

Land bound by John Dalton Street, Ridgefield, Bow Street and South King Street, Manchester

Noise Impact Assessment

Island Site (General Partner) Limited

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1.0

Introduction

1.0 Introduction

This report has been prepared by Cundall in support of a planning application for the development of a commercial office in central Manchester. The proposed development site is located on John Dalton Street. The proposals are for circa 12,000 m² commercial office development with supporting ancillary functions.

In summary, the proposals include demolition of the existing buildings and structures and the erection of a 10-storey plus basement office building (Use Class E(g)), with flexible ground floor and basement uses (Use Class E) and a rooftop garden, works to facilitate the pedestrianisation of the southern part of Ridgefield and other associated works.

The purpose of this assessment is to evaluate the findings of the acoustic survey in relation to the proposed scheme being brought forward and, if required, to provide recommendations for mitigation measures in order to achieve a comfortable internal acoustic environment, in line with the relevant Standards and local and national planning policies.

To establish the prevailing noise climate across the existing site, two noise surveys were undertaken from 17 to 20 and 29 to 30 January 2020.

The scope of the assessment is based on the relevant technical guidance, good practice techniques and extensive previous experience of similar projects.

2.0

Assessment criteria

2.0 Assessment criteria

This section of the report outlines the key legislation and guidance relevant to the assessment of noise for a development of this type.

2.1 Noise Policy Statement for England

The Noise Policy Statement for England (NPSE) was published by Defra in March 2010. This NPSE sets out the long-term vision of Government noise policy:

“Promote good health and a good quality of life through the effective management of noise within the context of Government policy on sustainable development.”

The NPSE long term vision is supported by the following aims:

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

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

2.2 National Planning Policy Framework

The National Planning Policy Framework (NPPF) was originally published in March 2012 and amended in July 2019. The NPPF is part of government reform to make the planning system less complex and more accessible, and to promote sustainable growth. It replaced existing national planning policies such as Planning Policy Guidance PPG24: Planning and Noise.

The NPPF states:

“170 - 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 soil, air, water or **noise pollution** or land instability. Development should, wherever possible, help to improve local environmental conditions such as air and water quality, taking into account relevant information such as river basin management plans;”*

and

“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;”*

2.3 British council for Offices Guide to Specification 2019 (BCO 2019)

BCO 2019 contains guidance on acoustics in offices. Table 1 shows BCO 2019 recommendations for internal noise limits (split between noise intrusion from external sources and building services noise):

Type of space	Upper limit for external noise intrusion	Upper limit for building services noise
Speculative offices*	NR 38 $L_{eq,T}$ 55 dB $L_{A01,1hour}$	NR 38
Reception / Lift lobbies / Circulation	-	NR 40
Toilets	-	NR 45
Note: *For the purpose of Cat A fit out stage, the noise rating for 'speculative offices' should be achieved in the main open plan office spaces.		

Table 1 – BCO internal noise levels

The document clarifies that:

“These criteria are also based on building services noise without a specific character. Where individual noise sources are impulsive or tonal, they shall be at least 5 dB lower (10 dB lower where the noise is both impulsive and tonal).

Where noise levels are likely to be significantly below these NR levels, localised noise sources e.g. extract stub ducts, duct noise breakout, risers and plantrooms, should also be at least 5 dB lower than indicated above and 10 dB lower where the noise is both localised and either tonal or intermittent.”

BS 8233 states that dBA levels are approximately equivalent to NR + 6. It can therefore be seen from the tables above that compliance with detailed BCO guidance on internal noise levels from both external noise intrusion and mechanical services would see broad compliance with BS 8233 and in turn the relevant credit available under Hea 05 (see Section).

With regards to naturally ventilated buildings, the document states:

“In the case of naturally ventilated buildings, it may be appropriate to accept higher external noise intrusion levels (than shown ... in the table guideline NR Levels) in maximum ventilation mode, provided occupants have the choice to open or close windows or ventilation openings. For example, depending on the character of the noise, a +5 dB relaxation may be acceptable during occasional periods.”

2.4 BS 8223:2014 ‘Guidance on sound insulation and noise reduction for buildings (BS 8223:2014)

Table 2 details the BS 8233 design range for internal noise levels within ‘retail’ spaces, as deemed applicable for the proposed flexible basement and ground floor commercial units. It should be noted that the recommended values are a combination of noise from both internal and external noise sources.

