PLP CONSTRUCTION LTD

BARCLAY HOUSE, MANCHESTER

NOISE IMPACT ASSESSMENT

R2463-REP02-PC

27 FEBRUARY 2026

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REPORT DETAILS

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1.0 INTRODUCTION

Red Acoustics Ltd has been commissioned by PLP Construction Ltd to undertake an assessment of environmental and commercial sound associated with the proposed multi-use development at Barclay House, 35 Whitworth Street West, Manchester, M1 5NG.

This report has been prepared in support of Planning Application Ref. 14501/FO/2026, which seeks consent for the proposed conversion of the existing undercroft car park to provide three residential apartments. The proposals also include facade alterations to facilitate the installation of replacement windows, together with the relocation of an approved electrical substation within the car park area.

Following submission of the planning application, the Local Planning Authority identified that the application was invalid due to the absence of supporting technical information. In particular, the Authority requested the provision of existing and proposed cross-sections for all areas subject to external alteration, together with a detailed acoustic assessment. The requested acoustic information includes an evaluation of existing ambient noise levels during daytime, nighttime and weekend periods, proposed internal noise targets for the accommodation and details of the acoustically rated glazing to be incorporated. It is assumed at this stage that the proposed development is to be ventilated using a fully mechanical means not relying on passive trickle ventilation in the facade.

In addition, the acoustic assessment is required to address the proposed commercial uses, identifying the mitigation measures necessary to control noise break-out from the premises. Such measures include acoustic lobbies at points of access and egress, acoustic treatment to the building structure, sound limiters linked to amplification equipment, specified maximum internal noise levels and an assessment of noise associated with the proposed substation.

Planning Application Number: 14501/FO/2026 this repeated below for clarity:

Proposal: *Proposed conversion of the Undercroft car park to form 3 apartments, opening up works to allow for the installation of replacement windows within the existing facade and relocation of the approved substation within the carpark.*

Location: *Barclay House, 35 Whitworth Street West, Manchester, M1 5NG*

Following your recent planning application submission, I am unable to progress your proposal as the application is invalid or incomplete for the following reason(s):

1) Existing and proposed cross sections are required for all areas where there are external alterations (windows and louvres)

2) An acoustic study identifying ambient noise levels during daytime, night time and weekends along with an indication of noise levels that you propose to achieve within the accommodation and details of the acoustic glazing and acoustically treated ventilation you propose to use.

In terms of the proposed uses, the study should identify the acoustic treatment and measures that will limit the breakout of noise in accordance with a noise study of the premises. The scheme proposed shall include measures such as acoustic lobbies at access and egress points of the premises, acoustic treatment of the building structure, sound limiters linked to sound amplification equipment, and specified maximum internal noise levels.

Please include the noise breakout associated with the substation as well.

This report also provides information in support of a proposed variation of Condition 2 of planning permission Ref. 128804/FO/2020, which relates to the location and orientation of the substation. The relevant noise control condition is reproduced within this report for clarity:

3) a) Externally mounted ancillary plant, equipment and servicing shall be selected and/or acoustically treated in accordance with a scheme designed so as to achieve a rating level of 5dB (LAeq) below the typical background (LA90) level at the nearest noise sensitive location. Prior to commencement of the use hereby approved the scheme shall be submitted to and approved in writing by the City Council as local planning authority in order to secure a reduction in the level of noise emanating from the site. The scheme shall be implemented in full before the use commences or as otherwise agreed in writing by the City Council as local planning authority.

b) Prior to the operation of the scheme a verification report shall be submitted to and approved in writing by the City Council as local planning authority to validate that the work undertaken throughout the development conforms to the recommendations and requirements in the approved acoustic report. The report shall also undertake post completion testing to confirm that the noise criteria have been met. Any instances of non-conformity with the recommendations in the report shall be detailed along with any measures required to ensure compliance with the agreed noise criteria.

Reason - To minimise the impact of the development and to prevent a general increase in pre-existing background noise levels around the site pursuant to policies DM1 and SP1 of the Core Strategy for the City of Manchester.

Environmental surveys have been undertaken to establish the existing sound climate at the nearest noise sensitive receptors (NSRs). The measured data has been used to assess potential noise impact in accordance with BS4142:2014+A1:2019 (BS4142) and to inform the assessment of environmental sound affecting the proposed basement commercial use and the residential accommodation at the rear facade.

It has been shown that predicted typical sound levels at the nearest NSRs, associated with noise break-out from the proposed new basement commercial development and typical sound levels associated with the installation of the proposed substation is expected to result in low impact when rated in accordance with BS4142.

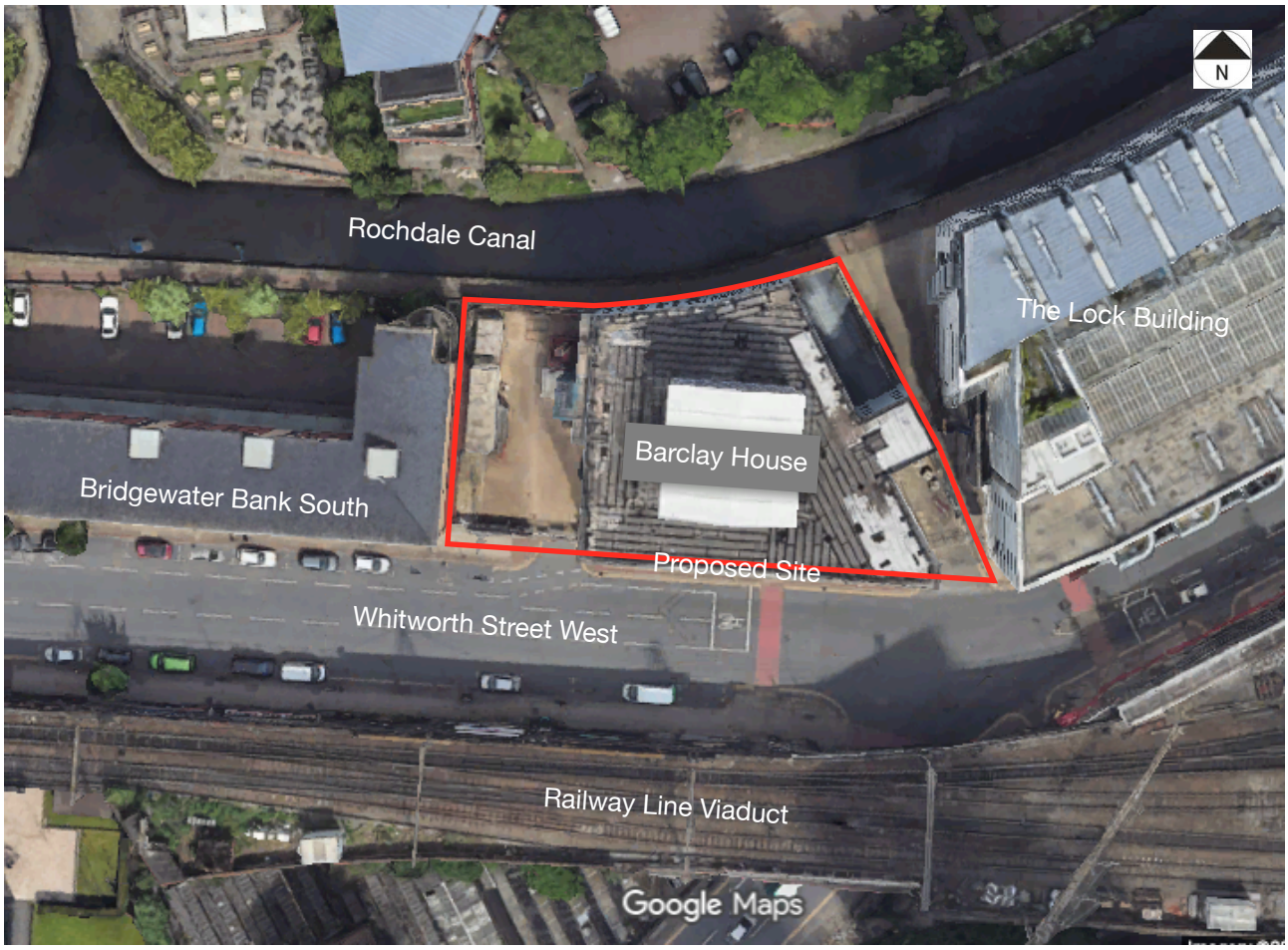
Recommendations have been made in relation to facade noise mitigation to achieve noise targets at the proposed residential uses, having regard to NPPF, British Standard and World Health Organisation guidance.

