal glazing	26.3	No	N/A	Alternative Ventilation not Required
Plot 112 - 114	GF	S	47	17	-18	12	Standard thermal glazing	34	No	N/A	Alternative Ventilation not Required
Plot 115 - 116	GF	NW	38.7	8.7	-26.3	4	Standard thermal glazing	25.7	No	N/A	Alternative Ventilation not Required
Plot 115 - 116	GF	NE	37	7	-28	2	Standard thermal glazing	24	No	N/A	Alternative Ventilation not Required
Plot 115 - 116	GF	SE	46.7	16.7	-18.3	12	Standard thermal glazing	33.7	No	N/A	Alternative Ventilation not Required
Plot 115 - 116	GF	SW	46.3	16.3	-18.7	11	Standard thermal glazing	33.3	No	N/A	Alternative Ventilation not Required
Plot 117	GF	W	44.9	14.9	-20.1	10	Standard thermal glazing	31.9	No	N/A	Alternative Ventilation not Required
Plot 117	GF	S	45.5	15.5	-19.5	11	Standard thermal glazing	32.5	No	N/A	Alternative Ventilation not Required
Plot 117	GF	E	37.8	7.8	-27.2	3	Standard thermal glazing	24.8	No	N/A	Alternative Ventilation not Required
Plot 117	GF	N	38.2	8.2	-26.8	3	Standard thermal glazing	25.2	No	N/A	Alternative Ventilation not Required
Plot 118	GF	W	40	10	-25	5	Standard thermal glazing	27	No	N/A	Alternative Ventilation not Required
Plot 118	GF	S	46.3	16.3	-18.7	11	Standard thermal glazing	33.3	No	N/A	Alternative Ventilation not Required
Plot 118	GF	E	37.7	7.7	-27.3	3	Standard thermal glazing	24.7	No	N/A	Alternative Ventilation not Required
Plot 118	GF	N	36.6	6.6	-28.4	2	Standard thermal glazing	23.6	No	N/A	Alternative Ventilation not Required
Plot 119	GF	E	37.6	7.6	-27.4	3	Standard thermal glazing	24.6	No	N/A	Alternative Ventilation not Required
Plot 119	GF	N	36.6	6.6	-28.4	2	Standard thermal glazing	23.6	No	N/A	Alternative Ventilation not Required
Plot 119	GF	W	41.9	11.9	-23.1	7	Standard thermal glazing	28.9	No	N/A	Alternative Ventilation not Required
Plot 119	GF	S	46.4	16.4	-18.6	11	Standard thermal glazing	33.4	No	N/A	Alternative Ventilation not Required
Plot 120	GF	W	45.4	15.4	-19.6	10	Standard thermal glazing	32.4	No	N/A	Alternative Ventilation not Required
Plot 120	GF	S	44.2	14.2	-20.8	9	Standard thermal glazing	31.2	No	N/A	Alternative Ventilation not Required
Plot 120	GF	E	36.8	6.8	-28.2	2	Standard thermal glazing	23.8	No	N/A	Alternative Ventilation not Required
Plot 120	GF	N	37.9	7.9	-27.1	3	Standard thermal glazing	24.9	No	N/A	Alternative Ventilation not Required
Plot 121	GF	W	45.9	15.9	-19.1	11	Standard thermal glazing	32.9	No	N/A	Alternative Ventilation not Required
Plot 121	GF	S	40	10	-25	5	Standard thermal glazing	27	No	N/A	Alternative Ventilation not Required

Plot 121	GF	E	37.1	7.1	-27.9	2	Standard thermal glazing	24.1	No	N/A	Alternative Ventilation not Required
Plot 121	GF	N	37.7	7.7	-27.3	3	Standard thermal glazing	24.7	No	N/A	Alternative Ventilation not Required
Plot 122	GF	W	46.1	16.1	-18.9	11	Standard thermal glazing	33.1	No	N/A	Alternative Ventilation not Required
Plot 122	GF	S	39.7	9.7	-25.3	5	Standard thermal glazing	26.7	No	N/A	Alternative Ventilation not Required
Plot 122	GF	E	36.7	6.7	-28.3	2	Standard thermal glazing	23.7	No	N/A	Alternative Ventilation not Required
Plot 122	GF	N	37.7	7.7	-27.3	3	Standard thermal glazing	24.7	No	N/A	Alternative Ventilation not Required
Plot 123	GF	S	39.2	9.2	-25.8	4	Standard thermal glazing	26.2	No	N/A	Alternative Ventilation not Required
Plot 123	GF	E	36.9	6.9	-28.1	2	Standard thermal glazing	23.9	No	N/A	Alternative Ventilation not Required
Plot 123	GF	N	37.2	7.2	-27.8	2	Standard thermal glazing	24.2	No	N/A	Alternative Ventilation not Required
Plot 123	GF	W	45.9	15.9	-19.1	11	Standard thermal glazing	32.9	No	N/A	Alternative Ventilation not Required
Plot 124	GF	W	45.9	15.9	-19.1	11	Standard thermal glazing	32.9	No	N/A	Alternative Ventilation not Required
Plot 124	GF	S	40.2	10.2	-24.8	5	Standard thermal glazing	27.2	No	N/A	Alternative Ventilation not Required
Plot 124	GF	E	36.1	6.1	-28.9	1	Standard thermal glazing	23.1	No	N/A	Alternative Ventilation not Required
Plot 124	GF	N	36.9	6.9	-28.1	2	Standard thermal glazing	23.9	No	N/A	Alternative Ventilation not Required
Plot 125	GF	W	45.5	15.5	-19.5	11	Standard thermal glazing	32.5	No	N/A	Alternative Ventilation not Required
Plot 125	GF	S	38.7	8.7	-26.3	4	Standard thermal glazing	25.7	No	N/A	Alternative Ventilation not Required
Plot 125	GF	E	36.9	6.9	-28.1	2	Standard thermal glazing	23.9	No	N/A	Alternative Ventilation not Required
Plot 125	GF	N	36.8	6.8	-28.2	2	Standard thermal glazing	23.8	No	N/A	Alternative Ventilation not Required
Plot 126	GF	W	45.3	15.3	-19.7	10	Standard thermal glazing	32.3	No	N/A	Alternative Ventilation not Required
Plot 126	GF	S	39.6	9.6	-25.4	5	Standard thermal glazing	26.6	No	N/A	Alternative Ventilation not Required
Plot 126	GF	E	36.7	6.7	-28.3	2	Standard thermal glazing	23.7	No	N/A	Alternative Ventilation not Required
Plot 126	GF	N	35.9	5.9	-29.1	1	Standard thermal glazing	22.9	No	N/A	Alternative Ventilation not Required
Plot 127	GF	S	41.9	11.9	-23.1	7	Standard thermal glazing	28.9	No	N/A	Alternative Ventilation not Required
Plot 127	GF	W	44.1	14.1	-20.9	9	Standard thermal glazing	31.1	No	N/A	Alternative Ventilation not Required
Plot 127	GF	N	35	5	-30	0	Standard thermal glazing	22	No	N/A	Alternative Ventilation not Required
Plot 127	GF	E	38.2	8.2	-26.8	3	Standard thermal glazing	25.2	No	N/A	Alternative Ventilation not Required

APPENDIX V

NIGHT TIME FAÇADE NOISE LEVELS – ROAD TRAFFIC

(Bedrooms)

Table A4: Night Time Façade Levels

Plot	Storey	Façade Direction	Calculated LAeq, 8hr at Façade (dB)	Calculated Noise Level Inside Room (30dB reduction) (dB)	Difference with criteria (30dB) +/-	Required Sound Insulation Performance for Glazing (Rw +Ctr) (dB)	Commentary on Required Glazing	Calculated Internal Noise Level with a Partially Open Window (dB)	Alternative Ventilation Required?	Do Average Night-time Internal Noise Levels Achieve Compliance with AD-O?	Acoustics Ventilation & Overheating Assessment - Appropriate AD-F System	Example Alternative Ventilation Scheme
Plot 1	1st	SE	33.9	3.9	-26.1	4	Standard thermal glazing	20.9	No	Yes	N/A	Alternative Ventilation Not Required
Plot 1	1st	NE	28.6	-1.4	-31.4	-1	Standard thermal glazing	15.6	No	Yes	N/A	Alternative Ventilation Not Required