Type of space	Design range for indoor ambient noise levels dB $L_{Aeq,T}$
Retail	50 – 55

Table 2 – BS 8233:2014 internal noise levels

In mechanically ventilated spaces, noise from services within rooms should be designed such that the indoor ambient noise level range given above will not be exceeded when combined with noise ingress through the building envelope.

2.5 BREEAM

It is expected that credits Hea 05 and Pol 05 may be targeted under BREEAM UK New Construction 2018 (BREEAM).

Both sections call for evidence to be submitted by a suitably qualified acoustician. Cundall is a member of the Association of Noise Consultants (ANC) and is registered to carry out sound insulation testing under their pre-completion testing accreditation scheme. Cundall employs acoustic consultants at various global locations, most of whom hold corporate membership of the Institute of Acoustics (IOA).

A confirmation is also required that an acoustic consultant was appointed to assist in the development of the project at an early stage in the design process. Cundall can confirm that we were appointed prior to RIBA Stage 2 and have a

commission to assist the design team and contractor through the detailed design and construction phases of the development.

2.5.1 Hea 05

The following is required for acquiring the second credit available under Hea 05 of BREEAM:

Achieve indoor ambient noise levels that comply with the design ranges given in Section 7 of BS 8233: 2014.

As stated in Section 2.3, compliance with detailed BCO guidance on internal noise levels from both external noise intrusion and mechanical services would see broad compliance with BS 8233.

2.5.2 Pol 05

The credit available under BREEAM (2018) Pol 05 states:

"Where there are noise-sensitive areas within the assessed building or noise-sensitive areas within 800 m radius of the assessed site, a noise impact assessment compliant with BS 4142: 2014 is commissioned. Noise levels must be measured or determined for:

The noise level from the assessed building, as measured in the locality of the nearest or most exposed noise-sensitive development, must be at least 5 dB lower than the background noise throughout the day and night."

2.6 Local Authority requirements

2.6.1 Plant noise emission limits

Section 3.6.1.5.1 of the Manchester City Council (MCC) 'Planning & Noise - Technical Guidance' document (December 2015) relates to noise limits for building services plant and states:

Many of the noise complaints Environmental Health receive about noise from plant, equipment and machinery specifically concern the character of the noise emitted. Any noise assessment needs to consider not only the overall level of noise emitted but also its particular characteristics. The noise assessment should be based on BS 4142: 2014 and any application for fixed plant, equipment or machinery must demonstrate that:

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 5 dB (L_{Aeq}) below the typical background (L_{A90}) level at the nearest noise sensitive location.

It can be seen that upon compliance with this guidance, the requirements for achieving the one credit under Pol 05 of BREEAM will also be met by default.

2.6.2 Entertainment noise limits

In the event that any amplified music is proposed flexible basement and ground floor commercial units, Section 3.6.1.2 of the MCC Planning & Noise Technical Guidance stated the following with respect to entertainment noise limits:

A planning application for a new entertainment venue that is structurally detached from other building uses 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'.

3.0

Environmental noise survey

3.0 Environmental noise survey

3.1 Site Context

The site extends to approximately 0.13 hectares and is located at the heart of Manchester City Centre. The site comprises a rectangular block of buildings bound by John Dalton Street to the south, South King Street to the north, Bow Street to the east and Ridgefield to the west. Three existing buildings are located within the site boundary comprising:

- Old Colony House (25,968 sq ft), a vacant 7 storey building comprising office accommodation with a vacant former restaurant at ground floor level. The building fronts onto South King Street;
- 5 Ridgefield (11,748 sq ft), a 3 storey building comprising a former restaurant use at basement and ground floor level and vacant offices at first and second floors. The site fronts onto Ridgefield and Bow Street; and,
- Grange House (17,309 sq ft), a 6 storey building comprising ground floor retail/restaurant/office use with vacant upper floors formerly in office use. The building fronts onto John Dalton Street.

The buildings vary in age and character and are no longer fit for purpose as office accommodation. A significant proportion of the accommodation is currently vacant and/or underutilised.

The site is located within the St Ann's Square Conservation Area and adjacent to the Albert Square Conservation Area. None of the buildings within the site are listed.

A site location with approximate red line boundary is given in the Figure below.

