Hanover Building (Retail Units)
Manchester

Noise Impact Assessment Report

28411/NIA1

14 December 2020

For:

Noma (GP) Limited
c/o Hermes Real Estate Investment Management Limited
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Hann Tucker Associates

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Document Control

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-	04/12/2020	Draft Issue		
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This report has been prepared by Hann Tucker Associates Limited (HTA) with all reasonable skill, care and diligence in accordance with generally accepted acoustic consultancy principles and the purposes and terms agreed between HTA and our Client. Any information provided by third parties and referred to herein may not have been checked or verified by HTA unless expressly stated otherwise. This document contains confidential and commercially sensitive information and shall not be disclosed to third parties. Any third party relies upon this document at their own risk.

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Appendix A – Acoustic Terminology

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1.0 Introduction

It is proposed to refurbish the ground and basement floor areas of the Hanover Building on Hanover Street, Manchester, to provide 4No speculative retail units across both floors. Hann Tucker Associates have therefore been commissioned to assess the potential noise impact the commercial units may have on structurally connected receptors and external receptors.

This report presents the noise impact assessment and our advice on further mitigation measures, where necessary.

2.0 Objectives

To establish the prevailing external noise climate in the vicinity of the site and nearby receptors.

To visit site to measure the prevailing airborne sound insulation performance of the floor separating the proposed commercial units and offices in accordance with BS EN ISO 140-4:1998 *'Acoustics – Measurement of airborne sound insulation in buildings and of building elements'*.

To review the requirements of the Local Authority pertaining to entertainment noise control and subsequently set design criteria for the proposed commercial units.

Based on the above, to assess the potential noise impact of the commercial units on the offices above and external receptors, providing advice on mitigation measures where necessary.

To set plant noise emission limits in line with Local Authority guidance.

3.0 Acoustic Terminology

Please refer to Appendix A for an explanation of acoustic terminology used herein.

4.0 Impact of COVID-19

At the time of writing, strict COVID restrictions were in place across England which are likely to result in atypical noise levels at the proposed development site. However, the surrounding area has been subject to much development in recent years and therefore benefits from several noise surveys undertaken as part of planning applications within the locality.

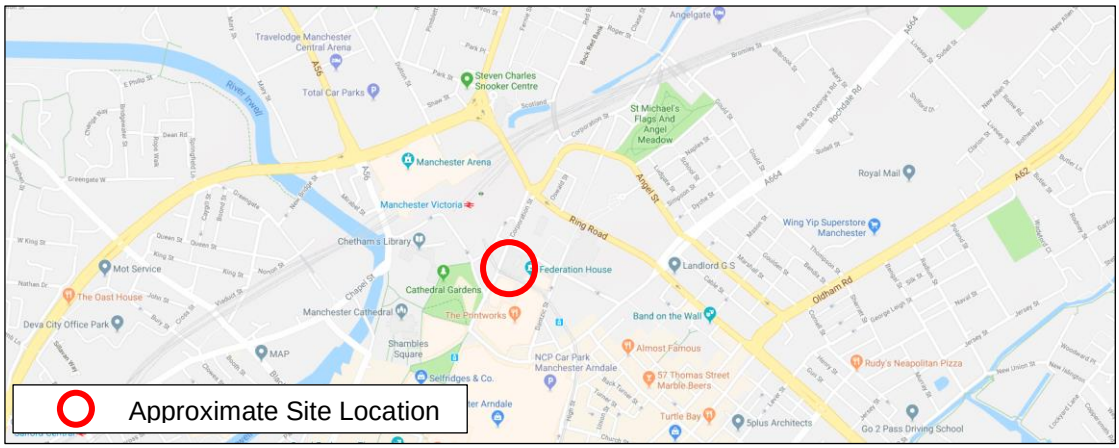
A number of these surveys have been undertaken by Hann Tucker Associates as part of planning applications relating to neighbouring buildings, with the detailed environmental noise survey data approved by Manchester City Council during the planning process and therefore available as public information via Planning Portal.

Our report shall therefore reference surveys previously undertaken within the locality as a means of establishing the external noise climate, where appropriate.

