



Azymuth Acoustics UK

Professional Acoustic Services

Noise Impact Assessment

Ref: Z65495RevA

Proposed Apartment Building

Site of Alpha House

Wythenshawe

On behalf of

**Wythenshawe Community Housing
Group and Muse Places**



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1.0 Introduction

Azymuth Acoustics UK (henceforth Azymuth) has been contracted by Wythenshawe Community Housing Group and Muse Places to perform a Noise Impact Assessment (NIA) in relation to the erection of a residential development (Use Class C3) comprising a part 2, part 6 storey building together with ancillary communal facilities, associated access, car and cycle parking, refuse storage, landscaping, amenity space, signage and other associated works.

The development shall consist of 125no. new dwellings and will be located at the site of the existing Alpha House, Wythenshawe, which is currently under demolition.

This noise impact assessment is intended to provide information relating to potential noise levels affecting the site in order to support the detailed planning application for the residential development. In particular, the report sets out the following details:

- The results of a baseline noise survey undertaken in the vicinity of Alpha House
- The appropriate assessment criteria and guidance relating to noise in the environment as associated with this kind of development
- Recommendations to meet the targets as set out by the assessment criteria

It is assumed that all drawings and information provided by the client is up to date and correct.

2.0 Baseline Noise Survey

2.1 Measurement Procedures

The instrumentation used for the NIA consisted of a SvanTek 971 type 1 precision sound level meter. The equipment was calibrated before and after measurements. The sound level meter measured A-weighted (fast response) noise levels as well as octave bands noise levels for all measurement record.

Daytime noise level measurements were undertaken between 10:50hrs and 13:06hrs on Wednesday 31st July as well as between 15:21hrs and 17:32hrs on Wednesday 7th August 2024. Night-time measurements were undertaken between 23:00hrs and 00:34hrs on Wednesday 7th / Thursday 8th August 2024.

Recent additional evening measurements were undertaken between 17:32hrs and 19:39hrs on Tuesday 14th October 2025.

All measurements have been averaged and are displayed in Table 1.

The noise measurements were undertaken using the sound level meter at the position(s) shown in Figure 1 below, a vibration measurement was also undertaken at Position 4 in 2025:

- Position 1: Rowlandsway 1 (~1.5m from roadside)
- Position 2: Wavell Road 1 (~0.5m from roadside)
- Position 3: Wavell Road 2 (~0.5m from roadside)
- Position 4: Rowlandsway 2 (~0.5m from roadside)

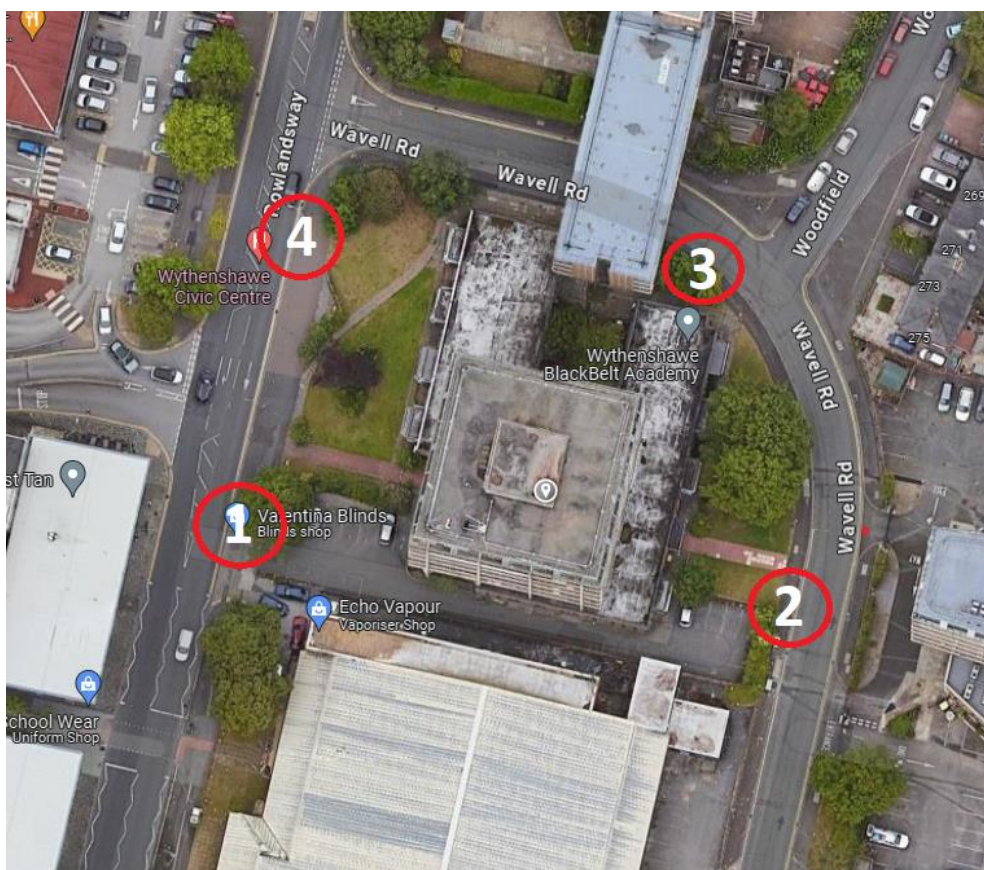


Figure 1 – Noise measurement position(s)

2.2 Summary of Noise Measurements

2.2.1 Noise Survey

The following table summarises the results of all the noise measurements undertaken at the proposed site in terms of the average daytime and night-time noise levels for both the 2024 survey and the recent 2025 survey.

Location	Period	L _{AFmax}	L _{Aeq}	L _{A10}	L _{A50}	L _{A90}
1) Rowlandsway 1	Day	80.6	66.5	69.2	61.2	53.9
1) Rowlandsway 1	Night	78.2	61.8	63.9	52.2	46.3
2) Wavell Road 1	Day	76.2	61.2	62.2	53.9	50.5
2) Wavell Road 1	Night	69.3	52.5	47.7	45.4	44.2
3) Wavell Road 2	Day	76.0	59.4	60.3	51.9	49.0
3) Wavell Road 2	Night	62.5	50.1	49.2	47.0	45.9
4) Rowlandsway 2	Day	80.1	65.9	68.9	61.2	55.4
4) Rowlandsway 2	Night	76.0	57.3	58.4	48.6	44.1

Table 1 – Summary of noise measurements

Azymuth assumes that all noise levels measured on-site during the baseline noise survey are typical of the site.

Full results of the noise levels recorded during the course of the survey are included in Appendix B of this report.

2.2.2 Assessment of Night-time L_{Amax} Data

Azymuth has carried out an assessment of the available night-time L_{Amax} noise level data for measurement position 1 at the Alpha House site (referenced to ~1.5m from the roadside). The highest measured L_{Amax} value was 82.1dB and the duration of the night-time survey was exactly 25 minutes at this position, hence it is estimated that the 10th highest L_{Amax} value over the entire 8hr night-time period is likely to be around 84-87dB (at 1.5m from the roadside).

2.3 Description of Noise Climate

The main source of noise affecting the site originates from traffic on the roads surrounding the site. The development is situated in Wythenshawe town centre therefore there is a constant flow of traffic along Rowlandsway. Construction noise from an adjacent site was audible throughout the July 2024 measurements at Position 2.

The weather during the measurement procedures was dry with wind speeds below 5mph.

3.0 Baseline Vibration Survey

3.1 Measurement Procedures

The instrumentation used for the NIA consisted of a SvanTek 977 type 1 precision sound level meter and Dytran 3055B2 accelerometer. The meter was set to 30s interval measurements and collected readings for peak, max and RMS velocity (m/s), as well as octave band RMS acceleration (m/s^2).

The accelerometer was fixed to a timber block located on a level section of ground and weighted down onto the ground surface with bricks to facilitate a stable and secure coupling to the surface of the ground at each measurement location.

Evening vibration level measurements were undertaken between 18:09hrs and 18:29hrs on Tuesday 14th October 2025.

The accelerometer was positioned ~4m set back from the roadside adjacent to Position 4: Rowlandsway 2.

