

# OPENABLE WINDOWS IN RESIDENTIAL DEVELOPMENTS – ACOUSTIC COMFORT VS THERMAL COMFORT

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## DESIGN BRIEFING NOTE

Councils are increasingly requiring residential developments in noisy areas to be ventilated so that future occupants do not have to rely on open windows to prevent overheating.

This is to protect residents from the situation during warmer months where they either have to keep their windows closed and tolerate uncomfortably high internal temperatures or open their windows and tolerate unacceptably high internal noise levels. This design briefing note sets out a process to achieve adequate ventilation in residential developments so that windows can remain closed. The process is outlined in Attachment 1 below and is designed to achieve the noise criteria set out in BS8233:2014 - *Guidance on sound insulation and noise reduction for buildings*. It is compliant with current legislation, regulations and guidelines and is based on our extensive experience in the acoustic design of residential developments.

As shown in Appendix 1, where windows need to be kept closed to protect residents from external noise; mechanical ventilation will invariably be required.

The mechanical ventilation systems and associated ductwork will normally need to be more powerful than standard systems in order to achieve the high ventilation rates required to offset overheating in habitable rooms during summer. This can have significant implications for equipment costs and space requirements inside ceiling voids to accommodate the larger ductwork required to carry the increased volume of air movement.

The mechanical ventilation systems will also need to be designed so that noise from the systems themselves do not disturb residents (i.e. noise from supply air and extract air grilles etc). Recent research indicates that residents can be disturbed by noise from mechanical ventilation systems over around 25 dB LAeq. We therefore generally recommend that, where possible, mechanical systems are designed to achieve noise levels around this level under normal background ventilation rates. However, it is generally appropriate to adopt higher noise limits for the mechanical systems when they running at the higher ventilation rates required to offset overheating.

It should be noted that there is no requirement in the Building Regulations to consider the impact of open windows on internal noise levels in habitable rooms (although there is a requirement to control overheating under Part L1A of the Building Regulations). Therefore, this matter will only normally require assessment at the request of the Local Authority as part of the planning process. For information, relevant parts of the Building Regulations are summarised in Attachment 2.

However, developers may want to consider the implications of relying on openable windows to control thermal comfort under their duty of care to future residents.