5.0 Site Description

5.1 Location

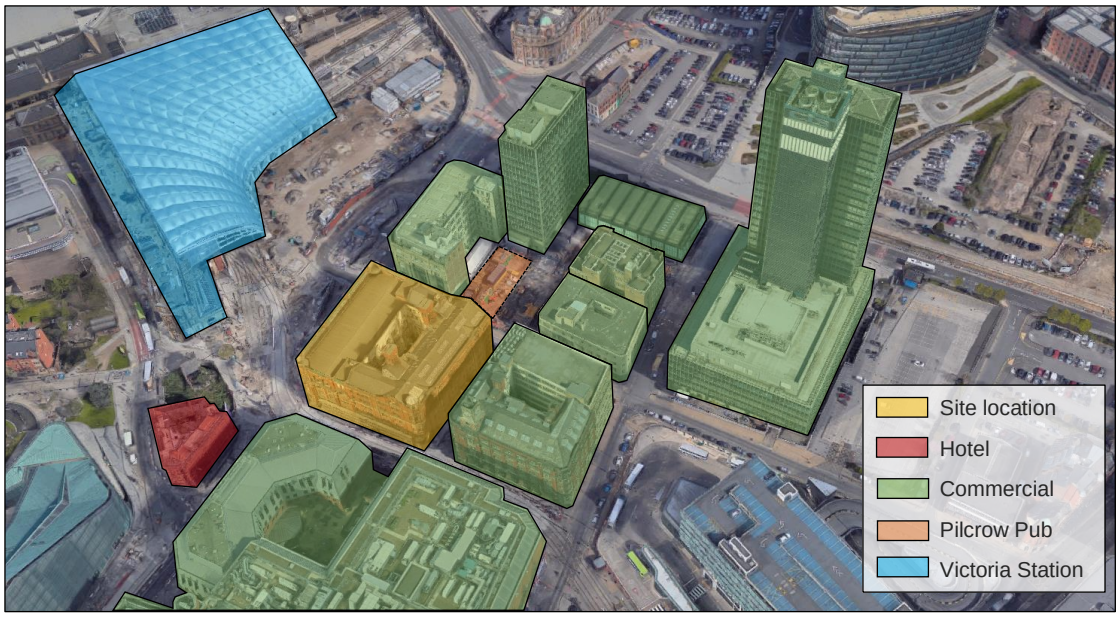
The proposed development is located on Hanover Street in Manchester city centre, and falls under the jurisdiction of Manchester City Council. See site location below.



Site Location (© maps.google.co.uk)

5.2 Description

Hanover Building is a Grade II office building forged from two original buildings and comprises office space from 1st floor upwards, with speculative retail space at ground and basement level. The building is bound by Hanover Street, Federation Street, Balloon Street and Corporation St. The office space within the building is currently occupied, however the ground floor and basement of the building is vacant (except for access to first floor offices via lobby). The surrounding area is predominantly commercial (offices) and the nearest residential receptor is a hotel approximately 30m away. See site plan below.



Site Plan (© maps.google.co.uk)

6.0 Project Proposals

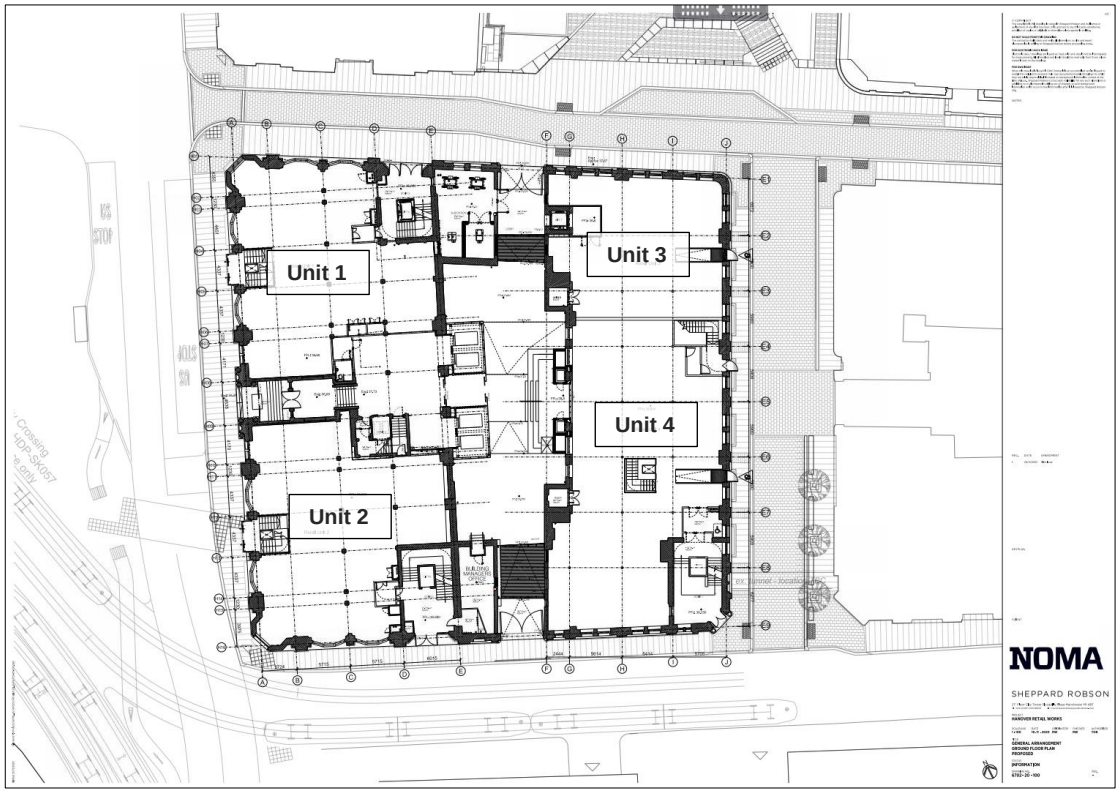
6.1 Drawings & Information

All acoustic analyses reported herein, have been based on the following layout drawings.