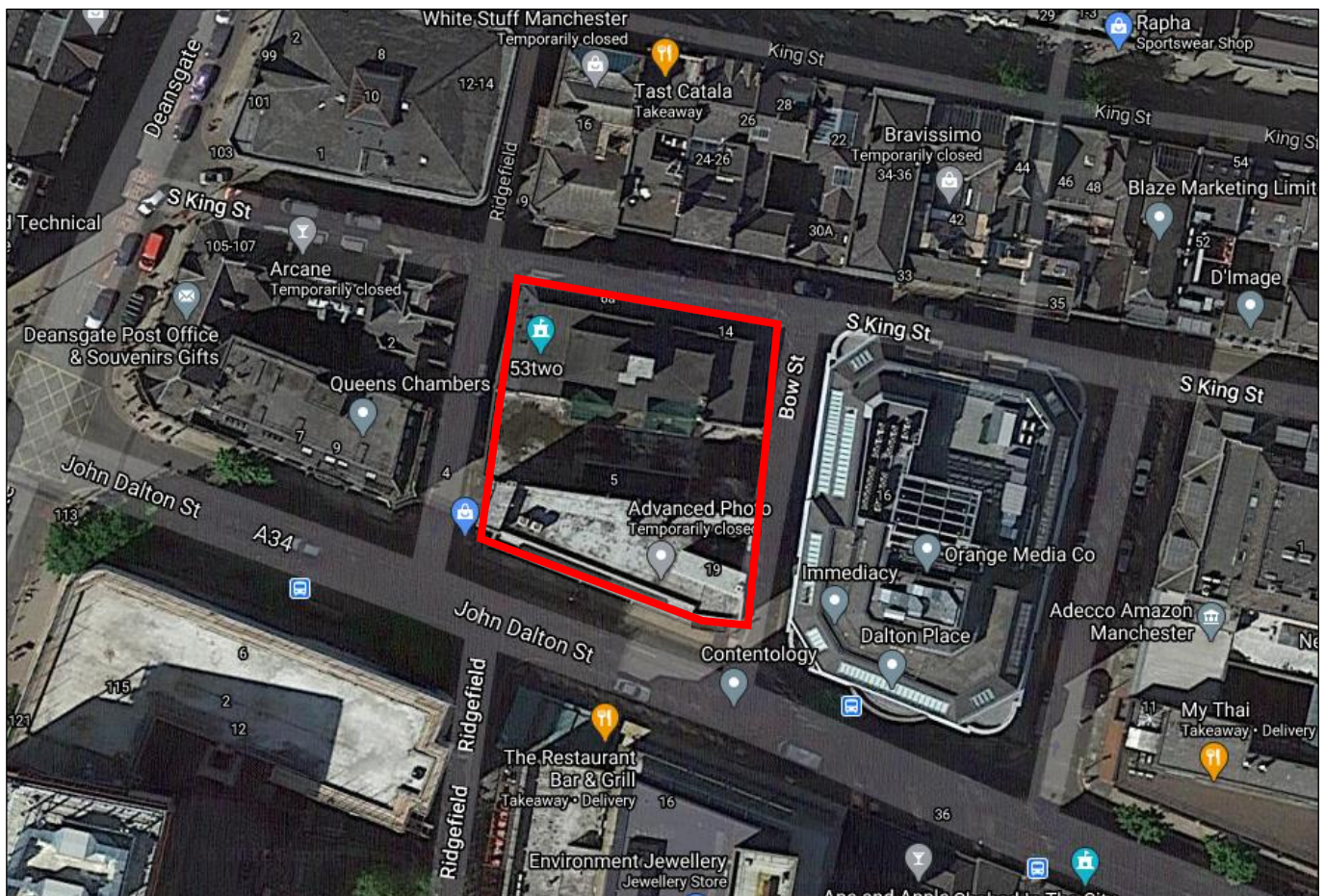


Figure 1 – Site location and approximate red line boundary

3.2 Survey methodology

In order to assess prevailing levels of environmental noise affecting the proposed Development, unattended continuous noise surveys were undertaken at two measurement positions. The noise monitoring at position MP1 was carried out between approximately 11:00 hours on Friday 17 January to 09:00 hours Monday 20 January 2020 and at position MP2 was carried out between approximately 14:30 hours on Wednesday 29 January to 14:30 hours on Thursday 30 January 2020.