3.2 Summary of Vibration Measurements

3.2.1 Vibration Survey

The following table summarises the results of the vibration measurements undertaken at the proposed site in terms of the daytime peak, maximum transient and average RMS vibration, as well as estimated vibration dose (eVDV).

Measurement Position	Distance from Roadside (~m)	Peak Vibration Acceleration (m/s^2)	Maximum Transient Vibration Value (m/s^2)	Average RMS Vibration over 20mins (m/s^2)	eVDV _b ($m/s^{1.75}$)
Position 4	4	0.035	0.006	0.003	0.015 (day)
					0.013 (night)

Table 2 – Summary of vibration measurements

Azymuth assumes that all vibration levels measured on-site during the baseline vibration survey are typical of the site.

A graphical representation of the vibration levels recorded during the course of the survey are included in Appendix C of this report.

4.0 Assessment Criteria

In order to assess the extent of any measures required in order to comply with suitable conditions relating to potential noise or vibration sources, Azymuth Acoustics UK has reviewed various guidance documents and standards, these include:

- ProPG: Professional Practice Guidance on Planning and Noise (New residential development)
- National Planning Policy Framework 2024
- British Standard 8233: 2014
- World Health Organisation Guidelines on Community Noise
- British Standard 4142:2014+A1: 2019
- IOA Guide to Noise Requirements of Approved Document O 2022
- Acoustics Ventilation and Overheating Residential Design Guide 2020
- British Standard 6472: 2008

4.1 ProPG: Planning and Noise - May 2017

This Professional Practice Guidance on Planning and Noise (ProPG) has been produced to provide practitioners with guidance on a recommended approach to the management of noise within the planning system in England. The National Planning Policy Framework encourages improved standards of design. The CIEH, IOA and the ANC have worked together to produce this guidance which encourages better acoustic design for new residential development and aims to protect people from the harmful effects of noise.

The Professional Practice Guidance on Planning and Noise States 'The recommended approach is intended to give the developer, noise practitioner, and decision maker an early indication of the likely initial suitability of the site for new residential development from a noise perspective and the extent of acoustic issues that would be faced'. It is important that acoustic design is reviewed at an early stage of the development process.

4.2 National Planning Policy Framework 2024

The National Planning Policy Framework (NPPF) provides guidance to local authorities taking into account noise in making planning decisions. Paragraph 198 of the NPPF states that planning policies and decisions should aim to:

- Mitigate and reduce to a minimum potential adverse impacts resulting from new development – and avoid noise giving rise to significant adverse impacts on health and quality of life,
- Identify and protect tranquil areas which have remained relatively undisturbed by noise and are prized for their recreational and amenity value for this reason;

Paragraphs 187-188 of the NPPF state that the planning system should distinguish between the hierarchy of international, national and locally designated sites; allocate land with the least environmental or amenity value, where consistent with other policies in this Framework. In addition, the planning system should 'prevent both new and existing development from contributing to or being put at unacceptable risk from, or being adversely affected by unacceptable levels of soil, air, water or noise pollution or land instability'.

Paragraph 200 of the NPPF states new developments should provide suitable mitigation measures to prevent adverse impact of existing business or community facilities, with responsibility for mitigation measures on the applicant or 'agent of change'.

4.3 British Standard 8233: 2014

BS 8233 provides a code of practice for the sound insulation of a variety of building types affected by general environmental noise. It provides recommendations for control of noise in and around buildings and suggests appropriate internal ambient noise level criteria / limits for a variety of different situations including residential properties.

The following table summarises the noise limits suggested by BS 8233 applying to residential properties:

Activity	Room	Good Design Range $L_{Aeq,T}$ dB	
		07:00-23:00hrs	23:00-07:00hrs
Resting	Living Room	35	-
Dining	Dining Room / Area	40	-
Sleeping (daytime resting)	Bedroom (at night)	35	30

Table 3 – Noise Limits for Residential Properties Suggested in BS 8233

BS 8233 also states that traditional external areas that are used for amenity space, such as gardens and patios, 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.

4.4 World Health Organisation Environmental Noise Guidelines (ENG) 2018

The main purpose of the 2018 WHO guidelines is to provide recommendations for protecting human health from exposure to environmental noise originating from the following sources: transportation (road traffic, railway and aircraft), wind turbines and leisure activities.

The guidelines set out to define recommended exposure levels for environmental noise in order to protect population health. Exposure limits are average levels defined over a period of one year, measured outdoors in free field at the most exposed façade. It should be noted that the document does not provide guideline limit values for multiple noise sources in combination.

The 2018 guidelines supersede the Community Noise Guidelines from 1999. Nevertheless, the document recommends that all CNG indoor guideline values and any values not covered by the current guidelines should remain valid. As such, the following guidance would remain appropriate:

For protection against sleep disturbance inside dwellings, night-time noise levels should not exceed 30dB L_{Aeq} for continuous noise and 45dB L_{Amax} for typical single sound events (which are exceeded 15 times or more per night – see ProPG Appendix A.12 for more details).

To protect the majority of people from being seriously annoyed during the daytime, the outdoor sound level from steady, continuous noise (interpreted as noise from all sources combined) should not exceed 55dB L_{Aeq} on balconies, terraces and in outdoor living areas.

It should be noted that exposure levels defined in ENG and CNG are for guidance purposes as relates potential adverse health impacts and should not be interpreted as absolute limits or regulations.

4.5 British Standard 4142:2014+A1: 2019

“Methods for assessing and rating industrial sound” describes methods for rating and assessing sound of an industrial and/or commercial nature. 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.

- Typically, the greater the difference between background sound and industrial/commercial noise, the greater the magnitude of the impact.
- The lower the rating level is relative to the measured background sound level, the less likely it is that the specific sound source will have an adverse impact or a significant adverse impact. Where the rating level does not exceed the background sound level, this is an indication of the specific sound source having a low impact, depending on the context.
- A difference of around +5dB is likely to be an indication of an adverse impact, depending on the context.
- A difference of around +10dB or more is likely to be an indication of a significant adverse impact, depending on the context.

BS 4142 notes that: “Adverse impacts include, but are not limited to, annoyance and sleep disturbance. Not all adverse impacts will lead to complaints and not every complaint is proof of an adverse impact.”

4.6 IOA Guide to Noise Requirements of Approved Document O 2024

Approved Document O ‘Overheating’ was released in December 2021 and came into effect in England on 15th June 2022. It introduces requirements for various types of residential premises to limit unwanted solar gains in summer and provide an adequate means to remove heat from the indoor environment (Requirement O1 (1)). Requirement O1(2)(a) of the regulation requires that account must be taken of the safety of an occupant, and their reasonable enjoyment of the residence. There is also a requirement (O2(b)) that mechanical cooling may only be used where sufficient heat cannot be removed from the indoor environment without it.

The guide aims to set out a method to demonstrate compliance to the Building Control Body of the noise constraints in Approved Document O. This guide provides clarity for practitioners and regulators so that assessments can be carried out consistently, and the outcome is repeatable and reliable.

Paragraph 3.3 of Approved Document O states that windows are likely to be closed during sleeping hours if noise within bedrooms exceeds the following internal limits:

- 40dB $L_{Aeq,T}$, averaged over 8 hours (between 11pm and 7am)
- 55dB L_{AFmax} , more than 10 times a night (between 11pm and 7am)

The IOA guide also provides the following clarification of the range of external (free field) limiting noise levels (assuming 10dB of attenuation for partly open window and typical room conditions) that generally precludes the simplified method for over-heating calculations (ie above these values they recommend dynamic thermal modelling) based on Approved Document O:



Parameter	High Risk Location	Moderate Risk Location
$L_{Aeq, 8hr}$, averaged over 8hrs between 11pm and 7am	45dB	50dB
L_{AFmax} , more than 10 times a night between 11pm and 7am	60dB	65dB

Table 4 – Noise Limits above which IOA guide recommends dynamic thermal modelling for over-heating assessments

4.7 Acoustics Ventilation and Overheating Residential Design Guide 2020

The Acoustics, Ventilation and Overheating Guide (AVO) is intended to be used by acoustic practitioners as well as all those involved in the planning, development, design and commissioning of new dwellings.