With the incorporation of the proposed glazing and ventilation measures, satisfactory internal noise levels can be achieved within the proposed residential accommodation, as discussed below.

2.0 SITE DESCRIPTION & SURROUNDINGS

The proposed development comprises the conversion of the existing ground floor undercroft car park to provide three additional residential apartments, together with revisions to the location and orientation of the proposed substation. Figure 2.1 shows the location of the existing building in its surrounding context, while Figures 2.2 and 2.3 below present the proposed site plan and basement layout respectively, detailing the proposed commercial accommodation.

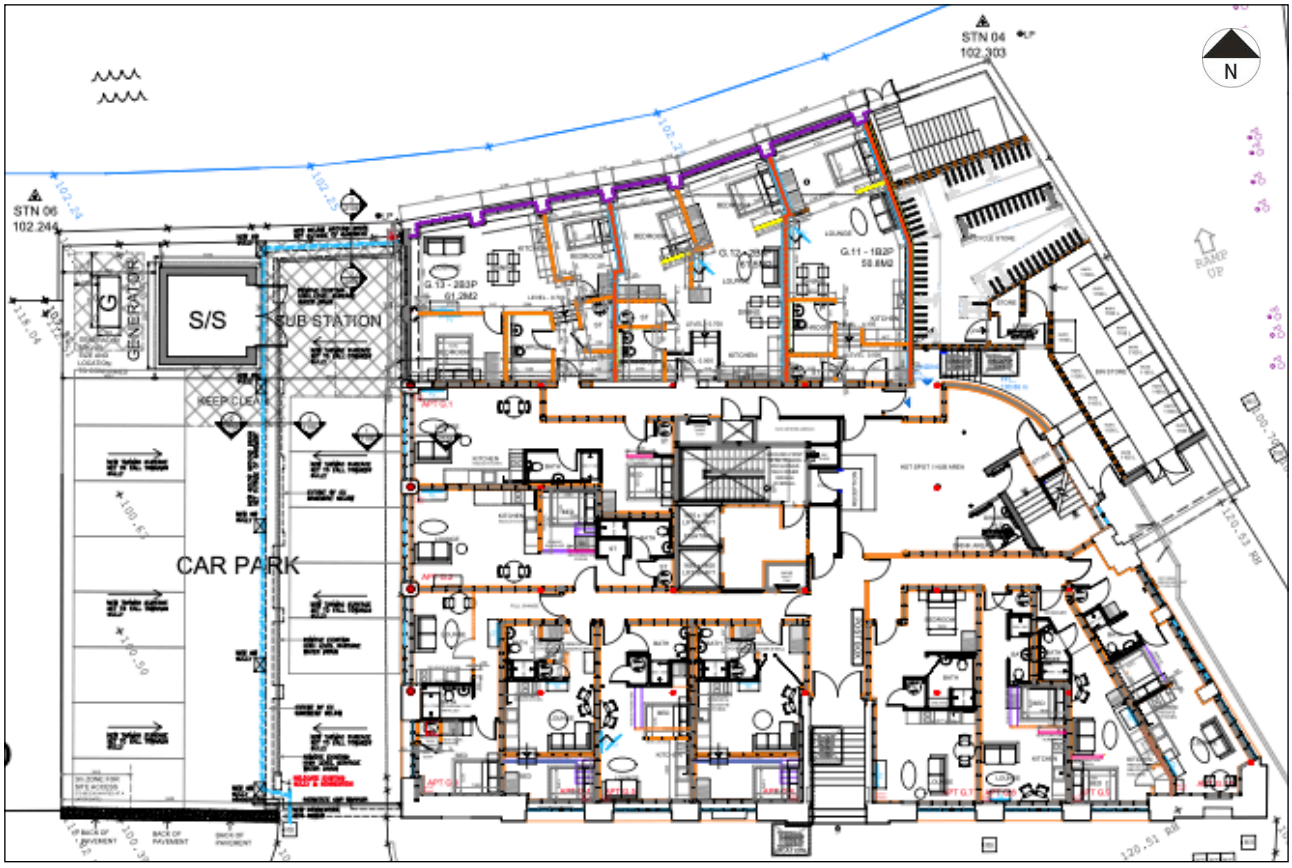
Figure 2.1: Site Location



The site is located within a dense city centre environment. To the north, the site is bounded by the Rochdale Canal and its associated towpath, with Bridgewater Bank lying on the opposite side of the canal which is characterised by a mix of residential and commercial uses. The sound climate along the northern, or rear, elevation of Barclay House is primarily influenced by distant city centre traffic noise and benefits from a degree of screening from major road, rail, and entertainment noise sources. The site is flanked to the west and east by two further multi-use developments, namely Bridgewater Bank South and The Lock Building. To the south, the building fronts onto Whitworth Street West, a busy city centre route that runs adjacent to a railway viaduct. Consequently, the sound climate at the southern facade is dominated by frequent and intermittent road traffic and rail pass-by events.

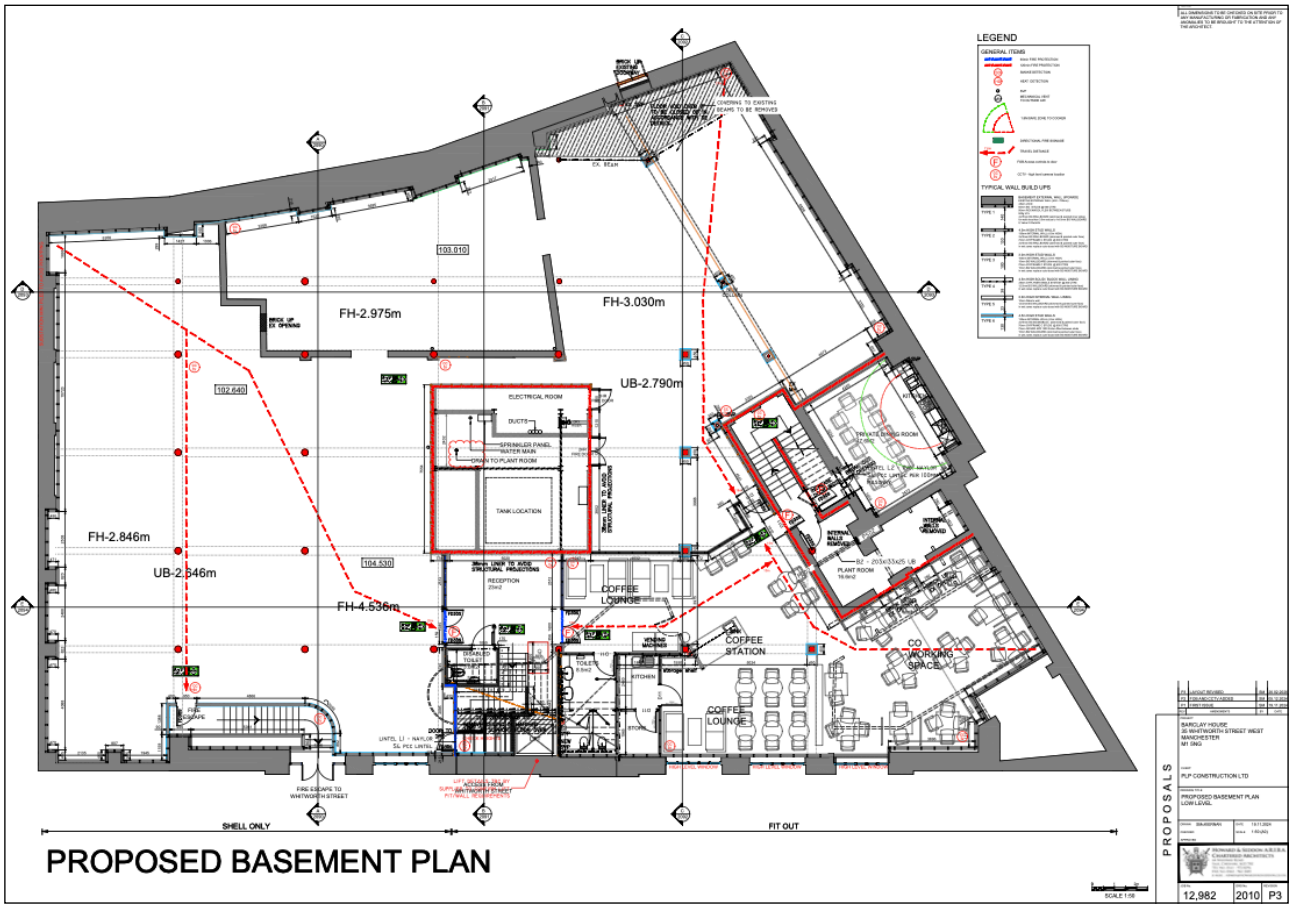
The NSRs comprise residential dwellings located immediately adjacent to the proposed development on both sides, together with existing residential accommodation within the Barclay House building itself.