Plot 1	1st	NW	31	1	-29	1	Standard thermal glazing	18	No	Yes	N/A	Alternative Ventilation Not Required
Plot 1	1st	SW	35.4	5.4	-24.6	5	Standard thermal glazing	22.4	No	Yes	N/A	Alternative Ventilation Not Required
Plot 2	1st	W	35.3	5.3	-24.7	5	Standard thermal glazing	22.3	No	Yes	N/A	Alternative Ventilation Not Required
Plot 2	1st	S	36.3	6.3	-23.7	6	Standard thermal glazing	23.3	No	Yes	N/A	Alternative Ventilation Not Required
Plot 2	1st	E	29.2	-0.8	-30.8	-1	Standard thermal glazing	16.2	No	Yes	N/A	Alternative Ventilation Not Required
Plot 2	1st	N	29.1	-0.9	-30.9	-1	Standard thermal glazing	16.1	No	Yes	N/A	Alternative Ventilation Not Required
Plot 3	1st	W	36.4	6.4	-23.6	6	Standard thermal glazing	23.4	No	Yes	N/A	Alternative Ventilation Not Required
Plot 3	1st	S	36.5	6.5	-23.5	7	Standard thermal glazing	23.5	No	Yes	N/A	Alternative Ventilation Not Required
Plot 3	1st	E	29.3	-0.7	-30.7	-1	Standard thermal glazing	16.3	No	Yes	N/A	Alternative Ventilation Not Required
Plot 3	1st	N	29.2	-0.8	-30.8	-1	Standard thermal glazing	16.2	No	Yes	N/A	Alternative Ventilation Not Required
Plot 4	1st	W	36.7	6.7	-23.3	7	Standard thermal glazing	23.7	No	Yes	N/A	Alternative Ventilation Not Required
Plot 4	1st	S	36.8	6.8	-23.2	7	Standard thermal glazing	23.8	No	Yes	N/A	Alternative Ventilation Not Required
Plot 4	1st	E	29.5	-0.5	-30.5	-1	Standard thermal glazing	16.5	No	Yes	N/A	Alternative Ventilation Not Required
Plot 4	1st	N	30	0	-30	0	Standard thermal glazing	17	No	Yes	N/A	Alternative Ventilation Not Required
Plot 5	1st	W	32.2	2.2	-27.8	2	Standard thermal glazing	19.2	No	Yes	N/A	Alternative Ventilation Not Required
Plot 5	1st	S	36.2	6.2	-23.8	6	Standard thermal glazing	23.2	No	Yes	N/A	Alternative Ventilation Not Required
Plot 5	1st	E	29.5	-0.5	-30.5	-1	Standard thermal glazing	16.5	No	Yes	N/A	Alternative Ventilation Not Required
Plot 5	1st	N	29.5	-0.5	-30.5	-1	Standard thermal glazing	16.5	No	Yes	N/A	Alternative Ventilation Not Required
Plot 6	1st	S	35.6	5.6	-24.4	6	Standard thermal glazing	22.6	No	Yes	N/A	Alternative Ventilation Not Required
Plot 6	1st	W	35.5	5.5	-24.5	6	Standard thermal glazing	22.5	No	Yes	N/A	Alternative Ventilation Not Required
Plot 6	1st	N	29.4	-0.6	-30.6	-1	Standard thermal glazing	16.4	No	Yes	N/A	Alternative Ventilation Not Required
Plot 6	1st	E	29.2	-0.8	-30.8	-1	Standard thermal glazing	16.2	No	Yes	N/A	Alternative Ventilation Not Required
Plot 7	1st	SE	32.7	2.7	-27.3	3	Standard thermal glazing	19.7	No	Yes	N/A	Alternative Ventilation Not Required
Plot 7	1st	NE	29.2	-0.8	-30.8	-1	Standard thermal glazing	16.2	No	Yes	N/A	Alternative Ventilation Not Required
Plot 7	1st	NW	30.5	0.5	-29.5	1	Standard thermal glazing	17.5	No	Yes	N/A	Alternative Ventilation Not Required
Plot 7	1st	SW	35.9	5.9	-24.1	6	Standard thermal glazing	22.9	No	Yes	N/A	Alternative Ventilation Not Required
Plot 8	1st	SW	35.7	5.7	-24.3	6	Standard thermal glazing	22.7	No	Yes	N/A	Alternative Ventilation Not Required
Plot 8	1st	SE	32.9	2.9	-27.1	3	Standard thermal glazing	19.9	No	Yes	N/A	Alternative Ventilation Not Required
Plot 8	1st	NE	29.3	-0.7	-30.7	-1	Standard thermal glazing	16.3	No	Yes	N/A	Alternative Ventilation Not Required
Plot 8	1st	NW	31	1	-29	1	Standard thermal glazing	18	No	Yes	N/A	Alternative Ventilation Not Required
Plot 9	1st	SW	36.5	6.5	-23.5	7	Standard thermal glazing	23.5	No	Yes	N/A	Alternative Ventilation Not Required
Plot 9	1st	SE	33.5	3.5	-26.5	4	Standard thermal glazing	20.5	No	Yes	N/A	Alternative Ventilation Not Required
Plot 9	1st	NE	29.3	-0.7	-30.7	-1	Standard thermal glazing	16.3	No	Yes	N/A	Alternative Ventilation Not Required
Plot 9	1st	NW	30.8	0.8	-29.2	1	Standard thermal glazing	17.8	No	Yes	N/A	Alternative Ventilation Not Required
Plot 12	1st	W	37	7	-23	7	Standard thermal glazing	24	No	Yes	N/A	Alternative Ventilation Not Required
Plot 12	1st	S	37.4	7.4	-22.6	7	Standard thermal glazing	24.4	No	Yes	N/A	Alternative Ventilation Not Required
Plot 12	1st	E	29.8	-0.2	-30.2	0	Standard thermal glazing	16.8	No	Yes	N/A	Alternative Ventilation Not Required
Plot 12	1st	N	30.3	0.3	-29.7	0	Standard thermal glazing	17.3	No	Yes	N/A	Alternative Ventilation Not Required

Plot 13	1st	W	38.4	8.4	-21.6	8	Standard thermal glazing	25.4	No	Yes	N/A	Alternative Ventilation Not Required
Plot 13	1st	N	30.8	0.8	-29.2	1	Standard thermal glazing	17.8	No	Yes	N/A	Alternative Ventilation Not Required
Plot 13	1st	E	30.4	0.4	-29.6	0	Standard thermal glazing	17.4	No	Yes	N/A	Alternative Ventilation Not Required
Plot 13	1st	S	38.6	8.6	-21.4	9	Standard thermal glazing	25.6	No	Yes	N/A	Alternative Ventilation Not Required
Plot 14	1st	W	34.3	4.3	-25.7	4	Standard thermal glazing	21.3	No	Yes	N/A	Alternative Ventilation Not Required
Plot 14	1st	S	37.6	7.6	-22.4	8	Standard thermal glazing	24.6	No	Yes	N/A	Alternative Ventilation Not Required
Plot 14	1st	E	30.2	0.2	-29.8	0	Standard thermal glazing	17.2	No	Yes	N/A	Alternative Ventilation Not Required
Plot 14	1st	N	30.8	0.8	-29.2	1	Standard thermal glazing	17.8	No	Yes	N/A	Alternative Ventilation Not Required
Plot 15	1st	W	32.8	2.8	-27.2	3	Standard thermal glazing	19.8	No	Yes	N/A	Alternative Ventilation Not Required
Plot 15	1st	S	37.8	7.8	-22.2	8	Standard thermal glazing	24.8	No	Yes	N/A	Alternative Ventilation Not Required
Plot 15	1st	E	30	0	-30	0	Standard thermal glazing	17	No	Yes	N/A	Alternative Ventilation Not Required
Plot 15	1st	N	30.7	0.7	-29.3	1	Standard thermal glazing	17.7	No	Yes	N/A	Alternative Ventilation Not Required
Plot 16	1st	SE	32.8	2.8	-27.2	3	Standard thermal glazing	19.8	No	Yes	N/A	Alternative Ventilation Not Required
Plot 16	1st	NE	29.5	-0.5	-30.5	-1	Standard thermal glazing	16.5	No	Yes	N/A	Alternative Ventilation Not Required
Plot 16	1st	NW	31.8	1.8	-28.2	2	Standard thermal glazing	18.8	No	Yes	N/A	Alternative Ventilation Not Required
Plot 16	1st	SW	36.1	6.1	-23.9	6	Standard thermal glazing	23.1	No	Yes	N/A	Alternative Ventilation Not Required
Plot 17	1st	SE	35	5	-25	5	Standard thermal glazing	22	No	Yes	N/A	Alternative Ventilation Not Required
Plot 17	1st	NE	29.6	-0.4	-30.4	0	Standard thermal glazing	16.6	No	Yes	N/A	Alternative Ventilation Not Required
Plot 17	1st	NW	31	1	-29	1	Standard thermal glazing	18	No	Yes	N/A	Alternative Ventilation Not Required
