



Former Gamecock Pub, Booth Street West, Manchester

Noise impact assessment

9830.1

30th August 2023

Revision B



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A	First issue	NC	25 th May 23
B	Revised following change of building height – Figure 3, Tables 8 & 9	NC	30 th August 23

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1 Summary

- 1.1 This report has been prepared in support of a planning application for a student residential development at Booth Street West, Manchester.
- 1.2 Noise levels affecting the proposed development from road traffic and other sources have been measured during the day and night, and the façade noise impact calculated.
- 1.3 Noise propagation across the site is calculated in environmental noise modelling software, CadnaA.
- 1.4 The existing noise risk at the site is assessed in accordance with current planning policy, relevant standards and noise practice guidance.
- 1.5 The façade sound insulation design is considered with windows closed to reduce the calculated noise impact to below the lowest adverse effect level. Alternative provision should be made for whole dwelling ventilation according to the Building Regulations, Approved Document F (AD-F).
- 1.6 The acoustic performance requirements for glazing and ventilators are summarised in Table 1. Based on these ventilator acoustic constraints, potential AD-F ventilation strategies are suggested. The sound insulation treatments required for each façade are shown in Table 9 in Section 6.
- 1.7 Overheating options are discussed and the façades which can use openable windows for controlling thermal comfort have been identified.
- 1.8 If the ventilation strategy ends up without facade ventilators, the glazing performance could be reduced, but for this assessment we have assumed that vents could be required.
- 1.9 Based on the details outlined in this report, the noise risks identified are mitigated and minimised, and the site is considered suitable for residential development.

Façade Zone	Glazing $R_w + C_{tr}$ dB	Façade ventilator $D_{new} + C_{tr}$ dB
A	25 dB	29 dB
B	30 dB	34 dB
C	35 dB	39 dB

Table 1: Summary of minimum façade sound insulation treatments

- 1.10 **Plant noise limits and noise ratings**
- 1.11 Background sound levels have been determined using noise measurements undertaken by Mach Acoustics between 25/02/2021 and 26/02/2021.
- 1.12 A BS 4142 rated noise impact of no more than 5dB below the background sound levels at the nearest residential noise sensitive receptor is proposed for the cumulative impact of all fixed mechanical plant.
- 1.13 Proposed plant noise limits are shown in Table 2.

Location (1m from NSR facades)	Period	Maximum noise rating level, $L_{Ar,Tr}$	Comments
Location 1	Daytime (07:00 – 23:00)	≤ 49 dB	Rating level of no more than 5dB below the background noise levels.
	Night-time (23:00 – 07:00)	≤ 37 dB	

Table 2: Proposed upper noise limits for fixed mechanical plant

- 1.14 At this stage in the development, exact mechanical plant specifications are unavailable; based on the initial selection of fixed plant, the appropriate noise ratings for the proposed plant have been set and calculated to meet the plant noise limits; plant noise ratings are proposed in Table 12.
- 1.15 Considering the context of the existing acoustic environment and proposed plant noise limits, a BS 4142 assessment would indicate the likelihood of a low impact should the calculated upper limits be adhered to. This impact is considered to be at worst a LOAEL in alignment with the NPSE aims.

2 Introduction

2.1 Apex Acoustics has been commissioned to undertake a noise survey and assessment of the potential noise impact on the proposed development site in support of a planning application.

2.2 The Description of the development is:

“Demolition of existing building and structure and redevelopment of site for Purpose Built Student Accommodation (PBSA) uses (Sui Generis use class) with ancillary amenity space, a ground floor ‘community hub’ (proposed for Use Classes F2(b), E(b), E(3), E(f)) associated landscape works and infrastructure.”

2.3 The site location is shown in Figure 1, relative to the nearby roads: Boundary Lane and Booth Street West.

2.4 The purpose of this report is to identify the noise impacts at the site, propose appropriate acoustic design parameters and demonstrate the way internal noise levels may be achieved in practice.

2.5 Noise levels affecting the proposed development from road traffic and other sources have been measured during the day and night, and the façade noise impact calculated.

2.6 Noise propagation across the site is calculated in environmental noise modelling software, CadnaA.

2.7 The scope of our appointment includes:

- Use existing noise survey data for the proposed site to produce a noise model based on the proposed layouts to determine noise levels impacting across the site;
- Calculate the highest façade noise impact affecting the proposed development;
- Where appropriate, provide a scheme for the mitigation of noise to reduce the risk of adverse effect, in accordance with local and national policy requirements.

