

Memorandum

From:

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Date

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To

Stephen Price

cc

Tsz Kan Woo, Matthew Hayward, Rob Turner

Subject

One Medlock Street – AVO Assessment

This memorandum has been prepared in response to a comment received from Manchester City Council (MCC) with regards to the One Medlock Street Planning Application (Ref: 135419/FO/2022). The comment related to acoustics and overheating and states the following:

It has been stated in Chapter 8 of the Environmental Statement that the requirements of Approved Document O will be met with regards to overheating but we need to see a Level 2 Overheating Assessment in accordance with the AVO Guide (2020) to ensure that acoustics and overheating are both considered together. They have also stated that a detailed glazing attenuation will be undertaken and this should be done alongside the Level 2 Overheating Assessment.

Cundall previously issued a response in a memorandum (Ref: 1036341-MEMO-AS-001) which made the case that complying with the requirements of Approved Document O (ADO) was sufficient to demonstrate that acoustics and overheating had been suitably considered. The comment received back from the EHO on this point was as follows.

Re the additional documents for overheating - Whilst we partly agree with the assessment, based on the windows being open for 5 hours in the quietest part of the evening (18:00 to 23:00) in line with ADO for Building Regulations, they have not included the resultant internal noise levels with the windows open or included an assessment of impact (as stated in AVO Guide which is applicable to daytime noise). They need to add this additional assessment to support the over heating assessment to ensure the occupiers are not being exposed to unacceptable noise levels with the windows open, the AVO guide includes tables and graphs to assess the impact (e.g. Tables 3-2 and 3-3 and figure 3-2). This will ensure that the overheating assessment balances acoustics and thermal comfort, as the current assessment has not taken the acoustic report into account.

This memorandum demonstrates the results of an AVO Guide assessment and considers the relevance of the results in relation to the frequency, level and timing of noted exceedances.

ANC AVO Design Guide

In January 2020, the Association of Noise Consultants (ANC) published the Acoustics Ventilation and Overheating Residential Design Guide (AVO) which provides guidance on internal noise levels and overheating. The AVO Guide seeks to:

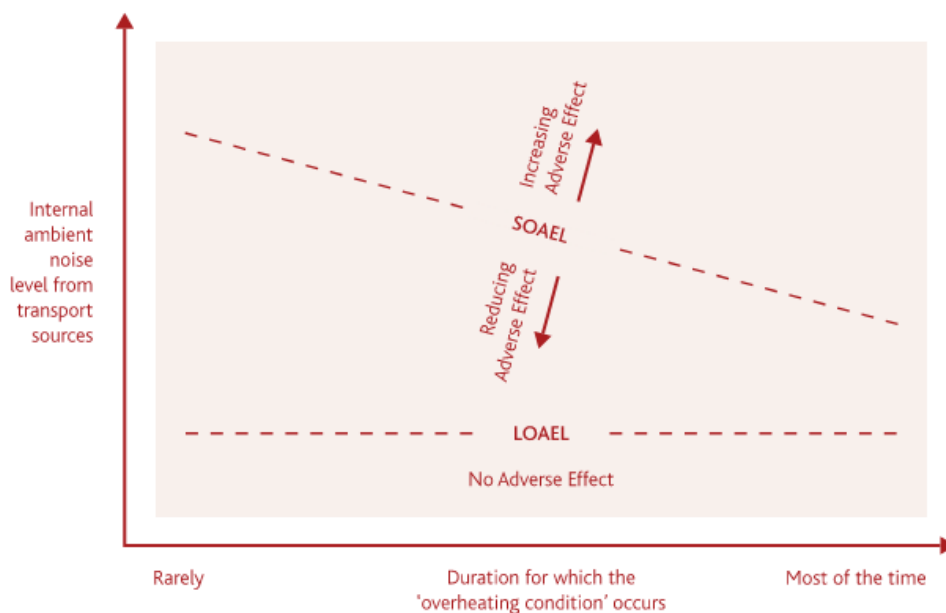
- *encourage an assessment of noise that recognises the interdependence between the acoustics, ventilation and overheating designs;*
- *provide a means of assessment to satisfy the need to consider acoustics, ventilation and overheating at the planning stage;*
- *assist in educating clients, environmental health/planning officers and other stakeholders of the interdependence of design for acoustics, ventilation and overheating.*

As the ProPG emphasises the importance and principles of good acoustic design, the AVO Guide is intended to “contribute to the practice of good acoustic design”. In particular, it is noted that the over-arching aspiration of good acoustic design is that residents may open windows without any adverse acoustic impact (ProPG paragraph 2.33) and the AVO Guide provides a practical method to address these requirements.

