



PROJECTCO SUB 2040 LIMITED

PROPOSED HOTEL DEVELOPMENT

STOCK EXCHANGE SUITS, NORFOLK HOUSE, MANCHESTER

ENVIRONMENTAL NOISE STUDY

R2423-REP01b-PC

30 OCTOBER 2025

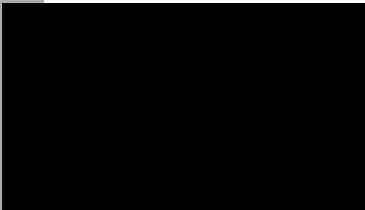
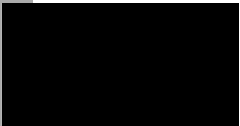
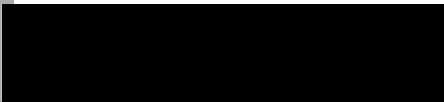
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REPORT DETAILS

Project	Stock Exchange Suits, Norfolk House, Manchester		
Client	Projectco Sub 2024 Limited Fourth Floor, Unit 5b The Parklands Bolton Lancashire BL6 4SD		
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Signed			

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SUMMARY

Red Acoustics Ltd has been commissioned by Projectco Sub 2024 Limited to provide an assessment of the impact of environmental sound on the proposed hotel development site at Norfolk House, Norfolk St, Manchester M2 1DH.

Environmental sound surveys have been carried out to determine the existing sound climate affecting the site. The measured sound levels were then used to advise on the level of facade noise mitigation across the proposed development based on the current layout plans provided by the client.

Sound break-in calculations have been undertaken based on the measured data and drawn information provided to date. The break-in calculations have been used to make recommendations regarding the acoustic strategy in relation to facade noise mitigation. The aim of the strategy is to achieve the following internal sound levels:

- Bedrooms 35dB $L_{Aeq,16hour}$ (Daytime) / 30dB $L_{Aeq,8hour}$ and 45dB L_{Amax} Typical (Nighttime)

The results of the environmental sound survey and subsequent impact assessment together with sound break-in calculations conclude that the above targets can be achieved using a mixture of acoustic glazing specifications together with a fully mechanical ventilation system for the whole development. The purpose of this report at this stage is to feed into the design development and demonstrate for planning purposes that the internal target sound levels are achievable.

The development is located in Manchester's busy city centre, adjacent to the main shopping district. Noise impacts from surrounding commercial activities have been assessed, and recommendations have been made for enhanced glazing acoustic performance in areas most affected by environmental sound. With these measures in place, noise is not expected to present a constraint on the site's suitability for development.

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1.0 INTRODUCTION

Red Acoustics Ltd has been commissioned by Projectco Sub 2024 Limited to provide an assessment of the impact of environmental sound on the proposed hotel development site at Norfolk House, Norfolk St, Manchester M2 1DH.

Red Acoustics have been commissioned to:

- Undertake an environmental sound survey to assess the current sound climate affecting the proposed development site.
- Based on drawn information provided by the client and measured data, determine facade sound levels affecting the proposed development and advise on suitable facade mitigation to achieve internal target criteria having regard to the guidance in BS8233:2014.

This report has been prepared based on the currently available information provided by the client in support of an application for planning consent relating to proposed development.

Environmental sound surveys have been carried out to establish the prevailing sound climate, with sound break-in calculations undertaken using the measured data and preliminary building layout information. This report presents the survey results and break-in assessment outcomes, providing advice on the likely façade noise mitigation strategy, based on the proposed site layout drawings.

The report presents the measured data and sound break-in calculation results to inform the glazing strategy for façade noise mitigation.

2.0 SITE DESCRIPTION & PROPOSED DEVELOPMENT

The proposed hotel development is located at Norfolk House on Norfolk Street, Manchester. Figure 2.1 below shows the site location outlined in red. The proposal involves converting the existing 5 storey office building into a 95 bedroom hotel. Figure 2.2 presents a typical floor general arrangement layout. Previously used as office space, the site is bordered to the north by a Tesco Express and New Market Street, which provides both site access and delivery access to the Tesco loading bays. The site is centrally located within Manchester's main shopping district, running parallel to the city's primary retail street.

Figure 2.1: Proposed Site Location



[illegible]

3.0 ENVIRONMENTAL SOUND SURVEYS

Unattended environmental sound surveys have been undertaken to establish the existing sound climate at the proposed development site. Figures 3.1 - 3.2 below show the location of the monitoring positions (MP1 - MP4). Monitoring positions were selected to obtain façade level measurements of environmental sound for use in break-in calculations. Measurements were taken at each elevation of the building at first floor level and at 1m from the façade. Sound level meters at survey locations MP1 to MP3 were equipped audio recording capabilities, allowing for the review of specific and typical sound generating events. Survey details and instrumentation used are presented in Appendix A.