The approximate measurement locations are shown in Figure 2 overleaf:



Figure 2 – Survey measurement positions

The measurement positions were selected to overlook the primary sources of noise incident on the proposed development site: John Dalton Street and South King Street. Position MP1 was located at 3rd floor level approximately 9 m above ground and Position MP2 was located at 4th floor level approximately 12 m above ground. Sound level meters were placed inside the building with microphones attached to poles protruding from slightly open windows at a distance of approximately 1m from the façade.

Due to the unattended nature of the survey it is not possible to comment on weather conditions throughout the entirety of the survey period; however, when the survey was setup the weather conditions were calm and dry, with daytime temperatures on both days of setting up equipment around 6°C and wind speeds below 5 m/s. From weather data records it understood that weather conditions throughout the survey period were generally unchanged from this.

Noise measurements were made using a NtI XL2 (serial number A2A-16315-E0) precision sound level meter, in accordance with BS EN 60651:1994 and BS 7445:1993. The meter was field calibrated before and after with no significant drift witnessed. Calibration certificates for all equipment are available upon request.

Monitoring equipment was set up by competently trained Cundall staff. Subjective impressions from site were that the noise climate was generally dictated by surrounding road traffic noise, with John Dalton Street being the primary noise source.

3.3 Results summary

A summary of the average ambient noise levels recorded is detailed within Table 3 and Table 4. Values given are the logarithmically averaged $L_{Aeq,T}$, the maximum L_{AFmax} , the highest $L_{A01,1hour}$ and lowest $L_{A90,15min}$ values measured.

All values have been corrected for free-field conditions by subtracting 3 dB from recorded values and rounded to the nearest integer value (as fractions of a decibel are imperceptible) and are given in dBA.

Position MP1

Date	Time Period	$L_{Aeq,T}$ (dB)	L_{AFmax} (dB)	Highest $L_{A01,1hour}$ (dB)	Lowest $L_{A90,15min}$ (dB)
17 January 2020	Daytime (10:45 – 23:00 hrs)	70	92	81	59
17 – 18 January 2020	Night-time (23:00 – 07:00 hrs)	67	104*	78	49
18 January 2020	Daytime (07:00 – 23:00 hrs)	67	90	81	55
18 – 19 January 2020	Night-time (23:00 – 07:00 hrs)	66	99	78	49
19 January 2020	Daytime (07:00 – 23:00 hrs)	64	95	76	49
19 – 20 January 2020	Night-time (23:00 – 07:00 hrs)	65	95	84	49
20 January 2020	Daytime (07:00 – 08:45 hrs)	69	97	76	56
*High max level likely the result of non-representative intermittent noise sources i.e. emergency sirens					

Table 3 – MP1 noise level results summary

Position MP2

Date	Time Period	$L_{Aeq,T}$ (dB)	L_{AFmax} (dB)	Highest $L_{A01,1hour}$ (dB)	Lowest $L_{A90,15min}$ (dB)
29 January 2020	Daytime (14:45 – 23:00 hrs)	61	90	78	51
29 – 30 January 2020	Night-time (23:00 – 07:00 hrs)	63	102*	79	46
30 January 2020	Daytime (07:00 – 14:45 hrs)	64	91	74	52
*High max level likely the result of non-representative intermittent noise sources i.e. emergency sirens					

Table 4 – MP2 noise level results summary

4.0

Noise impact assessment

4.0 Noise impact assessment

4.1 Environmental noise model

In order to determine road traffic noise propagation across the proposed development site, a model has been produced using SoundPLAN 8.2 acoustic modelling software. The model is capable of accurately determining sound propagation, by taking into account variations in topography, barrier attenuation provided by existing landscaping and buildings, and distance attenuation.

Road traffic noise sources within the 3D model have been calibrated based upon the worst case daytime L_{Aeq} results obtained at each measurement position.

The resultant façade noise maps of the predicted daytime noise levels are presented below. Levels shown in these figures and referred to in the following sub-sections are 'free-field values' at the façade i.e. they do not include additional contribution from acoustic reflections from the proposed building façade.