It recommends an approach to acoustic assessments for new residential developments that take due regard of the interdependence of provisions for acoustics, ventilation and overheating. Application of the AVO Guide is intended to demonstrate good acoustic design as described in the ProPG, when considering internal noise level guidelines.

4.8 British Standard 6472: 2008

“Guide to evaluation of human exposure to vibration in buildings” (BS 6472) provides a code of practice for rating and assessing human response to vibration in buildings in the frequency range 0.5Hz – 80Hz. Impact is quantified in vibration dose value (VDV) from frequency weighted vibration measurements. The adverse effect is considered for different building uses (residential, office, workshop) and time periods (day/night). The criteria set out in BS6472 relating VDV to adverse comment are reproduced below:

Place and Time	Low Probability of Adverse Comment $m/s^{1.75}$	Adverse Comment Possible $m/s^{1.75}$	Adverse Comment Probable $m/s^{1.75}$
Residential Buildings (0700hrs to 2300hrs)	0.2 - 0.4	0.4 - 0.8	0.8 - 1.6
Residential Buildings (2300hrs to 0700hrs)	0.1 - 0.2	0.2 - 0.4	0.4 - 0.8

Table 5 - Vibration VDV levels for residential properties suggested in BS 6472

4.9 Recommended Noise and Vibration Assessment Criteria

Based on the guidance above it is recommended that the following criteria would be reasonable with the aim of minimising the impact of the environmental noise and vibration on the proposed new residential accommodation:

- Daytime noise levels not to exceed 35dB $L_{Aeq, 16hr}$ in living rooms / bedrooms
- Daytime noise levels not to exceed 40dB $L_{Aeq, 16hr}$ in dining room / kitchen
- Night-time noise levels in bedrooms not to exceed 30dB $L_{Aeq, 8hr}$
- Night-time single sound events in bedrooms not to exceed 45dB L_{Amax} more than 15 times a night
- Noise levels in external amenity spaces to not exceed 50dB $L_{Aeq, T}$, with an upper guideline of 55dB $L_{Aeq, T}$ in noisier environments
- Daytime vibration levels not to exceed $0.2m/s^{1.75}$ eVDV
- Night-time vibration levels not to exceed $0.1m/s^{1.75}$ eVDV

Table 4, Note 5 of BS 8233:2014 states: ‘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. If applicable, any room should have adequate ventilation (e.g. trickle ventilators should be open) during assessment.'

Given the location of the site the proposed development has been identified as a moderate risk location, as per IOA guidance on Approved Document O. As such Azymuth would recommend the following external noise level targets:

- 50dB $L_{Aeq,T}$, averaged over 8 hours (between 11pm and 7am)
- 65dB L_{AFmax} , more than 10 times a night (between 11pm and 7am)

5.0 Assessment of Environmental Noise and Vibration

5.1 Assessment of Environmental Noise Risk

The following noise and overheating risk assessment highlights the level of risk of an adverse effect based on the guidance from the ProPG and AVO guidance documents.

The calculated levels as used in the assessment have been derived from the SoundPLAN noise model. Each assessment location is the worst-case noise level on each façade.

Location	Time of Day	Calculated Noise Levels (dBA)	ProPG Risk of Adverse Effect	AVO Guide Risk (overheating) Category
West Elevations (Second Floor)	Daytime $L_{Aeq, 16hr}$	63	Low/Medium	Medium/High
	Night-time $L_{Aeq, 8hr}$	58	Medium	High
South Elevations (Second Floor)	Daytime $L_{Aeq, 16hr}$	59	Low	Low/Medium
	Night-time $L_{Aeq, 8hr}$	54	Low/Medium	Medium
East Elevations (First Floor)	Daytime $L_{Aeq, 16hr}$	60	Low/Medium	Medium
	Night-time $L_{Aeq, 8hr}$	48	Low	Negligible/Low
North Elevations (First Floor)	Daytime $L_{Aeq, 16hr}$	61	Low/Medium	Medium
	Night-time $L_{Aeq, 8hr}$	56	Medium	Medium/High

Table 6 – Noise risk assessment for Alpha House

As shown above the elevations facing directly onto Rowlandsway generally possesses a medium risk of adverse noise affect and overheating as per the ProPG and AVO guidance documents respectively.

The AVO guide gives the following example outcomes for noise that may be perceived as present and disruptive:

"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."

It should be noted that ProPG does not account for daytime L_{Amax} instances that may arise from vehicles passing by. These instances may cause annoyance during the day to the

potential residents. As such, extra mitigation has been recommended in order to minimise noise complaints to the premises.

5.1.1 Approved Document O Assessment of Noise Levels

The calculated worst-case night-time noise levels indicate exceedances of the ADO noise limits on the north and west facades as well as partly on the south façade (nearest Rowlandsway). There is therefore an elevated risk of overheating requiring enhanced ventilation that would normally be offered by opening windows, however, the noise risk assessment indicates that relying on opening windows would result in significant noise intrusion, thus disrupting normal sleep. Strict adherence to the ADO guidance implies that windows would be assumed closed at night on north, west and part south for the purposes of simplified overheating calculations.

Calculated worst-case night-time noise levels on the west and most of the south facades are compliant with the ADO noise limits.

5.2 SoundPLAN Model

Azymuth has undertaken acoustic modelling with the SoundPLAN noise modelling software to predict and visualise the impact of noise on the proposed development site.

5.2.1 Grid Noise Map (GNM)

The below GNM shows the effect of noise from the adjacent roads on the development during the daytime hours.



Figure 2 – Daytime GNM, Alpha House



Figure 3 – Night-time GNM, Alpha House

5.2.2 Façade Noise Maps (FNM)

The below FNMs show the likely predicted noise levels incident on the facades of the proposed development.