Figure 2.2: Proposed Site Plan



It is currently proposed that the basement uses will include a gymnasium and a coffee work/study zone. It is proposed that the basement spaces will be offered as shell only development, with the commercial operators providing their own specific acoustic fit-out measures.

Figure 2.3: Proposed Basement Plan

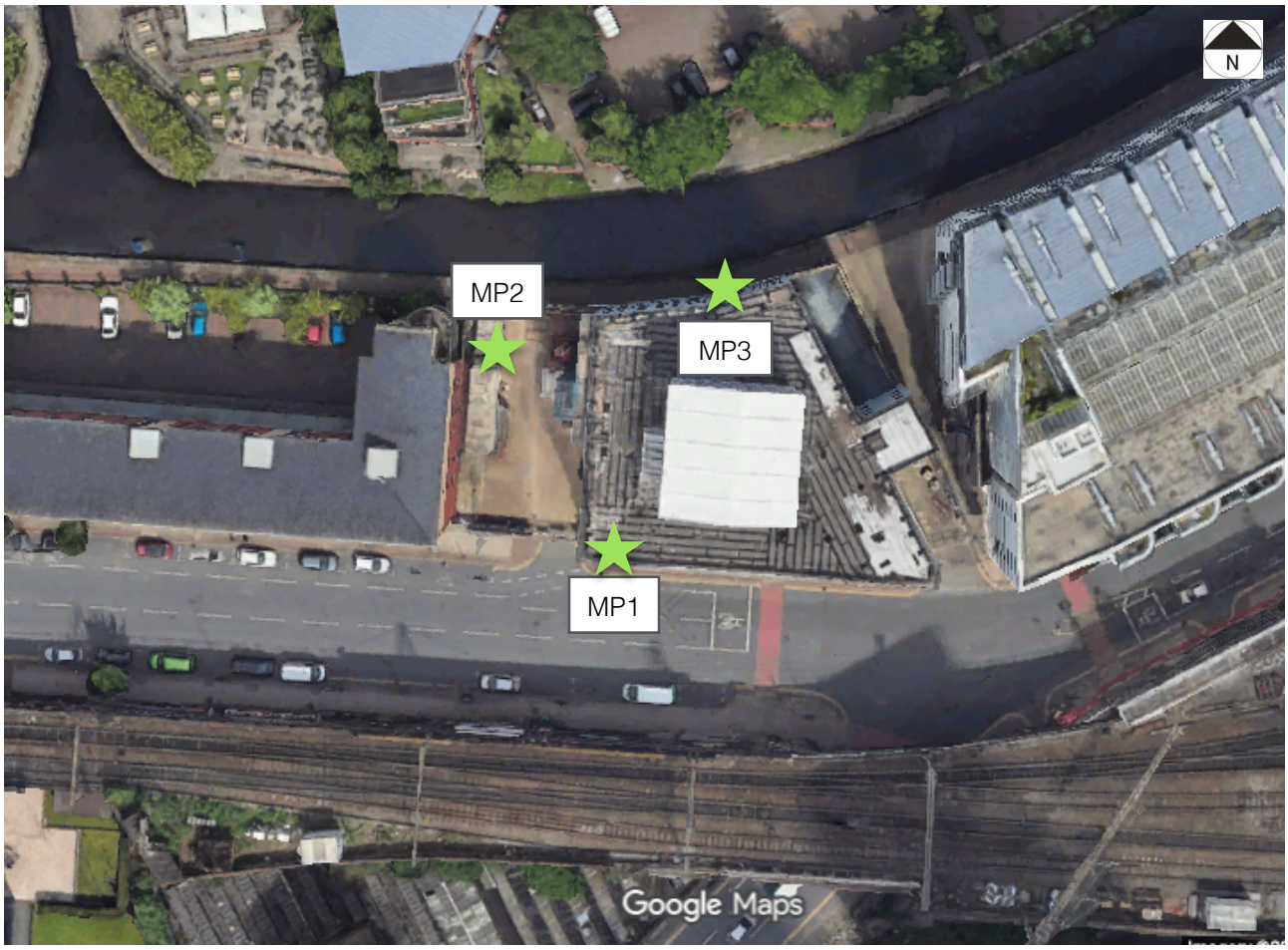


3.0 ENVIRONMENTAL SOUND SURVEY

An environmental sound survey has been carried out by Red Acoustics to determine the prevailing sound climate at the proposed development site. At this stage, the proposed operational hours of the commercial development are unknown and 24 hour use is assumed for the purpose of the assessment.

Measurements were undertaken by Red Acoustics at monitoring positions MP1 - MP3 during typical daytime and nighttime periods between 13 - 16 February 2026 using Class 1 sound level meters. Figure 3.1 below shows the location of the monitoring positions.

Figure 3.1: Survey Monitoring Positions



Monitoring positions MP1 & MP3 were selected to obtain facade level measurements of environmental sound for use in break-in calculations. These measurements were taken at the front and rear elevation of the building respectively at first floor level and at 1m from the facade. The sound level meter at monitoring position MP1 was also equipped with audio recording capabilities, allowing for the review of specific and typical sound generating events. Monitoring position MP2 was positioned on a tripod at a height of 1.8 m above ground level, in free field conditions and selected to to establish the existing background sound climate at a position representative of the nearest NSPs.

Survey details and instrumentation used are presented in Appendix A.

