Hi Peter/Dan,

The acoustician has calculated the combined noise of the units of 66dB(A) and added 4dB(A) for the acoustic correction as indicated in BS4142 to give a 70dB(A) rating level. Based on their calculations, a 13dB(A) reduction by using the enclosure specification prescribed would bring the facade level 5m away from source down to 43dB(A).

I don't know where the acoustician has measured from to ascertain the 5m to the nearest receptor but I will assume the nearest point from the edge of the line of pumps to the facade. They have then added the noise of all the heat pumps together and measured it as a single point source from this nearest edge, but in reality the noise sources are spread over approximately 15 metres. Each unit is 2m wide and there needs to be spacing of at least 1m in between each unit to allow for air flow and the chosen attenuation. Thus I expect that the original assessment has overestimated the noise contribution from the units by at least 4dB. There is also the point as to whether the noise from the units should be actually considered a line source for noise, this depends on the actual length of the array and the proximity to the receptor. The acoustic guidance states, "a line source has to be at least three times as long as the distance between the source and receiver, otherwise it behaves as a point source." With a line source the noise level drops 3dB per doubling of distance instead of 6dB reduction per doubling of distance for a point source. Modelling should maybe have been undertaken here to provide a more accurate picture of the noise impact from this development. But we are where we are.

If we calculate the noise as 5 separate noise point sources and add their noise contribution together at the receptor rather than calculate it as one point source we get a different answer. For example the nearest unit is 5m away from the receptor the furthest is 17+metres away. So on the assumption each unit is 2m wide and there is a 1m gap in between each unit to allow for air flow and the acoustic attenuation, I calculated the following:

Each unit produces 59dB(A) at 1m, and with attenuation this is reduced to 51dB(A).

Therefore the nearest unit with attenuation will contribute 37dB(A) at 5m, at the nearest receptor.

the second unit will contribute 33dB(A) at 8m

the third unit will contribute 30dB(A) at 11m

the fourth unit will contribute 28dB(A) at 14m

and the fifth unit will contribute 26dB(A) at 17m

add these contributions together and you get 40dB(A) rounded to the nearest dB. If we halve that reduction in the event of it being a line source, ie a 3dB reduction per doubling of distance rather than 6dB, then we have 45dB(A). The worst case scenario is 1dB(A) below background and with an

open window this would be 30dB(A) inside, so the noise level from these units would comply with BS8233. The measured background level was 46dB(A). If we add the acoustic correction of 4dB(A) as indicated in BS4142 because of the character of the sound, then we have a rating level at the facade of 44dB(A) and a worst case of 49dB(A). The BS41412 rating level provides an indication of the noise impact and is not the actual noise level at the receptor. A rating level below background means a low impact, depending on context and a rating level just over background is an indication of an adverse impact depending on context. The context in this case is whether a character penalty needs to be added to an attenuated noise source. Also this is the worst case scenario when all Air Source Heat pumps are operating,and in reality the operation of the heat pumps will be staggered and it will only be during really cold weather that all 5 pumps will be operating simultaneously. In such climatic conditions it is probable that windows will be kept closed.

I can confirm I have no objections to the proposals.

Regards

Michael Lavender