

**PROPOSED RESIDENTIAL DEVELOPMENT - ANCOATS WORKS, MANCHESTER
NOISE IMPACT ASSESSMENT**

On behalf of:

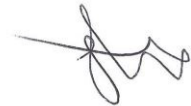
Banidev Limited C/O Capital & Centric and Kamani Property Group

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NOISE IMPACT ASSESSMENT**

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1.0 INTRODUCTION

- 1.1 This report has been prepared by Hepworth Acoustics Ltd on behalf of Banidev Limited, to support a full planning application for a residential-led development to provide 183 no. apartments and 10 no. duplex apartments (Use Class C3) and flexible commercial space (Use Class E/ sui generis) at the site of Ancoats Works on Pollard Street, Manchester.
- 1.2 The site extends to approximately 0.55 hectares and is located approximately 1.5km to the east of Manchester City Centre. It is currently occupied by a range of industrial buildings associated with the former Ancoats Works industrial site, and also includes the former Bank of England pub, both of which are now vacant. The main Ancoats Works building is of three storey height and occupies the north-eastern half of the site, with car parking toward the Carruthers Street boundary. The existing building is a traditional and substantial industrial unit with a double-gabled roof.
- 1.3 The site is bound to the north by the Ashton Canal, to the east by Hope Mill, a grade II* listed 7-storey former mill building which comprises a theatre and a range of other business uses, to the south by Pollard Street and to the west by Carruthers Street. There are dwellings opposite the site on Pollard Street, Carruthers Street and to the northwest beyond the canal on Piercy Street.
- 1.4 There are dwellings opposite the site on Pollard Street, Carruthers Street and to the northwest beyond the canal on Piercy Street.
- 1.5 The demolition and partial demolition of existing buildings is proposed, but the scheme includes retention of the southern area of the former industrial building together with its Pollard Street elevation. Two new build residential blocks are proposed to the north of the retained building, with a central courtyard providing amenity space for use by residents.
- 1.6 In addition, a ground floor commercial unit is proposed on the corner of Pollard Street and Carruthers Street. Therefore, the noise assessment focuses on the measures that are necessary to mitigate the impact of noise (i.e. from road traffic) on the proposed residential element of the development. The need to control noise impact associated of commercial elements proposed on ground floor of the development is also considered, but as the future tenants, and thus details of the types of use, are unknown at this stage, this is addressed by recommending appropriate noise design limits for any associated mechanical services plant.

1.7 The noise assessment has included:

- An inspection of the site and surrounding area;
- Measurement of noise levels during representative periods of the daytime and night/early morning;
- Recommendation of appropriate mitigation measures.

1.8 The various noise units and indices referred to in this report are described in Appendix I. All noise levels mentioned in the text have been rounded to the nearest decibel, as fractions of decibels are imperceptible.

2.0 NOISE SURVEYS

- 2.1 Noise measurements have been carried out at the site in order to establish the prevailing noise climate around the site.
- 2.2 Unattended noise monitoring was carried out for a full 24-hour period between approximately 12:30 on Wednesday 8th September and 12:30 on Thursday 9th September 2021 at two locations. Additional monitoring was carried out at one location on the north-eastern elevation (close to Hope Mill) between Friday 28th January and Wednesday 2nd February 2022.
- 2.3 In response to concerns in respect to noise from the use of Hope Mill Recording Studios a scheme of noise break-out measurements were carried out in conjunction with a band performing in the studio live room on Friday 9th September 2022.
- 2.4 The measurement Locations are summarised below:
1. Pollard Street– To measure noise from road traffic (Pollard Street, Carruthers Street and Merrill Street) and noise from the nearby tram line that runs on Merrill Street.
 2. Carruthers Street - To measure noise from road traffic from vehicles on Carruthers Street.
 3. Hope Mill – To measure noise from Hope Mill Theatre and other tenants of the building. The survey coincided with “Turn on Fest” a music and arts festival which included live performances and club nights.
 4. (a, b, c & d) Measurements were carried out at various locations close to the existing northern elevation of the building close to Hope Mill.
- 2.5 The noise measurements at Location 1 and 4 were taken in ‘facade’ conditions and therefore include any reflections of sound from the building. The measurements at Locations 2 and 3 were taken in free field conditions.
- 2.6 The noise measurements at Locations 1-3 were undertaken in sequential 5 minutes periods using Rion NL-52 ‘Class 1’ sound level meters (s/n: 320643, 242747 & 620870). Acoustic calibration checks of the sound level meters was carried out before and after the noise measurements and there was no significant variation in the calibration noise levels.
- 2.7 The music noise levels measurements at Locations 4a, 4b, 4c and 4d were carried out using a Brüel & Kjær 2250 (s/n: 3011706) ‘Type 1’ sound level meter. Acoustic calibration checks of the sound level

meter were carried out before and after the noise measurements and there was no significant variation in the calibration noise levels. Synchronised measurements during the performance were also taken within the recording studio using a Rion NL-52 'Class 1' sound level meter (s/n: 821105).

- 2.8 Weather conditions during the September survey were dry, warm (~16-20°C), clear skies with periods of light cloud and light westerly breeze (<5 m/s) during the daytime with dry, mild (~16-17°C), cloudy and light westerly breeze (<5 m/s) conditions at night.
- 2.9 Weather conditions during the January survey were generally dry with a period of rain and fairly high winds on Friday 28th January, winds were generally moderate with a westerly breeze (<5 m/s) during the daytime with dry and cold conditions at night (~2-7°C), and a light westerly breeze (<5 m/s).
- 2.10 The Daytime $L_{Aeq,16hr}$ and Night-time $L_{Aeq,8hr}$ noise levels at Locations 1-3 have been determined by the logarithmic average of the measured $L_{Aeq,5min}$ measurements.
- 2.11 The full results of the noise surveys shown in the form of charts in Appendix II. The daytime and night-time exposure levels are summarised in Table 1 below.

Table 1: Calculated Noise Exposure Levels

Location	Daytime $L_{Aeq,16hr}$	Night Time $L_{Aeq,8hr}$
1. Pollard Street	61	57
2. Carruthers Street	62	55
3. Hope Mill	47-55	45-51

- 2.12 The main noise in the area during the surveys was traffic noise from the surrounding roads and passing trams on Merrill Street.
- 2.13 At Location 3 there was very little noise attributable to Hope Mill except for brief periods of bottle bins emptying towards the end of the night (22:45). It was noted that whilst the door is open to allow access to the courtyard faint music was audible.
- 2.14 Peaks of noise (L_{Amax}) during the night time period ranged between dB L_{Amax} 48 and 92 at Location 1, 43 and 83 dB L_{Amax} at Location 2 and 85-44 L_{Amax} at Location 3.