Title	Date	Revision
General Arrangement Basement Floor Plan Proposed	20 November 2020	0
General Arrangement Lower Ground Floor Plan Proposed	20 November 2020	0
General Arrangement Ground Floor Plan Proposed	20 November 2020	0

6.2 Site Layout

The proposed development comprises four (4No.) retail units with associated access directly from the street (i.e. no shared lobbies) See proposed ground floor plan below for an overview.



Proposed Site Plan (c/o Sheppard Robson - Architects)

6.3 Site Context

The commercial units have existing planning permission for retail use, including retail, restaurant and financial and professional services. The proposed application seeks to extend the range of permissible uses to include bar and office use.

6.4 Operating Hours

At this stage the likely operating hours for individual units are not fixed, however, general operational hours are anticipated to be between 07:00 – 01:00 hours Monday to Saturday and 09:00 – 14:00 on Sundays.

Regardless of the above, for the purposes of our assessment, we have based all noise emission limits on the quietest 15 minute period measured over daytime/night-time periods during a 5 day survey which encompassed a weekend. Our assessment therefore essentially considers the potential for the site to be operational 24 hours per day 7 days a week (purely as a pessimistic assessment) and should provide flexibility for the above operating hours to change as required.

6.5 Site Usage

The proposed development will comprise 4No retail units. The uses specifically considered in this report are as follows:

- Shops/retail;
- Professional services;
- Food and drink (restaurant/café);
- Drinking establishments (bar); and
- Gym.

Notwithstanding the above, there are confirmed tenants for 2No of the retail units as below.

Unit	Floor Area	Nature	Use
Unit 1	816 m^2	Flexible use	Any of the above uses
Unit 2	839 m^2	Flexible use	Any of the above uses
Unit 3	253 m^2	Tenant confirmed	Restaurant
Unit 4	1,163 m^2	Tenant confirmed	Office

For each of the units with a confirmed tenant, this report shall also comment on the suitability for all of the above use classes within each unit to allow flexibility at a later time.

7.0 Acoustic Standards & Guidelines

7.1 Guidance on the Impact of COVID-19 (ANC/IOA)

Joint guidance on the impact of COVID-19 on the practicality and reliability of baseline sound level surveying and the provision of sound & noise impact assessments was published on 23 March 2020 as a joint venture between the Institute of Acoustics (IOA) and the Association of Noise Consultants (ANC).

The document highlights that as the responsible bodies, the ANC and IOA are keen to ensure that it is 'business as usual', as far as is practicably possible and responsible. The document sets out a number of methods in which a suitable assessment could still be carried out.

The document states that rather than a baseline noise survey *"other approaches can be taken to establish an appropriate robust estimate of baseline conditions, such as using existing data (for example, from previous local surveys and noise maps) or undertaking baseline sound predictions. These approaches can be supplemented by additional limited on-site sound level measurements, as necessary. Each of the possible options will need to be reviewed on a case-by-case basis, in order to identify the most appropriate approach, assessing the level of uncertainty and including this information in the reporting. Most importantly at this time, before progressing with surveying, there should be discussion of the intended approach with the relevant regulating authority".*

Based on the above, the baseline acoustic conditions of the site have been established through data collected as part of previous surveys undertaken as part of the planning applications on neighbouring developments (also undertaken by Hann Tucker Associates).

7.2 Local Planning Requirements

Manchester City Council requirements are outlined in Section 3.0 of Manchester City Council's Planning & Noise Technical Guidance document (December 2015).

7.2.1 Noise Generated by Events and/or Music Noise

Section 3.6.1.2 offers the following guidance regarding music noise:

> *"Noise from entertainment venues e.g. noise from recorded music, live bands, or karaoke, can be particularly annoying for local residents and businesses if it is not adequately contained within the venue.*
>
> *When considering the potential impact of a proposal for an entertainment venue consultants should consider the overall noise level (L_{eq}) and the 63 Hz and 125 Hz octave band noise levels (L_{eq})."*

The document then proposes the following assessment criteria for structurally connected uses, although this only makes reference to the impact on habitable rooms (not offices):

"A criterion that would achieve a condition of 'inaudible' / 'virtually inaudible' which is applicable for new residential developments that are structurally connected to entertainment venues (or vice versa) would be:

Music noise levels in the 63Hz and 125Hz octave centre frequency bands (L_{eq}) should be controlled so as not to exceed (in habitable rooms) 47dB and 41dB (L_{eq}) respectively."