Figure 3.1: Environmental Sound Survey Monitoring Positions

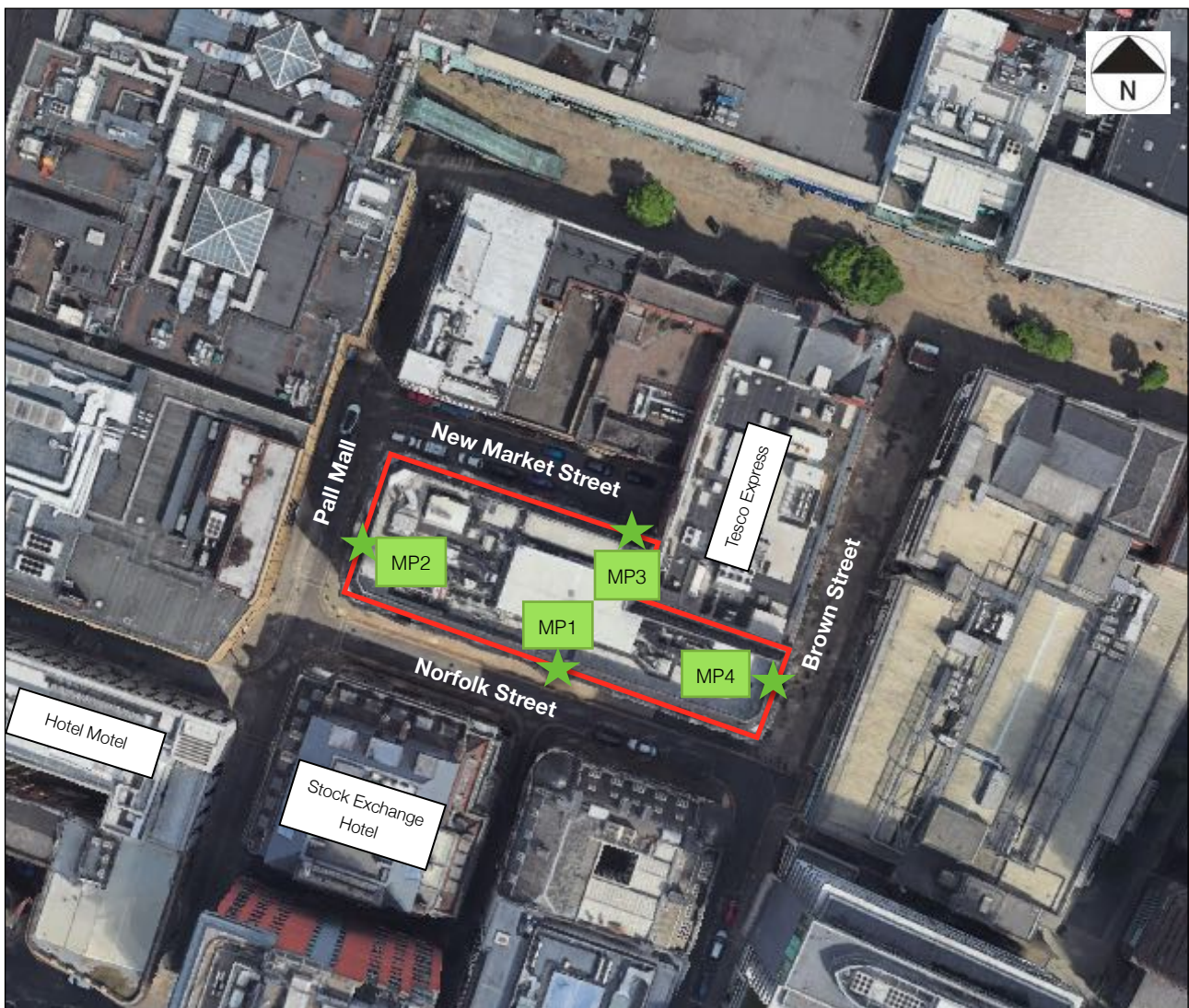


Figure 3.2: Environmental Sound Survey Monitoring Positions (2)

Figure 3.2 above illustrates the first floor window locations used for survey positions MP1 to MP4. Measurements were taken using a telescopic pole extended through the existing windows, with microphones positioned approximately 1 metre from the building façade. As a result, all measurements include a façade reflection correction. The unattended environmental sound surveys were carried out between 17:30hrs on Monday 8th September 2025 and 16:30hrs on Wednesday 10th September 2025 to capture typical daytime and nighttime sound levels over a 24 hour period. Table 3.1 below summarises the results of the measurements undertaken.

From the initial site inspection it was identified that the main sources of environmental sound that may be of interest were mechanical plant items on the rooftop of the adjacent Tesco Express building and the ground floor loading bay area. Both are located directly north of the site. Delivery vehicle movements and unloading on New Market Street and (also from all roads around site) were noted from a review of the audio recordings taken during measurements. This activity occurred both during the daytime and nighttime periods. The development is located in the busy city centre area of Manchester and is adjacent to main shopping district. Surrounding roads are used primarily for delivery access for the nearby and adjacent commercial uses as well as street cleaning and refuse collection. Noise from these activities is significant at the façade of the proposed development and difficult to assess in isolation due to the varied nature of the sound generating environment. The result of an assessment in accordance with BS4142:2014+A1:2019 would, if undertaken for each source individually, likely

indicate that sound has potential for significant impact to the façades of the development. As the proposed development is a hotel facility without external amenity areas, the main design driver for acoustic comfort internally will be the acoustic performance of glazing to habitable rooms. As BS4142:2014+A1:2019 is not appropriate for the assessment of indoor sound levels, a detailed assessment of individual sources would be of little benefit having determined that the noise impact is significant. We have recommended appropriate and robust façade mitigation to address noise impacts to the building based on measured data. Façade mitigation (i.e. glazing acoustic performance) has been uplifted as necessary to address absolute sound levels in hotel bedroom spaces depending on measured façade levels in each area of the building to account for the varied sound climate. Ventilation is assumed to be provided by a fully mechanical means not relying on passive trickle ventilators in the facade.