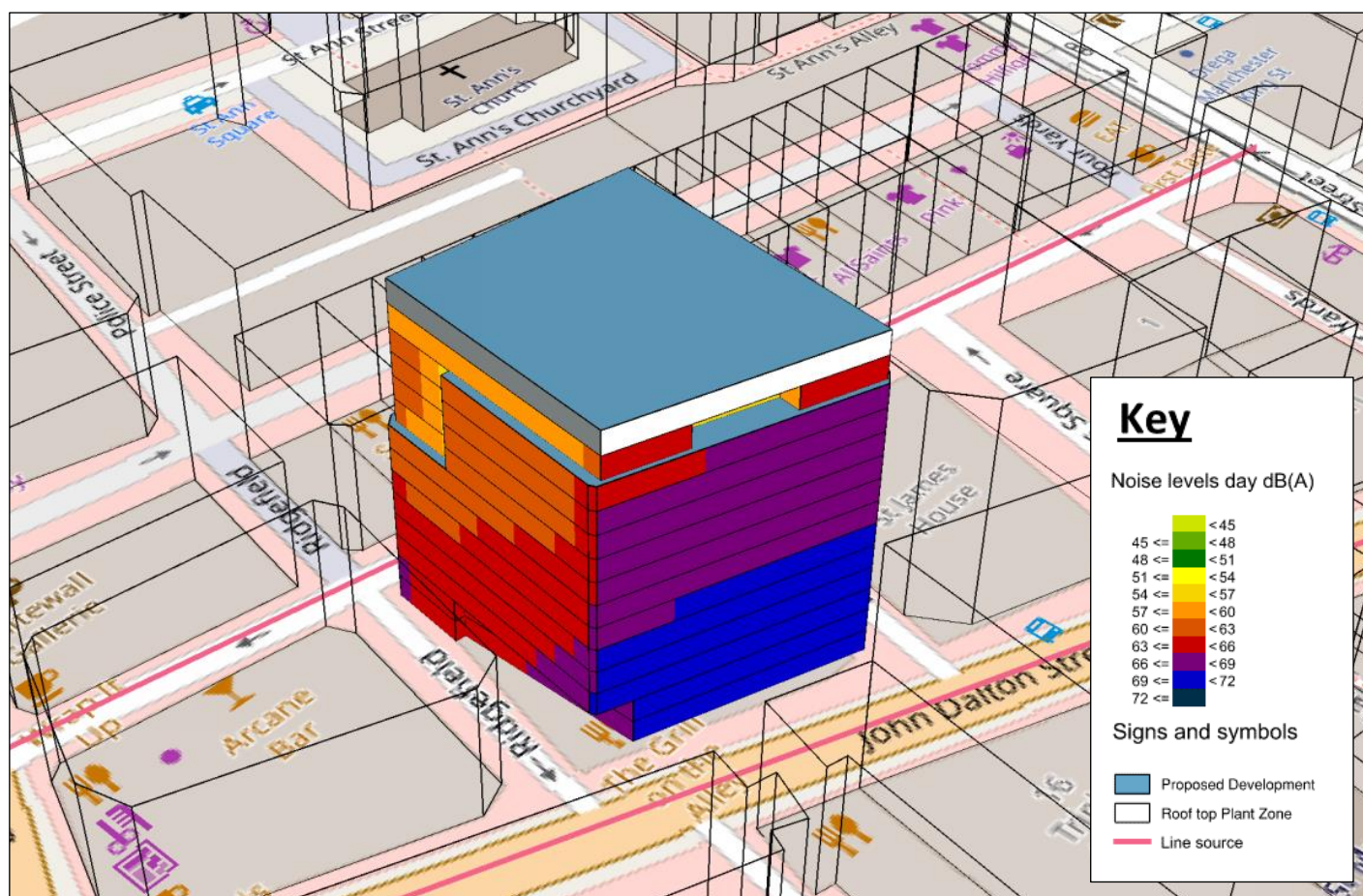


Figure 3 - Facade noise map (daytime) – John Dalton Street Façade

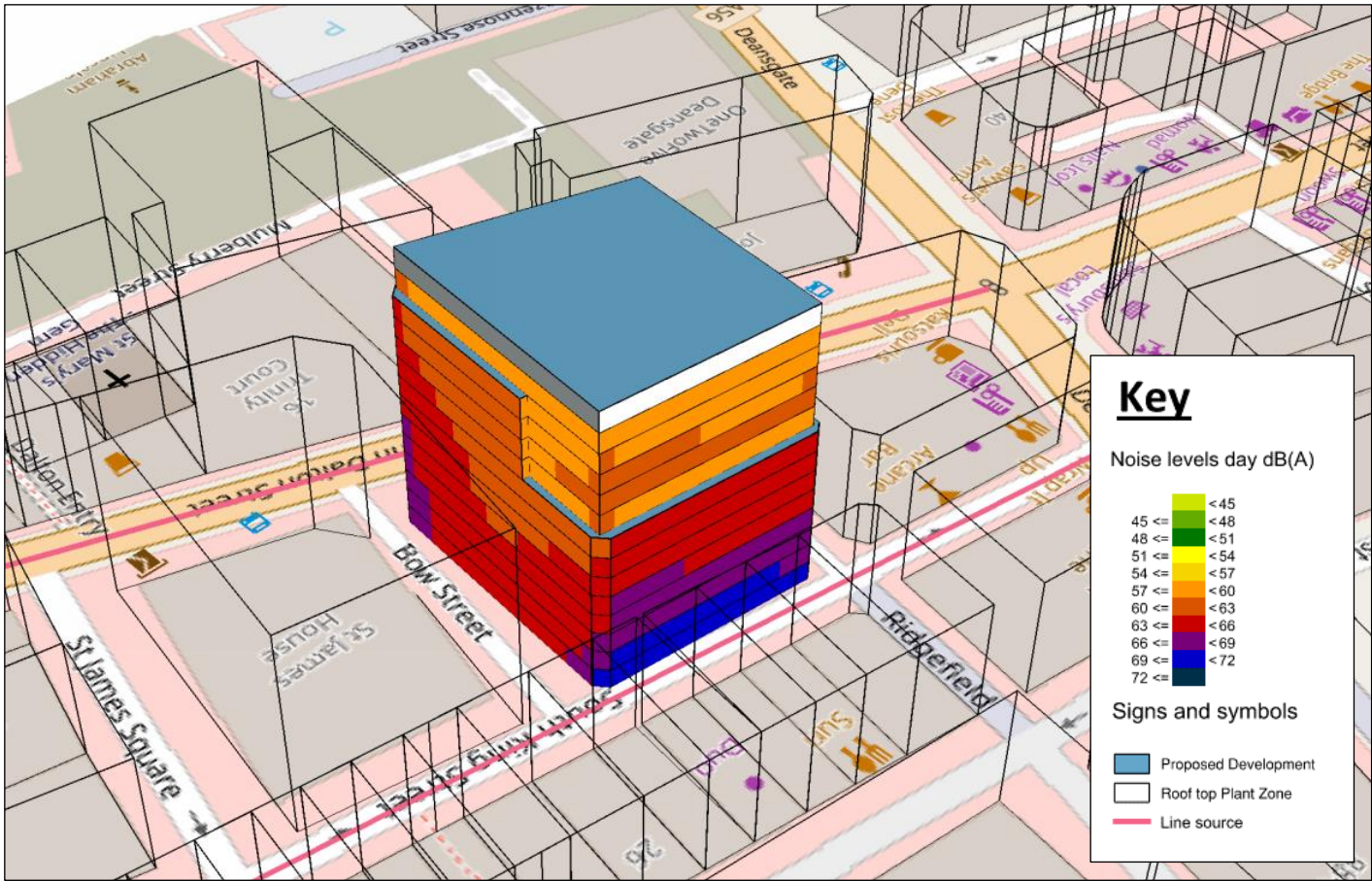


Figure 4 - Facade noise map (daytime) – South King Street Façade

4.2 Glazing systems requirements for offices

The current proposal for the ventilation strategy of the building is to utilise mechanical ventilation via centralised air handling plant during the coldest and warmest parts of the year, with natural ventilation the preferable solution during mid-season.

For mechanically ventilated buildings, the weakest elements of the external elevation are typically the glazing. The specification of glazing is therefore considered to be the primary factor in determining the internal ambient noise level within noise-sensitive areas due to noise ingress from outside.