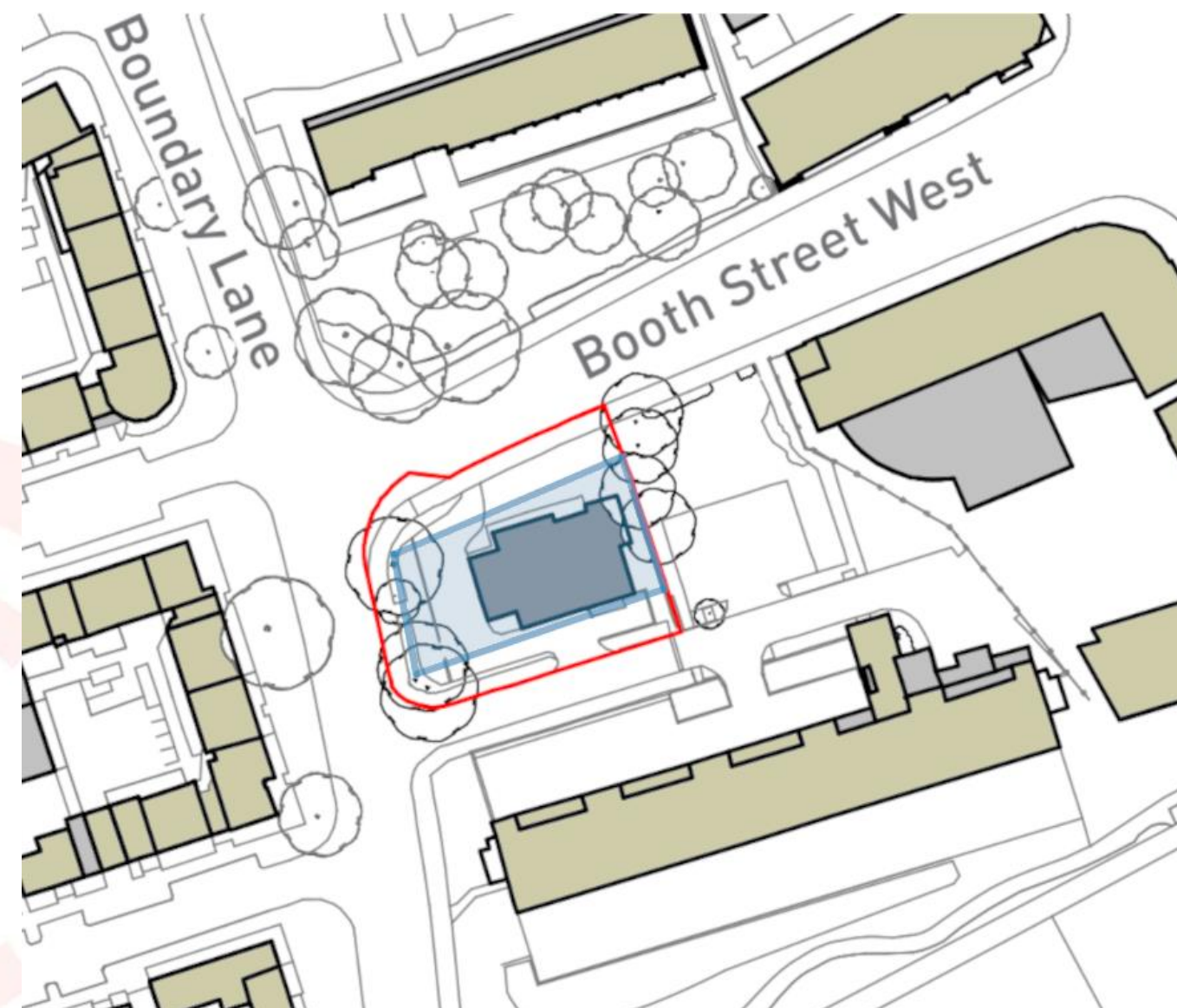


Figure 1: Site location

3 Planning policy, guidance and criteria

3.1 National Planning Policy Framework (NPPF,2021) ¹

3.2 The National Planning Policy Framework (NPPF), sets out the Government's planning policies for England and how these should be applied. It provides a framework within which locally-prepared plans for housing and other development can be produced. In respect of noise, Paragraph 174, 185 and 187 of the NPPF states the following:

3.3 Paragraph 174:

"e) preventing new and existing development from contributing to, being put at unacceptable risk from, or being adversely affected by, unacceptable levels of soil, air, water or noise pollution or land instability..."