Plot 17	1st	SW	36.6	6.6	-23.4	7	Standard thermal glazing	23.6	No	Yes	N/A	Alternative Ventilation Not Required
Plot 18	1st	SW	36.7	6.7	-23.3	7	Standard thermal glazing	23.7	No	Yes	N/A	Alternative Ventilation Not Required
Plot 18	1st	SE	33.2	3.2	-26.8	3	Standard thermal glazing	20.2	No	Yes	N/A	Alternative Ventilation Not Required
Plot 18	1st	NE	29.5	-0.5	-30.5	-1	Standard thermal glazing	16.5	No	Yes	N/A	Alternative Ventilation Not Required
Plot 18	1st	NW	32	2	-28	2	Standard thermal glazing	19	No	Yes	N/A	Alternative Ventilation Not Required
Plot 19	1st	SW	36.8	6.8	-23.2	7	Standard thermal glazing	23.8	No	Yes	N/A	Alternative Ventilation Not Required
Plot 19	1st	SE	33.7	3.7	-26.3	4	Standard thermal glazing	20.7	No	Yes	N/A	Alternative Ventilation Not Required
Plot 19	1st	NE	29.6	-0.4	-30.4	0	Standard thermal glazing	16.6	No	Yes	N/A	Alternative Ventilation Not Required
Plot 19	1st	NW	31.6	1.6	-28.4	2	Standard thermal glazing	18.6	No	Yes	N/A	Alternative Ventilation Not Required
Plot 20	1st	SW	37.1	7.1	-22.9	7	Standard thermal glazing	24.1	No	Yes	N/A	Alternative Ventilation Not Required
Plot 20	1st	SE	33.1	3.1	-26.9	3	Standard thermal glazing	20.1	No	Yes	N/A	Alternative Ventilation Not Required
Plot 20	1st	NE	29.8	-0.2	-30.2	0	Standard thermal glazing	16.8	No	Yes	N/A	Alternative Ventilation Not Required
Plot 20	1st	NW	31.6	1.6	-28.4	2	Standard thermal glazing	18.6	No	Yes	N/A	Alternative Ventilation Not Required
Plot 21	1st	SW	37.2	7.2	-22.8	7	Standard thermal glazing	24.2	No	Yes	N/A	Alternative Ventilation Not Required
Plot 21	1st	SE	34.3	4.3	-25.7	4	Standard thermal glazing	21.3	No	Yes	N/A	Alternative Ventilation Not Required
Plot 21	1st	NE	29.8	-0.2	-30.2	0	Standard thermal glazing	16.8	No	Yes	N/A	Alternative Ventilation Not Required
Plot 21	1st	NW	31.1	1.1	-28.9	1	Standard thermal glazing	18.1	No	Yes	N/A	Alternative Ventilation Not Required
Plot 22	1st	SW	37.1	7.1	-22.9	7	Standard thermal glazing	24.1	No	Yes	N/A	Alternative Ventilation Not Required
Plot 22	1st	SE	35.7	5.7	-24.3	6	Standard thermal glazing	22.7	No	Yes	N/A	Alternative Ventilation Not Required
Plot 22	1st	NE	29.9	-0.1	-30.1	0	Standard thermal glazing	16.9	No	Yes	N/A	Alternative Ventilation Not Required
Plot 22	1st	NW	31.7	1.7	-28.3	2	Standard thermal glazing	18.7	No	Yes	N/A	Alternative Ventilation Not Required
Plot 23	1st	SW	36.9	6.9	-23.1	7	Standard thermal glazing	23.9	No	Yes	N/A	Alternative Ventilation Not Required
Plot 23	1st	SE	36.1	6.1	-23.9	6	Standard thermal glazing	23.1	No	Yes	N/A	Alternative Ventilation Not Required
Plot 23	1st	NE	29.8	-0.2	-30.2	0	Standard thermal glazing	16.8	No	Yes	N/A	Alternative Ventilation Not Required
Plot 23	1st	NW	32.6	2.6	-27.4	3	Standard thermal glazing	19.6	No	Yes	N/A	Alternative Ventilation Not Required
Plot 24	1st	W	39.4	9.4	-20.6	9	Standard thermal glazing	26.4	No	Yes	N/A	Alternative Ventilation Not Required
Plot 24	1st	S	40.1	10.1	-19.9	10	Standard thermal glazing	27.1	No	Yes	N/A	Alternative Ventilation Not Required

Plot 24	1st	E	31.6	1.6	-28.4	2	Standard thermal glazing	18.6	No	Yes	N/A	Alternative Ventilation Not Required
Plot 24	1st	N	30.1	0.1	-29.9	0	Standard thermal glazing	17.1	No	Yes	N/A	Alternative Ventilation Not Required
Plot 25	1st	SW	38.4	8.4	-21.6	8	Standard thermal glazing	25.4	No	Yes	N/A	Alternative Ventilation Not Required
Plot 25	1st	SE	36.5	6.5	-23.5	7	Standard thermal glazing	23.5	No	Yes	N/A	Alternative Ventilation Not Required
Plot 25	1st	NE	30.2	0.2	-29.8	0	Standard thermal glazing	17.2	No	Yes	N/A	Alternative Ventilation Not Required
Plot 25	1st	NW	33.8	3.8	-26.2	4	Standard thermal glazing	20.8	No	Yes	N/A	Alternative Ventilation Not Required
Plot 26	1st	SW	38.7	8.7	-21.3	9	Standard thermal glazing	25.7	No	Yes	N/A	Alternative Ventilation Not Required
Plot 26	1st	SE	37.3	7.3	-22.7	7	Standard thermal glazing	24.3	No	Yes	N/A	Alternative Ventilation Not Required
Plot 26	1st	NE	30.2	0.2	-29.8	0	Standard thermal glazing	17.2	No	Yes	N/A	Alternative Ventilation Not Required
Plot 26	1st	NW	33.5	3.5	-26.5	4	Standard thermal glazing	20.5	No	Yes	N/A	Alternative Ventilation Not Required
Plot 27	1st	SW	38.2	8.2	-21.8	8	Standard thermal glazing	25.2	No	Yes	N/A	Alternative Ventilation Not Required
Plot 27	1st	SE	35.7	5.7	-24.3	6	Standard thermal glazing	22.7	No	Yes	N/A	Alternative Ventilation Not Required
Plot 27	1st	NE	30.2	0.2	-29.8	0	Standard thermal glazing	17.2	No	Yes	N/A	Alternative Ventilation Not Required
Plot 27	1st	NW	34	4	-26	4	Standard thermal glazing	21	No	Yes	N/A	Alternative Ventilation Not Required
Plot 28	1st	SE	36.6	6.6	-23.4	7	Standard thermal glazing	23.6	No	Yes	N/A	Alternative Ventilation Not Required
Plot 28	1st	NE	30.3	0.3	-29.7	0	Standard thermal glazing	17.3	No	Yes	N/A	Alternative Ventilation Not Required
Plot 28	1st	NW	32.6	2.6	-27.4	3	Standard thermal glazing	19.6	No	Yes	N/A	Alternative Ventilation Not Required
Plot 28	1st	SW	38.1	8.1	-21.9	8	Standard thermal glazing	25.1	No	Yes	N/A	Alternative Ventilation Not Required
Plot 29 - 30	1st	W	39	9	-21	9	Standard thermal glazing	26	No	Yes	N/A	Alternative Ventilation Not Required
Plot 29 - 30	1st	NW	32.9	2.9	-27.1	3	Standard thermal glazing	19.9	No	Yes	N/A	Alternative Ventilation Not Required
Plot 29 - 30	1st	NE	30.3	0.3	-29.7	0	Standard thermal glazing	17.3	No	Yes	N/A	Alternative Ventilation Not Required
Plot 29 - 30	1st	SE	36.1	6.1	-23.9	6	Standard thermal glazing	23.1	No	Yes	N/A	Alternative Ventilation Not Required
Plot 31	1st	W	38.3	8.3	-21.7	8	Standard thermal glazing	25.3	No	Yes	N/A	Alternative Ventilation Not Required
Plot 31	1st	S	35.6	5.6	-24.4	6	Standard thermal glazing	22.6	No	Yes	N/A	Alternative Ventilation Not Required
Plot 31	1st	E	30.4	0.4	-29.6	0	Standard thermal glazing	17.4	No	Yes	N/A	Alternative Ventilation Not Required
Plot 31	1st	N	31.2	1.2	-28.8	1	Standard thermal glazing	18.2	No	Yes	N/A	Alternative Ventilation Not Required
Plot 32	1st	W	38.5	8.5	-21.5	9	Standard thermal glazing	25.5	No	Yes	N/A	Alternative Ventilation Not Required
Plot 32	1st	S	38.1	8.1	-21.9	8	Standard thermal glazing	25.1	No	Yes	N/A	Alternative Ventilation Not Required
Plot 32	1st	E	31.5	1.5	-28.5	2	Standard thermal glazing	18.5	No	Yes	N/A	Alternative Ventilation Not Required