Live Music Measurements

- 2.15 Measurements were carried out during the performance of live music, in the live room of Hope Mill Recording Studio. The studio is located at the south west corner of Hope Mill on the second floor of the building the live room live room itself has openable windows that overlook the courtyard area shared with Anocats Works. The survey was carried out with the band playing rock type music which included drums, bass guitar, electric guitar, and vocals.
- 2.16 Measurements were carried out at Locations 4a, 4b, 4c and 4d at both ground and first floor levels at various distances from the recording studio. The music was performed while all openable windows were open to ensure a worst-case scenario. It was observed that during the performance music levels measured within the live room were consistently over 100 dB $L_{Aeq,1min}$ to put that into perspective the “Lower Exposure Action Value” daily noise dosage without hearing protection as detailed in “The Control of Noise at Work Regulations” would be exceeded in as little as four minutes.
- 2.17 The full results of the noise survey are shown in the form of charts in Appendix II. The measured noise levels are summarised in Table 2 below.

Table 2: Measured Music Noise Level

Location	Measured Noise Level L_{Aeq}
4a. (8m from open windows)	70 dB
4b. (15m from open windows)	66 dB
4c. (20m from open windows)	62 dB
4d. (25m from open windows)	61 dB

- 2.18 It is important to note that the studio’s live room is in constant use, and whilst most performances would be quieter, there would be a reasonable number where the music noise level would be at the level measured during our survey which represent a worst-case scenario.
- 2.19 Nevertheless, any scheme of noise mitigation proposed takes account of these worst-case conditions. The implications of the noise exposure values are set out in Section 6.0.

3.0 ACOUSTIC DESIGN CRITERIA

NPPF

- 3.1 The National Planning Policy Framework (NPPF) 2021 states at paragraph 174 that “Planning policies and decisions should contribute to and enhance the natural and local environment by: ... *e) preventing new and existing development from contributing to, being put at unacceptable risk from, or being adversely affected by, unacceptable levels of ... noise pollution ...*”.
- 3.2 Further, paragraph 185 states that “*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 ...*”.
- 3.3 The NPPF 2021 also provides some general guidance to local authorities on taking noise into account in planning policies and decisions. This includes guidance that local authorities should ‘*aim to avoid noise from giving rise to significant adverse impacts on health and quality of life as a result of new development*’ and that ‘*existing businesses wanting to develop in continuance of their business should not have unreasonable restrictions put on them because of changes in nearby land uses*’.

NPSE:2010

- 3.4 The Noise Policy Statement for England (NPSE) 2010, which is referred to the in NPPF, includes three aims:
1. Avoid significant adverse impacts on health and quality of life from environmental, neighbour and neighbourhood noise within the context of Government policy on sustainable development.
 2. Mitigate and minimise adverse impacts on health and quality of life from environmental, neighbour and neighbourhood noise within the context of Government policy on sustainable development.

3. Where possible, contribute to the improvement of health and quality of life through the effective management and control of environmental, neighbour and neighbourhood noise within the context of Government policy on sustainable development.

- 3.5 Therefore, it is necessary to refer to established national guidance such as the acoustic design goals for residential development that are set out in British Standard 8233: 2014, *Guidance on sound insulation and noise reduction for buildings*, which carries the full weight of an adopted British Standard.
- 3.6 As transportation noise from the roads is the predominant source of noise on the site, the noise mitigation measures will focus on noise control measures to limit the impact of these sources.

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

- 3.7 No specific guidance is given in the NPPF on acoustic criteria, therefore the guidance discussed below has been used for acoustic design purposes which carries the full weight of an adopted British Standard.
- 3.8 Guidance on acceptable noise levels in habitable rooms and private gardens is set out in British Standard 8233: 2014, *'Guidance on sound insulation and noise reduction for buildings'* (referred hereafter as BS 8233). The design criteria recommended in BS 8233 for daytime periods (07:00–23:00) and night-time periods (23:00–07:00) are summarised in Table 3.

Table 3: BS 8233:2014 Recommended Acoustic Design Criteria

Activity	Location	Daytime (07:00 - 23:00)	Night-time (23:00 - 07:00)
Resting	Living room	35 dB $L_{Aeq,16hr}$	-
Dining	Dining room/area	40 dB $L_{Aeq,16hr}$	-
Sleeping (daytime resting)	Bedroom	35 dB $L_{Aeq,16hr}$	30 dB $L_{Aeq,8hr}$

- 3.9 BS 8233 also recognises that regular individual noise events at night can cause sleep disturbance but does not provide specific design criteria. Peaks of noise from individual events such as these are usually described in terms of dB L_{Amax} values. ProPG: Planning & Noise 'Professional Practice Guidance on Planning & Noise' 2017 states that *"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 45dB $L_{Amax,F}$ more than 10 times a night."* The 10th highest L_{Amax} value measured at Location 1 was 78 dB at Location 2 it was 81 dB and at Location the 10th highest value was 76 dB.

- 3.10 For outdoor amenity spaces, such as balconies, gardens and patios, BS 8233 states that it is desirable that the external noise level does not exceed 50 dB $L_{Aeq,T}$ with an upper guideline value of 55 dB $L_{Aeq,T}$ which would be acceptable in noisier environments'. However, BS 8233 acknowledges that these are only guidelines and some flexibility may need to be applied for residential developments in higher noise areas near to major roads. The standard states that *'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. Other locations, such as balconies, roof gardens and terraces, are also important in residential buildings where normal external amenity space might be limited or not available, i.e. in flats, apartment blocks, etc. In these locations, specification of noise limits is not necessarily appropriate. Small balconies may be included for uses such as drying washing or growing pot plants, and noise limits should not be necessary for these uses. However, the general guidance on noise in amenity space is still appropriate for larger balconies, roof gardens and terraces, which might be intended to be used for relaxation. In high-noise areas, consideration should be given to protecting these areas by screening or building design to achieve the lowest practicable levels. Achieving levels of 55 dB $L_{Aeq,T}$ or less might not be possible at the outer edge of these areas but should be achievable in some areas of the space'*
- 3.11 There are a number of balconies proposed but these will not be on elevations facing towards Caruthers Street or Pollard Street. A communal landscaped amenity space for the residents is proposed in the central courtyard area, much of which will be set back and shielded from the surrounding roads by the building itself. We calculate for the inwardly facing balconies and the amenity space that traffic noise will be within 55 dB $L_{Aeq,16hr}$ in accordance with the extract from BS 8233 above. Therefore, our recommendations for noise mitigation focus on the apartments themselves.
- 3.12 The minimum building regulations sound insulation requirements between apartments and the ground floor commercial space is to be achieved with upgrades to be incorporated by ground floor tenants if necessary and commensurate to their operation.
- 3.13 The results of the environmental noise survey have been used as a basis for recommending appropriate noise design limits for any external building services equipment associated with ground floor

commercial uses, in accordance with BS 4142:2014. These acoustic design limits are described in Section 4.0.