Based on meeting the requirements of BCO, the minimum façade sound reduction requirements identified for façades across the development are presented below, with calculation procedures for determining the glazing attenuation as follows:

$$R_w + C_{tr} = \text{External Façade Level dBA} - \text{Internal Design Target dBA}$$

Table 5 presents a summary of the highest daytime noise levels predicted at offices across the development as calculated by the noise model, as well as worst case daytime $LA_{01,1\text{hour}}$ measured at position MP1 of the noise survey. Modelling of $LA_{01,1\text{hour}}$ noise propagation / façade impacts has not been undertaken (as performing distance corrections on statistical noise indices is an inaccurate approach); however, the $LA_{01,1\text{hour}}$ values measured at MP1 are considered to be representative of worst case values across the proposed development. Levels are presented with a comparison against the proposed internal ambient noise level criteria.

Space type	Worst case External façade noise level	Internal noise criteria	Required sound insulation, dB $R_w + C_{tr}$
Offices	$L_{Aeq,T}$ 72 dB	$L_{Aeq,T}$ 44 dB (NR 38)	28
	$L_{A01,1hour}$ 81 dB	$L_{A01,1hour}$ 55 dB	26
Retail	$L_{Aeq,T}$ 72 dB	$L_{Aeq,T}$ 50 - 55 dB	17

Table 5 – Summary of glazing conditions

Based on the above, the following table presents a glazing configuration capable of achieving the minimum required facade sound reduction index values detailed above:

Minimum required glazing sound reduction index - $R_w + C_{tr}$ (dB)	Example suitable glazing specification
≥ 28	6 mm pane 6 to 20 mm airgap 4 mm pane Rated at $R_w + C_{tr}$ 28 dB*
*Based on values given in 'BS EN 12354-3:2000 Building acoustics. Estimation of acoustic performance in buildings from the performance of elements. Airborne sound insulation against outdoor sound'	

Table 6 – Minimum glazing sound insulation performance requirements

It should be noted that it is typical for buildings of this nature for thermal, solar and structural requirements to lead to a glass specification which provides significantly more sound insulation than the minimum acoustic performance calculated above. It is therefore likely that internal noise levels as a result of external noise break-in will comfortably meet the BCO target.

To control noise break-in from outside, it is considered good practice for the external wall construction to provide a sound reduction at least 10 dB above that of the glazing values given above.

All glazing should be well sealed when closed. It is imperative that frames / non-glazed curtain walling components do not compromise the performance of the glazing. No gaps should be visible around the frame from the exterior.

4.3 Opening windows assessment

As stated in Section , BCO guidance states that it may be appropriate to accept a relaxation of noise intrusion levels of +5 dB when windows are open to provide fresh air as part of a fully natural or mixed-mode ventilation solution. It is widely accepted that open windows can provide attenuation from outside noise sources of approximately 10 dB. As such, the table below indicates the suggested maximum permissible noise levels at building façades when considering this relaxation in criteria.

Description	Noise levels
BCO internal noise criterion	$L_{Aeq,T}$ 44 dB (NR 38)
Natural vented relaxation	+ 5 dB
Open window attenuation	+ 10 dB
Maximum suggested façade noise levels	$L_{Aeq,T}$ 59 dB

Table 7 - Maximum facade noise levels for naturally ventilated solution

Using the limit indicated above, modelling process as described in Section 4.1 has been used to split incident façade noise levels into categories above and below this 59 dB $L_{Aeq,T}$ limit, hence indicating where open windows would result in exceedance or compliance with the suggested BCO internal noise criterion.

The conclusions from this modelling process are:

- Most areas within the building will see an exceedance of suggested internal noise limits with open windows;
- The highest exceedances of the criterion will be in the region of +13 dB; and
- Unlike the façade performance requirements discussed in Section , compliance for open windows are based on suggestions made in BCO guidance and so do not prohibit the use of open windows as a ventilation solution, but indicate the need for a holistic approach when balancing the needs of a sustainable solution against acoustic comfort.

5.0

External plant noise limits

5.0 External plant noise limits

Manchester City Council stipulate the following criteria with respect to noise emissions from new building services plant installations:

“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 5 dB (L_{Aeq}) below the typical background (L_{A90}) level at the nearest noise sensitive location.”

5.1 Nearest noise sensitive receptors

The nearest noise-sensitive receptors are understood to be:

- Residential apartments located at 8 King Street which is located approximately 10 m to the north west of the site boundary.
- Proposed new 261 suite hotel at John Dalton House on corner of John Dalton Street / Deansgate (approved decision notice ref: 119979/FO/2018)

5.2 Nearest noise sensitive receptor

Table 8 below summarises the existing background noise levels measured at the site along with limiting noise levels for all new items of services plant, when measured at 1 m from the nearest noise sensitive receptors.