## **ADDITIONAL INFORMATION**

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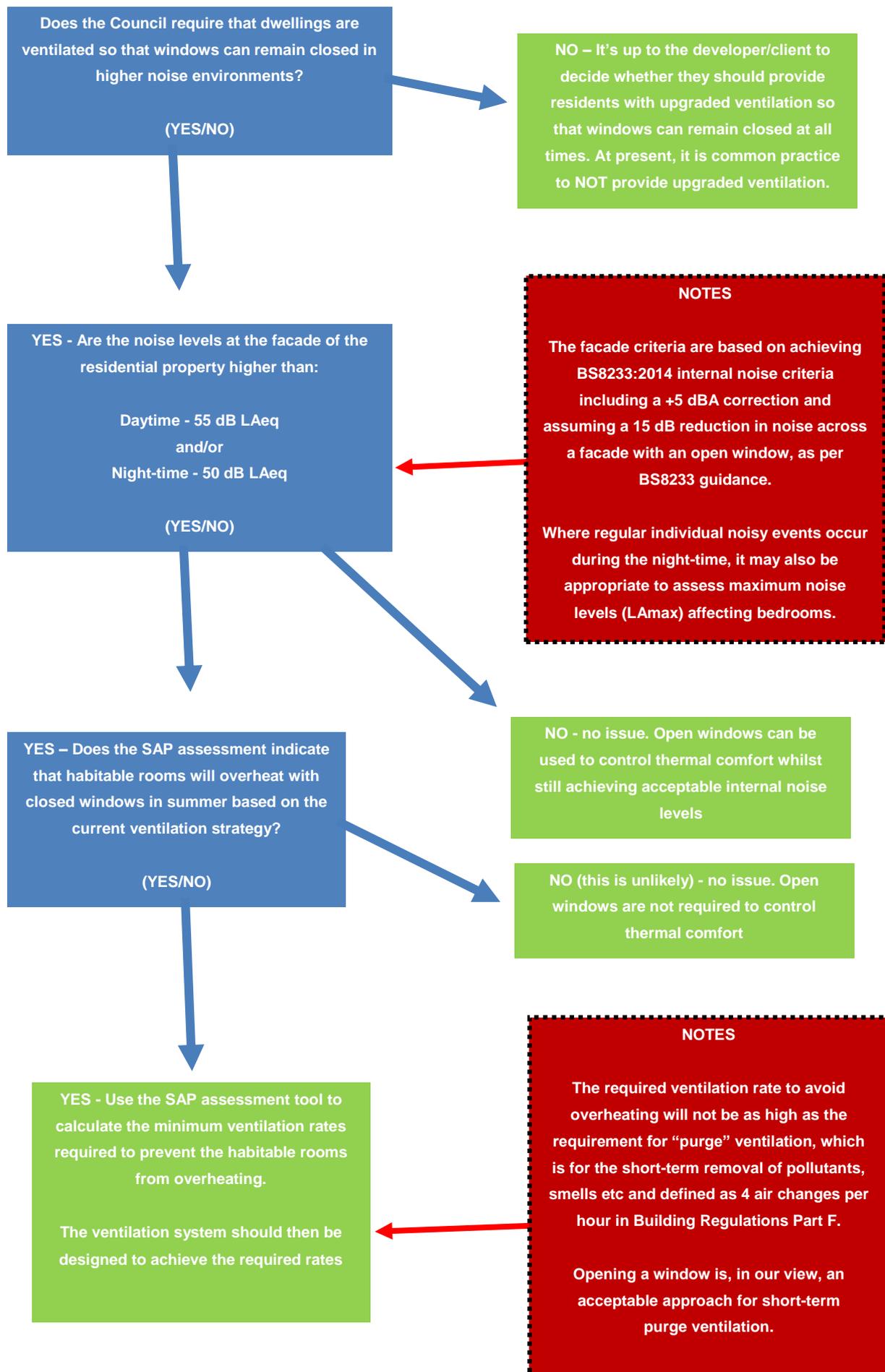
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We are experienced in the design and testing of large developments for major developers (e.g. Barratt Homes, Berkeley Homes, Bouygues, Morgan Sindall, Bovis, Crest Nicholson, Durkan, Galliard, Gladedale, Hill Partnerships, Kier Group, Mulalley, Mace Group, Taylor Wimpey, Telford Homes, United House).

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# ATTACHMENT 1 – THERMAL COMFORT VS ACOUSTIC COMFORT FLOW DIAGRAM



## **ATTACHMENT 2 – BUILDING REGULATIONS REQUIREMENTS IN RELATION TO NOISE AND OPENABLE WINDOWS**

### **Part E (2003 including 2004 amendments) – Resistance to the Passage of Sound**

- Part E does not contain any requirements in relation to the sound insulation provided by external facades nor limits for acceptable levels of external noise ingress in habitable rooms. There is also no mention of the use of openable windows to control thermal comfort and the impact this has on sound insulation.

### **Part F (2010) - Ventilation**

- Part F of the Building Regulations requires that all residential buildings are adequately ventilated including provision for background ventilation and purge ventilation.
- Purge ventilation is specified as a rate of 4 air changes per hour and is normally provided by openable windows.
- Part F states that “*ventilation may also provide a means to control thermal comfort but this is not controlled under the Building Regulations. Part L addresses minimising energy use due to the effects of solar gain*”.
- Part F goes on to say “*Purge ventilation provisions may also be used to improve thermal comfort, although this is not controlled under the Building Regulations.*”

### **Part L1A (2013) – Conservation of Fuel and Power**

- Part L1A states that reasonable provision should be made to limit solar gains and notes that solar gains can be limited by an appropriate combination of window size and orientation, solar protection through shading and other solar measures, ventilation (day and night) and high thermal capacity.
- Part L1A states that SAP 2012 Appendix P contains a procedure enabling designers to check whether solar gains are likely to be excessive and that reasonable provision can be considered to be achieved if a SAP assessment indicates that the dwelling will not have a high risk of high internal temperatures.
- Therefore, under Part L1A of the building regulation a SAP assessment should be carried out to assess whether overheating is likely to occur, and where necessary, the design of the development should be modified to prevent overheating.

To summarise the above, there is a requirement to control overheating under Part L1A of the Building Regulations, however, there is no requirement in the Regulations to consider the impact of open windows on internal noise levels in habitable rooms.