3.4 Paragraph 185:

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

a) mitigate and reduce to a minimum potential adverse impacts resulting from noise from new development – and avoid noise giving rise to significant adverse impacts on health and the quality of life [See Explanatory Note to the Noise Policy Statement for England];

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

3.5 Paragraph 187:

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

3.6 Noise Policy Statement for England (NPSE)²

3.7 The Noise Policy Statement for England, states three policy aims as follows:

"Through the effective management and control of environmental, neighbour and neighbourhood noise within the context of Government policy on sustainable development:

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

3.8 The NPSE defines adverse noise impact as follows:

No Observed Effect Level - NOEL

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

Lowest Observed Adverse Effect Level - LOAEL

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

Significant Observed Adverse Effect Level - SOAEL

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

3.9 The first two aims of the NPSE require that no significant adverse impact should occur and that, where a noise level which falls between a level which represents the lowest observable adverse effect and a level which represents a significant observed adverse effect, then according to the explanatory notes in the statement:

"... all reasonable steps should be taken to mitigate and minimise adverse effects on health and quality of life whilst also taking into consideration the guiding principles of sustainable development. This does not mean that such effects cannot occur."

¹ National Planning Policy Framework, Department for Communities and Local Government, July 2021.

² Noise Policy Statement for England, Department for Environment, Food and Rural Affairs, March 2010.

3.10 Planning Practice Guidance for Noise (PPG-Noise,2014)³

3.11 Planning Practice Guidance for Noise advises on how planning can manage potential noise impacts in a new development.

3.12 It explains how to recognise when noise could be a concern and describes how effects levels could be derived. These are summarised in Table 3.

Perception	Examples of Outcomes	Increasing Effect Level	Action
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 - LOAEL			
Noticeable and intrusive	Noise can be heard and causes small changes in behaviour and/or attitude, e.g. turning up volume of television; speaking more loudly; where there is no alternative ventilation, having to close windows for some of the time because of the noise. Affects the acoustic character of the area such that there is a perceived change in the quality of life.	Observed Adverse Effect	Mitigate and reduce to a minimum
Significant Observed Adverse Effect Level - SOAEL			
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. Quality of life diminished due to change in acoustic character of the area.	Significant Observed Adverse Effect	Avoid

Table 3: Description of likely responses at effects levels

3.13 ProPG: Planning and Noise ⁴

3.14 Professional Practice Guidance: Planning & Noise - New Residential Development (ProPG, 2017) is a joint publication by the Chartered Institute of Environmental Health (CIEH), the Association of Noise Consultants (ANC) and the Institute of Acoustics (IoA).

3.15 The primary goal of ProPG is “to assist the delivery of sustainable development by promoting good health and wellbeing through the effective management of noise”.

3.16 The guidance has been produced to assist practitioners in matters relating to noise and new residential development. It focusses on existing transportation noise sources and has been developed to consider the Government’s overarching noise policy, planning policy and policy guidance. It has also been developed to take into account other authoritative sources of guidance such as British Standard BS 8233:2014 ‘Guidance on Sound Insulation and Noise Reduction for Buildings’.

3.17 In the case of sites exposed to industrial and/or commercial noise, ProPG states that if the industrial and/or commercial noise is present but not dominant, then its contribution may be included in the noise level used to establish the degree of risk.

3.18 **British Standard BS 8233:2014 ‘Guidance on Sound Insulation and Noise Reduction for Buildings’⁵**

3.19 BS 8233:2014 provides guidance for the control of noise in and around buildings. It is applicable to the design of new buildings, or refurbished buildings undergoing a change of use.

3.20 BS 8233:2014 provides noise guidance for buildings of different uses, however in respect to dwellings and habitable residential spaces, Table 4 of BS 8233:2014 provides guideline values that it is desirable not to exceed during daytime and night-time periods. These guideline values are reproduced in Table 4.

Situation	Upper limits / dB	
	L _{Aeq, T}	L _{AFmax}
Living rooms and Bedrooms, daytime	35	-
Bedrooms, night-time	30	45

Table 4: Proposed internal noise level requirements

3.21 BS 8233 does not provide specific guidance on noise levels for regular individual noise events, such as passing trains, which can cause sleep disturbance. Guidance on suitable noise levels for individual events is provided in ProPG, which states:

In most circumstances in noise-sensitive rooms at night (e.g. bedrooms) good acoustic design can be used so that individual noise events do not normally exceed 45 dB L_{Amax,F} more than 10 times a night. However, where it is not reasonably practicable to achieve this guideline then the

³ Planning Practice Guidance – Noise: <http://planningguidance.planningportal.gov.uk/blog/guidance/noise/noise-guidance/>

⁴ Association of Noise Consultants (ANC), Institute of Acoustics (IOA) and Chartered Institute of Environmental Health (CIEH), "ProPG: Planning & Noise - New Residential Development," May 2017.