3.14 Therefore, for this development we recommend that the following noise criteria be adopted:

- Daytime noise levels within 35 dB $L_{Aeq,16hr}$ inside living rooms and bedrooms, and within 40 dB $L_{Aeq,16hr}$ in dining rooms; and
- Night-time noise levels within 30 dB $L_{Aeq,8hr}$ and generally not exceeding 45 dB L_{Amax} in bedrooms (i.e. typically no more than 10 times per night).

4.0 RECOMMENDED NOISE MITIGATION MEASURES

Sound Insulation of Dwellings

- 4.1 Windows of standard well-fitted thermal double glazing (4mm glass – 4mm glass) have a typical sound reduction performance of 25 dB $R_w + C_{tr}$. Therefore, where external noise levels exceed 60 dB $L_{Aeq,16hr}$ during the daytime and/or 55 dB $L_{Aeq,8hr}$ and/or 70 dB L_{Amax} at night, higher specification glazing will be necessary. (Note $R_w + C_{tr}$ is sometimes notated as R_{tra}). Therefore, sound insulation measures will be necessary for the windows of the proposed apartments and our recommendations are made below.
- 4.2 We understand that mechanical ventilation in the form of an MVHR system is proposed for all living rooms and bedrooms of all dwellings on the proposed development. This measure will provide future residents with the option of ventilating the rooms without opening a window, whilst still achieving the adopted internal noise criteria. Thus, the recommendations made below are on the assumption that windows will be closed for ventilation, except for periods of rapid/purge ventilation.
- 4.3 For the avoidance of doubt the below recommendations are for **all** floors of the development.
- 4.4 For all outwardly facing living rooms fronting onto and with a view of (i.e those not behind the brick frontage) Pollard Street and Carruthers Street elevations as marked in **magenta** on Figure 2, we recommend that windows of habitable rooms are fitted with double glazing that has a sound reduction performance of at least 30 $R_w + C_{tr}$. Typically this would be achieved with double glazing specifications of:
- 6.4mm Solaglas 'Stadip Silence' laminated glass - nominal (8-20mm) cavity - 4mm glass; or
 - 8mm glass - nominal (8-20mm) cavity - 4mm glass.
- 4.5 For all outwardly facing bedrooms fronting onto and with a view of Pollard Street and Carruthers Street elevations (i.e those not behind the brick frontage) as marked in **yellow** on Figure 2 we recommend the following high specification of glazing (minimum 35 dB $R_w + C_{tr}$):
- 8.4mm Solaglas 'Stadip Silence' laminated glass - nominal (8-20mm) cavity – 8mm glass; or
 - 10mm glass - nominal (8-20mm) cavity - 4mm glass.

- 4.6 To control noise from the commercial units associated with Hope Mill, including Hope Mill Recording Studios and White Bear Studios, we recommended that bedrooms and living rooms with a view of Hope Mill marked in **Green** on Figure 2, are fitted with double glazing that has a sound reduction performance of at least $37 R_w + C_{tr}$. Typically this would be achieved with double glazing specifications of:
- 8.8mm Solaglas 'Stadip Silence' laminated glass - nominal (8-20mm) cavity – 10.8mm glass
- 4.7 Bedrooms and living rooms marked in **yellow** on Figure 2, are fitted with double glazing that has a sound reduction performance of at least $35 R_w + C_{tr}$. Typically this would be achieved with double glazing specifications of:
- 8.8mm Solaglas 'Stadip Silence' laminated glass - nominal (8-20mm) cavity – 8.4mm glass
- 4.8 Calculation sheets are presented in Appendix III.
- 4.9 Windows can be openable but must have compressible seals for effective sealing when closed.
- 4.10 It should be noted that neither the existing single glazed, or existing thin double-glazed windows in the part of the building to be retained will provide adequate sound reduction to meet the criteria detailed in Section 3.0 and will need to be replaced in line with the recommendations above.
- 4.11 Depending on the proposed usage of the proposed ground floor commercial unit, dwellings in close proximity may require an enhanced scheme of sound insulation. However, as the usage is not currently known it would not be appropriate to make detailed recommendations.
- 4.12 The implementation of an adequate scheme of noise mitigation measures these dwellings can be ensured by the use of an appropriately worded planning condition. Nevertheless, it is worth noting that dwellings facing towards Pollard Street and Carruthers Street would already benefit from an enhanced level of sound insulation due to their proximity to the road traffic and tram noise.
- 4.13 For all other elevations, including the and inwardly facing apartments and those apartments behind the brick frontage on Pollard Street, windows of standard thermal double glazing with a minimum specification of $25 \text{ dB } R_w + C_{tr}$ (4 mm glass - 4 mm glass) will be suitable for these in order to control internal ambient noise levels to within the BS 8233 criteria.

Noise Design Limits for Mechanical Services Plant

- 4.14 Acoustic requirements for fenestration of the ground floor commercial unit will need to be commensurate with the types of uses and will be a matter for detailed design once likely tenants are known.
- 4.15 At this stage, guidance can be given on control of noise from any mechanical services equipment (i.e. external equipment or grilles/vents from plant rooms, etc.). Taking into account as Manchester City Council's 'Planning & Noise Technical Guidance' dated December 2015 which states:
- '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 (L_{Aeq}) below the typical background (L_{A90}) level at the nearest noise sensitive location'*
- 4.16 Along with, the L_{A90} results of the noise survey, and requirements of BS4142:2014 'Methods for rating and assessing industrial and commercial sound' recommendations for suitable cumulative plant noise limits for this development have been made.
- 4.17 The mode (most common) background noise level measured on the Carruthers Street elevation during the daytime (46 dB L_{A90}) and night time (36 dB L_{A90}) have been adopted as the typical background noise level. On this basis our recommendations for control of plant noise from the proposed ground floor commercial operations are set out in Table 4.
- 4.18 The recommended limits below must take account of any tonal, impulsive or intermittent characteristics of the plant noise in accordance with the guidance set out in BS4142:2014.