In relation to noise egress MCC state that planning applications should *"demonstrate that music noise from the proposal will not be 'audible' in nearby residential properties, assuming that the residential properties in question have their windows open. The criterion here is:*

"Entertainment noise (L_{Aeq}) should be controlled to 10dB below the background noise level (L_{A90}) without the entertainment noise present, in each octave band at the nearest noise sensitive location."

7.2.2 Fixed Plant Noise Emissions

Section 3.6.1.5.1 outlines that the noise assessment for fixed plant should be based on BS 4142:2014 and the assessment must demonstrate that

"Externally mounted ancillary plant, equipment and servicing shall be selected and/or acoustically treated in accordance with a scheme so as to achieve a rating level of 5dB (L_{Aeq}) below the typical background (L_{A90}) level at the nearest noise sensitive location."

7.3 National Planning Policy Framework

The following paragraphs are from the NPPF (revised February 2019):

180. 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;

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

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

Paragraph 180 also references the Noise Policy Statement for England. This document does not refer to specific noise levels but instead sets out three aims:

- 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.
- 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.
- 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."

7.4 BS 4142:2014

BS 4142: 2014 describes methods for rating and assessing the effects of outdoor sound levels, of an industrial and/or a commercial nature, "*on people who might be inside or outside a dwelling or premises used for residential purposes upon which sound is incident*".

The impact of a specific sound is indicated by subtracting the existing background noise level from the rating level (i.e. noise level from the proposed items of plant/machinery/etc plus any acoustic feature corrections). The standard states that:

- *"a difference of around +10dB or more is likely to be an indication of a significant adverse impact";*
- *"a difference of around +5dB is of marginal significance is likely to be an indication of an 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".*

The noise from the new development is expressed in terms of a rating level and given as a $L_{Aeq, T}$ noise level. The existing background noise level is expressed in terms of a $L_{A90, T}$ noise level. T is the assessment time interval, which is 1-hour for operations during daytime hours (07:00 to 23:00 hr) and 15-minutes for operations during night-time hours (23:00 to 07:00 hr).

BS 4142:2014 states that if a noise source contains an 'acoustic feature', such as tonality, intermittency or impulsiveness, an appropriate penalty should be applied.

8.0 Establishing Baseline Conditions

8.1 Previous Environmental Noise Survey (Planning ref. 127465/LO/2020)

Overview

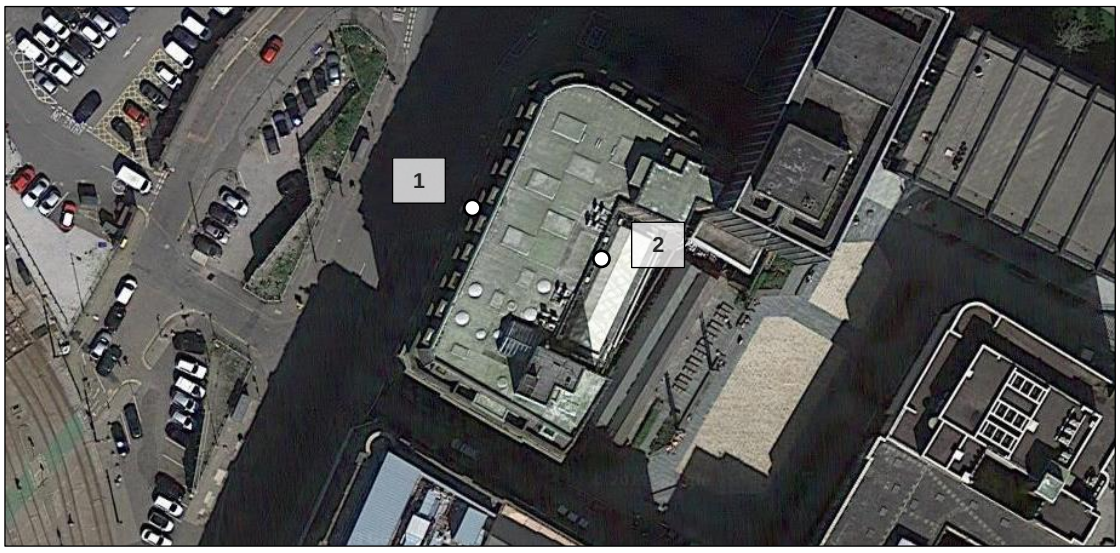
As an environmental noise survey could not be undertaken on site, Hann Tucker have reviewed a noise impact assessment (ref. 26428/NIA1, 15 September 2020, Rev 04) submitted to support the planning application for a neighbouring building (Old Bank Building). The noise impact assessment has been accepted and the development has been granted planning approval.