Table 3.1: Survey Results

Position	Period	Measurement Period	Octave Band Centre Frequency Hz / dB					Measured Broadband (dBA)
			125	250	500	1000	2000	
MP1	Daytime	L _{eq,16hour}	59.2	53.0	52.5	51.6	51.4	58.3
	Night-time	L _{eq,8hour}	54.2	51.3	51.4	49.6	47.5	54.5
		L _{AFmax}	76.5	74.3	70.7	69.1	66.8	74.0
MP2	Daytime	L _{eq,16hour}	62.4	56.9	55.0	53.5	52.1	58.7
	Night-time	L _{eq,8hour}	55.4	52.4	52.1	50.6	51.1	56.3
		L _{AFmax}	67.1	67.5	75.0	74.0	70.2	77.7
MP3	Daytime	L _{eq,16hour}	60.0	59.9	59.0	56.6	57.1	62.9
	Night-time	L _{eq,8hour}	58.1	57.9	58.7	58.2	59.0	64.2
		L _{AFmax}	74.9	71.5	74.3	77.8	75.9	82.1
MP4	Daytime	L _{eq,16hour}	60.6	55.8	54.4	52.7	49.2	57.2
	Night-time	L _{eq,8hour}	59.0	54.2	52.7	51.0	46.3	55.3
		L _{AFmax}	70.6	64.7	60.7	60.8	62.2	66.6

* The L_{AFmax} values were selected from the 10th highest maximum event recorded on the second (loudest) night of monitoring. At monitoring positions MP1 to MP3, the maximum events were directly attributed to the slamming of a metal gate. Audio reviews confirmed that these events were likely associated with loading activities in the adjacent service area.

Figures 3.3 - 3.6 below detail the results of the survey measurements undertaken at MP1 - MP4.