Table 4: Recommended Cumulative Plant Noise Limits Outside Apartments (Rated to BS4142:2014)

Daytime 07:00 – 23:00	Night 23:00 - 07:00
41 dB $L_{Aeq,1hr}$	31 dB $L_{Aeq,15 mins}$

5.0 SOUND INSULATION IMPROVEMENTS TO HOPE MILL RECORDING STUDIO

- 5.1 We understand that following discussions between the developer and the operator of Hope Mill recording studio the installation of secondary glazing has been proposed to improve the sound insulation of the recording studio, and thus allow for windows of proposed apartments to be openable. Therefore, we have calculated the noise level at the nearest proposed dwelling with the implementation of secondary glazing to the studio windows.
- 5.2 Of course, it is important to note that the performance of the glazing will depend on the windows remaining closed during the use of the recording studios.
- 5.3 Based on music noise levels measured in the recording studio on Friday 9th September 2022 where measured noise levels in the studio during use were over 100 dB L_{Aeq} . We have adopted suitable music noise levels for the purposes of calculations. The adopted values are summarised in Table 5 below.

Table 5: Adopted Music Levels in L_{eq} (dB)

Location	Octave Band Centre Frequency (Hz)							A
	63	125	250	500	1k	2k	4k	
Adopted Music Level	100	103	104	98	92	90	90	101

- 5.4 Using the adopted music levels in Table 5 alongside details of the external building envelope, we have calculated the likely resulting egress of music to the nearby proposed apartments.
- 5.5 The substantial masonry external wall will provide a high level of sound insulation and so noise egress will be dictated by the glazed areas in the façade. Our calculations have taken into account the areas and sound reduction indices for the existing single glazed windows with a suitable secondary glazing system.
- 5.6 We recommend secondary glazing consisting of a 10.8mm thick acoustic laminated glass pane in a separate internal frame behind each window within the live room, the maximum possible air gap of at least 100mm should be formed between the existing outer glazing and new inner secondary glazing frame. The secondary glazing should be fully sealed.
- 5.7 Our recommendation of secondary glazing could be removed at a later date if needs be, and all areas made good and would not materially alter the fabric of the building.

- 5.8 We have calculated the likely noise break-out considering the building construction including the implementation of secondary glazing in the two recording studios, the distance to the nearest proposal dwellings, (at a distance of at least 21m) and with apartment windows closed.
- 5.9 We have also provided details of the noise level without the secondary glazing being installed at Hope Mill & White Bear Recording Studios. As shown in Tables 6 & 7 below.

Table 6: Calculated Noise in Apartments without Secondary Glazing (dB)

Description	Octave Band Centre Frequency (Hz)							A
	63	125	250	500	1k	2k	4k	
Adopted music level within nearest dwelling with windows closed (L_{Aeq})	18	30	31	22	18	18	8	26
Lowest background noise level measured (L_{A90})	45	38	37	36	36	28	16	44
Comparison	-27	-8	-6	-14	-18	-20	-8	-18

Table 7: Calculated Noise in Apartments with Secondary Glazing (dB)

Description	Octave Band Centre Frequency (Hz)							A
	63	125	250	500	1k	2k	4k	
Adopted music level within nearest dwelling with windows closed (L_{Aeq})	8	20	20	8	-3	-5	-6	24
Lowest background noise level measured (L_{A90})	45	38	37	36	36	28	16	44
Comparison	>-20	-18	-17	>-20	>-20	>-20	>-20	-20

- 5.10 Clearly the above music levels within the apartments with windows closed are very low and well below that of the background noise level, but it is important to note the actual internal noise level will be affected by all sources of noise in the area and will naturally be higher than the above.
- 5.11 It is generally accepted that a partially open window will reduce the external noise level by 10-15 dB(A). Therefore, we have included a modest 10 dB reduction of external noise level with windows partially open and doesn't not take into account the performance of the high specification glazing proposed for habitable rooms with a view to the recording studios. As shown in Tables 8 & 9 below.

Table 8: Calculated Noise Level in Apartments without Secondary Glazing (dB)

Description	Octave Band Centre Frequency (Hz)							A
	63	125	250	500	1k	2k	4k	
Adopted music level within nearest dwelling with partially open window (L_{Aeq})	50	47	43	30	20	23	17	37
Lowest background noise level measured (L_{A90})	45	38	37	36	36	28	16	44
Comparison	-5	+9	+14	+6	-16	-5	+1	-7