A noise survey was carried out by Hann Tucker Associates from approximately 11:00 hours on Friday 8 February 2019 to 09:30 hours on Wednesday 14 February 2019 to establish representative noise readings during typical weekday and weekend periods.

Measurement Positions

Façade noise level measurements were undertaken at two (2No.) positions around the development site, as described/illustrated below.

Position	Description
1	Facade measurement at 3rd floor level overlooking Corporation Street.
2	Facade measurement at 5th floor level overlooking Sadler's Yard.



Site Plan showing measurement locations (© maps.google.co.uk)

Relevant Survey/Assessment Data

A summary of the results from the noise survey, as presented in the previous noise impact assessment, is presented in the table below. All results are presented as free-field sound pressure levels.

Position	Daytime (07:00 – 19:00)		Evening (19:00 – 23:00)		Night-time (23:00 – 07:00)	
	$L_{Aeq,12h}$	Lowest $L_{A90,15min}$	$L_{Aeq,4h}$	Lowest $L_{A90,15min}$	$L_{Aeq,8h}$	Lowest $L_{A90,15min}$
1	63	53	63	51	59	43
2	58	45	58	45	54	41

In addition to the above broadband survey results, octave band background sound levels were collected as part of the survey. Although not explicitly presented in the report, these octave band background sound levels were used to establish entertainment noise level emission criteria. These entertainment noise level emission criteria are repeated below, for reference (to be achieved at the nearest noise sensitive windows).

Description	Entertainment Noise Level Limit (dB $L_{eq,15min}$) at Octave Band Centre Frequency (Hz)							dBA
	63	125	250	500	1k	2k	4k	
Daytime (07:00 – 23:00)	55	44	43	39	38	36	29	39
Night-time (23:00 – 07:00)	47	41	42	36	34	29	22	43

NB: The above entertainment noise level limits are based on the lowest measured 15 minute interval across both measurement positions during all daytime/night-time periods of the entire environmental noise survey.

Discussion

The survey undertaken by Hann Tucker Associates to support the Old Bank Building application was undertaken in very close proximity to the proposed development site with a similar view to dominant noise sources.

Further to the above, the data to be used from the previous survey relates only to measured background sound levels which would generally be dominated by distant noise sources and the level of screening provided to these distant noise sources, as opposed to the L_{eq} noise level which is more readily influenced by intermittent noise sources near to the measurement position.

We would suggest that Measurement Position 1 may be considered representative of background sound levels along Corporation Street as the line of sight to distant noise sources is largely consistent along Corporation Street to the nearest receptors.

We would suggest that Measurement Position 2 may be considered representative of background noise levels at any of the nearby receptors that don't have a clear line of sight to distant noise sources (i.e. receptors along Balloon Street, Federation Street and Hanover Street). Further to this, Measurement Position 2 is afforded a greater level of screening than almost all of the nearby receptors to distant noise sources and should therefore permit a worst-case (i.e. lowest background level) assessment.

9.0 Sound Insulation Testing

9.1 Procedure

Hann Tucker Associates have attended site to undertake sound insulation testing across typical separating floors and through typical external facades. The testing was carried out from the ground floor level retail space to open plan office spaces above.

The testing was undertaken on Monday 30 November 2020 by Michael Hartley, MSc, BSc (Hons), AMIOA.

The sound insulation testing was undertaken in general accordance with BS EN ISO 140-4:1998 *'Acoustics – Measurement of airborne sound insulation in buildings and of building elements'*.

The tests were undertaken with the premises empty of all fixtures and fittings. From observations while at the site, the separating floor appears to comprise a solid masonry/concrete construction with an approximate depth of 250mm while the façade comprised solid masonry with single glazed windows.

9.2 Equipment

The following equipment was used for the testing.

Equipment	Model	Serial Number	Calibration Date	Certificate No
Precision Sound Analyser Meter	Brüel & Kjær Type 2250	2600445	18/01/2019	04083/2
Sound Level Calibrator	Brüel & Kjær Type 4231	2271905	16/07/2020	04737/1
Sound Source	Custom made, un-ported sealed cabinet type	N/A	N/A	N/A

9.3 Results

The results of the airborne sound insulation testing are presented in the table below:

Description	Element	Measured Level Difference (dB *D*) at Octave Band Centre Frequency (Hz)						
		63	125	250	500	1k	2k	4k
Unit 4 to Office above	Floor	36	36	45	52	55	55	57
Unit 1 to Office above	Floor	31	36	44	53	57	59	59
Unit 4 to Federation Street (2.5m from façade)	Façade	25	28	32	36	35	35	40
Unit 1 to Corporation Street (2.5m from façade)	Façade	25	29	31	35	34	32	35