Figure 3.3: Survey Results MP1

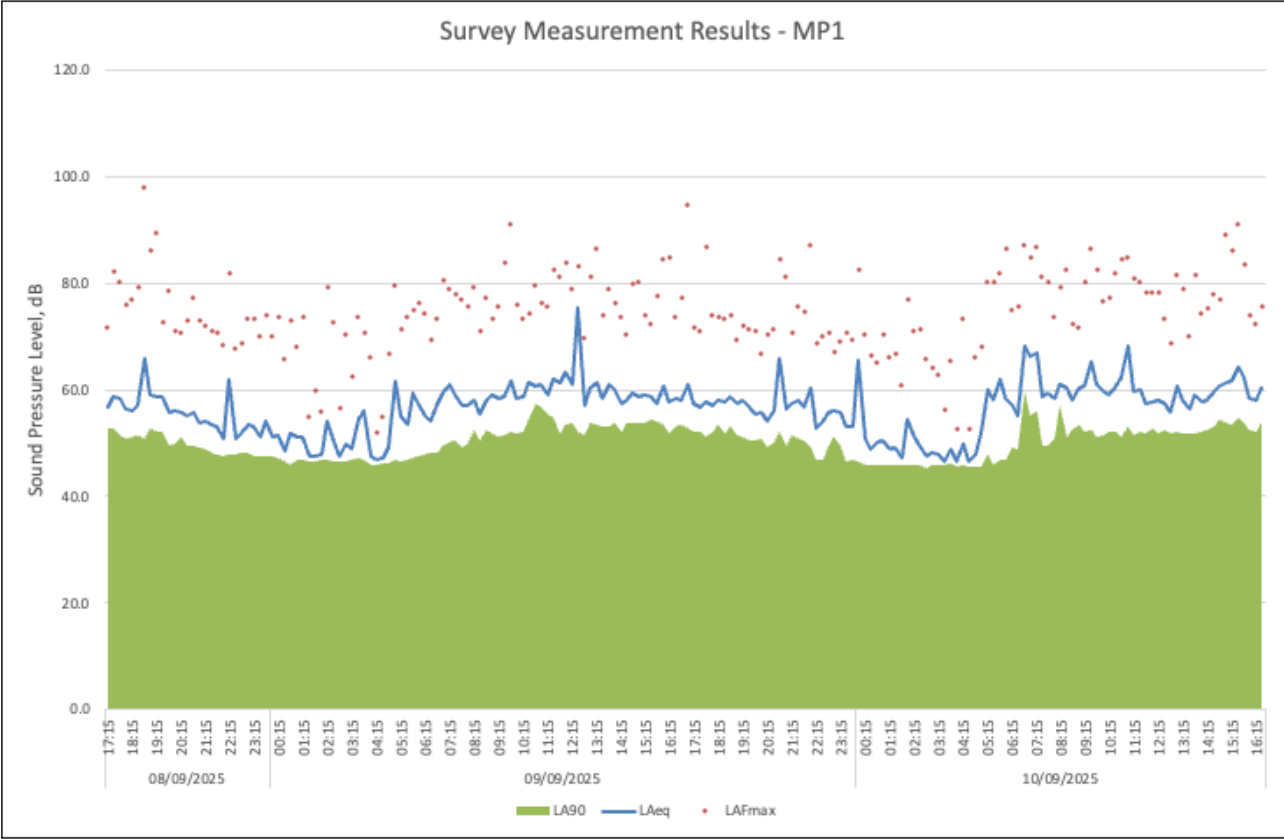


Figure 3.4: Survey Results MP2