Plot 32	1st	N	30.8	0.8	-29.2	1	Standard thermal glazing	17.8	No	Yes	N/A	Alternative Ventilation Not Required
Plot 33	1st	SE	36.8	6.8	-23.2	7	Standard thermal glazing	23.8	No	Yes	N/A	Alternative Ventilation Not Required
Plot 33	1st	NE	30.4	0.4	-29.6	0	Standard thermal glazing	17.4	No	Yes	N/A	Alternative Ventilation Not Required
Plot 33	1st	NW	36.6	6.6	-23.4	7	Standard thermal glazing	23.6	No	Yes	N/A	Alternative Ventilation Not Required
Plot 33	1st	SW	39.4	9.4	-20.6	9	Standard thermal glazing	26.4	No	Yes	N/A	Alternative Ventilation Not Required
Plot 34	1st	SW	39.2	9.2	-20.8	9	Standard thermal glazing	26.2	No	Yes	N/A	Alternative Ventilation Not Required
Plot 34	1st	SE	34.9	4.9	-25.1	5	Standard thermal glazing	21.9	No	Yes	N/A	Alternative Ventilation Not Required
Plot 34	1st	NE	30.6	0.6	-29.4	1	Standard thermal glazing	17.6	No	Yes	N/A	Alternative Ventilation Not Required
Plot 34	1st	NW	34.3	4.3	-25.7	4	Standard thermal glazing	21.3	No	Yes	N/A	Alternative Ventilation Not Required
Plot 34	1st	SW	38.9	8.9	-21.1	9	Standard thermal glazing	25.9	No	Yes	N/A	Alternative Ventilation Not Required
Plot 35	1st	SW	40	10	-20	10	Standard thermal glazing	27	No	Yes	N/A	Alternative Ventilation Not Required
Plot 35	1st	SE	36.3	6.3	-23.7	6	Standard thermal glazing	23.3	No	Yes	N/A	Alternative Ventilation Not Required
Plot 35	1st	NE	30.7	0.7	-29.3	1	Standard thermal glazing	17.7	No	Yes	N/A	Alternative Ventilation Not Required
Plot 35	1st	NW	33.2	3.2	-26.8	3	Standard thermal glazing	20.2	No	Yes	N/A	Alternative Ventilation Not Required
Plot 36	1st	SW	39	9	-21	9	Standard thermal glazing	26	No	Yes	N/A	Alternative Ventilation Not Required
Plot 36	1st	SE	37.4	7.4	-22.6	7	Standard thermal glazing	24.4	No	Yes	N/A	Alternative Ventilation Not Required
Plot 36	1st	NE	30.7	0.7	-29.3	1	Standard thermal glazing	17.7	No	Yes	N/A	Alternative Ventilation Not Required

Plot 36	1st	NW	33.9	3.9	-26.1	4	Standard thermal glazing	20.9	No	Yes	N/A	Alternative Ventilation Not Required
Plot 37	1st	SW	41.4	11.4	-18.6	11	Standard thermal glazing	28.4	No	Yes	N/A	Alternative Ventilation Not Required
Plot 37	1st	NW	35.2	5.2	-24.8	5	Standard thermal glazing	22.2	No	Yes	N/A	Alternative Ventilation Not Required
Plot 37	1st	NE	30.8	0.8	-29.2	1	Standard thermal glazing	17.8	No	Yes	N/A	Alternative Ventilation Not Required
Plot 37	1st	SE	40.1	10.1	-19.9	10	Standard thermal glazing	27.1	No	Yes	N/A	Alternative Ventilation Not Required
Plot 38	1st	SW	32.5	2.5	-27.5	3	Standard thermal glazing	19.5	No	Yes	N/A	Alternative Ventilation Not Required
Plot 38	1st	SE	37.7	7.7	-22.3	8	Standard thermal glazing	24.7	No	Yes	N/A	Alternative Ventilation Not Required
Plot 38	1st	NE	30.7	0.7	-29.3	1	Standard thermal glazing	17.7	No	Yes	N/A	Alternative Ventilation Not Required
Plot 38	1st	NW	35.3	5.3	-24.7	5	Standard thermal glazing	22.3	No	Yes	N/A	Alternative Ventilation Not Required
Plot 39	1st	SE	39.2	9.2	-20.8	9	Standard thermal glazing	26.2	No	Yes	N/A	Alternative Ventilation Not Required
Plot 39	1st	SW	35	5	-25	5	Standard thermal glazing	22	No	Yes	N/A	Alternative Ventilation Not Required
Plot 39	1st	NW	35.1	5.1	-24.9	5	Standard thermal glazing	22.1	No	Yes	N/A	Alternative Ventilation Not Required
Plot 39	1st	NE	30.4	0.4	-29.6	0	Standard thermal glazing	17.4	No	Yes	N/A	Alternative Ventilation Not Required
Plot 10 - 11	1st	E	29.8	-0.2	-30.2	0	Standard thermal glazing	16.8	No	Yes	N/A	Alternative Ventilation Not Required
Plot 10 - 11	1st	N	29.8	-0.2	-30.2	0	Standard thermal glazing	16.8	No	Yes	N/A	Alternative Ventilation Not Required
Plot 10 - 11	1st	W	37	7	-23	7	Standard thermal glazing	24	No	Yes	N/A	Alternative Ventilation Not Required
Plot 10 - 11	1st	S	37	7	-23	7	Standard thermal glazing	24	No	Yes	N/A	Alternative Ventilation Not Required
Plot 40	1st	S	38.7	8.7	-21.3	9	Standard thermal glazing	25.7	No	Yes	N/A	Alternative Ventilation Not Required
Plot 40	1st	E	32	2	-28	2	Standard thermal glazing	19	No	Yes	N/A	Alternative Ventilation Not Required
Plot 40	1st	N	31.8	1.8	-28.2	2	Standard thermal glazing	18.8	No	Yes	N/A	Alternative Ventilation Not Required
Plot 40	1st	W	40.2	10.2	-19.8	10	Standard thermal glazing	27.2	No	Yes	N/A	Alternative Ventilation Not Required
Plot 41 - 42	1st	SE	38.6	8.6	-21.4	9	Standard thermal glazing	25.6	No	Yes	N/A	Alternative Ventilation Not Required
Plot 41 - 42	1st	NE	31.1	1.1	-28.9	1	Standard thermal glazing	18.1	No	Yes	N/A	Alternative Ventilation Not Required
Plot 41 - 42	1st	NW	35	5	-25	5	Standard thermal glazing	22	No	Yes	N/A	Alternative Ventilation Not Required
Plot 41 - 42	1st	SW	39.5	9.5	-20.5	10	Standard thermal glazing	26.5	No	Yes	N/A	Alternative Ventilation Not Required
Plot 43	1st	S	40.2	10.2	-19.8	10	Standard thermal glazing	27.2	No	Yes	N/A	Alternative Ventilation Not Required
Plot 43	1st	E	32.7	2.7	-27.3	3	Standard thermal glazing	19.7	No	Yes	N/A	Alternative Ventilation Not Required
Plot 43	1st	N	31.8	1.8	-28.2	2	Standard thermal glazing	18.8	No	Yes	N/A	Alternative Ventilation Not Required
Plot 43	1st	W	39.7	9.7	-20.3	10	Standard thermal glazing	26.7	No	Yes	N/A	Alternative Ventilation Not Required
Plot 44	1st	SW	39.6	9.6	-20.4	10	Standard thermal glazing	26.6	No	Yes	N/A	Alternative Ventilation Not Required
Plot 44	1st	SE	38.2	8.2	-21.8	8	Standard thermal glazing	25.2	No	Yes	N/A	Alternative Ventilation Not Required
Plot 44	1st	NE	31.1	1.1	-28.9	1	Standard thermal glazing	18.1	No	Yes	N/A	Alternative Ventilation Not Required
Plot 44	1st	NW	34.7	4.7	-25.3	5	Standard thermal glazing	21.7	No	Yes	N/A	Alternative Ventilation Not Required
Plot 45	1st	SW	39.8	9.8	-20.2	10	Standard thermal glazing	26.8	No	Yes	N/A	Alternative Ventilation Not Required
Plot 45	1st	SE	38.3	8.3	-21.7	8	Standard thermal glazing	25.3	No	Yes	N/A	Alternative Ventilation Not Required
Plot 45	1st	NE	31.2	1.2	-28.8	1	Standard thermal glazing	18.2	No	Yes	N/A	Alternative Ventilation Not Required
Plot 45	1st	NW	35.7	5.7	-24.3	6	Standard thermal glazing	22.7	No	Yes	N/A	Alternative Ventilation Not Required
Plot 46	1st	W	42.1	12.1	-17.9	12	Standard thermal glazing	29.1	No	Yes	N/A	Alternative Ventilation Not Required
Plot 46	1st	N	33.2	3.2	-26.8	3	Standard thermal glazing	20.2	No	Yes	N/A	Alternative Ventilation Not Required