AVO Guide assessment

Where an AVO Guide Level 2 assessment is required for transport noises sources, Table 3-3 of the document presents a summary of the assessment of adverse effect based on internal ambient noise level and duration.

Whilst Table 3-3 provides no quantitative guidance regarding the combined effect of level and duration for the overheating condition, the situation is summarised qualitatively in Figure 3-2 of the AVO Guide, as reproduced below.



Whilst the above figure does not give exact labels on its axis, for the daytime period, the upper category in Table 3-3 is defined on the basis that 50 dB $L_{Aeq,T}$ represents “the upper end of the range for reliable speech communication”.

The following daytime noise break-in assessment has therefore considered this 50 dB $L_{Aeq,T}$ value as the upper desirable IANL value in bedrooms during the daytime.

It should, however, be noted that the NPSE states that it is not possible to have a single objective noise-based measure that defines SOAEL that is applicable to all sources of noise in all situations. Consequently, the SOAEL is likely to be different for different noise sources, for different receptors and at different times, and an internal ambient noise level of ≥ 50 dB $L_{Aeq,T}$ should not automatically be considered as resulting in the SOAEL.

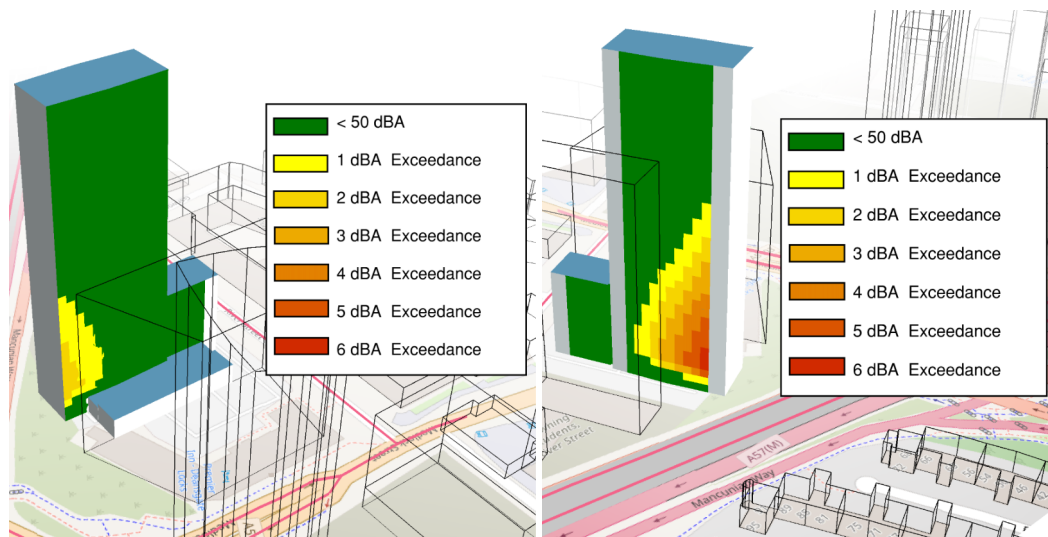
Dynamic thermal modelling and noise-break-in assessment

From the ADO compliance report produced by Ridge for the project (Ref: 5016684-RDG-XX-XX-DOC-ME-001 V1.0), compliance has been achieved with the following openings and timings:

- Overheating condition expected to occur for only 0.4% Total Annual Hours for worst case affected Bedroom
- During this overheating condition, bedroom windows only required to be open between 6pm – 11pm
- Maximum bedroom window openable area of 0.55 m²

Based on the openable area listed above and the dimensions of proposed bedrooms, the external to internal noise reduction provided by the façade with a partially open window to control overheating is expected to be 8 dB.