⁵ BS 8233: 2014, Guidance on sound insulation and noise reduction for buildings.

judgement of acceptability will depend not only on the maximum noise levels but also on factors such as source, number, distribution, predictability and regularity of noise events’.

3.22 On this basis, it is considered appropriate to adopt the 10th highest $L_{Amax,F}$ noise event occurring in the night-time period for the purposes of the assessment.

3.23 **Approved Document O**

3.24 All new residential buildings, which have building notice, full plans application, or initial notice submitted after 15th June 2022, or have site works starting after 15th June 2023, are required to comply with Part O of Schedule 1 to the Building Regulations 2010. Requirement O1 is as follows:

O1 Overheating mitigation

(1) Reasonable provision must be made in respect of a dwelling, institution or any other building containing one or more rooms for residential purposes, other than a room in a hotel (“residences”) to—

- (a) limit unwanted solar gains in summer;
- (b) provide an adequate means to remove heat from the indoor environment.

(2) In meeting the obligations in paragraph (1)—

- (a) account must be taken of the safety of any occupant, and their reasonable enjoyment of the residence; and
- (b) mechanical cooling may only be used where insufficient heat is capable of being removed from the indoor environment without it.

3.25 The aim of AD-O is to protect the health and welfare of occupants of the building by reducing the occurrence of high indoor temperatures. As described by the Approved Document, in the Secretary of State’s view, compliance with requirement O1 can be demonstrated by using one of the following methods.

- a. The simplified method for limiting solar gains and providing a means of removing excess heat, as set out in Section 1 of AD-O.
- b. The dynamic thermal modelling method, as set out in Section 2 of AD-O.

3.26 Student accommodation usually requires the use of dynamic thermal modelling.

3.27 Section 3 of AD-O sets out further standards against meeting the obligations of O1(2)(A). Standards are provided for:

- Noise at night;
- Pollution;

- Security;
- Protection from falling; and
- Protection from entrapment.

3.28 As the Building Regulations make it a mandatory requirement to provide suitable internal noise levels when controlling overheating, the impacts of noise via open windows to reduce overheating are not considered to be controlled via the planning process.

3.29 Some guidance is provided in this report relating to how Part O noise level requirements can be met as they will form part of the overall ventilation strategy.

3.30 **Local Authority Requirements**

3.31 The local authority has produced guidance for noise and planning⁶ which provides criteria for indoor ambient noise levels and for noise levels from proposed plant.

- A summary of the criteria for the internal ambient noise levels are:
 - Bedrooms (night time - 23.00 - 07.00)
30 dB L_{Aeq} (individual noise events shall not exceed **45 dB $L_{Amax,F}$** more than 15 times per night)
 - Living Rooms (daytime - 07.00 - 23.00)
35 dB L_{Aeq}
 - If closed windows are to be relied upon to meet the values, there needs to be an appropriate alternative means of ventilation that does not compromise the façade insulation or the resulting noise level.
- Noise from external plant to be controlled to have a rating level of no more than 5dB below the background noise levels.

3.32 Each of these is addressed within this assessment.

⁶ Manchester City Council Planning & Noise Technical Guidance, December 2015.

4 Noise sources and measurements

- 4.1 The noise levels across the site have been determined using noise measurements undertaken by Mach Acoustics between 25/02/2021 and 26/02/2021 and these were reported in the report reference RP210303 which was submitted with the previous planning application.⁷
- 4.2 The dominant noise sources were identified as road traffic noise from Boundary Lane and Booth Street West and from more distant roads. Some aircraft noise was also noted.
- 4.3 The noise monitoring locations are shown in Figure 2.



Figure 2: Noise monitoring locations

- 4.4 Measurements at position 1 were made with the microphone located at 4 m high above the ground and away from other reflecting surfaces. Position 2 and 3 were measured with the

microphone tripod mounted located 1.5 m above the ground and they were located away from other reflecting surfaces, such that the measurements are considered to be free-field.

- 4.5 The measured levels at position 1 are summarised in Table 5.

Date	Period	Typical $L_{Aeq,T}$ dB	10 th highest L_{Amax} dB	Background Level L_{A90} dB
25/02/21	Daytime 16hr	60	-	56
	Night-time 8hr	54	72	42
26/02/21	Daytime 16hr	61	-	54

Table 5: Sound levels representative of the assessment periods at location 1

- 4.6 The measured levels at Positions 2 and 3 are summarised in Table 6.