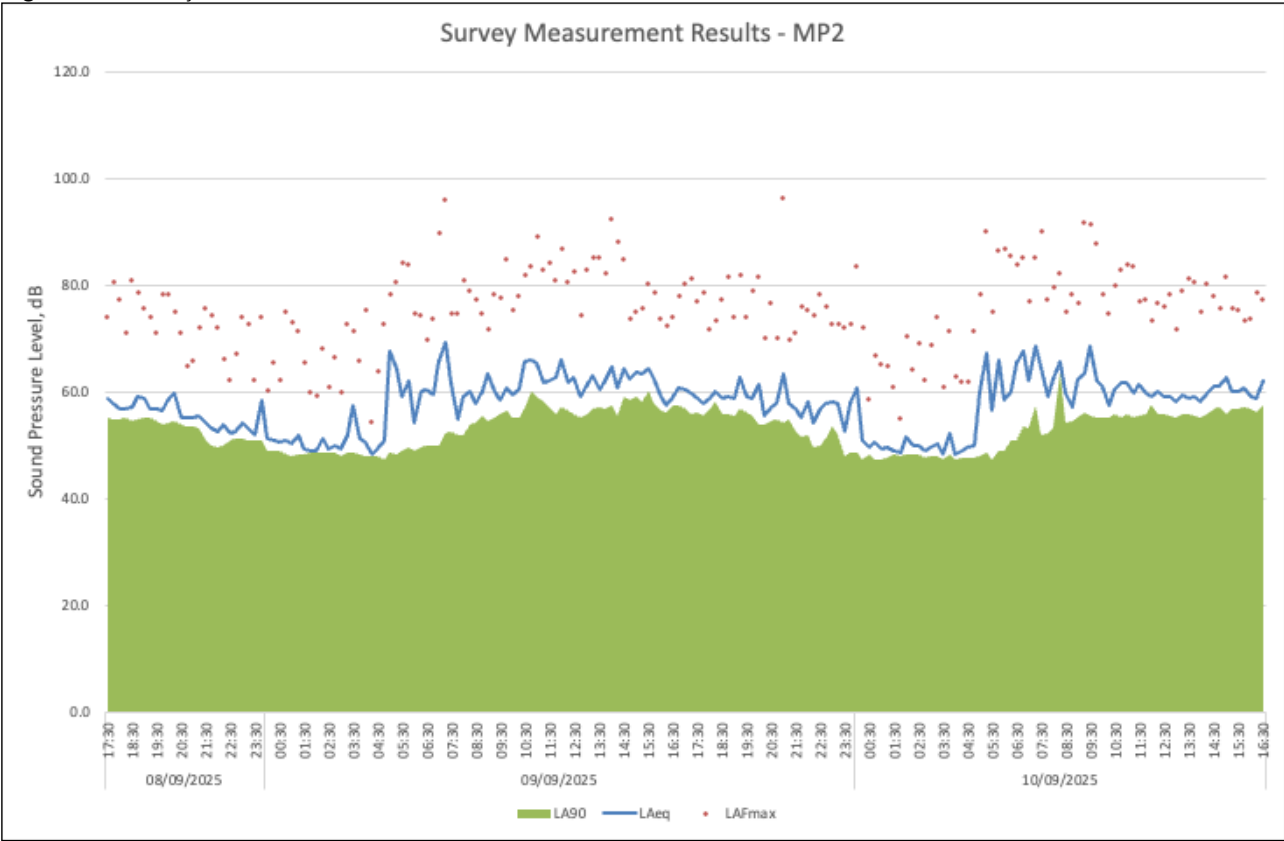


Figure 3.5: Survey Results MP3

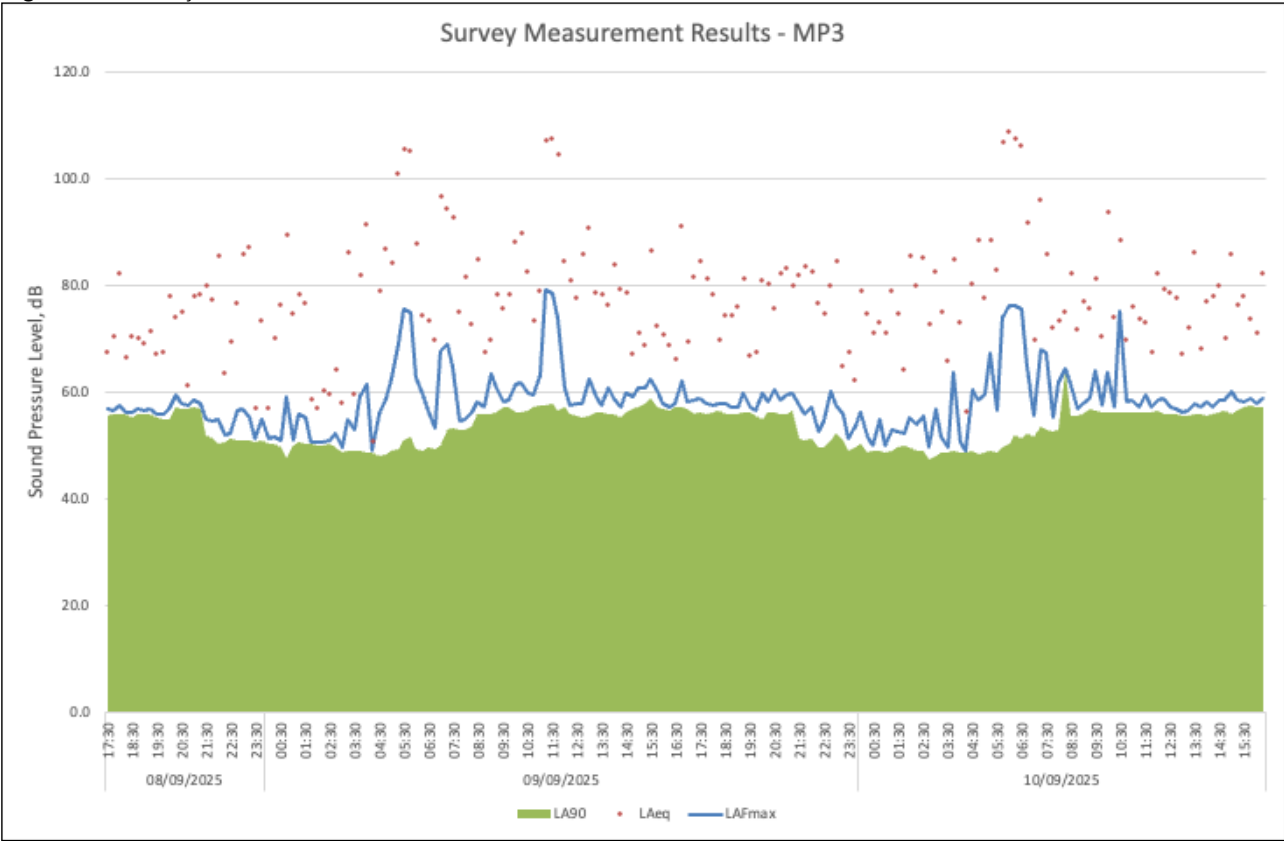