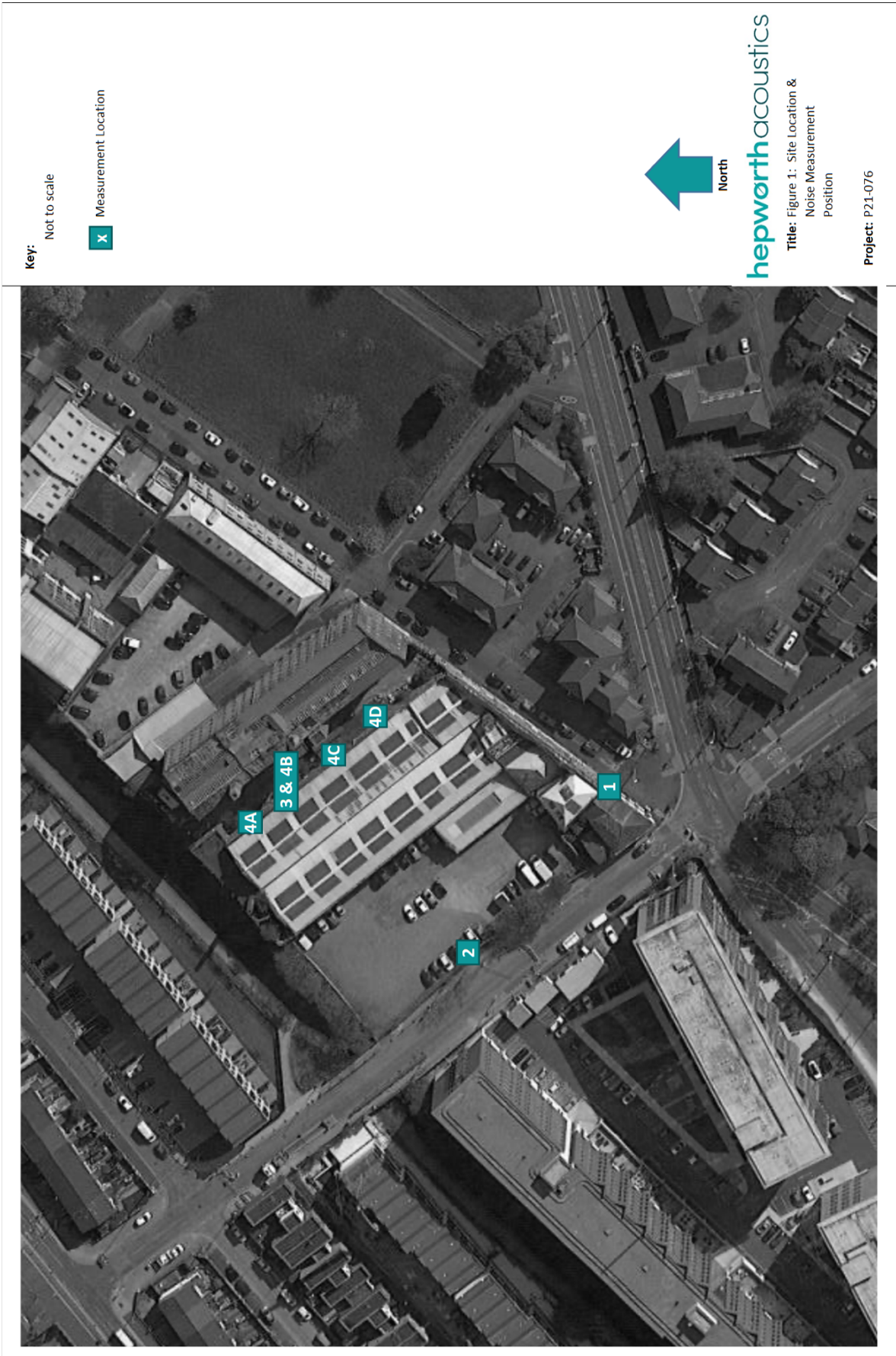
Table 9: Calculated Noise in Apartments with Secondary Glazing (dB)

Description	Octave Band Centre Frequency (Hz)							A
	63	125	250	500	1k	2k	4k	
Adopted music level within nearest dwelling with partially open window (L_{Aeq})	40	37	32	16	-1	0	3	26
Lowest background noise level measured (L_{A90})	45	38	37	36	36	28	16	44
Comparison	-5	-1	-5	-20	-37	-28	-13	-18

- 5.12 Table 9 shows that the calculated music noise level inside the nearest dwellings (with secondary glazing installed in the recording studio), in terms of octave band L_{eq} , will not exceed the lowest background noise levels measured during the recording studios normal opening hours of 10:00 - 23:00 seven days a week in terms of octave band L_{90} .
- 5.13 The calculations above demonstrate music noise break-out will not result in any unacceptable noise impact.
- 5.14 The calculated noise level also achieves entertainment noise guidance set out within Manchester City Council 'Planning & Noise Technical Guidance', which relates to control of entertainment noise within dwellings themselves. The criteria for the control of entertainment noise within habitable rooms of dwellings are 47 dB and 41 dB L_{eq} in the 63 Hz and 125 Hz octave bands respectively.

6.0 SUMMARY

- 6.1 The impact of ambient noise has been assessed for the residential element of the proposed redevelopment of the Ancoats Works in Manchester.
- 6.2 A noise monitoring survey has been carried out over a 24-hour period, outside two elevations of the building in order to establish the prevailing noise climate of the area.
- 6.3 Appropriate acoustic design criteria have been adopted from relevant British Standards that will ensure the protection of residential amenity.
- 6.4 From the survey results, the existing windows will not provide adequate sound insulation and therefore, to achieve the design criteria, it will be necessary to implement a scheme of sound insulation measures. Appropriate recommendations for sound insulated windows and acoustic vents have been made in the report.
- 6.5 Suitable noise limits have also been provided for control of noise from any mechanical services equipment associated with the proposed commercial space.
- 6.6 The implementation of an adequate scheme of noise mitigation measures for the development can be ensured by the use of an appropriately worded planning condition.





Appendix I: Noise Units & Indices

Sound and the decibel

A sound wave is a small fluctuation of atmospheric pressure. The human ear responds to these variations in pressure, producing the sensation of hearing. The ear can detect a very wide range of pressure variations. In order to cope with this wide range of pressure variations, a logarithmic scale is used to convert the values into manageable numbers. Although it might seem unusual to use a logarithmic scale to measure a physical phenomenon, it has been found that human hearing also responds to sound in an approximately logarithmic fashion. The dB (decibel) is the logarithmic unit used to describe sound (or noise) levels. The usual range of sound pressure levels is from 0 dB (threshold of hearing) to 120dB (threshold of pain).

Due to the logarithmic nature of decibels, when two noises of the same level are combined together, the total noise level is (under normal circumstances) 3 dB(A) higher than each of the individual noise levels e.g. 60 dB(A) plus 60 dB(A) = 63 dB(A). In terms of perceived 'loudness', a 3 dB(A) variation in noise level is a relatively small (but nevertheless just noticeable) change. An increase in noise level of 10 dB(A) generally corresponds to a doubling of perceived loudness. Likewise, a reduction in noise level of 10 dB(A) generally corresponds to a halving of perceived loudness.

The ear is not equally sensitive to sound at all frequencies. It is less sensitive to sound at low and very high frequencies, compared with the frequencies in between. Therefore, when measuring a sound made up of different frequencies, it is often useful to 'weight' each frequency appropriately, so that the measurement correlates better with what a person would actually hear. This is usually achieved by using an electronic filter called the 'A' weighting, which is built into sound level meters. Noise levels measured using the 'A' weighting are denoted dB(A) or dBA.

Frequency and Hertz (Hz)

As well as the loudness of a sound, the frequency content of a sound is also very important. Frequency is a measure of the rate of fluctuation of a sound wave. The unit used is cycles per second, or hertz (Hz). Sometimes large frequency values are written as kiloHertz (kHz), where 1 kHz = 1000 Hz.