Location	Date	Period	Typical $L_{Aeq,5min}$ dB	Highest $L_{Amax,5min}$ dB	Background Level $L_{A90,5min}$ dB
2	25/02/21	16:45 to 17:10	63 to 65	79 to 83	55 to 56
	26/02/21	08:40 to 09:05	63 to 65	76 to 78	51 to 57
3	25/02/21	16:20 to 16:45	63 to 67	76 to 80	54 to 57
	26/02/21	09:10 to 09:30	62 to 65	77 to 79	48 to 52

Table 6: Measured noise levels at measurement positions 2 and 3

⁷ RP 210303 – Former Gamecock Public House, Booth Street West – Noise Impact Assessment, application reference 130387/FO/2021

5 Noise impact on the site

5.1 Noise transmission and propagation is modelled using proprietary software, Cadna/A.⁸ This models noise propagation outdoors according to ISO 9613.⁹

5.2 The modelling parameters used, source of data and details are described in Table 7.

Parameter	Source	Details
Model dimensions	Google Earth	British Transverse Mercator coordinates
Site location and layout	Architects drawings	Architects drawings
Topography –within site	Site observations and Google Street view	Modelled with no changes in topography
Topography –Outside of site	Site observations and Google Street view	Modelled with no changes in topography
Building heights – proposed buildings	Drawings	Architects drawings
Building heights – outside of site	Site observations and Google Street view	3 m per storey + 2 m roof (residential properties)
Receptor positions	Site observations and Google Street view	On the façade closest to the source at a height of 1.5 m, 4 m and 6.5 m to represent ground, first and second floor window heights respectively
Building and barrier absorption coefficient	ISO 9613-2	0.21 to represent a reflection loss of 1 dB
G, Ground factor	ISO 9613-2	Hard ground, G = 0; Porous ground, G = 1 (locally on model)

Table 7: Modelling parameters and assumptions

5.3 Measured daytime and night-time noise levels have been used to ascribe sound power levels to the surrounding roads, and the noise impact at the proposed building façades has been calculated.