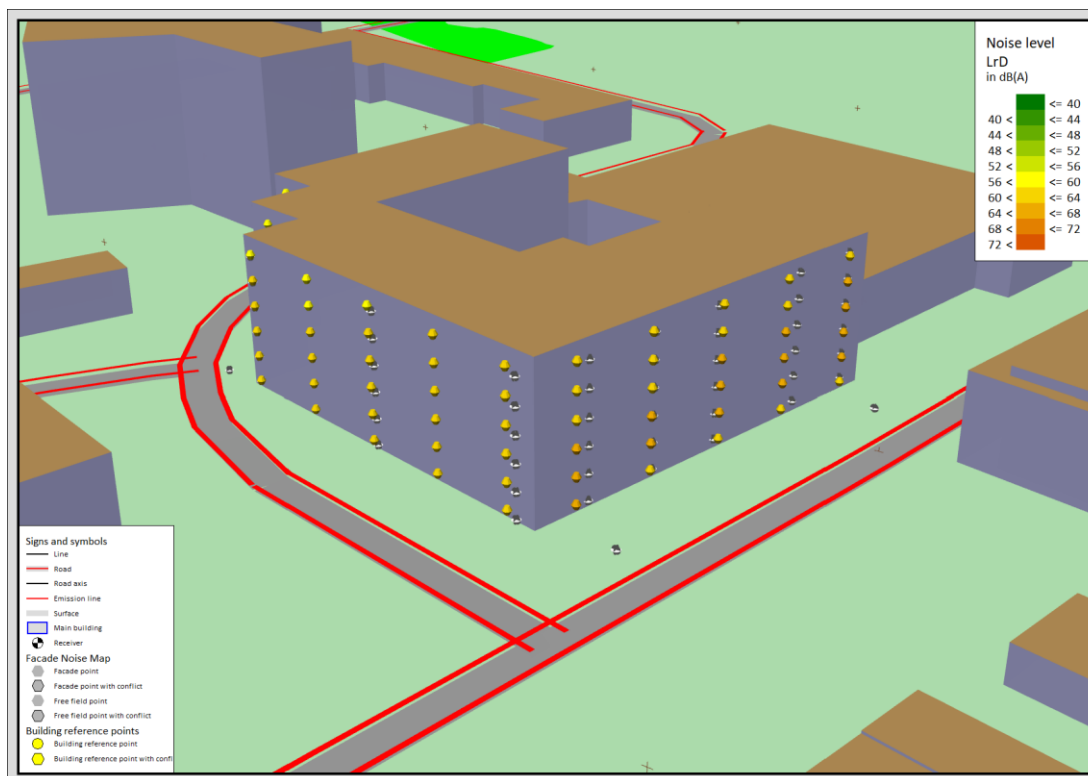


Figure 4 – Daytime FNM, Alpha House west elevation

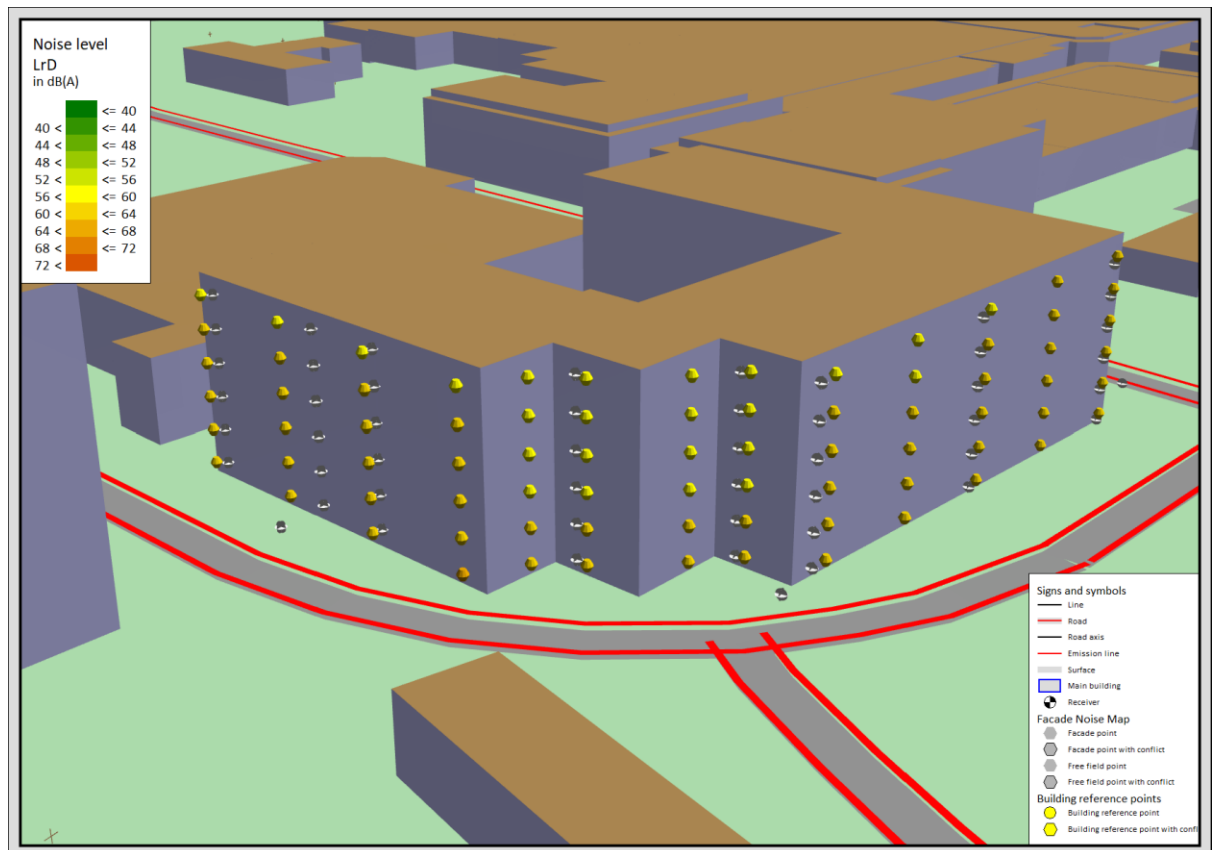


Figure 5 – Daytime FNM, Alpha House east elevations

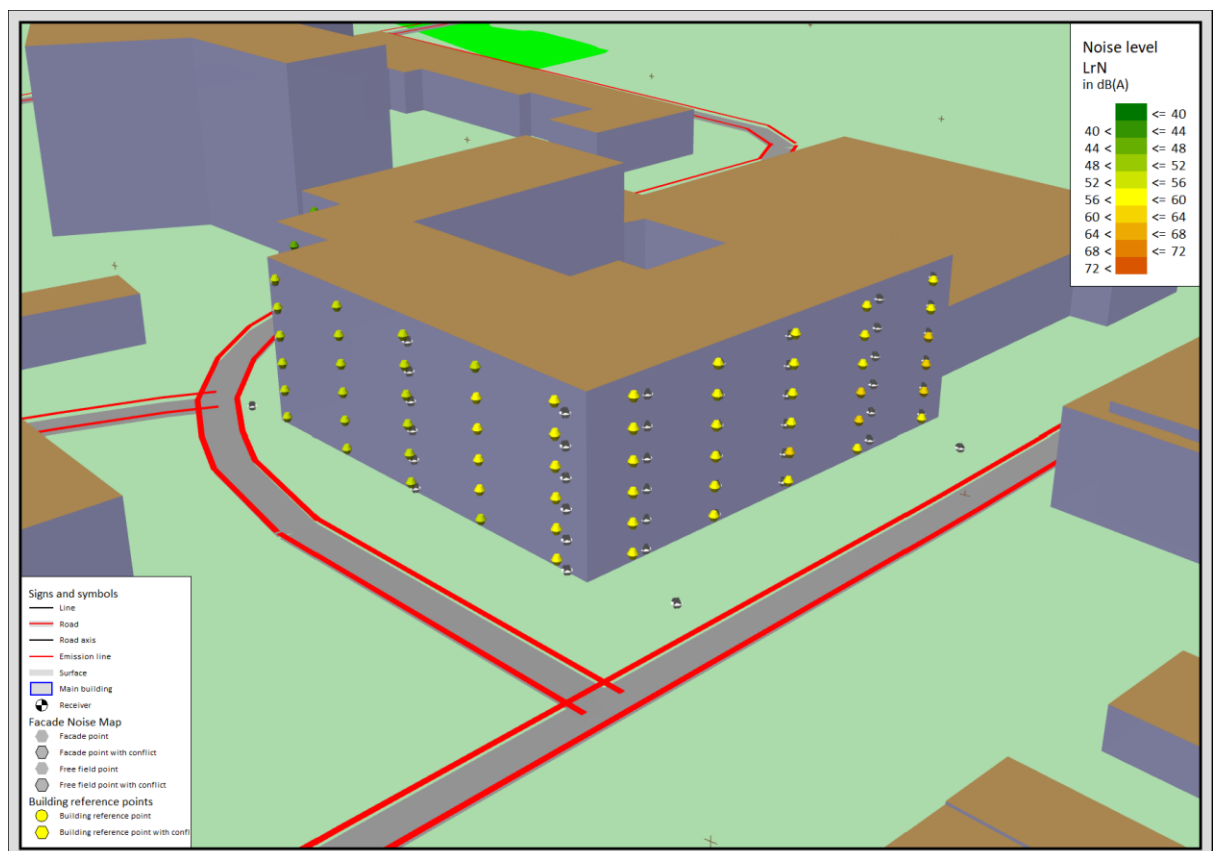


Figure 6 – Night-time FNM, Alpha House west elevation

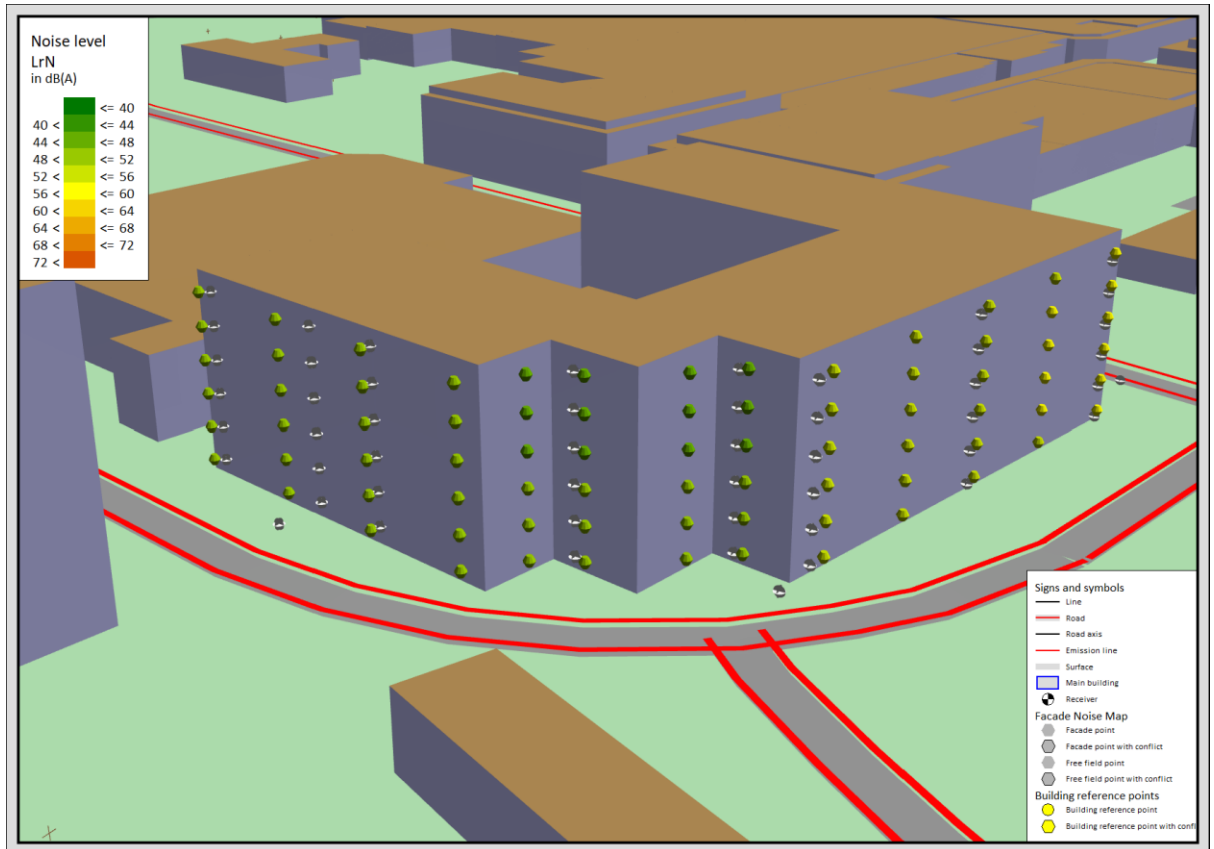


Figure 7 – Night-time FNM, Alpha House east elevations