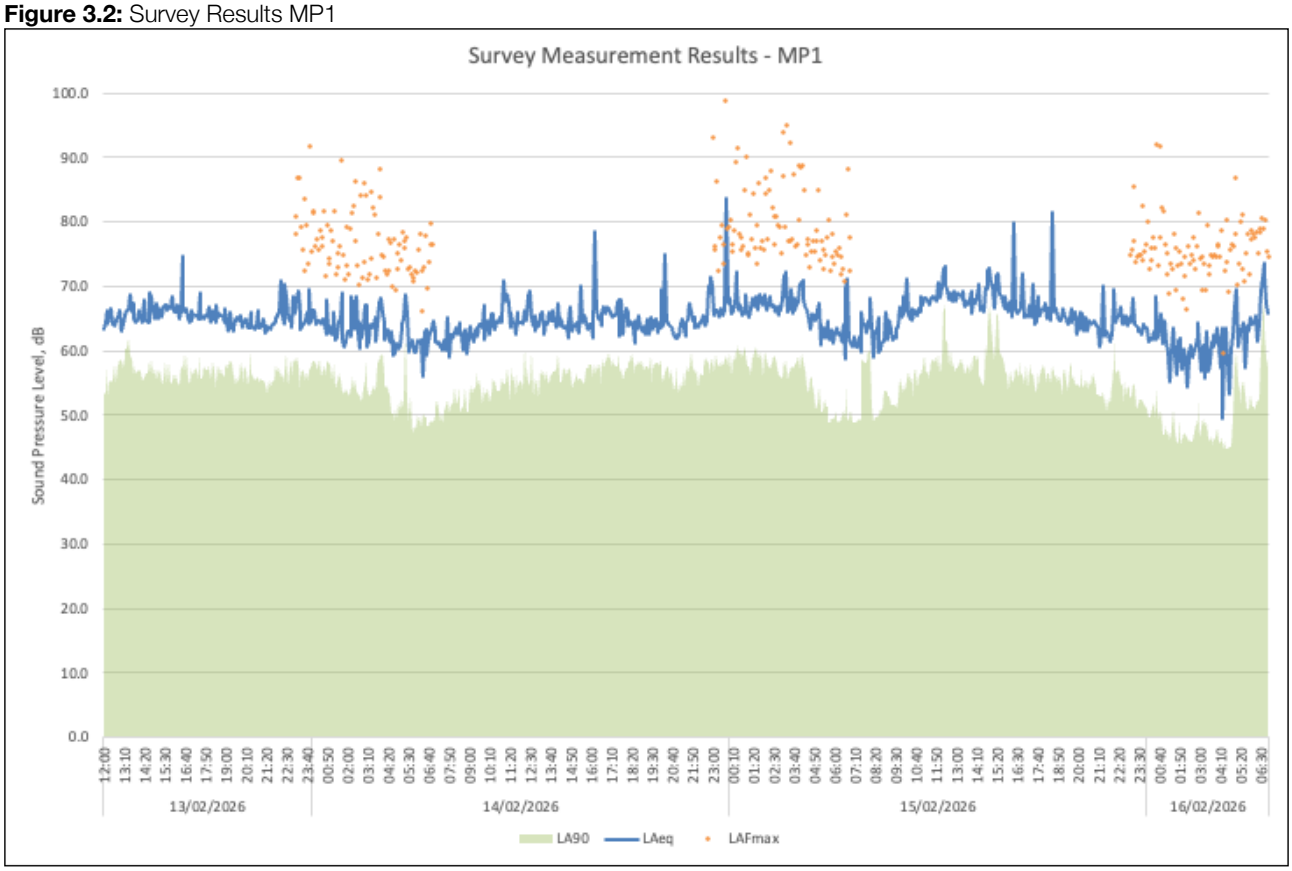
Figures 3.2 to 3.4 present the survey results. Table 3.1 summarises the typical measured daytime and nighttime background sound level at MP2 which is representative of the nearest NSRs. The survey period included weekend days (Saturday and Sunday). Statistical analysis confirmed that weekend background sound levels were consistent with the representative daytime and night-time values presented in Table 3.1.

Table 3.1: Typical Background Sound Level (Daytime/Nighttime Periods)

	Measured Sound Levels	
Location	**Daytime (07:00 - 23:00) Typical Measured L_{A90}, dB**	**Nighttime (23:00 - 07:00) Typical Measured L_{A90}, dB**
MP2	52	49

Typical background sound levels at MP2 are determined by statistical analysis of the daytime and nighttime measured data taken over the full measurement period.

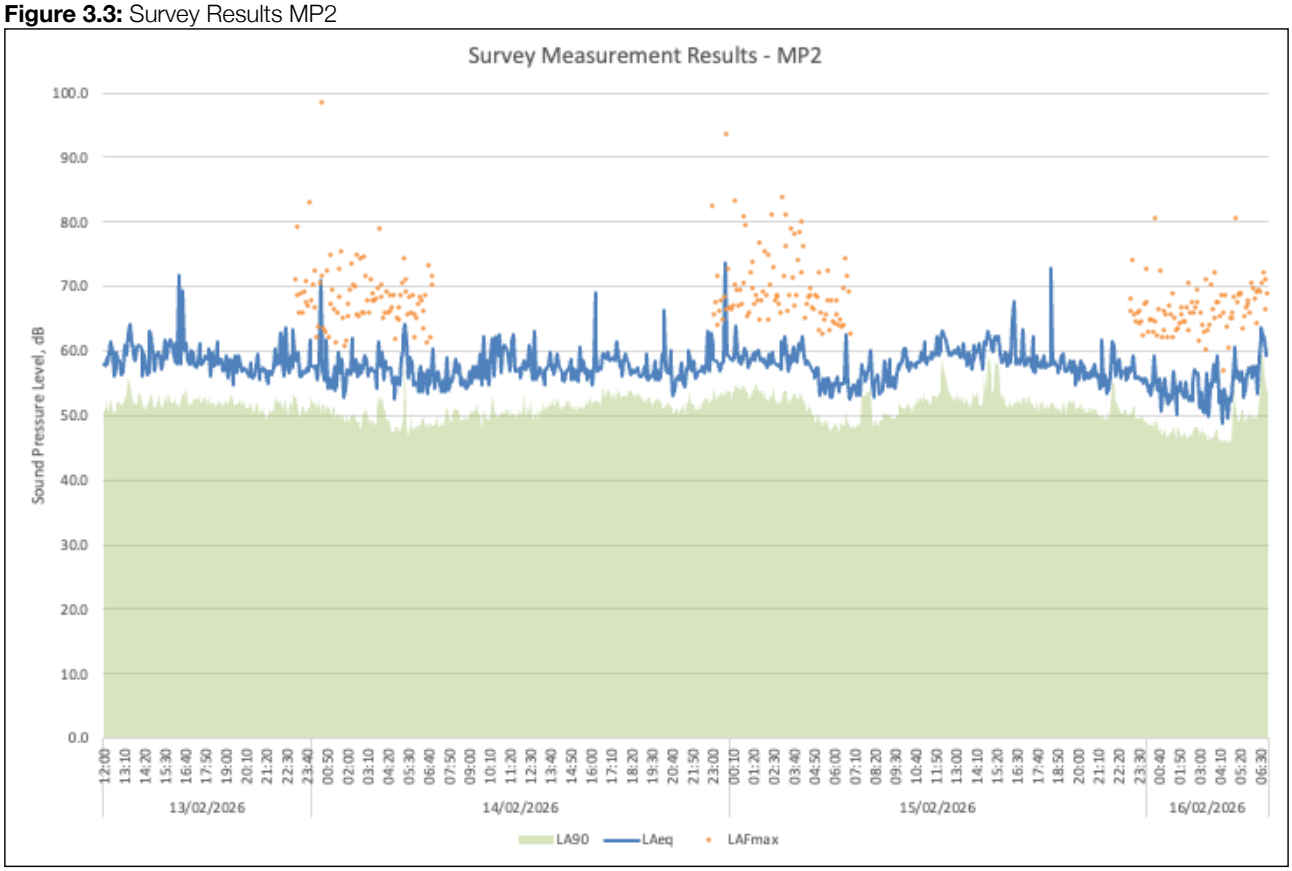
Figure 3.2: Survey Results MP1



Location	Date	Period	Measurement Period	Octave Band Centre Frequency Hz / dB					Measured Broadband (dBA)
				125	250	500	1000	2000	
MP1	13-16/02/2026	Daytime	$L_{Aeq,16hr}$	50.6	56.2	58.5	62.1	61.1	66.6
		Nighttime	$L_{Aeq,8hr}$	47.2	52.7	56.8	62.4	61.1	66.2
			*L_{AFmax}	53.3	72.1	86.9	84.5	82.2	88.5

* L_{AFmax} values represent the 15th highest measured maximum using a 2 minute time weighting during the nighttime period.