5.4 A 3D perspective of the CadnaA model is shown in Figure 3.

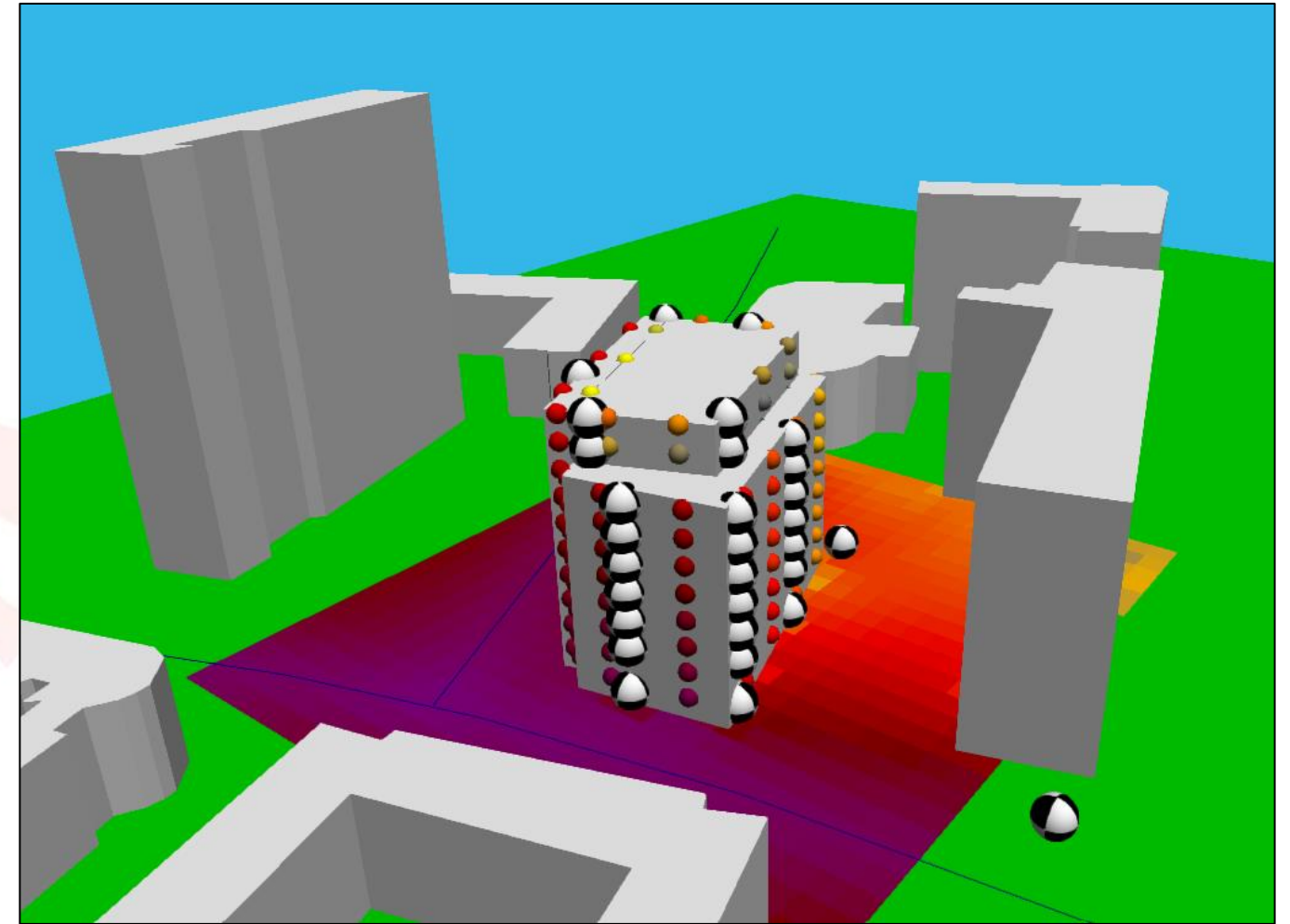


Figure 3: 3D view of the CadnaA model

⁸ Cadna/A environmental noise modelling software, version 2020, Datakustik GmbH

⁹ ISO 9613: Acoustics - Attenuation of sound during propagation outdoors

6 Façade sound insulation scheme

6.1 Free-field noise levels at the windows of each floor on each façade which are used in the façade sound insulation calculations are shown Table 8.

Floor Level	North Elevation		East Elevation		South Elevation		West Elevation	
	Day dB $L_{Aeq,16hr}$	Night dB $L_{Aeq,8hr}$	Day dB $L_{Aeq,16hr}$	Night dB $L_{Aeq,8hr}$	Day dB $L_{Aeq,16hr}$	Night dB $L_{Aeq,8hr}$	Day dB $L_{Aeq,16hr}$	Night dB $L_{Aeq,8hr}$
1	65	58	61	54	62	55	67	59
2	64	57	60	53	62	54	66	58
3	64	57	60	53	61	53	65	57
4	63	56	59	52	61	53	64	57
5	63	55	59	52	60	52	64	56
6	62	55	58	51	60	52	63	55
7	62	54	58	51	50	42	54	46
8	61	54	57	50	54	46	57	49

Table 8: A-weighted external free-field noise levels used to calculate façade sound insulation

6.2 As the highest maximum night-time noise levels due to vehicle movements could be from Booth Street West and/or Boundary Lane, it is difficult to locate where the noise events were coming from. Therefore, the L_{AFmax} has been predicted based on an 18 dB level difference between the measured night-time $L_{Aeq,8hr}$ and L_{AFmax} .

6.3 Maximum noise levels will reduce at a greater rate than ambient levels and for levels 7 and above a difference of 15 dB between the night-time $L_{Aeq,8hr}$ and L_{AFmax} has been applied.

6.4 The calculation method for façade sound insulation is in accordance with BS 8233 and the principles of BS EN 12354-3.¹⁰

6.5 From ISO 16283¹¹, the reverberation time is typically 0.5 seconds across the relevant frequency range for a furnished living room. This value is used for both living rooms and bedrooms.

¹⁰ BS EN 12354-3:2000, Building Acoustics – Estimation of acoustic performance of buildings from the performance of elements – Part 3: Airborne sound insulation against outdoor sound

6.6 The minimum glazing and ventilator performances presented in the summary table are calculated to be required to reduce noise levels to below the BS8233 recommended internal noise levels in those rooms most exposed to external noise ingress.