The following FNM's show the worst-case level for each façade of the proposed development. NB façade noise levels are typically 2-3dB greater than free field noise levels.

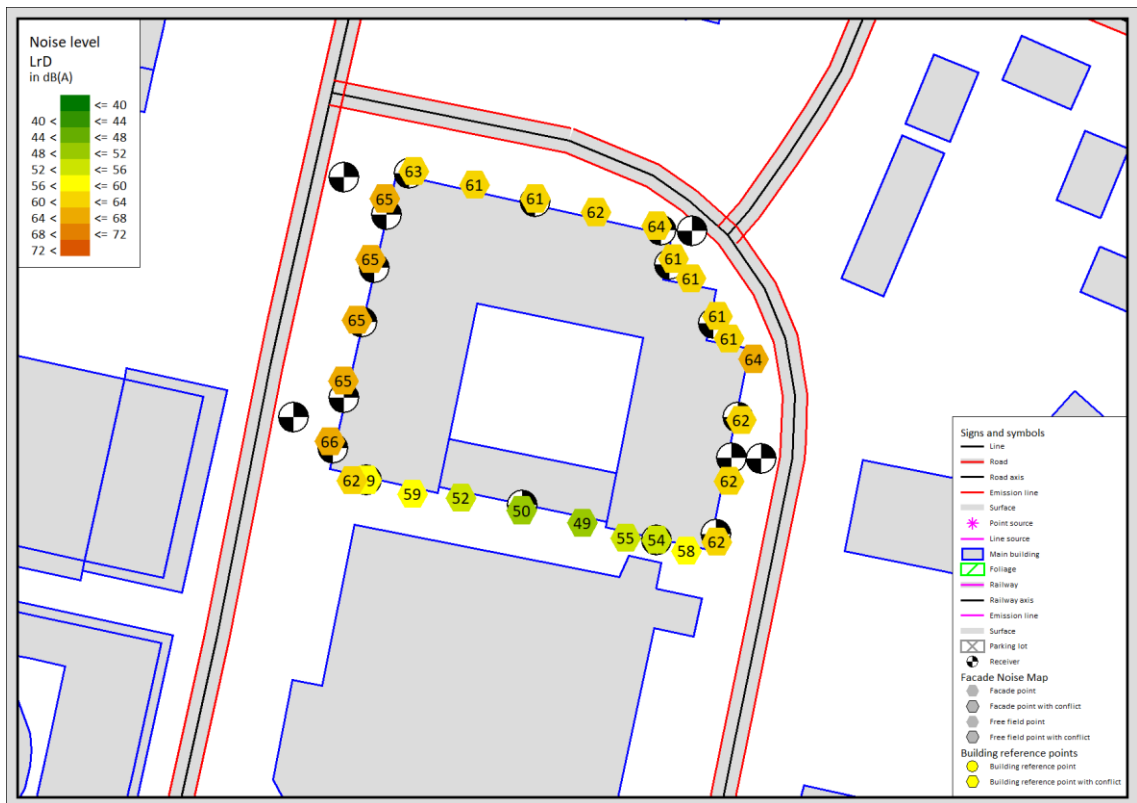


Figure 8 – Daytime FNM, worst-case levels

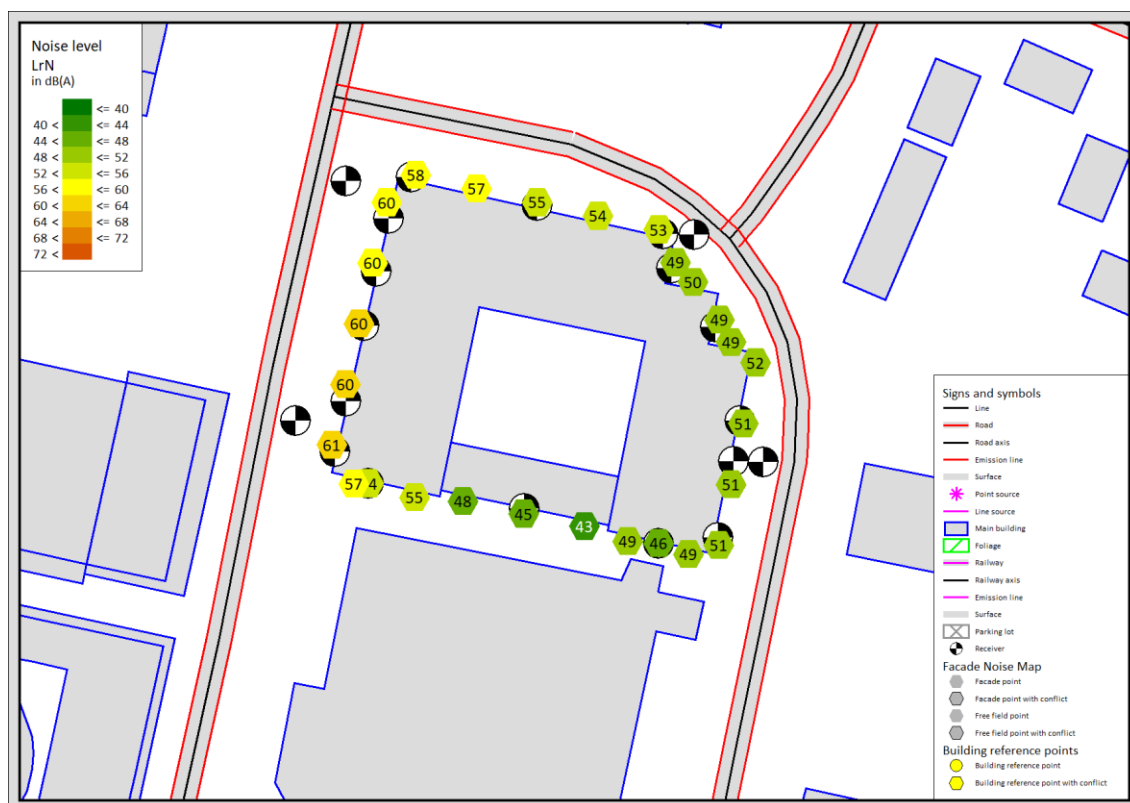


Figure 9 – Night-time FNM, worst-case levels

5.3 Assessment of Vibration Risk

The following vibration risk assessment highlights the risk of adverse effect based on the guidance from BS 6472.