Time period	Representative background noise level* dB L_{A90}	Plant noise rating level not to be exceeded at 1 m from nearest noise-sensitive receptor dB $L_{A1,Tr}$
Daytime (07:00 – 23:00 hrs)	51	46
Night-time (23:00 – 07:00 hrs)	46	41
* Existing background noise value based on lowest measured $L_{A90,15min}$ value during attended noise surveys at MP2		

Table 8 – Limiting rating noise levels for building services plant

The above limit is applicable to the cumulative noise level from all new items of plant when running under normal operation. Where applicable, acoustic feature corrections should be applied to the specific plant noise level to account for any distinguishable acoustic characteristics (e.g. tonality, impulsivity, intermittency).

6.0

Entertainment noise limits

6.0 Entertainment noise limits

6.1 Entertainment noise limiting criterion

In the event that flexible Use Class E units at basement and/or ground floor level feature a PA system, it will be necessary to see that amplified music break-out impacts will be suitably controlled.

To meet the requirements of MCC Planning Policy for entertainment noise, sound levels attributable to amplified music should be limited to 10 dB below the background noise level (L_{A90}) at nearby sensitive receptors.

The octave spectrums of the lowest measured $L_{A90,15min}$ periods as measured at Position MP2 have been used to define these limits. The following noise limits are proposed which are not to be exceeded at 1 m from the façade of the noise-sensitive receptors:

	Octave band centre frequency (Hz)						
	63	125	250	500	1k	2k	4k
Daytime & Evening (07:00 – 23:00)							
Existing background level, dB	47	43	44	42	41	37	25
MCC noise limits, dB	37	33	34	32	31	27	15
Night-time (23:00 – 23:00)							
Existing background level, dB	42	38	40	38	36	31	21
MCC noise limits, dB	32	28	30	28	26	21	11

Table 9 – Limiting entertainment noise levels

To see that amplified music noise levels do not exceed the above criteria at the nearest sensitive receptors, it will be necessary to install a suitable limiter within any amplified music systems installed at the development.

7.0

Terrace noise impact

7.0 Terrace noise impact

It is understood the terrace areas may be used by potential office occupants. In accordance with MCC entertainment noise policy (see Section), noise impacts associated with any amplified music in these external areas “*should be controlled to 10 dB below the background noise level (LA90) without the entertainment noise present, in each octave band at the nearest noise sensitive location.*”

Based on the findings of the Cundall environmental noise survey, the subsequent entrainments noise limits for daytime and night-time periods are presented in Table 10.

	Octave band centre frequency (Hz)						
	63	125	250	500	1k	2k	4k
Daytime & Evening (07:00 – 23:00)							
Existing background level, dB	47	43	44	42	41	37	25
MCC noise limits, dB	37	33	34	32	31	27	15
Night-time (23:00 – 23:00)							
Existing background level, dB	42	38	40	38	36	31	21
MCC noise limits, dB	32	28	30	28	26	21	11

Table 10 – Limiting terrace entertainment noise levels

The nearest noise-sensitive property to the terrace area is the newly refurbished Qbic Hotel on the opposite side of John Dalton Street. Due to the high levels of ambient noise associated with road traffic movements on John Dalton Street it is anticipated that background music (up to a level of 70dB(A) when measured on the terrace during daytime hours) will not lead to undue impacts at this receptor.

In the event that any external music aside from background music during daytime hours is proposed, compliance measurements should be undertaken at the nearest noise-sensitive receptors to demonstrate that appropriate noise limits settings have been applied to satisfy the MCC noise policy requirements.

8.0

Conclusions

8.0 Conclusions

Prevailing noise levels at the proposed development site have been measured, and an assessment of the site has been made in accordance with National Planning Policies and Standards.

Based on predicted façade noise impacts at the proposed development, an initial glazing strategy feasibility study has been undertaken based on achieving internal ambient noise levels compliant with the proposed internal ambient noise level criteria for office and retail spaces.

Limiting noise levels have been provided for external noise impacts at existing nearby noise-sensitive receptors.

The assessment has concluded that noise impacts to the proposed development and surrounding areas can be mitigated against to meet the relevant standards and guidelines, and as such there are no technical aspects from an acoustics perspective that should prevent planning permission from being granted.

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