Based on the external noise levels measured during the periods of 6pm – 11pm when windows may be open (full details of Cundall's noise survey and initial modelling process are detailed within the Noise and Vibration Chapter of the ES) and the internal noise levels being compliant with Local Authority requirements for the rest of the daytime 16 hour period when windows are closed, the following façade map figures show the results of noise modelling to determine the exceedance over the 50 dB $L_{Aeq,T}$ upper IANL values during hours with the aforementioned requirement for partially open windows.



The table below indicates the exceedances above as listed as a percentage of overall bedrooms which experience it.

Exceedance	% Development occurrence
None – worst-case IANL ≤ 50 dB $L_{Aeq,day}$	76.9
1 dB Exceedance	9.2
2 dB Exceedance	6.0
3 dB Exceedance	3.1
4 dB Exceedance	2.2
5 dB Exceedance	1.9
6 dB Exceedance	0.6

It can be seen that the vast majority of bedrooms will not see exceedances of 50 dBA with windows open for periods of overheating, with progressively smaller percentages of bedrooms experiencing the higher levels of exceedance to the guide values. For shared living areas in dwellings, the 5 dB relaxation of noise criteria in these spaces (in line with BS 8233 and requirements of the Local Authority) mean that exceedances will be lower than those experienced in bedrooms by default.

Conclusion

It is expected that during very occasional daytime periods when ventilative cooling is required to control summertime overheating, levels of ≥ 50 dB $L_{Aeq,T}$ may be experienced in some habitable rooms.

However, the following context is considered applicable to the Development and should be considered when determine the outcomes of the AVO Guide Part 2 assessment and context within the Noise Exposure Hierarchy.

- Over 75% of bedrooms won't see an exceedance to the 50 dB upper guide value, with most exceedances occurring being low exceedances and a very small fraction of 0.6% experiencing the worst exceedances
- All of the above exceedances described would at a maximum occur over very short periods over the whole year of 0.4% of annual hours.
- The road transport network is expected to be mostly electric vehicles in future years (as a result of both UK wide policy of the ban of new diesel and petrol cars by 2030 and MCCs own target of Manchester being a zero carbon city by 2038), and this would see over 95% of bedrooms not seeing exceedances of 50 dB $L_{eq,16\text{ hour}}$, with the worst-case exceedance of 3 dB only being experienced in 0.6% of bedrooms
- As a result of complying with the acoustic requirements of Approved Document O, all above exceedances would be confined to daytime hours, with night-time noise levels being compliant with BS 8233 internal noise limits all year round.
- The current interdependency between acoustics, ventilation and overheating has been designed in line with the Noise Policy Statement for England (NPSE) vision of promoting good health and a good quality of life through the effective management of noise within the context of Government policy on 'sustainable development'. In clarifying how the term 'the context of Government policy on sustainable development' should be interpreted, some assistance can be obtained from the Government decision letter associated with the Thames Tideway Tunnel project. In that letter, it is stated that:
"The National Planning Policy Framework, the National Planning Practice Guidance on noise and the Noise Policy Statement for England are all clear that noise management should be determined in the context of sustainable development including the environmental, economic and social benefits of the proposal."
- The Planning Policy Guidance Noise (PPG(N)) states that local authority planning policies can include noise standards which apply to various forms of proposed development and locations in their area. The PPG(N), however, states that care should be taken to avoid these standards from being applied as rigid thresholds as specific circumstances may justify some variation being allowed.

Considering the above, and the illustration of the Cundall's interpretation of the daytime condition in the AVO diagram below, the predicted levels are below the "SOAEL" level, and below a level at which noise causes a material change in behaviour in Table 3-3 of the AVO Guide. They are therefore considered to be suitable for occupants given the very low overheating risk, and hence limited periods of time that windows are required to be open to mitigate overheating during the day (and with no requirement to open windows to mitigate cooling at night).