These vibration levels have been calculated with respect to Position 4 and the accelerometer set back ~4m from the roadside. The proposed building façade is to be set back a further ~2m from the road as such the actual vibration levels will likely be less than the values given in the following table.

Location	Time of Day	Calculated eVDV Level ($\text{m/s}^{1.75}$)	Assessment Criteria eVDV Limit ($\text{m/s}^{1.75}$)	Risk of Adverse Effect
Measurement Position 4	Daytime	0.015	0.2	Negligible
	Night-time	0.013	0.1	Negligible

Table 7 – Vibration risk assessment for Alpha House

As shown in the table above, the calculated day and night eVDV levels are less than the assessment criteria eVDV limits thus the risk of adverse vibration impact is negligible as per BS6472.



6.0 Recommendations for Environmental Noise Mitigation

Based on survey data and the predicted noise levels derived from SoundPLAN, Azymuth have produced the following recommendations in order to mitigate the effects of noise within the proposed development. If these recommendations are followed, noise levels within the development will satisfy the criteria as set out in Section 4.9.

NB all recommended mitigation specifications are subject to good workmanship and for materials to be installed as the manufacturer intends. Any poor workmanship may lead to weaknesses in the sound attenuation provided by the building elements.

Mitigation specifications have been colour coded with reference to Section 7.3.

6.1 Recommended Glazing Specification

The table below outlines the glazing specifications Azymuth would recommend in order to achieve the specified internal ambient noise level targets.

Location (Habitable Spaces)	Glazing Specification	Appropriate Glazing Types
Elevations facing onto Rowlandsway (ORANGE)	Any building regulations approved min. 32dB R_w and 28dB R_w+C_{tr}	Acoustic glazing e.g 6/16/4mm good quality double glazed units
All other elevations (GREEN)	Any building regulations approved min. 29dB R_w and 25dB R_w+C_{tr}	Any good quality double glazed units

Table 8 – Azymuth recommended glazing specification for Alpha House

6.2 Recommended Ventilation Specification

Table 9 outlines the recommended ventilation that should be paired with the glazing specifications to ensure the appropriate sound insulation targets are met. With reference to the AVO and ProPG guidance, Azymuth recommends the following ventilation specification to ensure sufficient air flow to dwellings whilst also achieving internal noise level targets.

Azymuth understands that the development shall make use of Passivhaus principles, as such MVHR shall be used throughout which is entirely acceptable from an acoustics point of view.

Location (Habitable Spaces)	Minimum Ventilation Specification	Appropriate Ventilation Types
Dwellings facing onto Rowlandsway (ORANGE)	Building Regulations Part F Mechanical ventilation with heat recovery	MVHR, no trickle vents. Any air inlets/outlets should be appropriately attenuated
All other dwellings (GREEN)	Building Regulations Part F Mechanical ventilation with heat recovery	MVHR, no trickle vents. Any air inlets/outlets should be appropriately attenuated

Table 9 – Azymuth recommended ventilation specification for Alpha House

6.3 Mitigation Specifications

The figure below shows the locations in which the specified mitigation measures should be implemented.

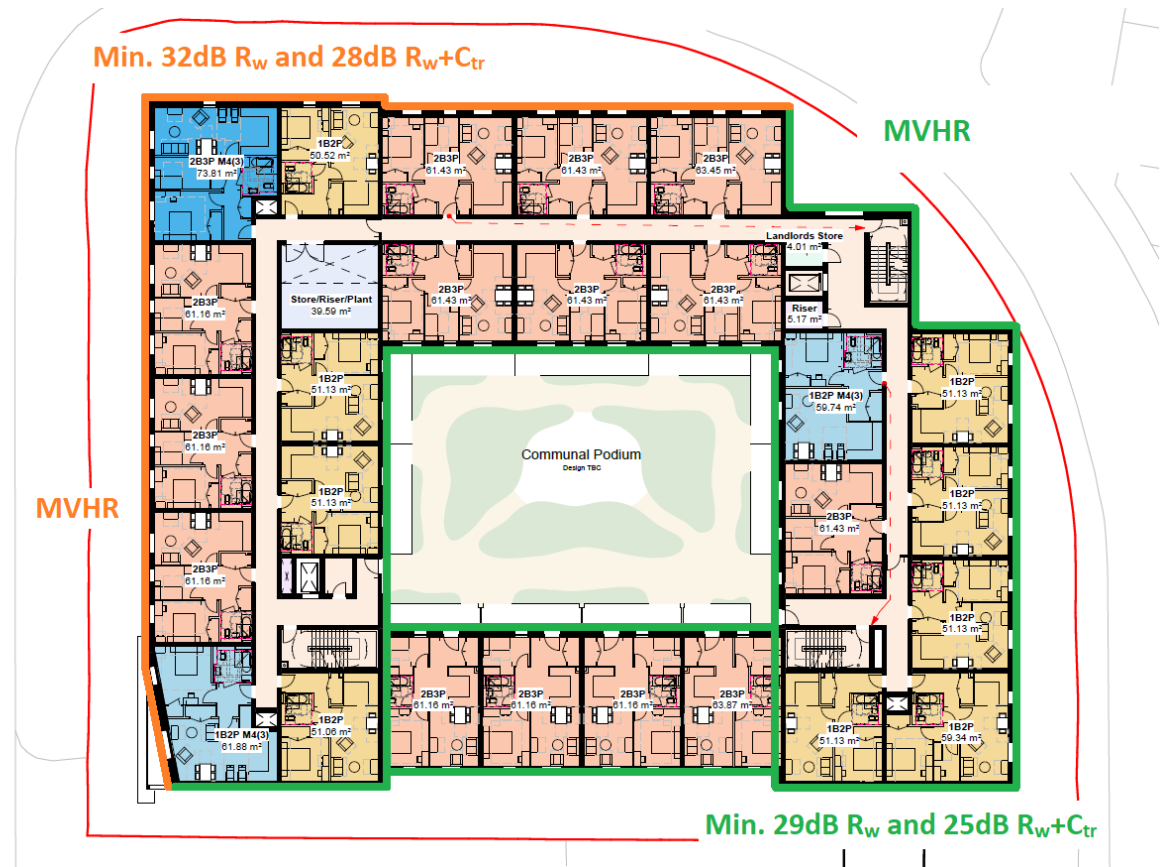


Figure 10 – Mitigation specifications for Alpha House, Wythenshawe

6.4 Other Elements of Building Envelope

Other elements of the building envelope should have the following sound insulation performance:

- External walls: minimum sound insulation 55dB R_w . This minimum is likely to be significantly exceeded by a normal brickwork façade. Where alternative external wall types (eg composite cladding panels / Metsec build-ups) are proposed on habitable areas it will be appropriate to check whether they comply with the target 55dB R_w .
- Roof: minimum sound insulation 45dB R_w . This minimum would likely be exceeded with a traditional slate or tile roof with mineral wool loft insulation above plasterboard ceilings or by a suitably insulated concrete roof or composite flat roof. (NB for composite flat roof build-ups a minimum 200mm roof void and 100mm mineral wool insulation would be recommended over and above the rigid insulation required to provide the required levels of thermal insulation).

7.0 Summary

Azymuth has undertaken a Noise Impact Assessment (NIA) in relation to the erection of a residential development (Use Class C3) comprising a part 2, part 6 storey building together with ancillary communal facilities, associated access, car and cycle parking, refuse storage, landscaping, amenity space, signage and other associated works.