Young people with normal hearing can hear frequencies in the range 20 Hz to 20 kHz. However, the upper frequency limit gradually reduces as a person gets older.

Glossary of Terms

When a noise level is constant and does not fluctuate, it can be described adequately by measuring the dB(A) level. However, when the noise level varies with time, the measured dB(A) level will vary as well. In this case it is therefore not possible to represent the noise climate with a simple dB(A) value. In order to describe noise where the level is continuously varying, a number of other indices can be used. The indices used in this report are described below.

$L_{Aeq,T}$ This is the A-weighted 'equivalent continuous noise level' which is an average of the total sound energy measured over a specified time period. In other words, L_{Aeq} is the level of a continuous noise which has the same total (A-weighted) energy as the real fluctuating noise, measured over the same time period. It is increasingly being used as the preferred parameter for all forms of environmental noise.

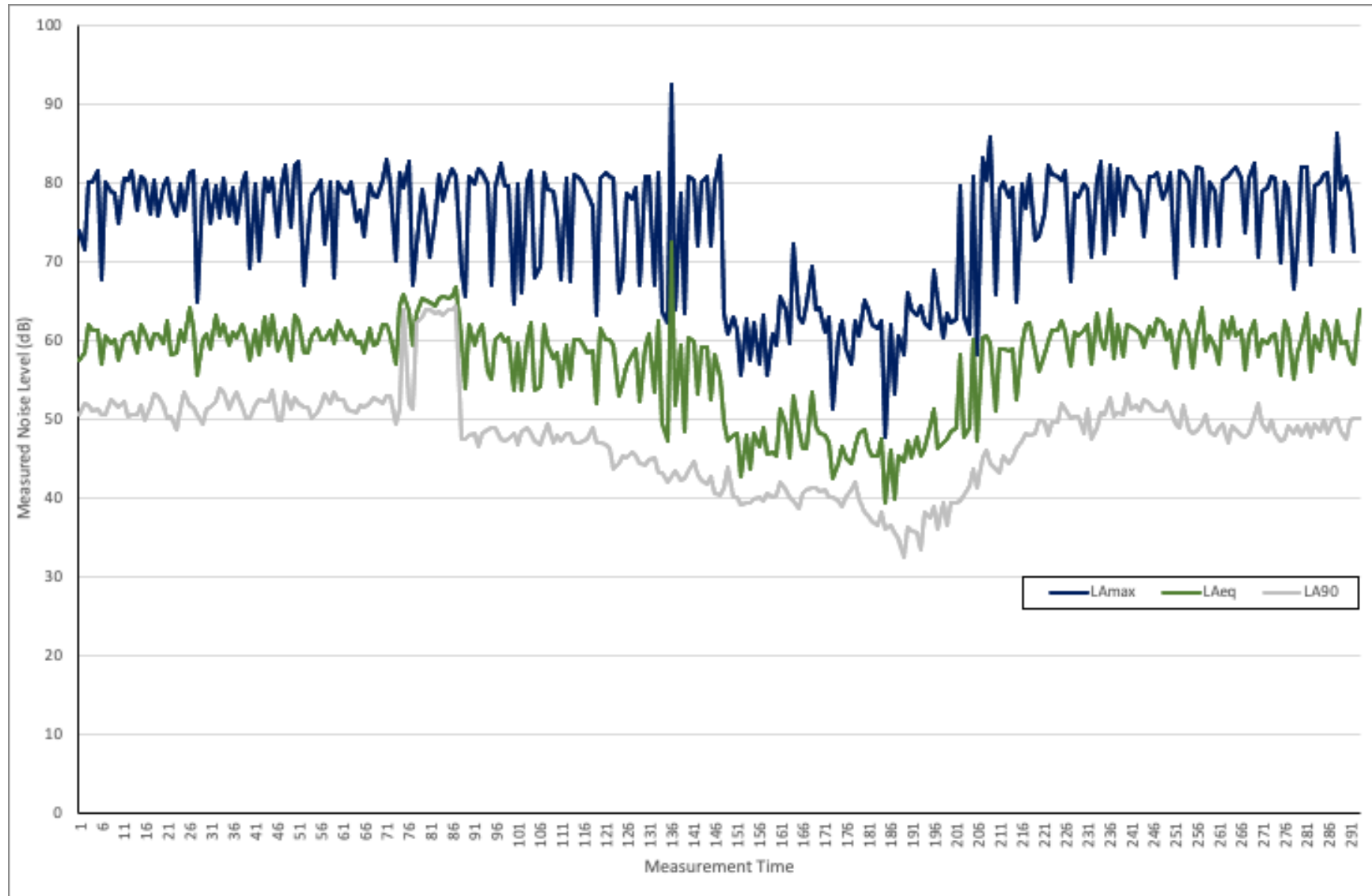
L_{Amax} This is the maximum A-weighted noise level that was recorded during the monitoring period.

$L_{A90,T}$ This is the A-weighted noise level exceeded for 90% of the time period. L_{A90} is used as a measure of background noise.