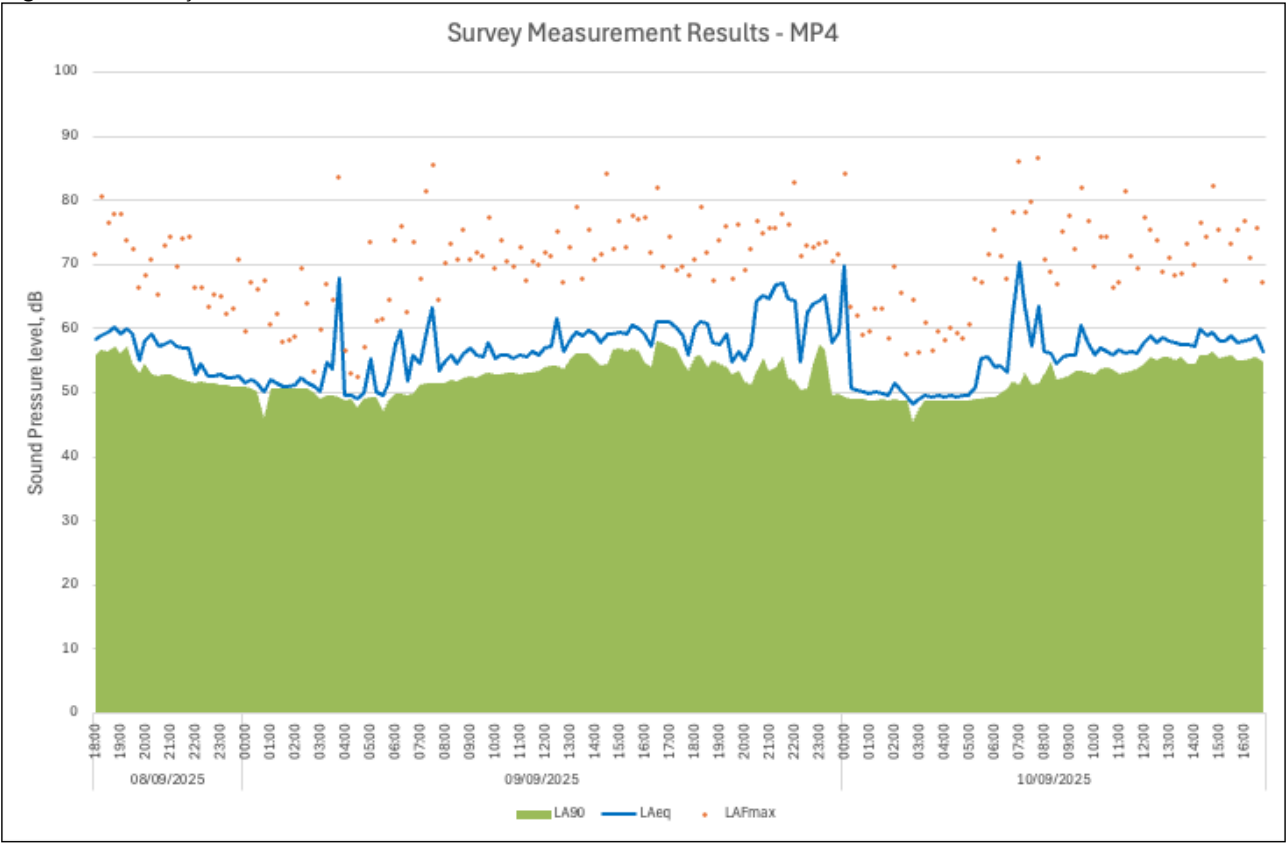
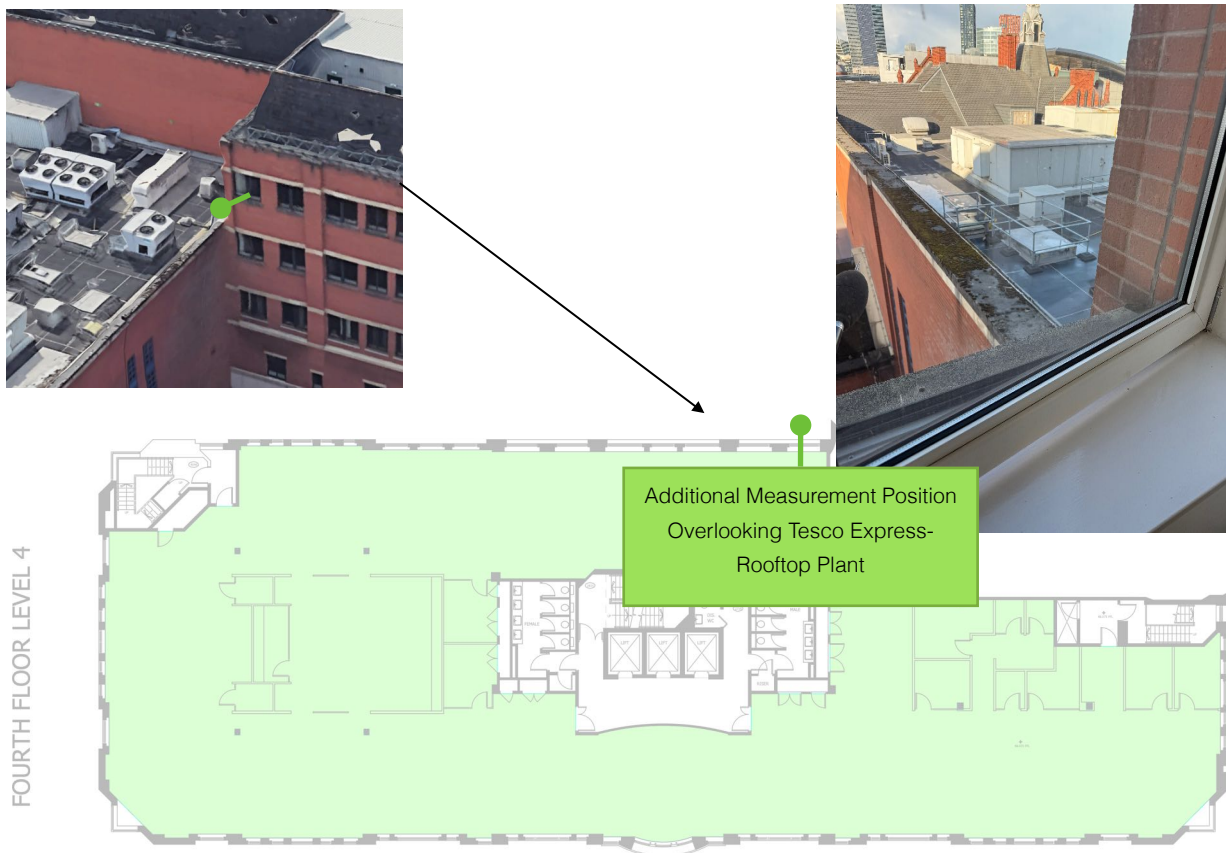