The development shall consist of 125no. new dwellings and will be located on the same site as the existing Alpha House in Wythenshawe, the existing premises are currently under demolition. The proposed development site is located in Wythenshawe town centre and as such will be subject to traffic noise.

Daytime ambient noise levels on Rowlandsway were measured to be $\sim 66\text{dB } L_{Aeq,16hr}$. Night-time noise levels were measured to be between 57dB - $62\text{dB } L_{Aeq,8hr}$.

Daytime noise levels on Wavell Road were measured to be between 59dB - $62\text{dB } L_{Aeq,16hr}$. Night-time noise levels were measured to be between 50dB - $53\text{dB } L_{Aeq,8hr}$.

Elevations facing onto Rowlandsway would possess a medium to high risk of adverse noise effect and overheating as per the ProPG and AVO guidance documents. All other elevations generally possess a low to medium risk.

Azymuth has produced a noise model in SoundPLAN 8.2 to predict and visualise the effect of noise on the development.

Equivalent vibration dose values $\sim 4\text{m}$ from Rowlandsway have been calculated to be $0.015\text{m/s}^{-1.75}$ during the daytime and $0.013\text{m/s}^{-1.75}$, as such there is a negligible risk of adverse vibration effect.

Azymuth have provided the following recommendations to mitigate the effects of any external noise to the internal areas of the development.

Glazing

- Elevations facing Rowlandsway: min. $32\text{dB } R_w$ and $28\text{dB } R_w+C_{tr}$
- All other elevations: min. $29\text{dB } R_w$ and $25\text{dB } R_w+C_{tr}$

Ventilation

- Dwellings facing Rowlandsway: MVHR
- All other dwellings: MVHR

Other Elements of Building Envelope

- External walls: min. $55\text{dB } R_w$
- Roof: min. $45\text{dB } R_w$

If the above recommendations are to be adhered to then the noise levels inside the development shall satisfy the assessment criteria contained within Section 4.9.

Additionally, Azymuth would recommend that a detailed overheating assessment is undertaken by a suitably qualified individual to ensure that dwellings, particularly those facing west (Rowlandsway), are not subject to excess solar gains requiring windows to be open for ventilation. Opening windows for a prolonged period of time may result in noise levels that exceed the relevant noise targets.

Appendix A – Glossary of Acoustic Terms

Decibel (dB)

This is the unit used to measure sound. The human ear has an approximately logarithmic response to acoustic pressure over a very large dynamic range (typically 20 micro Pascal to 100 Pascal).

dB (A)

This is a measure of the overall noise level of sound across the audible spectrum with a frequency weighting (i.e. A-weighting) to compensate for the sensitivity of the human ear to sound of different frequencies. The A-weighting curve is implemented in sound level meters using an electronic filter that approximately corresponds to the frequency response of the ear.

Octave Band Noise Level

The human ear is sensitive to sound over a range of frequencies between approximately 20Hz to 20kHz. The ear is also generally more sensitive to medium and high frequencies than to low frequencies. In order to define the frequency content of a noise, the spectrum can be divided into frequency bands. The most commonly used frequency bands are octave bands, in which the mid-frequency of each band is twice that of the band below it.

L_{Aeq}

This is the equivalent steady sound level in dB(A) containing the same acoustic energy as the actual fluctuating sound level over a given time period.

Reverberation Time (RT or sometimes T₃₀ or T₆₀)

This is the time taken for the reverberant sound energy in an enclosure to decay one millionth of its equilibrium value, i.e. by 60dB, after the source has been switched off. The reverberation time is frequency dependent and it is customary to measure its value in octave or one-third octave bands. Reverberation occurs when sound waves are repeatedly reflected from each surface of the room.

Sound Reduction Index (SRI)

Difference measured between the amount of energy flowing towards the wall in the source room and the total amount of energy entering the receiving room (usual range 100 - 3150Hz for one third octave band values). The SRI varies with frequency and is measured in a laboratory in either octave or one-third octave bands.

$SRI = L_1 - L_2 + 10 \log (S/A)$, where:

L1 = Noise level in the source room

L2 = Noise levels in the receiving room

S = Surface area of test specimen

A = Equivalent acoustic absorption area in the receiving room

Weighted Sound Reduction Index (R_w)

This is a weighted single figure descriptor of the sound insulation performance of a partition measured under laboratory conditions. The procedure used to quantify the R_w is to compare the sound reduction index (SRI) in each of the one-third octave bands from 100Hz to 3150Hz against a set of standard reference curves.



Appendix B – Noise Survey Data

Start	Position	Time	L _{Amax}	L _{Aeq}	L _{A10}	L _{A50}	L _{A90}
Wednesday 31st July 2024							
10:55:00	1	00:05:00	77.4	64.8	69	57.6	50.9
11:00:00	1	00:05:00	74.9	62.8	66.9	56.5	52
11:05:00	1	00:05:00	78.9	63.4	67	58.2	52.6
11:10:00	1	00:05:00	77.7	63.8	67.9	56.9	51.1
11:15:00	1	00:05:00	77.1	64.2	67.6	60.1	52.4
11:20:00	1	00:05:00	79.5	63	65.7	55.8	49
11:31:00	2	00:05:00	75.5	61.6	65.4	57.4	54.3
11:36:00	2	00:05:00	74.9	62.1	65.8	59.4	54.1
11:41:00	2	00:05:00	76.5	62	65.9	55.9	54.6
11:46:00	2	00:05:00	73.6	63.6	66.8	62.4	55.3
11:51:00	2	00:05:00	76.8	64.2	67.4	61.7	56.4
11:56:00	2	00:05:00	77.1	63.7	66.2	60.9	57.7
12:05:00	3	00:05:00	75.4	59.3	60.8	52.5	48.9
12:10:00	3	00:05:00	75.5	59	61.8	51.7	49.1
12:15:00	3	00:05:00	76.7	57.7	57.9	51.6	49.6
12:20:00	3	00:05:00	75	58.4	60.1	53	49.6
12:25:00	3	00:05:00	82	62.2	64.6	53.5	50.9
12:30:00	3	00:05:00	71.7	58.3	61.1	53.5	51.2
12:41:00	4	00:05:00	77.6	63.6	67.1	59.2	55.3
12:46:00	4	00:05:00	79.7	64	67.3	59	54
12:51:00	4	00:05:00	76.5	61.6	65.4	56.2	53.1
12:56:00	4	00:05:00	78.9	64.9	68	60.1	54.1
13:01:00	4	00:05:00	79.6	65.1	68.3	61.6	54.7
13:06:00	4	00:05:00	78.5	63	66.1	58.1	51.3
Wednesday 7th August 2024							
15:26:00	1	00:05:00	84.1	65.7	68.3	61.4	55.2
15:31:00	1	00:05:00	80.7	66.1	69.7	62	56
15:36:00	1	00:05:00	88.3	65.9	67.9	60.3	54.4
15:41:00	1	00:05:00	83.1	65.2	66	58.4	53
15:47:00	4	00:05:00	78.6	65.9	70.3	60.4	54.5
15:52:00	4	00:05:00	76.9	65.5	69.4	61.5	55.3
15:57:00	4	00:05:00	76.9	65.4	69.9	59.6	54.6
16:04:00	3	00:05:00	78.2	59.3	60	54.4	53
16:09:00	3	00:05:00	80.7	61.2	58.5	54.3	53.3
16:14:00	3	00:05:00	77.9	60.1	59.6	54.1	52.9
16:20:00	2	00:05:00	77	59.7	61.8	54.5	50.9
16:25:00	2	00:05:00	81.9	61.4	62.4	56.5	53.3
16:30:00	2	00:05:00	78.9	62.3	64.5	54.7	50.8
16:36:00	1	00:05:00	82.2	67.1	71.3	61.2	54.2
16:41:00	1	00:05:00	78.3	64.3	67.8	60.7	55.7
16:46:00	1	00:05:00	78.1	66.3	69.8	63.4	54.5
16:51:00	1	00:05:00	83.2	67.1	70.8	62.1	53.6
16:56:00	1	00:05:00	84.5	68.6	71.9	64.2	57.5
17:01:00	1	00:05:00	89.4	72.1	75.7	65.9	57.4
17:07:00	4	00:05:00	88	69.7	71.9	64.6	58.6
17:12:00	4	00:05:00	77.5	64.9	68.3	61.7	57.3