6.7 The façade noise levels, and required glazing and ventilator performance requirements are summarised in Table 9.

Façade Zone	Daytime ambient noise levels dB $L_{Aeq,16hr}$	Night-time ambient noise levels dB $L_{Aeq,8hr}$	Glazing $R_w + C_{tr}$ dB	Façade ventilator $D_{new} + C_{tr}$ dB
A (Level 7 - 8 of Western and Southern Elevations)	up to 58 dB	up to 50 dB	25 dB	29 dB
B (Level 1 - 6 of Southern Elevation & Level 6 - 8 of Northern Elevation)	59 to 63 dB	51 to 55 dB	30 dB	34 dB
C (Level 1 - 6 of Western Elevation & Level 1 - 5 of Northern Elevation)	64 to 68 dB	56 to 60 dB	35 dB	39 dB

Table 9: Summary of minimum façade sound insulation treatments

6.8 The room and window dimensions used in the calculations are taken from the architects' plans and elevations.¹²

6.9 The sound reduction of the masonry portion of the facade is much higher than that of the glazing and ventilation provision. Therefore, noise penetration through the masonry is disregarded as relatively insignificant.

¹¹ BS EN ISO 16283-1:2014 Acoustics – Field measurement of sound insulation in buildings and of building elements – Part 1: Airborne sound insulation

¹² Gamecock Booth Street West, Manchester, GA Plan – Typical Levels 02-06, 10224-SHP-Z1-A-G200-SK-TY-101, Rev P01.

6.10 Noise and Approved Document F ventilation conditions

6.11 The proposed development will be required to meet Part F of the Building Regulations with regard to the whole dwelling and extract ventilation conditions, as described in Approved Document F (AD-F).¹³

6.12 The required minimum acoustic performance of the facade ventilators that are calculated to achieve the indoor noise targets are summarised in Table 1 and Table 9.

6.13 Two practical options for meeting the requirements are, either a continuous mechanical extract or mechanical ventilation with heat recovery (MVHR) ventilation system as described by AD-F would be required. Should a MVHR system be implemented, facade ventilators are not required.

6.14 Where a continuous mechanical extract ventilation system is proposed, facade ventilators are required to habitable rooms, as described by AD-F.

6.15 On the basis of the AD-F strategies, the façade sound insulation with the provision for whole dwelling ventilation may be assessed with windows closed. This is in line with the local authority guidance on noise.

6.16 Purge ventilation conditions as described by AD-F is manually controlled ventilation of rooms or spaces at a relatively high rate to rapidly dilute pollutants and/or disperse water vapour. Purge ventilation may be provided by natural means (e.g. an openable window) or mechanical means (e.g. a fan).

6.17 For AD-F purge ventilation conditions, ProPG states:

“It should also be noted that the internal level guidelines are generally not applicable under “purge ventilation” conditions as defined by Building Regulations Approved Document F, as this should only occur occasionally (e.g. to remove odour from painting and decorating or from burnt food).”

6.18 Considering this guidance, opening windows is considered acceptable for these occasional events without giving risk to potential adverse effect on occupants.

6.19 Noise and Approved Document O (AD-O) – Overheating

6.20 Approved Document O¹⁴ relates to the overheating of new dwellings and when undertaking an assessment of the overheating risks the likely hood that open windows can be used for controlling thermal comfort must be considered.

6.21 According to AD-O:

“In locations where external noise may be an issue (for example, where the local planning authority considered external noise to be an issue at the planning stage), the overheating

mitigation strategy should take account of the likelihood that windows will be closed during sleeping hours (11pm to 7am).

Windows are likely to be closed during sleeping hours if noise within bedrooms exceeds the following limits.

a. 40dB LAeq,T, averaged over 8 hours (between 11pm and 7am).

b. 55dB LAFmax, more than 10 times a night (between 11pm and 7am).”

6.22 The facades in Zone A, which is the quietest façade noise levels, would be able to have openable windows to control overheating, and still achieve suitable indoor ambient noise levels with the windows openings restricted. This is based on a 10 dB reduction from an open window and an internal target of 40 dB during the night-time.

6.23 The facades in Zones B may be able to have openable windows, but the open areas would need to established and agreed with the thermal modellers. and

6.24 The facades in Zone C are likely to require overheating control solutions which do not rely on opening windows, such as:

Using the extract fan to provide increased air changes, with façade vents

Use an MVHR system which provides sufficient air changes to control overheating

6.25 Solutions for controlling overheating will be developed with the Mechanical Engineers and provision for the proposed options have been included within the current design.

6.26 It should be noted that Part O does allow for windows to be open during the daytime (07:00 to 23:00) and for the windows to be partially open at night-time, therefore reducing the level of noise ingress compared to a fully open window.

6.27 For a student accommodation scheme we would assume that the windows are either restricted or have a full security grill on the outside.