10.0 Noise Impact Assessments (Overview)

The following sections present our assessment of the various potential noise impacts associated with the development proposals, covering:

- **Commercial Unit Operational Noise Transfer via Floor**: The sound insulation performance of the floor will be used to establish the maximum permissible noise level in the retail units based only on noise transfer via the floor to offices above.
- **Commercial Unit External Noise Breakout**: The sound insulation performance of the façade will be used to establish the maximum permissible noise level in the retail units based only on noise transfer via the façade to nearby receptors.
- **Site Suitability**: The above assessments shall be used to establish an absolute internal noise level limit within the retail units, against which suitability for certain uses can be assessed.
- **Plant Noise Emissions**: Setting limits for new items of fixed plant against MCC guidance.

To inform our assessment of the commercial units, we have drawn upon previously measured noise levels for a range of uses, as set out below, to be considered as typical highest 1-hour noise levels during reasonable operation.

Description	Reverberant Noise Level (dB $L_{eq,1hr}$) at Octave Band Centre Frequency (Hz)							dBA
	63	125	250	500	1k	2k	4k	
Shop/Retail *Front of House Retail Shop during busy lunch-time*	58	60	61	60	62	57	57	66
Food and Drink *Typical restaurant with background music*	60	67	69	71	70	66	60	74
Drinking Establishment *Typical busy bar with moderate background music*	89	88	81	80	77	72	70	82
Gym *Noise levels produced by a major UK health club chain*	70	75	75	75	75	75	75	81

NB: We have not considered Professional Services Use to generate any higher levels of noise than the aforementioned.

With reference to the above, it is not possible to account for every possible scenario within each use class, however the above is intended to provide a reasonable baseline against which the general use can be assessed for feasibility with regards to planning permission. There is of course a wide range of noise levels that could be produced by any particular operation (e.g. gym class studio vs. a calm yoga studio) and it would be sensible for future tenants that may have the capacity to introduce high levels of noise to review their anticipated noise levels against the relevant noise emission criteria. MCC may wish to secure this through a suitably worded condition of planning.

11.0 Commercial Unit Operational Noise Assessment

11.1 Operational Noise Transfer via Floor

11.1.1 Criteria

In the absence of specific MCC criteria for noise transfer from commercial spaces to office spaces, it is recommended that to prevent loss of amenity to the offices/meeting rooms directly above, the aim should be to achieve maintain an internal noise level 10 dB below the standard BS 8233:2014 internal ambient noise level criteria.

Based on the above, and with consideration to (a) the need for spectral noise control in octave bands between 63 Hz and 4 kHz, and (b) the fact that the offices will generally not be occupied when the noisier commercial uses are in full operation, we would propose that reverberant noise levels from the commercial units within the office spaces directly above should be controlled so as to not exceed NR 30 (~35 dB L_{Aeq}).

11.1.2 Internal Building Fabric

The separating floor to the offices above is noted to comprise a minimum 250mm concrete slab.

Regardless of the above, the below presents a pessimistic sound level difference provided by the separating floor, based on measurements undertaken on-site. The sound insulation performance was noted to be relatively consistent across the floor slab and the below is taken as the lowest measured sound level difference from all floor slab measurements, at each frequency.

Description	Sound Level Difference (dB *D*) at Octave Band Centre Frequency (Hz)						
	63	125	250	500	1k	2k	4k
Retail Unit to Office via floor (pessimistic)	31	36	44	52	55	55	57

11.1.3 Assessment

The measurements of the level difference of the existing separating floor are considered representative of the future separating floor construction should an additional suspended ceiling **not** be installed. As such, the sound insulation performances presented in Section 9.3 have been used to inform subsequent assessment.

We have assessed noise transfer based on the criteria set out above to establish the internal sound level limit within retail units based on noise transfer via the floor only. The below must be considered in conjunction with noise emissions via the façade and should not be taken as definitive internal noise level limits.

Description	Octave Band Centre Frequency (Hz)						
	63	125	250	500	1k	2k	4k
Criteria in Offices (NR 30)	59	48	40	34	30	27	25
Level difference of existing floor (dB *D*)	31	36	44	52	55	55	57
Internal noise level limit in retail unit (dB L_{eq})	**90**	**84**	**84**	**86**	**85**	**82**	**82**

NB: As noted above, the above consider structurally connected receptors only, and should not be used in isolation to establish internal noise level limits.

11.2 Operational Noise Breakout via Facade

11.2.1 Criteria

MCC recommends that noise (L_{eq}) breaking out through the building frontage of an entertainment venue should not exceed 10 dB below the background noise level (L_{90}) at all octave band frequencies at the nearest noise sensitive windows.