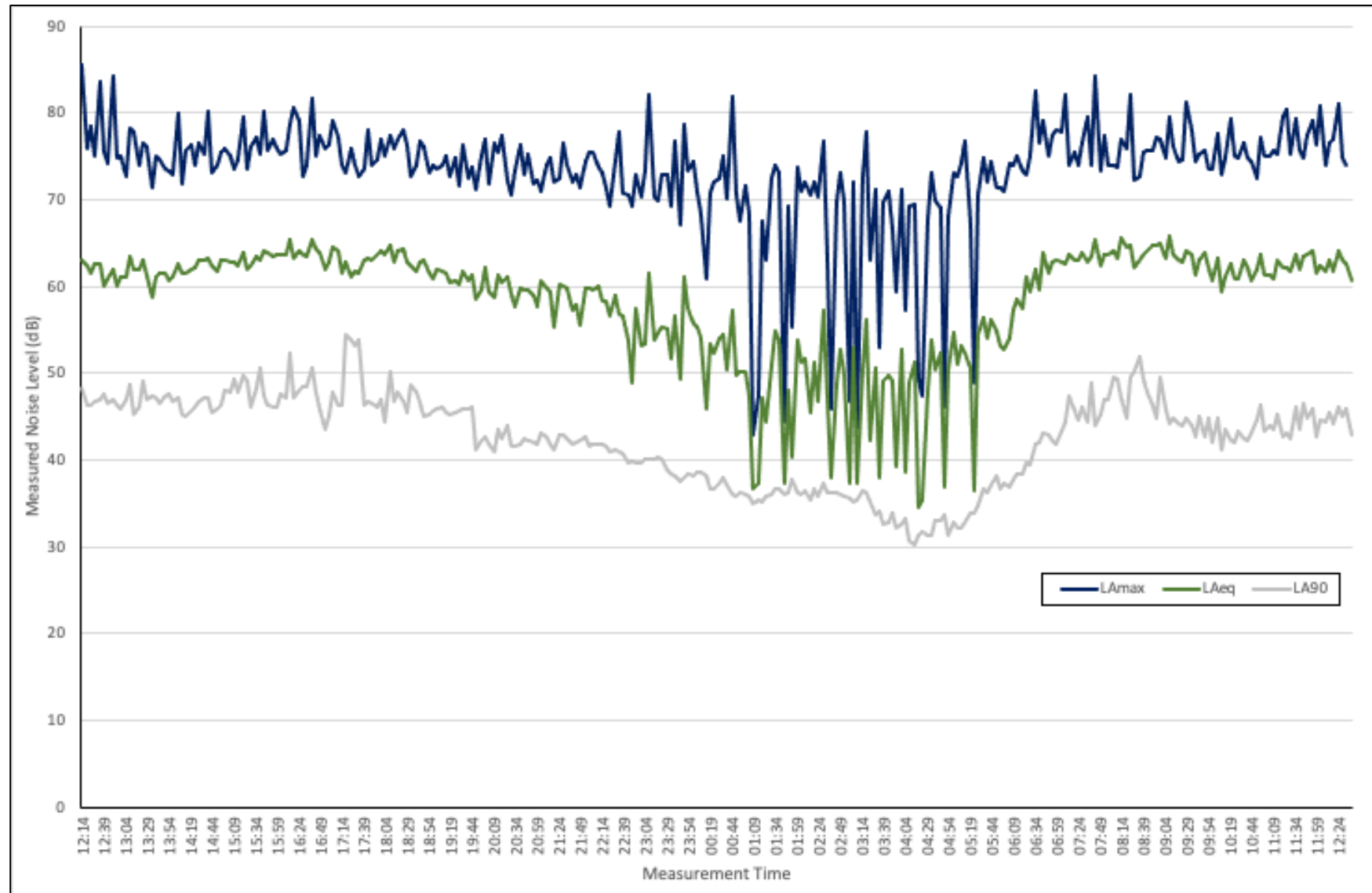
Appendix II: Noise Survey Results

Date(s):	Wednesday 8 th September - Thursday 9 th September 2021
	Friday 28 th January – Wednesday 2 nd February 2022
	Friday 9 th September 2022
Equipment:	3 Rion NL-52 'Class 1' sound level meters (serial nos. 00242747, 320643 and 620870) calibrator and environmental kit, pole and windshield
	Brüel & Kjær 2250 'Type 1' sound level meter (serial no. 3011706) and tripod
Weather:	Daytime dry, warm (~16-20°C), clear skies with periods of light cloud and light westerly breeze (<5 m/s).
	Night-time – Dry, mild (~16-17°C), cloudy and light westerly breeze (<5 m/s)
All levels in dB(A)	