¹³ Approved Document F 2021 Edition, The Building Regulations 2000

¹⁴ Approved Document O 2021 Edition, The Building Regulations 2010

7 Proposed plant noise limits and noise ratings

7.1 Proposed plant noise limits

7.2 Background sound levels have been determined using noise measurements undertaken by Mach Acoustics between 25/02/2021 and 26/02/2021 as shown in Table 5.

7.3 A BS 4142 rated noise impact of no greater than the background sound level at the nearest residential noise sensitive receptor is proposed for the cumulative impact of all fixed mechanical plant.

7.4 Proposed plant noise limits are shown in Table 10.

Location (1m from NSR facades)	Period	Background noise level, L_{A90}	Maximum noise rating level, $L_{Ar,Tr}$	Comments
Location 1	Daytime (07:00 – 23:00)	≤ 54 dB	≤ 49 dB	Rating level of no more than 5dB below the background noise levels
	Night-time (23:00 – 07:00)	≤ 42 dB	≤ 37 dB	

Table 10: Proposed upper noise limits for fixed mechanical plant

7.5 Proposed plant

7.6 The mechanical plant is assessed based on plant details supplied by the mechanical engineers.

7.7 The location of all the units have been taken from the mechanical engineers' drawings.¹⁵

7.8 The proposed plant is understood to comprise of that summarised in Table 11.

Plant	No. proposed
Air source heat pump (ASHP)	5
VRF Condenser	1

Table 11: Proposed plant

7.9 Proposed plant noise limits

7.10 At this stage of the development, the mechanical plant has not been finalised and the appropriate noise limits for the proposed plant have been set and calculated to meet the plant noise limits detailed in Table 10.

7.11 Based on the proposed number and location of the proposed items of plant, the maximum sound power level for each item of plant, for daytime and night time, are shown in Table 12.

Source	Plant noise rating	
	Sound Power Level / Unit, L_w dB(A)	
	Day	Night
ASHP	≤ 87	≤ 75
VRF Condenser		

Table 12: Proposed plant noise ratings

7.12 The proposed noise limits at the receptors are noise rating levels and the acoustic character of the individual items of plant must consider if any character corrections should be applied when establishing the noise limit for the plant.

7.13 The proposed noise limits are assuming that the roof perimeter screening is solid, and it is not based on louvres.

7.14 If air flow is required through the barrier, the barrier may need to be acoustic louvres, depending on the area and location of the opening areas required.

7.15 Operation times

7.16 All plant is assumed to operate continuously during the daytime 1-hour and night-time 15-minute assessment periods; this is a prudent assumption.

7.17 As fixed plant is specified and details become available, the impact will be assessed following the methodologies defined in BS 4142; calculation of fixed plant noise propagation will be undertaken in accordance with BS EN ISO 9613-2.

7.18 Where the calculated fixed plant noise impact exceeds the noise limits, mitigation measures will be developed and determined with the Mechanical Services Engineer which will be capable of mitigating the plant noise impact to achieve the criteria.

7.19 Considering the context of the existing acoustic environment and proposed plant noise limits, a BS 4142 assessment would indicate the likelihood of a low impact should the calculated upper limits be adhered to. This impact is considered to be at worst a LOAEL in alignment with the NPSE aims.

¹⁵ Gamecock Booth Street West, Manchester, GA Plan – Roof Level, 10224-SHP-Z1-A-G200-SK-RF-101, Rev P02.

8 Conclusion

- 8.1 The existing noise impact across the proposed development site has been assessed in support of an amended planning application.
- 8.2 The potential implications for the design of the façade sound insulation under whole dwelling conditions as described by AD-F is discussed, and the glazing and ventilator acoustic performance requirements to achieve the indoor noise level targets are identified in Table 1.
- 8.3 The façades which can use openable windows for controlling overheating have been identified.
- 8.4 Based on the existing noise risks and details outlined in this report, the site is considered suitable for residential development and meets with national planning policy and local planning and noise guidelines.
- 8.5 A noise survey has been carried out at site and analysis of representative background noise levels carried out for daytime and night-time periods based on guidance included within BS 4142.
- 8.6 A BS 4142 rated noise impact of no more than 5 dB below the background noise levels at the nearest residential noise sensitive receptor has been adopted for the cumulative impact of all fixed mechanical plant; noise limits and plant noise ratings are proposed in Table 10 and Table 12, respectively.
- 8.7 At this stage in the development, exact mechanical plant specifications are unavailable; plant noise limits for the cumulative impact of all proposed plant at the nearest noise sensitive location is proposed to reduce the risk of an adverse impact.