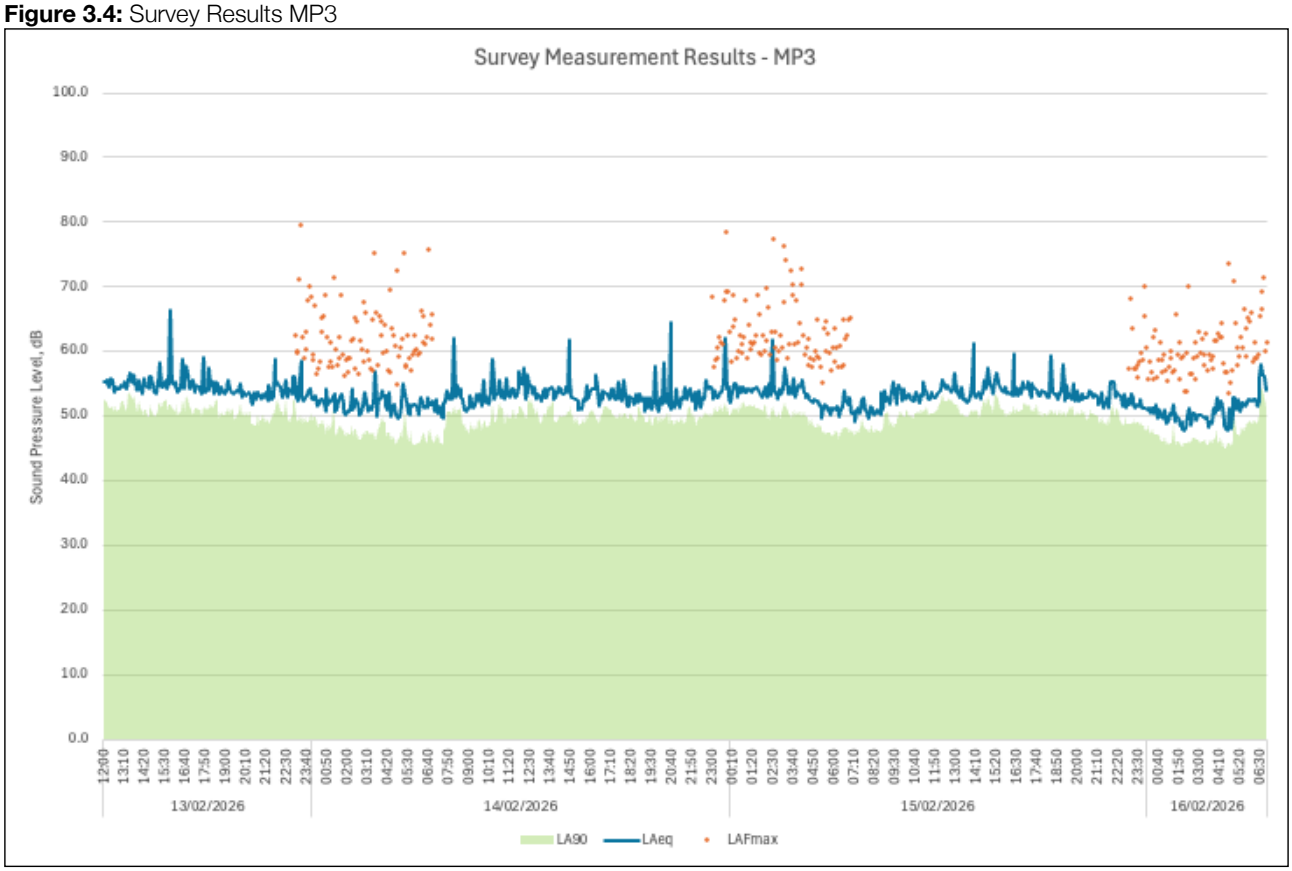
Figure 3.3: Survey Results MP2



Location	Date	Period	Measurement Period	Octave Band Centre Frequency Hz / dB					Measured Broadband (dBA)
				125	250	500	1000	2000	
MP2	13-16/02/2026	Daytime	$L_{Aeq,16hr}$	57.9	57.7	55.6	54.9	51.4	59.2
		Nighttime	$L_{Aeq,8hr}$	54.5	54.0	53.2	54.2	51.2	58.3
			*L_{AFmax}	72	73.3	68.2	74.1	77.8	80.6

* L_{AFmax} values represent the 10th highest measured maximum using a 5 minute time weighting during the nighttime period.

Figure 3.4: Survey Results MP3



Location	Date	Period	Measurement Period	Octave Band Centre Frequency Hz / dB					Measured Broadband (dBA)
				125	250	500	1000	2000	
MP3	13-16/02/2026	Daytime	$L_{Aeq,16hr}$	56.7	51.3	50.8	50.7	45.8	54.2
		Nighttime	$L_{Aeq,8hr}$	53.2	48.1	48.3	49.4	44.9	52.7
			*L_{AFmax}	74.0	70.1	76.3	63.5	54.1	72.7

* L_{AFmax} values represent the 10th highest measured maximum using a 5 minute time weighting during the nighttime period.

4.0 PLANNING POLICY & DESIGN TARGETS

Planning Policy

National Planning Policy Framework

The National Planning Policy Framework (NPPF[1]) sets out the Government's planning policies for England and how these should be applied. Where issues of noise impact are relevant the NPPF provides guidance. NPPF states that planning policies and decisions should contribute to and enhance the natural and local environment by:

'preventing new and existing development from contributing to, being put at unacceptable risk from, or being adversely affected by, unacceptable levels of noise pollution'.

NPPF also advises:

'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: 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 quality of life'.

The NPPF also refers to the 2010 DEFRA publication, the Noise Policy Statement for England (NSPE) which reinforces and supplements the NPPF guidance.

Noise Policy Statement for England

The Noise Policy Statement for England[2] (NPSE) sets out the long term vision of promoting good health and a good quality of life through the effective management of noise within the context of Government policy on sustainable development. This vision is supported by the following aims:

- Avoid Significant adverse impacts on health and quality of life.
- Mitigate and minimise adverse impacts on health and quality of life.
- Where possible, contribute to the improvement of health and quality of life.

The NPSE describes the following levels at which noise impacts may be identified:

[1] National Planning Policy Framework. Department for Levelling Up, Housing & Communities (2024)

[2] Noise Policy Statement for England - Department for Environment, Food & Rural Affairs (2010)

- NOEL - No Observed Effect Level. This is the level below which no effect can be detected. In simple terms, below this level, there is no detectable effect on health and quality of life due to the noise.
- LOAEL - Lowest Observed Adverse Effect Level : This is the level above which adverse effects on health and quality of life can be detected.
- SOAEL - Significant Observed Adverse Effect Level : This is the level above which significant adverse effects on health and quality of life occur.

According to the explanatory notes in the statement, where a noise level falls between LOAEL and a level which represents SOAEL then:

'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'.

Planning Practice Guidance on Noise

Planning Practice Guidance (PPG) - Noise[3] is an online www.gov.uk resource (last updated 2019) to provide additional guidance on the NPPF. It discusses:

- *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 NPSE, the PPG references the LOAEL and SOAEL in relation to noise impact. It also provides examples of outcomes that could be expected for a given perception level of noise, plus actions that may be required to bring about a desired outcome. However, inline with the NPSE, no objective noise levels are provided although the PPG states that:

'the subjective nature of noise means that there is not a simple relationship between noise levels and impact on those effected. This will depend on how various factors combine in any particular situation'

Table 4.1 below summarises the PGG noise expose hierarchy.

[3] Planning Practice Guidance on Noise (https://www.gov.uk/guidance/noise--2). Ministry of Housing, Communities & Local Government

Table 4.1: Explanation of Noise Exposure Hierarchy - PPG

Perception	Examples of Outcomes	Increasing Effect Levels	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; closing windows for some of the time because of the noise. Potential for non-awakening sleep disturbance. Affects the acoustic character of the area such that there is a perceived change in the quality of life.	Observed Adverse Effect	Mitigate and reduce to a minimum
		Significant Observed Adverse Effect Level	
Noticeable and disruptive	The noise causes a material change in behaviour and/or attitude, e.g. having to keep windows closed most of the time, avoiding certain activities during periods of intrusion. Potential for sleep disturbance resulting in difficulty in getting to sleep, premature awakening and difficulty in getting back to sleep. Quality of life diminished due to change in acoustic character of the area.	Significant Observed Adverse Effect	Avoid
Noticeable and very disruptive	Extensive and regular changes in behaviour and/or an inability to mitigate effect of noise leading to psychological stress or physiological effects, e.g. regular sleep deprivation/awakening; loss of appetite, significant, medically definable harm, e.g. auditory and non-auditory	Unacceptable Adverse Effect	Prevent

World Health Organisation, Environmental Noise Guidelines for the European Region 2018 (WHO)

The WHO (World Health Organisation) guidelines provide guidelines in relation to noise in the community and these are in line with the guidance in BS8233:2014. The WHO guidelines relate to the potential for health impacts relating to environmental noise and the impact of noise on uninterrupted speech and sleep. The suggested guideline values for the daytime in noise levels in external areas are reflected in the guidance in BS8233:2014 and typical Local Authority noise target levels.

Design Targets

The noise design targets for internal habitable spaces and gardens are detailed in Table 4.2. The targets are based on the advice provided in BS8233:2014/WHO guidelines as well as typically accepted Local Authority criteria.