Plot 46	1st	E	31.6	1.6	-28.4	2	Standard thermal glazing	18.6	No	Yes	N/A	Alternative Ventilation Not Required
Plot 46	1st	S	42.7	12.7	-17.3	13	Standard thermal glazing	29.7	No	Yes	N/A	Alternative Ventilation Not Required
Plot 47	1st	S	41.6	11.6	-18.4	12	Standard thermal glazing	28.6	No	Yes	N/A	Alternative Ventilation Not Required
Plot 47	1st	W	35.7	5.7	-24.3	6	Standard thermal glazing	22.7	No	Yes	N/A	Alternative Ventilation Not Required
Plot 47	1st	N	33.9	3.9	-26.1	4	Standard thermal glazing	20.9	No	Yes	N/A	Alternative Ventilation Not Required
Plot 47	1st	E	32.2	2.2	-27.8	2	Standard thermal glazing	19.2	No	Yes	N/A	Alternative Ventilation Not Required
Plot 48	1st	W	36.7	6.7	-23.3	7	Standard thermal glazing	23.7	No	Yes	N/A	Alternative Ventilation Not Required

Plot 48	1st	S	44.1	14.1	-15.9	14	Standard thermal glazing	31.1	Yes	Yes	ADF Systems 1 or 2	Acoustic-grade Trickle Ventilator
Plot 48	1st	E	32.3	2.3	-27.7	2	Standard thermal glazing	19.3	No	Yes	N/A	Alternative Ventilation Not Required
Plot 48	1st	N	33.7	3.7	-26.3	4	Standard thermal glazing	20.7	No	Yes	N/A	Alternative Ventilation Not Required
Plot 49	1st	S	44.6	14.6	-15.4	15	Standard thermal glazing	31.6	Yes	Yes	ADF Systems 1 or 2	Acoustic-grade Trickle Ventilator
Plot 49	1st	E	32.6	2.6	-27.4	3	Standard thermal glazing	19.6	No	Yes	N/A	Alternative Ventilation Not Required
Plot 49	1st	N	33.1	3.1	-26.9	3	Standard thermal glazing	20.1	No	Yes	N/A	Alternative Ventilation Not Required
Plot 49	1st	W	43.4	13.4	-16.6	13	Standard thermal glazing	30.4	Yes	Yes	ADF Systems 1 or 2	Acoustic-grade Trickle Ventilator
Plot 50	1st	S	44.8	14.8	-15.2	15	Standard thermal glazing	31.8	Yes	Yes	ADF Systems 1 or 2	Acoustic-grade Trickle Ventilator
Plot 50	1st	E	35.4	5.4	-24.6	5	Standard thermal glazing	22.4	No	Yes	N/A	Alternative Ventilation Not Required
Plot 50	1st	N	33	3	-27	3	Standard thermal glazing	20	No	Yes	N/A	Alternative Ventilation Not Required
Plot 50	1st	W	43.6	13.6	-16.4	14	Standard thermal glazing	30.6	Yes	Yes	ADF Systems 1 or 2	Acoustic-grade Trickle Ventilator
Plot 51 - 53	1st	S	41.2	11.2	-18.8	11	Standard thermal glazing	28.2	No	Yes	N/A	Alternative Ventilation Not Required
Plot 51 - 53	1st	E	33.6	3.6	-26.4	4	Standard thermal glazing	20.6	No	Yes	N/A	Alternative Ventilation Not Required
Plot 51 - 53	1st	N	32.2	2.2	-27.8	2	Standard thermal glazing	19.2	No	Yes	N/A	Alternative Ventilation Not Required
Plot 51 - 53	1st	W	41.6	11.6	-18.4	12	Standard thermal glazing	28.6	No	Yes	N/A	Alternative Ventilation Not Required
Plot 54	1st	S	36.4	6.4	-23.6	6	Standard thermal glazing	23.4	No	Yes	N/A	Alternative Ventilation Not Required
Plot 54	1st	W	41.6	11.6	-18.4	12	Standard thermal glazing	28.6	No	Yes	N/A	Alternative Ventilation Not Required
Plot 54	1st	N	31.9	1.9	-28.1	2	Standard thermal glazing	18.9	No	Yes	N/A	Alternative Ventilation Not Required
Plot 54	1st	E	34	4	-26	4	Standard thermal glazing	21	No	Yes	N/A	Alternative Ventilation Not Required
Plot 55	1st	W	41.2	11.2	-18.8	11	Standard thermal glazing	28.2	No	Yes	N/A	Alternative Ventilation Not Required
Plot 55	1st	S	36.9	6.9	-23.1	7	Standard thermal glazing	23.9	No	Yes	N/A	Alternative Ventilation Not Required
Plot 55	1st	E	32.7	2.7	-27.3	3	Standard thermal glazing	19.7	No	Yes	N/A	Alternative Ventilation Not Required
Plot 55	1st	N	32.1	2.1	-27.9	2	Standard thermal glazing	19.1	No	Yes	N/A	Alternative Ventilation Not Required
Plot 56	1st	W	41.6	11.6	-18.4	12	Standard thermal glazing	28.6	No	Yes	N/A	Alternative Ventilation Not Required
Plot 56	1st	S	38.5	8.5	-21.5	9	Standard thermal glazing	25.5	No	Yes	N/A	Alternative Ventilation Not Required
Plot 56	1st	E	32.2	2.2	-27.8	2	Standard thermal glazing	19.2	No	Yes	N/A	Alternative Ventilation Not Required
Plot 56	1st	N	32.1	2.1	-27.9	2	Standard thermal glazing	19.1	No	Yes	N/A	Alternative Ventilation Not Required
Plot 56	1st	W	39.5	9.5	-20.5	10	Standard thermal glazing	26.5	No	Yes	N/A	Alternative Ventilation Not Required
Plot 56	1st	S	37.9	7.9	-22.1	8	Standard thermal glazing	24.9	No	Yes	N/A	Alternative Ventilation Not Required
Plot 56	1st	E	36.5	6.5	-23.5	7	Standard thermal glazing	23.5	No	Yes	N/A	Alternative Ventilation Not Required
Plot 56	1st	N	32.2	2.2	-27.8	2	Standard thermal glazing	19.2	No	Yes	N/A	Alternative Ventilation Not Required
Plot 58 - 60	1st	S	36.8	6.8	-23.2	7	Standard thermal glazing	23.8	No	Yes	N/A	Alternative Ventilation Not Required
Plot 58 - 60	1st	W	40.4	10.4	-19.6	10	Standard thermal glazing	27.4	No	Yes	N/A	Alternative Ventilation Not Required
Plot 58 - 60	1st	N	32.2	2.2	-27.8	2	Standard thermal glazing	19.2	No	Yes	N/A	Alternative Ventilation Not Required
Plot 58 - 60	1st	E	35	5	-25	5	Standard thermal glazing	22	No	Yes	N/A	Alternative Ventilation Not Required
Plot 61 - 63	1st	W	40.4	10.4	-19.6	10	Standard thermal glazing	27.4	No	Yes	N/A	Alternative Ventilation Not Required
Plot 61 - 63	1st	S	41.5	11.5	-18.5	12	Standard thermal glazing	28.5	No	Yes	N/A	Alternative Ventilation Not Required
Plot 61 - 63	1st	E	34.9	4.9	-25.1	5	Standard thermal glazing	21.9	No	Yes	N/A	Alternative Ventilation Not Required
Plot 61 - 63	1st	N	32.5	2.5	-27.5	3	Standard thermal glazing	19.5	No	Yes	N/A	Alternative Ventilation Not Required
Plot 64	1st	S	43.9	13.9	-16.1	14	Standard thermal glazing	30.9	Yes	Yes	ADF Systems 1 or 2	Acoustic-grade Trickle Ventilator
Plot 64	1st	E	33.2	3.2	-26.8	3	Standard thermal glazing	20.2	No	Yes	N/A	Alternative Ventilation Not Required
Plot 64	1st	N	35.9	5.9	-24.1	6	Standard thermal glazing	22.9	No	Yes	N/A	Alternative Ventilation Not Required
Plot 64	1st	W	42.1	12.1	-17.9	12	Standard thermal glazing	29.1	No	Yes	N/A	Alternative Ventilation Not Required
Plot 65	1st	W	41.8	11.8	-18.2	12	Standard thermal glazing	28.8	No	Yes	N/A	Alternative Ventilation Not Required
Plot 65	1st	S	45.9	15.9	-14.1	16	Standard thermal glazing	32.9	Yes	Yes	ADF Systems 1 or 2	Acoustic-grade Trickle Ventilator
Plot 65	1st	E	33.6	3.6	-26.4	4	Standard thermal glazing	20.6	No	Yes	N/A	Alternative Ventilation Not Required

Plot 65	1st	N	34.9	4.9	-25.1	5	Standard thermal glazing	21.9	No	Yes	N/A	Alternative Ventilation Not Required
Plot 66	1st	S	46.4	16.4	-13.6	16	Standard thermal glazing	33.4	Yes	Yes	ADF Systems 1 or 2	Acoustic-grade Trickle Ventilator