Figure 3.6: Survey Results MP4



In addition to the survey measurements described above, a further measurement was undertaken to establish the typical daytime sound levels generated by the Tesco Express mechanical plant, located on the rooftop of the adjacent building and directly overlooked by proposed fourth-floor hotel bedroom spaces. The measurement location is shown in Figure 3.7.

Figure 3.7: Environmental Sound Survey Measurement Position - Tesco Rooftop Mechanical Plant

The additional measurement positioned at a fourth floor window location, with the microphone fixed via a telescopic pole extended through the existing window. The microphone was positioned approximately 1 metre from the building façade, accordingly a façade reflection correction has been applied.

This attended environmental sound survey represents a typical 1 hour daytime measurement of the rooftop mechanical plant in operation, excluding delivery noise. For assessment purposes, this level is also adopted as a worst case representation of the nighttime impact, although in practice lower levels are anticipated at night due to reduced mechanical plant duty in line with the store's operating hours. The result of this measurement are summarised in Table 3.2.

Table 3.2: Measurement Result

4th Floor Measurement Location	Octave Band Centre Frequency Hz / dB					Measured Broadband (dBA)
	125	250	500	1000	2000	
$L_{eq,1hour}$	67.0	64.0	60.1	59.6	53.6	63.4

4.0 SOUND BREAK-IN CALCULATIONS

BS8233:2014 Break-in Calculation

The methodology described in BS8233:2014¹ for break-in calculations has been used to determine a suitable recommendation for glazing acoustic performances.

The variables required to determine suitable glazing and ventilation requirements are as follows:

- Room volume in m³
- Facade element surface areas m²
- Facade element sound reduction indexes in each octave band (125Hz - 2kHz).
- Room reverberation time in seconds to determine effective absorption area in m² in the receiving room.

The room volume and facade element surface areas have been estimated from the supplied outline information provided by the client. The sound reduction index levels for glazing elements are held on file and taken from manufacturers' published data. The room reverberation time is assumed to be 0.7s in each octave band in-line with typical hotel bedrooms. External wall sound insulation performances are taken from the data in BS8233:2014 for typical cavity masonry wall constructions. It is assumed that the hotel development will include a fully mechanical ventilation system and that passive trickle ventilation is not proposed.

¹ British Standards Institute 8233:2014 *Guidance on sound insulation and noise reduction for buildings*

5.0 PLANNING POLICY & DESIGN TARGETS

Planning Policy

National Planning Policy Framework

The National Planning Policy Framework (NPPF²) 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 England³ (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.

² National Planning Policy Framework. Department for Levelling Up, Housing & Communities (2024)

³ Noise Policy Statement for England - Department for Environment, Food & Rural Affairs (2010)

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

- 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) - Noise⁴ 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 5.1 below summarises the PPG noise expose hierarchy.

⁴ Planning Practice Guidance on Noise (<https://www.gov.uk/guidance/noise--2>). Ministry of Housing, Communities & Local Government

Table 5.1: 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 5.2. The targets are based on the advice provided in BS8233:2014/WHO guidelines as well as typically accepted Local Authority criteria.

Table 5.2: BS8223:2014 Design Targets

Space	L _{Aeq,16hr} (07:00 - 23:00)	L _{Aeq,8hr} (23:00 - 07:00)	Typical L _{Amax} (23:00 - 07:00)
Bedroom	35dB	30dB	≤45dB

6.0 RECOMMENDATIONS

The sound break-in calculations undertaken have been completed to allow for the daytime and nighttime sound levels at the proposed development facades. Recommendations have been made for uprated glazing due to measured sound levels outside proposed hotel bedroom spaces to account for the varied sound climate. This results in a robust assessment of the absolute sound levels for the measured sound climate and to account for adverse impacts due to the observed activity. Based on the measured data and the assessments conducted having regard to the guidance in BS8233, the target sound levels within the relevant spaces can be achieved with the recommended glazing specifications together with the full mechanical ventilation system to prevent the need for opening windows (though this does not preclude the use of windows that are openable). External wall performances are taken from the data in BS8233:2014 for typical cavity masonry wall constructions.

Table 6.1 below presents the octave band Sound Reduction Index (SRI) values for the various facade elements used in the calculations and are mapped onto Figures B1 and B2 in Appendix B. Alternative proposals may be used provided that the minimum octave band acoustic performance specifications are met, and that once specific design details and contractor glazing proposals are developed for the external building envelope, the sound break-in calculations be re-checked by Red Acoustics to ensure that the target noise criteria will be met.

Table 6.1: Minimum Facade Element Performance Requirements

Facade Element	Octave Band Performance Data dB					Broadband Rw (+Ctr)
	125 Hz	250 Hz	500 Hz	1000 Hz	2000 Hz	
6/16/6.8 Glazing (SRI) including frame	23	24	34	42	43	38 (32)
6/16/8.8 Optiphon Glazing (SRI) including frame	25	27	38	48	47	41 (35)
10/16/8.8 Optiphon Glazing (SRI) including frame	28	31	42	45	50	44 (38)
External Wall (R)	40	44	45	51	56	-

7.0 PROPOSED PLANT NOISE TARGET LIMITS

At this stage no specific design information is available in relation to any proposed externally mounted/venting plant items if these are to be included in the proposed development. To enable specification of plant items and inform M&E design elements, target limits for plant noise to the nearest noise sensitive receptors to the proposed development are provided below based on the measured data at MP1 which is representative of the noise climate in the vicinity of the nearest receptors to the proposed development site. It is recommended that the rating level when assessed in accordance with BS4142:2014+A1:2019 not cause an increase in the typical measured background sound level at the nearest noise sensitive use to the proposed development. Design targets are therefore proposed to achieve 5dBA below the current measured background sound level.

Table 7.1: Proposed Plant Noise Target Limit

Measurement Location	Measured Sound Pressure Level, dB			
	Daytime Period 07:00hrs to 23:00hrs		Night-time Period 23:00hrs to 07:00hrs	
	Typical Existing L _{A90}	Proposed Design Target L _{Aeq,1hour}	Typical Existing L _{A90}	Proposed Target L _{Aeq,15min}
MP1	52	≤47	47	≤42

8.0 CONCLUSIONS

An assessment of sound levels impacting on the existing façades of the proposed hotel development has been carried out in order to determine a façade mitigation strategy to achieve indoor target sound levels.