Table 4.2: BS8233:2014 Design Targets

Space	$L_{Aeq,16hr}$ (07:00 - 23:00)	$L_{Aeq,8hr}$ (23:00 - 07:00)	Typical L_{Amax} (23:00 - 07:00)
Living Room & Kitchen	35dB	-	-
Dining Room & Study	40dB	-	-
Bedroom	35dB	30dB	≤45dB

For 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.

However, it is also recognised that these guideline values are not achievable in all circumstances where development might be desirable. In higher noise areas, such as city centres or urban areas adjoining the strategic transport network, a compromise between elevated noise levels and other factors, such as the convenience of living in these locations or making efficient use of land resources to ensure development needs can be met, might be warranted. In such a situation, development should be designed to achieve the lowest practicable levels in these external amenity spaces, but should not be prohibited.

British Standard 4142

BS 4142:2014+A1:2019[4] presents methods for rating and assessing the potential impact of commercial and industrial sound upon noise sensitive receptors. In order to assess impact using BS 4142, the 'rating level' of the new sound source is compared with the existing contextual 'background sound level'.

- Typically, the greater this difference, the greater the magnitude of the impact.
- A difference of around +10 dB or more is likely to be an indication of a significant adverse impact, depending on the context.
- A difference of around +5 dB is likely to be an indication of an adverse impact, depending on the context.
- 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.

The 'rating level' is determined by assessing the 'ambient sound level', distinguishing the 'specific sound level' from the 'residual sound level' and applying any sound specific penalties for acoustic features that would subjectively cause the sound to be perceived differently.

The 'specific sound level' of the commercial / industrial sound source is determined by either; measurement or calculation with regard to the appropriate reference time interval (for daytime or nighttime periods). The standard requires separate analysis for daytime and nighttime periods, evaluating the 'rating level' over an appropriate reference time interval (T_r) of: 1hr for daytime (07:00 - 23:00 hrs) and 15min for nighttime (23:00 - 07:00 hrs). The 'specific sound level' is defined as equivalent continuous A-weighted sound pressure level produced by the specific sound source at the assessment location over a given reference time interval, *T* (determined either by calculation or deducting the measured 'residual sound level' from the measured 'ambient sound level').

'Ambient sound' is defined as the totally encompassing sound in a given situation at a given time, usually composed of sound from many sources near and far (The ambient sound comprises the residual sound and the specific sound when present).

'Residual sound' is defined as the ambient sound remaining at the assessment location when the specific sound source is suppressed to such a degree that it does not contribute to the ambient sound.

[4] BS4142:2014+A1:2019 Methods for rating and assessing industrial and commercial sound

Where appropriate, a rating penalty can be applied to the specific sound level to account for the character of the sound, namely: tonality, impulsivity and intermittency. Such acoustic feature corrections can be added together linearly.

Tonality can be determined objectively (using adjacent third octave band analysis or the Joint Nordic method) or subjectively as described below:

- +2dB penalty: Just perceptible
- +4dB penalty: Clearly perceptible
- +6dB penalty: Highly perceptible

Impulsivity can be determined objectively (using Fast Fourier Transform analysis) or subjectively as described below:

- +3dB penalty: Just perceptible
- +6dB penalty: Clearly perceptible
- +9dB penalty: Highly perceptible

Where intermittency is present, a +3dB penalty can be applied. Where the acoustic feature characteristics are neither tonal nor impulsive, but are clearly distinguishable against the residual sound, a +3dB penalty can be applied.

BS 4142:2014+A1:2019 outlines specific limitations within its scope and states that it is not intended for the assessment of sound arising from people, recreational activities, raceways, shooting, music or entertainment, construction or demolition activities, public address systems, domestic animals, or for determining whether noise constitutes a statutory nuisance.

5.0 SOUND PROPAGATION MODELLING

To predict the sound levels from the proposed substation across the site and to the NSPs, the latest version of CadnaA 3D noise propagation modelling software has been used, which implements the calculation procedure specified within ISO9613-2[5]. CadnaA is considered to be the industry leading standard in noise propagation modelling software.

The model has been calibrated using the measured levels presented in Section 3.0. The calibration was undertaken by modelling the existing buildings and the surroundings using Google Earth imagery and 1m digital terrain height data obtained from DEFRA. Measured data for substation has been used as an internal level within the substation housing and the sound reduction of the relevant building elements have been calculated using INSUL modelling software and inputted into the sound propagation model where relevant.

It is assumed that the existing ground levels around the development site will be commensurate with the existing site levels. Proposed development site levels have been manually inputted into the model based on drawn information provided by the client. Within the model, ground reflection is set to 100% reflective to account for hard ground around the site and 3 orders of reflection have been set.

The predicted facade levels across the site, in addition to the measured levels for the most exposed areas, incorporating all of the dominant sources of noise affecting the proposed development and the proposed additional car park and substation have been used for the purpose of noise break-in calculations to ensure compliance with the guidance in BS8233:2014 and planning conditions which mirror this guidance. Appendix B presents the site general arrangement with the recommended facade mitigation mapped onto the relevant areas. It can be seen that as a result of the modelling, more exposed and affected facades facing onto the relevant noise sources have been uprated to account for the predicted and measured levels.

Appendix B presents the results of the sound propagation modelling and the recommended facade and boundary noise mitigation for the residential element of the development. The assessment includes for maximum events as well as daytime and nighttime L_{Aeq} levels.

[5] ISO 9613-2 2024 Acoustics - Attenuation of Sound During Propagation Outdoors Part 2

6.0 SOUND BREAK-IN CALCULATIONS

The methodology described in BS8233:2014[6] for break-in calculations has been used to determine a suitable glazing strategy. The variables required to determine suitable glazing and ventilation requirements are as follows:

- Room volume in m^3
- Facade element surface areas m^2
- Facade element sound reduction indexes in each octave band (125Hz - 2kHz).
- Room reverberation time in seconds to determine effective absorption area in m^2 in the receiving room.

The room volume and facade element surface areas have been taken from the architectural drawing pack provided by the client. The sound reduction index levels for glazing elements are held on file and taken from published manufacturer data. The room reverberation time is assumed to be 0.4s, 0.6s and 0.8s in each octave band for bedrooms, living rooms and kitchens respectively. External wall sound insulation performances are taken from the data in BS8233:2014 for typical cavity masonry wall constructions.

For the purpose of noise break-in calculations, windows are assumed to be closed with ventilation to be provided by a fully mechanical means capable of complying with the requirements of the Building Regulations 2010. Ventilation is assumed to be provided to ensure compliance with the Building Regulations 2010, though compliance in this regard and compliance with thermal comfort criteria is outside the scope of this assessment and should be checked and confirmed by others. Copies of noise break-in calculations are available if requested. It is further assumed at this stage that discussion is ongoing to determine the requirements for thermal comfort as well as energy use to balance the need for ventilation and overheating mitigation with acoustic requirements. It has been assumed for the purpose of noise break in calculations that ventilation will be provided by a fully mechanical means not relying on passive trickle ventilation in the facade.

The same assessment methodology has been applied to the noise break-in calculations to determine appropriate glazing specifications for the basement level commercial spaces. For these spaces, the room reverberation time has been set at 1.2s. Ambient noise levels within the non-domestic commercial areas have been assumed in accordance with typical values for non-domestic buildings.

[6] British Standards Institute 8233:2014 *Guidance on sound insulation and noise reduction for buildings*

7.0 SUBSTATION & COMMERICAL PROPOSALS

Substation

The proposed substation will comprise an fluid filled 500 kVA distribution transformer, nominally of the Schneider Electric Eco-Loss Tier 2 type, installed within a bespoke masonry substation building. The transformer will be mounted on anti-vibration supports and housed internally beneath a pitched tiled roof with an internal lining. Figure 7.1 below details the substation housing proposals.