Plot 66	1st	E	37.2	7.2	-22.8	7	Standard thermal glazing	24.2	No	Yes	N/A	Alternative Ventilation Not Required
Plot 66	1st	N	33.8	3.8	-26.2	4	Standard thermal glazing	20.8	No	Yes	N/A	Alternative Ventilation Not Required
Plot 66	1st	W	43.6	13.6	-16.4	14	Standard thermal glazing	30.6	Yes	Yes	ADF Systems 1 or 2	Acoustic-grade Trickle Ventilator
Plot 67	1st	E	38.7	8.7	-21.3	9	Standard thermal glazing	25.7	No	Yes	N/A	Alternative Ventilation Not Required
Plot 67	1st	N	37.5	7.5	-22.5	8	Standard thermal glazing	24.5	No	Yes	N/A	Alternative Ventilation Not Required
Plot 67	1st	W	46.1	16.1	-13.9	16	Standard thermal glazing	33.1	Yes	Yes	ADF Systems 1 or 2	Acoustic-grade Trickle Ventilator
Plot 67	1st	S	46.8	16.8	-13.2	17	Standard thermal glazing	33.8	Yes	Yes	ADF Systems 1 or 2	Acoustic-grade Trickle Ventilator
Plot 68	1st	W	42.4	12.4	-17.6	12	Standard thermal glazing	29.4	No	Yes	N/A	Alternative Ventilation Not Required
Plot 68	1st	S	42.5	12.5	-17.5	13	Standard thermal glazing	29.5	No	Yes	N/A	Alternative Ventilation Not Required
Plot 68	1st	E	35.9	5.9	-24.1	6	Standard thermal glazing	22.9	No	Yes	N/A	Alternative Ventilation Not Required
Plot 68	1st	N	33.4	3.4	-26.6	3	Standard thermal glazing	20.4	No	Yes	N/A	Alternative Ventilation Not Required
Plot 69 - 70	1st	S	37.3	7.3	-22.7	7	Standard thermal glazing	24.3	No	Yes	N/A	Alternative Ventilation Not Required
Plot 69 - 70	1st	W	42.4	12.4	-17.6	12	Standard thermal glazing	29.4	No	Yes	N/A	Alternative Ventilation Not Required
Plot 69 - 70	1st	N	32.9	2.9	-27.1	3	Standard thermal glazing	19.9	No	Yes	N/A	Alternative Ventilation Not Required
Plot 69 - 70	1st	E	34.8	4.8	-25.2	5	Standard thermal glazing	21.8	No	Yes	N/A	Alternative Ventilation Not Required
Plot 71 - 72	1st	S	37.6	7.6	-22.4	8	Standard thermal glazing	24.6	No	Yes	N/A	Alternative Ventilation Not Required
Plot 71 - 72	1st	W	42.2	12.2	-17.8	12	Standard thermal glazing	29.2	No	Yes	N/A	Alternative Ventilation Not Required
Plot 71 - 72	1st	N	32.7	2.7	-27.3	3	Standard thermal glazing	19.7	No	Yes	N/A	Alternative Ventilation Not Required
Plot 71 - 72	1st	E	37.4	7.4	-22.6	7	Standard thermal glazing	24.4	No	Yes	N/A	Alternative Ventilation Not Required
Plot 73	1st	S	38.2	8.2	-21.8	8	Standard thermal glazing	25.2	No	Yes	N/A	Alternative Ventilation Not Required
Plot 73	1st	E	38.3	8.3	-21.7	8	Standard thermal glazing	25.3	No	Yes	N/A	Alternative Ventilation Not Required
Plot 73	1st	N	32.8	2.8	-27.2	3	Standard thermal glazing	19.8	No	Yes	N/A	Alternative Ventilation Not Required
Plot 73	1st	W	41.6	11.6	-18.4	12	Standard thermal glazing	28.6	No	Yes	N/A	Alternative Ventilation Not Required
Plot 74	1st	S	35.6	5.6	-24.4	6	Standard thermal glazing	22.6	No	Yes	N/A	Alternative Ventilation Not Required
Plot 74	1st	E	36.4	6.4	-23.6	6	Standard thermal glazing	23.4	No	Yes	N/A	Alternative Ventilation Not Required
Plot 74	1st	N	32.4	2.4	-27.6	2	Standard thermal glazing	19.4	No	Yes	N/A	Alternative Ventilation Not Required
Plot 74	1st	W	41.3	11.3	-18.7	11	Standard thermal glazing	28.3	No	Yes	N/A	Alternative Ventilation Not Required
Plot 75 - 76	1st	S	41.4	11.4	-18.6	11	Standard thermal glazing	28.4	No	Yes	N/A	Alternative Ventilation Not Required
Plot 75 - 76	1st	W	40.5	10.5	-19.5	11	Standard thermal glazing	27.5	No	Yes	N/A	Alternative Ventilation Not Required
Plot 75 - 76	1st	N	32.7	2.7	-27.3	3	Standard thermal glazing	19.7	No	Yes	N/A	Alternative Ventilation Not Required
Plot 75 - 76	1st	E	38.3	8.3	-21.7	8	Standard thermal glazing	25.3	No	Yes	N/A	Alternative Ventilation Not Required
Plot 77	1st	S	41.7	11.7	-18.3	12	Standard thermal glazing	28.7	No	Yes	N/A	Alternative Ventilation Not Required
Plot 77	1st	W	39	9	-21	9	Standard thermal glazing	26	No	Yes	N/A	Alternative Ventilation Not Required
Plot 77	1st	N	32.8	2.8	-27.2	3	Standard thermal glazing	19.8	No	Yes	N/A	Alternative Ventilation Not Required
Plot 77	1st	E	36.3	6.3	-23.7	6	Standard thermal glazing	23.3	No	Yes	N/A	Alternative Ventilation Not Required
Plot 78	1st	S	40.8	10.8	-19.2	11	Standard thermal glazing	27.8	No	Yes	N/A	Alternative Ventilation Not Required
Plot 78	1st	W	40.1	10.1	-19.9	10	Standard thermal glazing	27.1	No	Yes	N/A	Alternative Ventilation Not Required
Plot 78	1st	N	32.8	2.8	-27.2	3	Standard thermal glazing	19.8	No	Yes	N/A	Alternative Ventilation Not Required
Plot 78	1st	E	40.4	10.4	-19.6	10	Standard thermal glazing	27.4	No	Yes	N/A	Alternative Ventilation Not Required
Plot 79 - 80	1st	N	33.1	3.1	-26.9	3	Standard thermal glazing	20.1	No	Yes	N/A	Alternative Ventilation Not Required
Plot 79 - 80	1st	E	39.9	9.9	-20.1	10	Standard thermal glazing	26.9	No	Yes	N/A	Alternative Ventilation Not Required
Plot 79 - 80	1st	S	43.1	13.1	-16.9	13	Standard thermal glazing	30.1	Yes	Yes	ADF Systems 1 or 2	Acoustic-grade Trickle Ventilator
Plot 79 - 80	1st	W	42	12	-18	12	Standard thermal glazing	29	No	Yes	N/A	Alternative Ventilation Not Required
Plot 81	1st	W	40.9	10.9	-19.1	11	Standard thermal glazing	27.9	No	Yes	N/A	Alternative Ventilation Not Required

Plot 81	1st	N	33	3	-27	3	Standard thermal glazing	20	No	Yes	N/A	Alternative Ventilation Not Required
Plot 81	1st	E	43.4	13.4	-16.6	13	Standard thermal glazing	30.4	Yes	Yes	ADF Systems 1 or 2	Acoustic-grade Trickle Ventilator
Plot 81	1st	S	47.1	17.1	-12.9	17	Standard thermal glazing	34.1	Yes	Yes	ADF Systems 1 or 2	Acoustic-grade Trickle Ventilator
Plot 82	1st	S	47.5	17.5	-12.5	18	Standard thermal glazing	34.5	Yes	Yes	ADF Systems 1 or 2	Acoustic-grade Trickle Ventilator
Plot 82	1st	W	45.3	15.3	-14.7	15	Standard thermal glazing	32.3	Yes	Yes	ADF Systems 1 or 2	Acoustic-grade Trickle Ventilator
Plot 82	1st	N	33	3	-27	3	Standard thermal glazing	20	No	Yes	N/A	Alternative Ventilation Not Required
Plot 82	1st	E	41.2	11.2	-18.8	11	Standard thermal glazing	28.2	No	Yes	N/A	Alternative Ventilation Not Required
Plot 83	1st	S	47.8	17.8	-12.2	18	Standard thermal glazing	34.8	Yes	Yes	ADF Systems 1 or 2	Acoustic-grade Trickle Ventilator
Plot 83	1st	NW	41	11	-19	11	Standard thermal glazing	28	No	Yes	N/A	Alternative Ventilation Not Required
Plot 83	1st	NE	33	3	-27	3	Standard thermal glazing	20	No	Yes	N/A	Alternative Ventilation Not Required