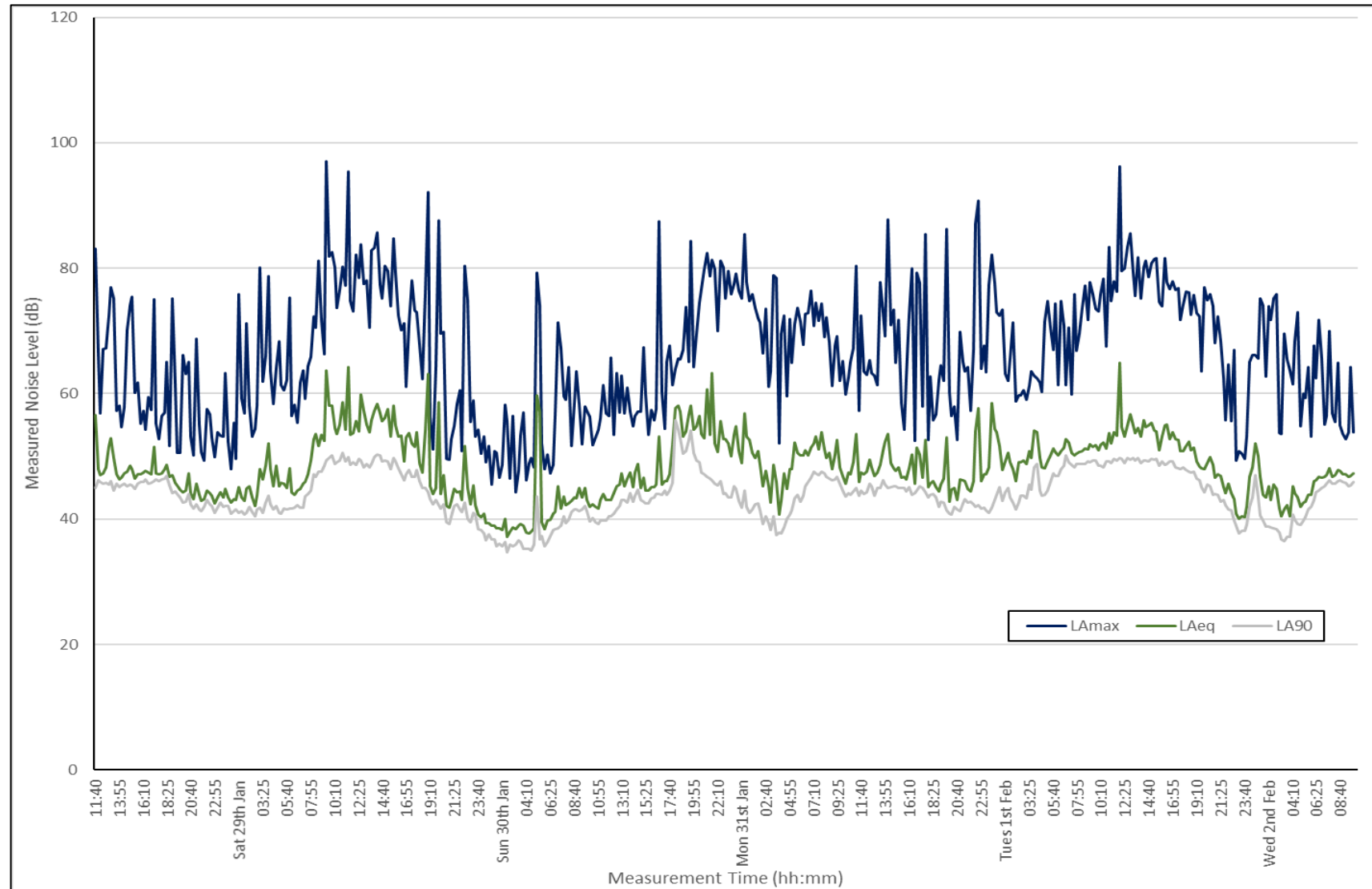
Location 1: Pollard Street



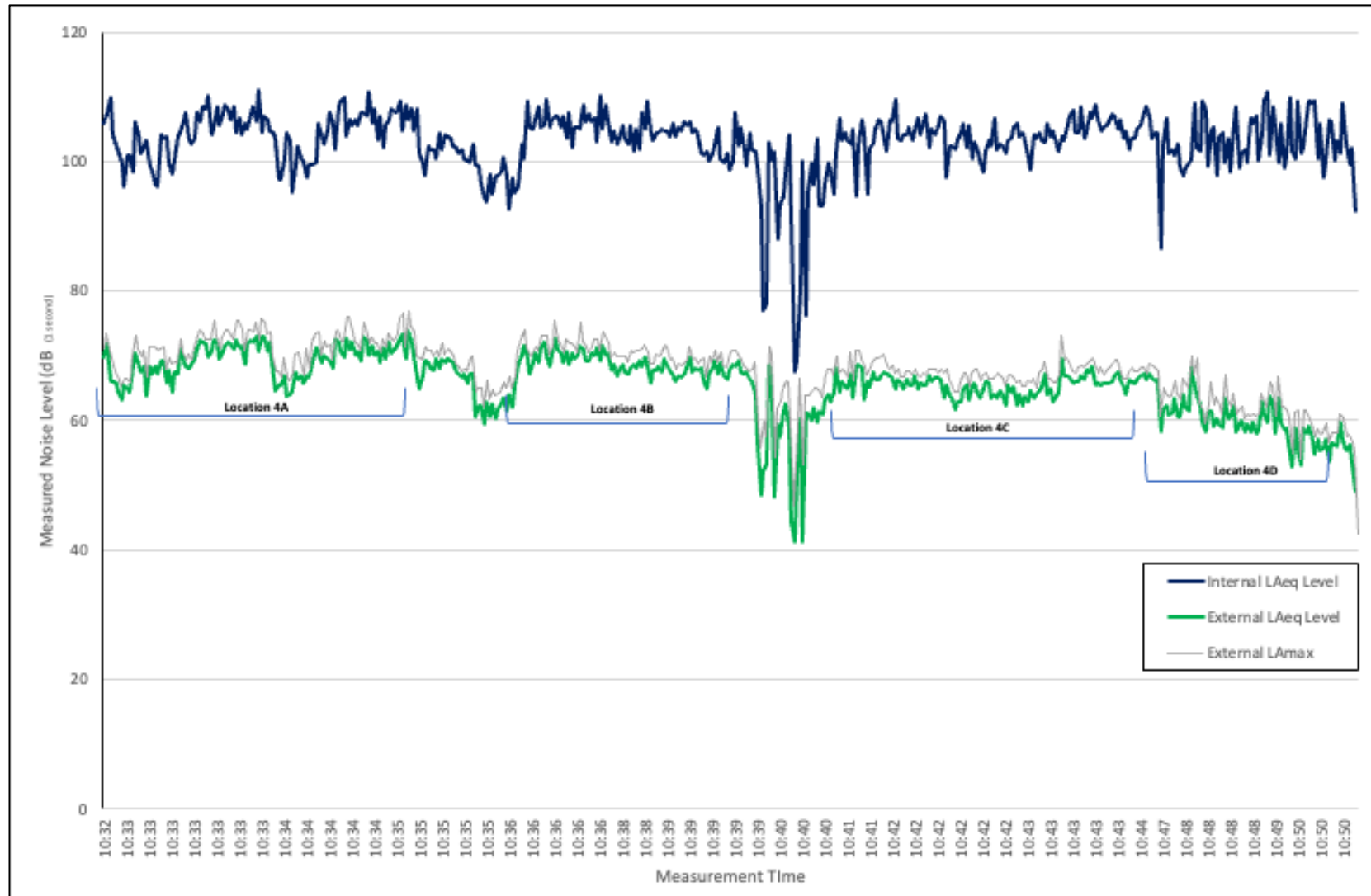
Location 2: Carruthers Street



Location 3: Hope Mill



Location 4: Live Music



Appendix II: Internal Noise Level Calculations

BS8233 Calculation of Noise Break-in

The expected precision of this calculation is ± 2 dB

Site: Ancoats Works

Period Day

Room: **Living Room**

NOTES Window partially open in recording studio

Term	Term Description	Value
S	Façade area (incl. window) (m ²)	3.0
S _{wi}	Area of the windows (m ²)	1.5
S _{ew}	Area of the external wall (m ²)	1.5
x	Room Dimension x (m)	3.0
y	Room Dimension y (m)	3.0
z	Room Dimension z (m)	2.5

		Octave Band Centre Frequency						
		125	250	500	1000	2000		
RT	Receiving Room RT	0.6	0.5	0.4	0.4	0.4	0.4	0.4
L _{eq}	Outside Room	67	70	71	65	59	57	57
D _{o,e}	Insulation of the Acoustic Vents ignore Trickle Vent	130	130	130	130	130	130	130
R _{wi}	SRI of the window 10:12:8.8 mm Stadip Silence	23	29	29	38	43	49	56
R _{ew}	SRI of the external wall BS8233 Example- Brick and block external wall	36	40	44	45	51	56	60
=10 log (b + c + d)		-26	-32	-32	-40	-45	-51	-58
=10 x log (S*RT/0.161*V)		-3	-4	-5	-5	-5	-5	-5
L _{eq}	Inside Room (A + F + G + 3dB façade correction)	41	38	37	22	11	3	-2
A-weighting		-26	-16	-9	-3	0	1	-1
L _{Aeq}	Inside Room	15	22	28	19	11	4	-3