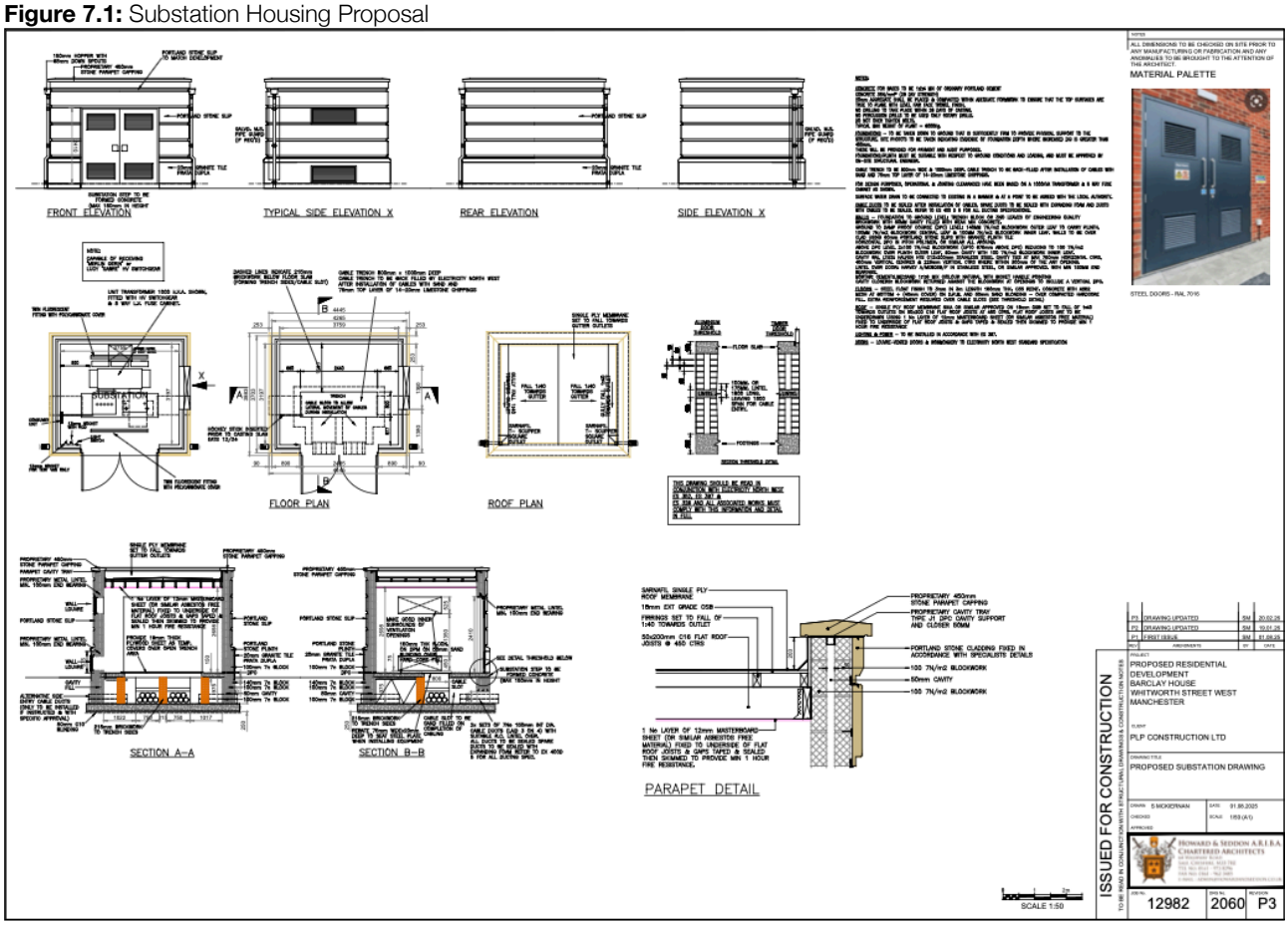
Manufacturer provided noise data indicates a broadband single figure sound power level of Lw(A) = 60dB(A) and a corresponding sound pressure level of Lp(A) = 47dB(A) measured at a distance of 1m. However, no information has been provided regarding the measurement methodology, calculation approach, operating conditions, or load state under which these noise levels were derived. In the absence of verifiable manufacturer measurement details, Red Acoustics have referenced specific measured sound level data held on file for an equivalent fluid filled 500 kVA distribution transformer. This dataset is based on measurements undertaken under normal operating load conditions and is considered representative of the proposed installation.

Accordingly, the assessment has been undertaken using this representative measured data, with sound levels measured at approximately 300 mm from the transformer, as presented in Table 7.1.

Table 7.1: Summary of Specific Measured Sound Levels - Substation

Description	Octave Band Centre Frequency Hz / L_{eq} dB					Measured Broadband (dBA)
	125	250	500	1000	2000	
500kVA Transformer Measured Data	55	52	51	48	44	53

Figure 7.1: Substation Housing Proposal



Basement Floor Commercial Space

The current basement proposal as shown above in Figure 2.3. It is currently proposed that the basement uses will include a gymnasium and a coffee work/study zone. It is proposed the basement spaces will be offered as a shell only construction, with the commercial operators providing their own specific acoustic fit-out measures.

As part of the basement shell fit-out works a new lobbied basement entrance is proposed together with the reintroduction of several windows into the building facade to serve the basement level This is discussed further in Section 9.0 below.

8.0 PROPOSED SUBSTATION NOISE IMPACT

An impact assessment of the proposed development has been undertaken in accordance with BS4142. Measured sound level data obtained at the proposed development site (MP2) has been used to establish the existing background sound level. The specific sound level at the nearest noise sensitive receptor, which forms part of the development itself, has been predicted using CadnaA sound propagation modelling software.

The sound propagation model has been developed to assess breakout from the substation building in its proposed location and orientation. Predicted sound levels at adjacent noise sensitive receptors located along the site boundary are lower than those at the nearest receptor.

Sound level data from a comparable substation, held on file by Red Acoustics and presented in Table 7.1 above, has been used for the assessment. The sound attenuation provided by the masonry enclosure, louvred door, wall louvres, and the proposed roof construction has been calculated using INSUL prediction software and incorporated into the sound source data within the model.

Table 8.1 below presents the BS4142 assessment. As the substation is expected to operate 24 hours, a nighttime assessment period has been used with the specific sound level rated against the typical $L_{A90,t}$ background sound level during the nighttime period.

Table 8.1: BS4142 Assessment Period

	Nighttime Period (23:00 - 07:00)
Predicted Specific Sound Level	28 dBA
Corrections	The substation is expected to operate continuously with no impulsive or tonal characteristics likely to be perceptible at receptor locations. Therefore no penalties are applied as no specific character is expected to be readily distinguishable.
Rating Level dB	28 dBA
Typical Background $L_{A90,t}$	49 dBA
Difference	-11 dBA
Comments	Predicted impact is significantly below target.
Conclusion	Low impact

9.0 COMMERCIAL IMPACT ASSESSMENT

At shell fit-out stage, the proposed separating floor construction and adjoining structural elements are considered capable of providing adequate protection against noise generated within the commercial spaces and affecting the residential accommodation above. At this stage of development, it is anticipated that individual commercial operators will be responsible for providing their own detailed acoustic fit-out measures once tenants have been confirmed.

Noise associated with the proposed basement coffee work/study zone, which will not utilise a foreground music system, is typically expected to fall within the range of 65–75 dB L_{Aeq}, with potential maximum noise levels of up to 85 dB L_{Amax}. To prevent noise intrusion to residential occupants within the building, a suitable level of sound insulation to contain these noise levels would generally be in the order of 60 dB $D_{nT,w}$.

Acoustic Ceilings

The following ceiling is recommended in the coffee work/study zone area:

- Two layers of 15mm high density plasterboard suspended from a metal grid ceiling system, minimum cavity void of 200mm. **Ceiling must be imperforate and located above any services.**

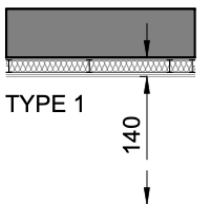
For the gymnasium space, the following base ceiling construction is recommended, together with compliance with the gym tenancy lease acoustic requirements outlined later in this section:

- Two layers of 15mm high density plasterboard suspended on metal grid ceiling system via proprietary vibration isolating hangers (GAH1 Acoustic Hangers) with a minimum cavity void of 500mm, 100mm Insulation in the ceiling cavity (density 10kg/m^3). **Ceiling must be imperforate and located above any services.**

Structural Wall linings

In addition to the ceiling constructions outlined above, further base shell fit-out acoustic treatments are recommended to all structural basement walls.