Plot 83	1st	SE	42.9	12.9	-17.1	13	Standard thermal glazing	29.9	No	Yes	N/A	Alternative Ventilation Not Required
Plot 84 - 85	1st	SW	47.8	17.8	-12.2	18	Standard thermal glazing	34.8	Yes	Yes	ADF Systems 1 or 2	Acoustic-grade Trickle Ventilator
Plot 84 - 85	1st	E	39.8	9.8	-20.2	10	Standard thermal glazing	26.8	No	Yes	N/A	Alternative Ventilation Not Required
Plot 84 - 85	1st	NE	33	3	-27	3	Standard thermal glazing	20	No	Yes	N/A	Alternative Ventilation Not Required
Plot 84 - 85	1st	NW	44.6	14.6	-15.4	15	Standard thermal glazing	31.6	Yes	Yes	ADF Systems 1 or 2	Acoustic-grade Trickle Ventilator
Plot 86 - 87	1st	SW	47.8	17.8	-12.2	18	Standard thermal glazing	34.8	Yes	Yes	ADF Systems 1 or 2	Acoustic-grade Trickle Ventilator
Plot 86 - 87	1st	SE	45.4	15.4	-14.6	15	Standard thermal glazing	32.4	Yes	Yes	ADF Systems 1 or 2	Acoustic-grade Trickle Ventilator
Plot 86 - 87	1st	NE	33	3	-27	3	Standard thermal glazing	20	No	Yes	N/A	Alternative Ventilation Not Required
Plot 86 - 87	1st	NW	42.8	12.8	-17.2	13	Standard thermal glazing	29.8	No	Yes	N/A	Alternative Ventilation Not Required
Plot 88 - 89	1st	W	46.2	16.2	-13.8	16	Standard thermal glazing	33.2	Yes	Yes	ADF Systems 1 or 2	Acoustic-grade Trickle Ventilator
Plot 88 - 89	1st	N	33.4	3.4	-26.6	3	Standard thermal glazing	20.4	No	Yes	N/A	Alternative Ventilation Not Required
Plot 88 - 89	1st	E	36.3	6.3	-23.7	6	Standard thermal glazing	23.3	No	Yes	N/A	Alternative Ventilation Not Required
Plot 88 - 89	1st	S	46.1	16.1	-13.9	16	Standard thermal glazing	33.1	Yes	Yes	ADF Systems 1 or 2	Acoustic-grade Trickle Ventilator
Plot 90	1st	W	46.2	16.2	-13.8	16	Standard thermal glazing	33.2	Yes	Yes	ADF Systems 1 or 2	Acoustic-grade Trickle Ventilator
Plot 90	1st	N	37.5	7.5	-22.5	8	Standard thermal glazing	24.5	No	Yes	N/A	Alternative Ventilation Not Required
Plot 90	1st	E	36	6	-24	6	Standard thermal glazing	23	No	Yes	N/A	Alternative Ventilation Not Required
Plot 90	1st	S	43.3	13.3	-16.7	13	Standard thermal glazing	30.3	Yes	Yes	ADF Systems 1 or 2	Acoustic-grade Trickle Ventilator
Plot 91 - 92	1st	S	45.4	15.4	-14.6	15	Standard thermal glazing	32.4	Yes	Yes	ADF Systems 1 or 2	Acoustic-grade Trickle Ventilator
Plot 91 - 92	1st	W	44.8	14.8	-15.2	15	Standard thermal glazing	31.8	Yes	Yes	ADF Systems 1 or 2	Acoustic-grade Trickle Ventilator
Plot 91 - 92	1st	N	32.5	2.5	-27.5	3	Standard thermal glazing	19.5	No	Yes	N/A	Alternative Ventilation Not Required
Plot 91 - 92	1st	E	36.6	6.6	-23.4	7	Standard thermal glazing	23.6	No	Yes	N/A	Alternative Ventilation Not Required
Plot 93 - 95	1st	S	43.5	13.5	-16.5	14	Standard thermal glazing	30.5	Yes	Yes	ADF Systems 1 or 2	Acoustic-grade Trickle Ventilator
Plot 93 - 95	1st	W	36.6	6.6	-23.4	7	Standard thermal glazing	23.6	No	Yes	N/A	Alternative Ventilation Not Required
Plot 93 - 95	1st	N	32.5	2.5	-27.5	3	Standard thermal glazing	19.5	No	Yes	N/A	Alternative Ventilation Not Required
Plot 93 - 95	1st	E	35	5	-25	5	Standard thermal glazing	22	No	Yes	N/A	Alternative Ventilation Not Required
Plot 96 - 98	1st	W	36.7	6.7	-23.3	7	Standard thermal glazing	23.7	No	Yes	N/A	Alternative Ventilation Not Required
Plot 96 - 98	1st	N	32.2	2.2	-27.8	2	Standard thermal glazing	19.2	No	Yes	N/A	Alternative Ventilation Not Required
Plot 96 - 98	1st	E	35.6	5.6	-24.4	6	Standard thermal glazing	22.6	No	Yes	N/A	Alternative Ventilation Not Required
Plot 96 - 98	1st	S	42.4	12.4	-17.6	12	Standard thermal glazing	29.4	No	Yes	N/A	Alternative Ventilation Not Required
Plot 99 - 100	1st	W	35.9	5.9	-24.1	6	Standard thermal glazing	22.9	No	Yes	N/A	Alternative Ventilation Not Required
Plot 99 - 100	1st	N	32.2	2.2	-27.8	2	Standard thermal glazing	19.2	No	Yes	N/A	Alternative Ventilation Not Required
Plot 99 - 100	1st	E	35.5	5.5	-24.5	6	Standard thermal glazing	22.5	No	Yes	N/A	Alternative Ventilation Not Required
Plot 99 - 100	1st	S	41.2	11.2	-18.8	11	Standard thermal glazing	28.2	No	Yes	N/A	Alternative Ventilation Not Required
Plot 101	1st	S	41.6	11.6	-18.4	12	Standard thermal glazing	28.6	No	Yes	N/A	Alternative Ventilation Not Required
Plot 101	1st	W	36.1	6.1	-23.9	6	Standard thermal glazing	23.1	No	Yes	N/A	Alternative Ventilation Not Required
Plot 101	1st	N	32	2	-28	2	Standard thermal glazing	19	No	Yes	N/A	Alternative Ventilation Not Required

Plot 101	1st	E	38.5	8.5	-21.5	9	Standard thermal glazing	25.5	No	Yes	N/A	Alternative Ventilation Not Required
Plot 102 - 103	1st	W	39.6	9.6	-20.4	10	Standard thermal glazing	26.6	No	Yes	N/A	Alternative Ventilation Not Required
Plot 102 - 103	1st	N	31.7	1.7	-28.3	2	Standard thermal glazing	18.7	No	Yes	N/A	Alternative Ventilation Not Required
Plot 102 - 103	1st	E	34.7	4.7	-25.3	5	Standard thermal glazing	21.7	No	Yes	N/A	Alternative Ventilation Not Required
Plot 102 - 103	1st	S	41.6	11.6	-18.4	12	Standard thermal glazing	28.6	No	Yes	N/A	Alternative Ventilation Not Required
Plot 104	1st	S	40.2	10.2	-19.8	10	Standard thermal glazing	27.2	No	Yes	N/A	Alternative Ventilation Not Required
Plot 104	1st	W	37.7	7.7	-22.3	8	Standard thermal glazing	24.7	No	Yes	N/A	Alternative Ventilation Not Required
Plot 104	1st	N	32	2	-28	2	Standard thermal glazing	19	No	Yes	N/A	Alternative Ventilation Not Required
Plot 104	1st	E	37	7	-23	7	Standard thermal glazing	24	No	Yes	N/A	Alternative Ventilation Not Required
Plot 105 - 106	1st	W	37.8	7.8	-22.2	8	Standard thermal glazing	24.8	No	Yes	N/A	Alternative Ventilation Not Required
Plot 105 - 106	1st	N	32	2	-28	2	Standard thermal glazing	19	No	Yes	N/A	Alternative Ventilation Not Required
Plot 105 - 106	1st	E	35.6	5.6	-24.4	6	Standard thermal glazing	22.6	No	Yes	N/A	Alternative Ventilation Not Required
Plot 105 - 106	1st	S	41.1	11.1	-18.9	11	Standard thermal glazing	28.1	No	Yes	N/A	Alternative Ventilation Not Required
Plot 107 - 108	1st	W	39.1	9.1	-20.9	9	Standard thermal glazing	26.1	No	Yes	N/A	Alternative Ventilation Not Required
Plot 107 - 108	1st	N	31.8	1.8	-28.2	2	Standard thermal glazing	18.8	No	Yes	N/A	Alternative Ventilation Not Required
Plot 107 - 108	1st	E	33.3	3.3	-26.7	3	Standard thermal glazing	20.3	No	Yes	N/A	Alternative Ventilation Not Required
Plot 107 - 108	1st	S	41.1	11.1	-18.9	11	Standard thermal glazing	28.1	No	Yes	N/A	Alternative Ventilation Not Required