Start	Position	Time	L _{Amax}	L _{Aeq}	L _{A10}	L _{A50}	L _{A90}
17:17:00	4	00:05:00	80.3	66.4	69.7	62.6	56.7
17:22:00	4	00:05:00	80.2	66	68.9	63.3	58.1
17:27:00	4	00:05:00	79.2	65.2	68.4	62	57
17:32:00	4	00:05:00	90.9	68.9	70.4	64.6	60.3
23:05:00	1	00:05:00	73.4	59	63.2	50.1	45.1
23:10:00	1	00:05:00	81.9	63.7	67.1	56.4	48
23:15:00	1	00:05:00	82.1	63.5	66.7	54.3	46.6
23:20:00	1	00:05:00	80.3	62.7	65.3	53.4	47.6
23:25:00	1	00:05:00	73.1	55.7	57.2	46.6	44.1
23:34:00	2	00:05:00	53.2	46.7	48.1	46.4	45.1
23:39:00	2	00:05:00	73.7	52.2	48.1	46.2	45.2
23:44:00	2	00:05:00	78	56.4	47.2	44.2	43
23:49:00	2	00:05:00	72.1	47.7	47.4	44.9	43.5
23:56:00	3	00:05:00	70.1	53.1	51.8	47.8	46.3
Thursday 8th August 2024							
00:01:00	3	00:05:00	52.9	46.7	47.5	46.5	45.7
00:06:00	3	00:05:00	64.5	47.3	48.2	46.6	45.8
00:14:00	4	00:05:00	74.1	57.2	60.6	50.4	45.6
00:19:00	4	00:05:00	76.3	57.3	58.3	48.9	43.8
00:24:00	4	00:05:00	69.8	55.9	59.6	47.8	43.7
00:29:00	4	00:05:00	80.3	57.5	56.3	48.5	44.7
00:34:00	4	00:05:00	79.4	58.1	57.4	47.4	42.7
Tuesday 14th October 2025							
17:37:00	1	00:05:00	78.2	67.2	70.2	64.8	60.4
17:42:00	1	00:05:00	79	65.9	68.9	62.9	52.8
17:47:00	1	00:05:00	77.2	66.1	69.7	62.8	54.4
17:52:00	1	00:05:00	77.2	66.9	70.3	64.9	57.1
17:57:00	1	00:05:00	88.4	68.2	70.4	62.8	52
18:02:00	1	00:05:00	76.5	66	70.2	62.8	50.1
18:08:00	4	00:05:00	79.3	66.6	70.6	61.8	53.7
18:13:00	4	00:05:00	77.2	65.3	69.3	60.7	52.8
18:18:00	4	00:05:00	83.2	67.6	70.9	63.8	58
18:23:00	4	00:05:00	79.4	64.6	68	60.4	55.1
18:28:00	4	00:05:00	81.9	65.3	68.9	60.1	52.2
18:33:00	4	00:05:00	81.3	67.1	70.5	63.1	56.9
18:42:00	3	00:05:00	76.8	59.5	62.7	49.9	46.1
18:47:00	3	00:05:00	77.5	57.5	57.6	48.9	45.6
18:52:00	3	00:05:00	76.3	59.7	61.3	49.7	46.4
18:57:00	3	00:05:00	65.3	51.8	55.3	48.9	45.1
19:02:00	3	00:05:00	82	61.9	62.1	51.6	46.5
19:07:00	3	00:05:00	68.6	56.8	61.1	51.5	47.4
19:14:00	2	00:05:00	75.3	53.7	52.5	47	45.1
19:19:00	2	00:05:00	75.9	58.1	56.8	47.2	45
19:24:00	2	00:05:00	74.1	58.3	61.7	48.2	45.4
19:29:00	2	00:05:00	75.2	57.3	54.2	46.3	44.7
19:34:00	2	00:05:00	75.7	61	63.4	48.6	45.2
19:39:00	2	00:05:00	74.1	55.8	58.1	47.7	45

Table B1 – Fully tabulated noise measurement results



Appendix C – Vibration Survey Data

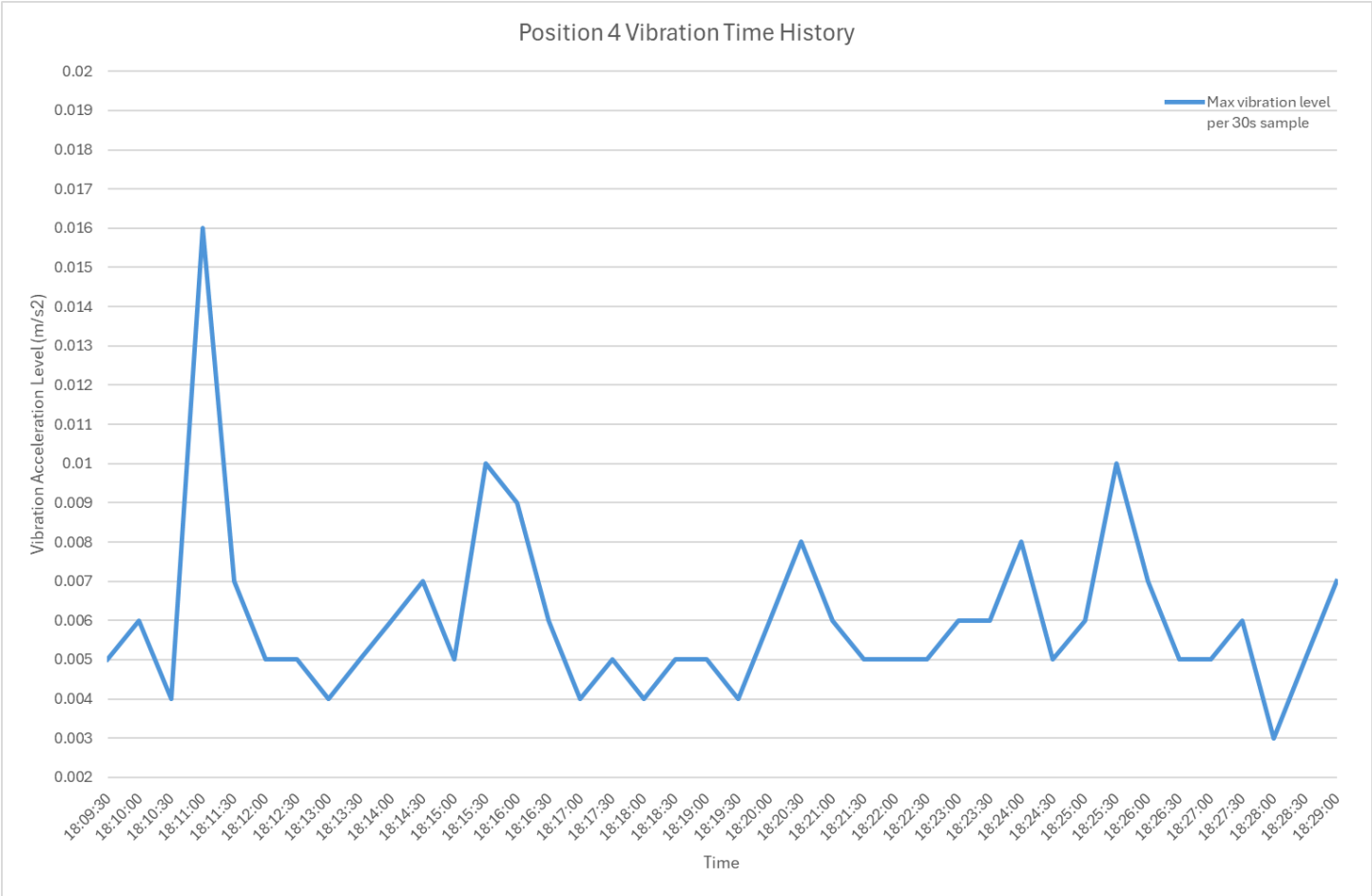


Figure C1 – Position 4 Vibration Time History October 2025