These noise level emission criteria established in Section 8.1 are repeated below for reference (to be achieved at the nearest noise sensitive windows).

Description	Entertainment Noise Level Limit (dB $L_{eq,15min}$) at Octave Band Centre Frequency (Hz)							dBA
	63	125	250	500	1k	2k	4k	
Daytime (07:00 – 23:00)	55	44	43	39	38	36	29	39
Night-time (23:00 – 07:00)	47	41	42	36	34	29	22	43

11.2.2 External Building Fabric

The façade comprises solid masonry with punched in single glazed window systems. Openable windows will not be utilised as a means of ventilation in any instance.

The below presents a pessimistic sound level difference provided by the façade to a distance of 2.5m from the facade, based on measurements undertaken on-site. The sound insulation performance was noted to be relatively consistent across all tested facades and the below is taken as the lowest measured sound level difference from all facade measurements, at each frequency.

Description	Sound Level Difference (dB *D*) at Octave Band Centre Frequency (Hz)						
	63	125	250	500	1k	2k	4k
Retail Unit to outside (2.5m from façade) via façade (pessimistic)	25	28	31	35	34	32	35

11.2.3 Assessment

We have assessed noise breakout to the worst affected receptors as follows:

- **Daytime (07:00 – 23:00)** Federation Building, 9.5m away
- **Night-time (23:00 – 07:00)** Hotel Indigo, 30m away

We have assessed noise breakout based on the criteria set out above to establish the internal sound level limit within retail units based on noise breakout via the façade only. The below must be considered in conjunction with noise transfer via the floor slab to offices above and should not be taken as definitive internal noise level limits.

Daytime (Federation Building)	**Octave Band Centre Frequency (Hz)**						
	63	**125**	**250**	**500**	**1k**	**2k**	**4k**
Criteria at receptor (dB L_{eq})	55	44	43	39	38	36	29
Level difference provided by façade (dB *D*)	25	28	31	35	34	32	35
Distance loss from 2.5m to 9.5m (dB, Rathe Method)	9	9	9	9	9	9	9
Internal noise level limit in retail unit (dB L_{eq})	**89**	**82**	**83**	**83**	**81**	**77**	**73**

Night-time (Hotel Indigo)	**Octave Band Centre Frequency (Hz)**						
	63	**125**	**250**	**500**	**1k**	**2k**	**4k**
Criteria at receptor (dB L_{eq})	47	41	42	36	34	29	22
Level difference provided by façade (dB *D*)	25	28	31	35	34	32	35
Distance loss from 2.5m to 9.5m (dB, Rathe Method)	19	19	19	19	19	19	19
Internal noise level limit in retail unit (dB L_{eq})	**91**	**89**	**92**	**90**	**87**	**80**	**76**

NB: As noted above, the above consider external receptors only, and should not be used in isolation to establish internal noise level limits.

11.3 Site Suitability

11.3.1 Assessment

The above has been collated to determine appropriate reverberant internal noise level limits for the retail units during daytime and night-time periods.

The daytime operational noise level limits have been determined based on the assessment of noise transfer via the slab set out in Section 11.1.3 and the assessment of noise breakout via the façade during daytime hours set out within Section 11.2.3. Since office receptors would not be in use during typical night-time periods, the night-time operational noise level limit has been determined based only on the assessment of noise breakout via the façade during night-time hours set out within Section 11.2.3 and does not consider noise transfer to offices above.

The operational noise level limits that would apply to retail units are presented below. Note that since all assessments have been based on pessimistic assumptions, the below would apply to all individual retail units.

Description	Operational Internal Noise Level Limit in Retail Unit (dB $L_{eq,15min}$) at Octave Band Centre Frequency (Hz)						
	63	125	250	500	1k	2k	4k
Daytime (07:00 – 23:00)	89	82	83	83	81	77	73
Night-time (23:00 – 07:00)	91	89	92	90	87	80	76

The above can be compared against the typical operational noise levels set out in Section 10.0 to assess the suitability of each use. The typical noise levels are repeated below for reference, along with a note on the suitability of each use (based on the above limits).

Description	Reverberant Noise Level (dB $L_{eq,1hr}$) at Octave Band Centre Frequency (Hz)							Suitability
	63	125	250	500	1k	2k	4k	
Shop/Retail *Front of House Retail Shop during busy lunch-time*	58	60	61	60	62	57	57	✓
Food and Drink *Typical restaurant with background music*	60	67	69	71	70	66	60	✓
Drinking Establishment *Typical busy bar with moderate background music*	89	88	81	80	77	72	70	✓
Gym *Noise levels produced by a major UK health club chain*	70	75	75	75	75	75	70	✓*

* The above considers airborne noise transmission only. Any proposed gym operation would need to consider structure borne noise a result of weight impacts and rhythmic excitation of the floor slab. Given the variance in gym operations, it would not be possible to undertake a 'one size fits all' assessment of impact noise at this stage.