Plot 109 - 111	1st	W	36.7	6.7	-23.3	7	Standard thermal glazing	23.7	No	Yes	N/A	Alternative Ventilation Not Required
Plot 109 - 111	1st	N	31.7	1.7	-28.3	2	Standard thermal glazing	18.7	No	Yes	N/A	Alternative Ventilation Not Required
Plot 109 - 111	1st	E	33.3	3.3	-26.7	3	Standard thermal glazing	20.3	No	Yes	N/A	Alternative Ventilation Not Required
Plot 109 - 111	1st	S	40.8	10.8	-19.2	11	Standard thermal glazing	27.8	No	Yes	N/A	Alternative Ventilation Not Required
Plot 112 - 114	1st	W	39	9	-21	9	Standard thermal glazing	26	No	Yes	N/A	Alternative Ventilation Not Required
Plot 112 - 114	1st	N	31.6	1.6	-28.4	2	Standard thermal glazing	18.6	No	Yes	N/A	Alternative Ventilation Not Required
Plot 112 - 114	1st	E	32	2	-28	2	Standard thermal glazing	19	No	Yes	N/A	Alternative Ventilation Not Required
Plot 112 - 114	1st	S	40.1	10.1	-19.9	10	Standard thermal glazing	27.1	No	Yes	N/A	Alternative Ventilation Not Required
Plot 115 - 116	1st	NW	32.7	2.7	-27.3	3	Standard thermal glazing	19.7	No	Yes	N/A	Alternative Ventilation Not Required
Plot 115 - 116	1st	NE	30.8	0.8	-29.2	1	Standard thermal glazing	17.8	No	Yes	N/A	Alternative Ventilation Not Required
Plot 115 - 116	1st	SE	39.9	9.9	-20.1	10	Standard thermal glazing	26.9	No	Yes	N/A	Alternative Ventilation Not Required
Plot 115 - 116	1st	SW	39.6	9.6	-20.4	10	Standard thermal glazing	26.6	No	Yes	N/A	Alternative Ventilation Not Required
Plot 117	1st	W	38.1	8.1	-21.9	8	Standard thermal glazing	25.1	No	Yes	N/A	Alternative Ventilation Not Required
Plot 117	1st	S	38.8	8.8	-21.2	9	Standard thermal glazing	25.8	No	Yes	N/A	Alternative Ventilation Not Required
Plot 117	1st	E	31.1	1.1	-28.9	1	Standard thermal glazing	18.1	No	Yes	N/A	Alternative Ventilation Not Required
Plot 117	1st	N	31.3	1.3	-28.7	1	Standard thermal glazing	18.3	No	Yes	N/A	Alternative Ventilation Not Required
Plot 118	1st	W	33.6	3.6	-26.4	4	Standard thermal glazing	20.6	No	Yes	N/A	Alternative Ventilation Not Required
Plot 118	1st	S	39.4	9.4	-20.6	9	Standard thermal glazing	26.4	No	Yes	N/A	Alternative Ventilation Not Required
Plot 118	1st	E	31.1	1.1	-28.9	1	Standard thermal glazing	18.1	No	Yes	N/A	Alternative Ventilation Not Required
Plot 118	1st	N	30.6	0.6	-29.4	1	Standard thermal glazing	17.6	No	Yes	N/A	Alternative Ventilation Not Required
Plot 119	1st	E	30.9	0.9	-29.1	1	Standard thermal glazing	17.9	No	Yes	N/A	Alternative Ventilation Not Required
Plot 119	1st	N	30.6	0.6	-29.4	1	Standard thermal glazing	17.6	No	Yes	N/A	Alternative Ventilation Not Required
Plot 119	1st	W	35.4	5.4	-24.6	5	Standard thermal glazing	22.4	No	Yes	N/A	Alternative Ventilation Not Required
Plot 119	1st	S	39.4	9.4	-20.6	9	Standard thermal glazing	26.4	No	Yes	N/A	Alternative Ventilation Not Required
Plot 120	1st	W	38.3	8.3	-21.7	8	Standard thermal glazing	25.3	No	Yes	N/A	Alternative Ventilation Not Required
Plot 120	1st	S	37.6	7.6	-22.4	8	Standard thermal glazing	24.6	No	Yes	N/A	Alternative Ventilation Not Required
Plot 120	1st	E	30.5	0.5	-29.5	1	Standard thermal glazing	17.5	No	Yes	N/A	Alternative Ventilation Not Required
Plot 120	1st	N	31	1	-29	1	Standard thermal glazing	18	No	Yes	N/A	Alternative Ventilation Not Required
Plot 121	1st	W	38.6	8.6	-21.4	9	Standard thermal glazing	25.6	No	Yes	N/A	Alternative Ventilation Not Required

Plot 121	1st	S	33.4	3.4	-26.6	3	Standard thermal glazing	20.4	No	Yes	N/A	Alternative Ventilation Not Required
Plot 121	1st	E	30.6	0.6	-29.4	1	Standard thermal glazing	17.6	No	Yes	N/A	Alternative Ventilation Not Required
Plot 121	1st	N	30.8	0.8	-29.2	1	Standard thermal glazing	17.8	No	Yes	N/A	Alternative Ventilation Not Required
Plot 122	1st	W	38.6	8.6	-21.4	9	Standard thermal glazing	25.6	No	Yes	N/A	Alternative Ventilation Not Required
Plot 122	1st	S	33.4	3.4	-26.6	3	Standard thermal glazing	20.4	No	Yes	N/A	Alternative Ventilation Not Required
Plot 122	1st	E	30.2	0.2	-29.8	0	Standard thermal glazing	17.2	No	Yes	N/A	Alternative Ventilation Not Required
Plot 122	1st	N	30.8	0.8	-29.2	1	Standard thermal glazing	17.8	No	Yes	N/A	Alternative Ventilation Not Required
Plot 123	1st	S	33.1	3.1	-26.9	3	Standard thermal glazing	20.1	No	Yes	N/A	Alternative Ventilation Not Required
Plot 123	1st	E	30.2	0.2	-29.8	0	Standard thermal glazing	17.2	No	Yes	N/A	Alternative Ventilation Not Required
Plot 123	1st	N	30.5	0.5	-29.5	1	Standard thermal glazing	17.5	No	Yes	N/A	Alternative Ventilation Not Required
Plot 123	1st	W	38.3	8.3	-21.7	8	Standard thermal glazing	25.3	No	Yes	N/A	Alternative Ventilation Not Required
Plot 124	1st	W	38.2	8.2	-21.8	8	Standard thermal glazing	25.2	No	Yes	N/A	Alternative Ventilation Not Required
Plot 124	1st	S	33.7	3.7	-26.3	4	Standard thermal glazing	20.7	No	Yes	N/A	Alternative Ventilation Not Required
Plot 124	1st	E	29.8	-0.2	-30.2	0	Standard thermal glazing	16.8	No	Yes	N/A	Alternative Ventilation Not Required
Plot 124	1st	N	30.3	0.3	-29.7	0	Standard thermal glazing	17.3	No	Yes	N/A	Alternative Ventilation Not Required
Plot 125	1st	W	37.8	7.8	-22.2	8	Standard thermal glazing	24.8	No	Yes	N/A	Alternative Ventilation Not Required
Plot 125	1st	S	32.5	2.5	-27.5	3	Standard thermal glazing	19.5	No	Yes	N/A	Alternative Ventilation Not Required
Plot 125	1st	E	30.1	0.1	-29.9	0	Standard thermal glazing	17.1	No	Yes	N/A	Alternative Ventilation Not Required
Plot 125	1st	N	30.1	0.1	-29.9	0	Standard thermal glazing	17.1	No	Yes	N/A	Alternative Ventilation Not Required
Plot 126	1st	W	37.6	7.6	-22.4	8	Standard thermal glazing	24.6	No	Yes	N/A	Alternative Ventilation Not Required
Plot 126	1st	S	33.2	3.2	-26.8	3	Standard thermal glazing	20.2	No	Yes	N/A	Alternative Ventilation Not Required
Plot 126	1st	E	30	0	-30	0	Standard thermal glazing	17	No	Yes	N/A	Alternative Ventilation Not Required
Plot 126	1st	N	29.6	-0.4	-30.4	0	Standard thermal glazing	16.6	No	Yes	N/A	Alternative Ventilation Not Required
Plot 127	1st	S	35.4	5.4	-24.6	5	Standard thermal glazing	22.4	No	Yes	N/A	Alternative Ventilation Not Required
Plot 127	1st	W	36.9	6.9	-23.1	7	Standard thermal glazing	23.9	No	Yes	N/A	Alternative Ventilation Not Required
Plot 127	1st	N	28.9	-1.1	-31.1	-1	Standard thermal glazing	15.9	No	Yes	N/A	Alternative Ventilation Not Required
Plot 127	1st	E	31	1	-29	1	Standard thermal glazing	18	No	Yes	N/A	Alternative Ventilation Not Required