- Basement level external wall lining:



BASEMENT EXTERNAL WALL UPGRADE
EXISTING EXTERNAL WALL (450 - 700mm)
25mm VOID
92mm BG I STUDS @ 600 CTRS
90mm ROCKWOOL FLEXI BETWEEN STUDS
500g VCL
2x15mm BG WALLBOARD (skimmed & painted inner sides)
for walls less than 3.0m reduce to 1x15mm BG WALLBOARD
U Value 0.22w/m2k

- Gyplyner to all structural staircase or non-external common flanking wall; Two layers of 15mm high density plasterboard fixed on Gyplyner wall system. Minimum cavity 26mm with 25mm Insulation in cavity (density 10kg/m3).

Linings to All Columns & SVP's

All basement columns and exposed soil vent pipes (SVPs) shall be adequately acoustically lined to reduce airborne noise breakout and potential flanking transmission.

Basement Entrance Lobbies

Access to the basement level shall be provided via acoustically lobbied entrances, as detailed in the architectural proposals, to reduce noise transmission between spaces.

Basement Reinstalled Glazing

As part of the basement shell fit-out works, several windows serving the basement areas will be reinstated. Sound break-in calculations have been undertaken for these locations and the proposed glazing specifications are detailed in Section 10.0 of this report. Due to the position of the windows along the most acoustically exposed facade, high performance glazing is proposed. This glazing will also provide adequate attenuation to control noise break-out from the proposed commercial spaces at shell fit-out stage.

Gym Tenancy Lease Acoustic Requirements

This section sets out the acoustic requirements to be incorporated into the basement gym tenancy lease and agreed with the Tenant.

The Tenant shall implement acoustic measures to ensure that the airborne and impact sound transmission criteria set out in Table 9.1 are achieved. These criteria are based on those defined within ProPG: Gym Acoustics Guidance (March 2023).

Table 9.1: Airborne and impact sound transmission criteria

Receptor	Airborne Sound, $L_{eq,t}$ (31.5 Hz to 8 kHz one-third octave bands)	Impact Sound, L_{Fmax} (31.5 Hz to 8 kHz one-third octave bands)
Residential Areas	G15 (Day)	G20 (Day)
	G10 (Night)	G15 (Night)

The Tenant shall also ensure that vibration levels comply with the criteria set out in Table 3 of Section 2.4 of ProPG: Gym Acoustics Guidance (March 2023).

The Tenant shall submit a gym acoustic design report to the Landlord for review and comment. The report shall include details of all proposed mitigation measures and supporting acoustic calculations relating to airborne sound, impact sound, and vibration control.

Prior to commencement of operation, the Tenant shall undertake post-completion acoustic testing to demonstrate compliance with the specified airborne sound, impact sound, and vibration criteria. The test report shall be submitted to the Landlord for review.

Commercial Plant Sound Limits

As the final commercial occupiers are not known at this stage and may vary, the specific nature and type of any future plant installations cannot yet be defined. Based on the measured baseline survey data, indicative plant sound emission limits have therefore been established to inform future design targets. Table 9.2 presents the proposed commercial plant sound emission limits at the nearest noise sensitive receptors, assessed in accordance with BS4142:2014+A1:2019.

In line with anticipated Local Planning Authority requirements, the proposed targets correspond to plant noise levels at least 5 dB below the existing measured representative background sound level.

Table 9.2: Proposed Commercial Sound (Plant) Target Limits

	Sound Pressure Level, dBA			
	Daytime Period 07:00hrs to 23:00hrs		Nighttime Period Period 23:00hrs to 07:00hrs	
Measurement Location	Existing $L_{A90,1hr}$	Proposed $L_{Aeq,1hr}$	Existing. $L_{A90,15min}$	Proposed $L_{Aeq,15min}$
Nearest NSPs	52	48	49	44

10.0 DISCUSSION & RECOMMENDATIONS

The sound climate along this northern elevation of Barclay House is primarily influenced by distant city centre traffic noise and benefits from a degree of screening from major road, rail, and entertainment noise sources. The target sound levels within the proposed residential spaces can be achieved with the recommended facade mitigation shown in Table 10.1 below. This is based on the measured data and the sound break-in calculations discussed in Section 6.0.

The measured data was also used to calculate the sound break-in level via the proposed glazing elements which will be reinstalled to the basement areas. Appropriate glazing specifications for the basement level commercial spaces have been recommended in accordance with typical values for non-domestic buildings as detailed in BS 8233:2014.

Table 10.1 presents the octave band Sound Reduction Index (SRI) values for the various facade elements used in the sound break-in calculations and subsequent recommendation. Alternative proposals may be used provided that the minimum octave band acoustic performance specifications are met. Once specific design details and contractor glazing proposals are developed for the external building envelope, the sound break-in calculations should be re-checked by Red Acoustics to ensure that the target criteria will be met. The calculations assume that the window is closed and fully mechanical ventilation provided is capable of supplying air to the required rate by the relevant Approved Documents of the Building Regulations 2010 (as amended). Compliance with ventilation and thermal comfort requirements required by the Building Regulations 2010 should be confirmed by others.

Table 10.1: Minimum Facade Element Performance Requirements

Facade Element	Octave Band Sound Reduction Index (SRI) and Element Normalised Level Difference ($D_{n,e}$) dB for glazing and ventilation elements					Broadband Performance
	125 Hz	250 Hz	500 Hz	1000 Hz	2000 Hz	
Residential Glazing Specification 10/16/6 Glazing (SRI) including frame	24	24	32	37	37	35 R_w
Basement Glazing Specification 8.8/16/6 Glazing (SRI) including frame	24	25	36	44	43	39R_w
External Wall (R)	40	44	45	51	56	-

11.0 CONCLUSION

An assessment of the sound impact arising from the operation of the proposed new substation at the Barclay House site has been undertaken in accordance with the guidance set out in BS 4142:2014+A1:2019.

In addition, an acoustic assessment has been completed to address the proposed shell fit-out of the commercial uses. This assessment identifies the mitigation measures required to control noise break-out from the commercial premises at shell fit-out stage. These measures include the provision of acoustic lobbies at access and egress points, acoustic treatment to the building structure, appropriate glazing specifications, and suitably worded acoustic requirements to be incorporated within commercial tenancy leases should the space be occupied by a gym operator.

Recommended sound emission target limits for future commercial mechanical plant have also been established to inform subsequent design stages and tenant fit-outs.

Furthermore, recommendations have been made in relation to facade noise mitigation to ensure that appropriate noise levels are achieved at the proposed residential accommodation, having regard to NPPF, British Standard and World Health Organisation guidance.

APPENDIX A: NOISE SURVEY DETAILS

Location

Barclay House, 35 Whitworth Street West, Manchester M1 5NG

Survey Dates

13 - 16 February 2026.

Weather

Conditions during the survey period were mainly dry with wind speeds <5ms^{-1}. Some light rain was noted on late Sunday evening / early Monday morning.

Personnel

Simon Webster BEng (Hons) MIOA.

Paul Clark Pg. Dip. IOA MIOA.

Instrumentation

Table A1 below presents the instrumentation used during the surveys.

Methodology

Before and after the measurements the sound level meters were check calibrated to an accuracy of ±0.3dB using their associated Class 1 Calibrators. No drift in the instruments' sensitivities were noted across any of the survey periods.

Calibration Certificates

Copies of all calibration certificates are kept on file by Red Acoustics Ltd and can be supplied if requested.

Table A1: Survey Instrumentation

Kit No	Equipment Description	Type Number	Manufacturer	Serial Number	Date of Last Calibration	Calibration Certificate Number
RED01	Sound Level Meter	XL2	Nti Audio	A2A-27002-E1	14 January 2026	UK-26-005
RED09	Sound Level Meter	Type 140 Type 1	Norsonic	1402793	01 May 2024	47694
RED13	Sound Level Meter	Type 140 Type 1	Norsonic	1402994	01 May 2024	47691
Sound Calibrator		Type 1251 IEC 60942-2003 Class 1	Norsonic	33007	31 October 2025	52540