11.3.2 Discussion

Unit 1 & 2

Unit 1 & 2 seek a flexible use with no tenants confirmed at the time of writing. Our assessment has indicated that noise emissions from most typical retail uses listed above should be readily controllable with the shell build.

Prospective tenants should be asked to verify that their anticipated noise levels are in accordance with the above operational noise level limits. If higher reverberant noise level limits are desired by prospective tenants, this may be feasible via appropriate tenant fit-out (e.g. mass-barrier ceiling, secondary glazing etc.).

Unit 3

Unit 3 has a confirmed tenant that will operate as a restaurant. The noise levels considered above for typical restaurant use are well below the operational noise level limits which would suggest that noise emissions from the restaurant should therefore not be a concern with regards to planning permission.

If the unit was to change to a flexible use in the future, the same advice set out above for Unit 1 & 2 would apply.

Unit 4

Unit 4 has a confirmed tenant that will operate as an office space. The noise levels anticipated from this use would be lower than any of the typical noise levels set out above and would therefore be significantly below the operational noise level limits. The above would suggest that noise emissions from the office space should therefore not be a concern with regards to planning permission.

If the unit was to change to a flexible use in the future, the same advice set out above for Unit 1 & 2 would apply.

12.0 Fixed Plant Noise Emissions

On the basis of the Manchester City Council's guidance and the results of the environmental noise survey, we propose that the following cumulative plant noise emission limits be achieved at 1 metre from the nearest noise sensitive windows.

Period	Plant Noise Limit (BS 4142 Rating Level)
Daytime (07:00-23:00)	40 dB
Night-time (23:00-07:00)	36 dB

For design purposes, any plant which could emit noise of a tonal, irregular or intermittent nature should be subject to an "acoustic feature" penalty in accordance with BS 4142:2014. The above limits shall be subject to the final approval of Manchester City Council.

13.0 Conclusions

In line with current ANC and IOA guidance relating to the practicality and reliability of baseline sound level surveying and the provision of sound & noise impact assessments, Hann Tucker have estimated the existing noise climate within the vicinity of the proposed development site through reviewing environmental noise measurement data collected as part of planning applications in the locality of the proposed development site.

Sound insulation testing has been undertaken to establish the acoustic performance of existing separating floor structure between the proposed commercial spaces and offices, and between the proposed commercial spaces and external receptors.

Based on the above and a review of national/local guidelines relating to entertainment noise control, we have assessed noise transfer from the operation of the proposed commercial units to achieve NR 30 within structurally attached offices and 10 dB below the background sound level at each octave band at the nearest noise sensitive windows.

Our assessment indicates noise from the commercial units is unlikely to significantly impact on the offices above or residential nearby and thus no further acoustic mitigation measures are considered necessary.

Noise emission limits have been set for new items of fixed plant related to the development.

Appendix A – Acoustic Terminology

The acoustic terms used in this report are defined as follows:

dB — Decibel - Used as a measurement of sound level. Decibels are not an absolute unit of measurement but an expression of ratio between two quantities expressed in logarithmic form. The relationships between Decibel levels do not work in the same way that non-logarithmic (linear) numbers work (e.g. 30dB + 30dB = 33dB, not 60dB).

dBA — The human ear is more susceptible to mid-frequency noise than the high and low frequencies. The 'A'-weighting scale approximates this response and allows sound levels to be expressed as an overall single figure value in dBA. The $_A$ subscript is applied to an acoustical parameter to indicate the stated noise level is A-weighted

It should be noted that levels in dBA do not have a linear relationship to each other; for similar noises, a change in noise level of 10dBA represents a doubling or halving of subjective loudness. A change of 3dBA is just perceptible.

$L_{90,T}$ — L_{90} is the noise level exceeded for 90% of the period *T* (i.e. the quietest 10% of the measurement) and is often used to describe the background noise level.

$L_{eq,T}$ — $L_{eq,T}$ is the equivalent continuous sound pressure level. It is an average of the total sound energy measured over a specified time period, *T*.

L_{max} — L_{max} is the maximum sound pressure level recorded over the period stated. L_{max} is sometimes used in assessing environmental noise where occasional loud noises occur, which may have little effect on the L_{eq} noise level.

L_p — Sound Pressure Level (SPL) is the sound pressure relative to a standard reference pressure of 2×10^{-5} Pa. This level varies for a given source according to a number of factors (including but not limited to: distance from the source; positioning; screening and meteorological effects).

L_w — Sound Power Level (SWL) is the total amount of sound energy inherent in a particular sound source, independent of its environment. It is a logarithmic measure of the sound power in comparison to a specified reference level (usually 10^{-12} W).