By implementing the recommended façade mitigation strategy the internal sound levels will achieve the target criteria recommended, however it is recommended that once contractor proposals are available, the sound break-in calculations be re-checked by Red Acoustics to ensure that the target noise criteria will be met.

APPENDIX A: SOUND SURVEY DETAILS

Location

Norfolk House on Norfolk Street, Manchester M2 1HD

Survey Dates

8-10 September 2025

Weather

Dry with light cloud and wind speeds <5m/s.

Personnel Present During Measurements

Simon Webster BEng (Hons) MIOA

Associate Members of the Association of Noise Consultants

Accredited Test Organisation Number 180



Instrumentation

Kit No	Equipment Description	Type Number	Manufacturer	Serial Number	Date of Last Calibration	Calibration Certificate Number
RED 04	Sound Level Meter	XL3	Nti Audio	A3A-01456-F0	13-Jan-25	UK-25-006
	Microphone Capsule	MC230A	Nti Audio	A30133	13-Jan-25	UK-25-006
	Preamplifier	MA230	Nti Audio	1916	13-Jan-25	UK-25-006
RED 08	Sound Level Meter	XL2	Nti Audio	A2A-22062-F0	28/03/2025	UK-25-039
	Preamplifier	MA220	Nti Audio	11383	28/03/2025	UK-25-039
	Microphone Capsule	MC230A	Nti Audio	A24704	28/03/2025	UK-25-039
RED 12	Sound Level Meter	XL2	Nti Audio	A2A-16928-E0	29/11/2023	UK-23-140
	Preamplifier	MA220	Nti Audio	8653	29/11/2023	UK-23-140
	Microphone Capsule	MC230A	Nti Audio	A17736	29/11/2023	UK-23-140
RED 13	Sound Level Meter	Type 140 Type 1	Norsonic	1402994	01-May-24	47691
	Preamplifier	Nor 1209	Norsonic	12548	01-May-24	47690
	Microphone Capsule	Nor 1225	Norsonic	91872	01-May-24	47690
Sound Calibrator		Type 1251 IEC 60942-1997 Class 1	Norsonic	32273	29-Oct-24	49118

Methodology & Calibration

Before and after the measurements, the sound level meters were check calibrated to an accuracy of $\pm 0.3\text{dB}$ using their associated Class 1 Calibrators. No drift in the instruments' sensitivities were noted across any of the survey periods. Copies of all calibration certificates are kept on file by Red Acoustics Ltd and can be supplied if requested.

APPENDIX B: FACADE MITIGATION STRATEGY

Figure B1: First Façade

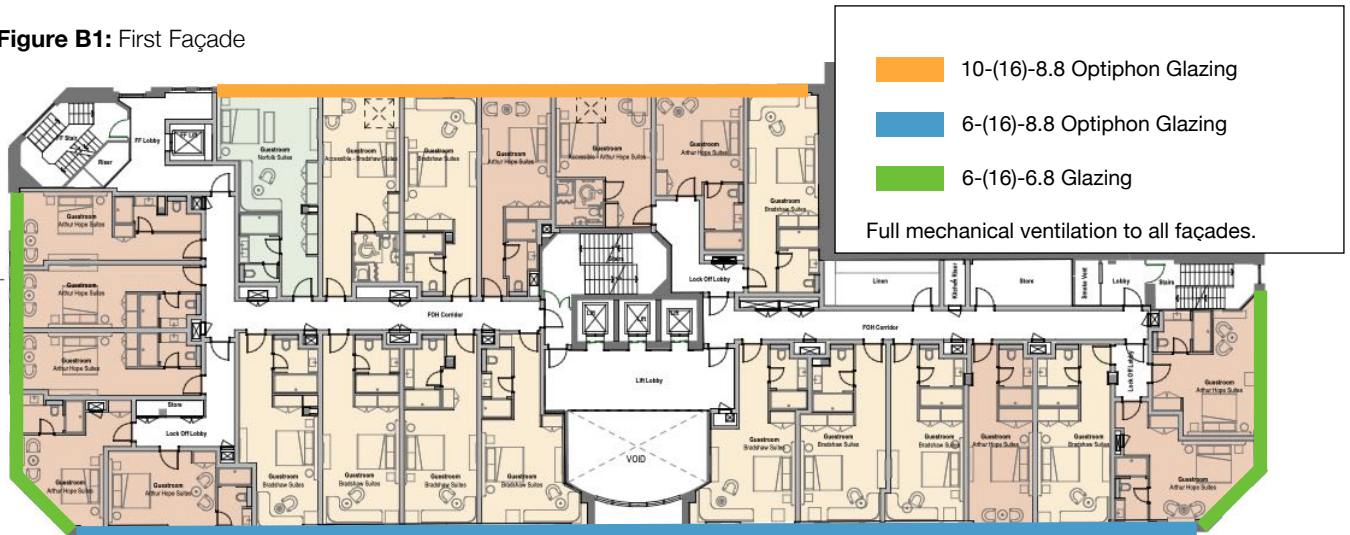


Figure B2: Second to Fourth Façades

