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21st February 2024

Mr Sam Skeet
Cowplain Evangelical Church

Dear Sam

Re: Heat Pump Sound Levels

Further to our conversation about the request from Havant Borough Council for a BS4142 assessment of the noise from the proposed heat pumps, I have been doing a few measurements and calculations, as well as reading-up on the standard. I have to say that, in the circumstances, a request for a full BS4142 report does seem disproportionate.

The proposed outdoor units are Mitsubishi MUZ-AP71VG with a manufacturer's quoted sound level of 56 dBA (cooling, 55 dBA heating). The nearest residential properties likely to be affected ("Nearest Sensitive Receptor" or NSR in BS4142 terminology) to any of the intended heat pump locations are the front gardens of No 3 and No 8 Durley Avenue, both a distance of about 20 metres (See Attachment 1). Using a conventional inverse-square law of power versus distance (spherical propagation) gives us a sound power reduction of 26 dB, meaning that the level at the NSR would be around 30 dBA. This level is less than that of a "quiet residential area, a quiet office, a library or a whisper at 1 metre range". To put it another way, it is roughly the sound level of a domestic hairdryer 70 metres away in the open air. To be more exact, one should add the effects of the two more distant units on either side. The side most exposed would be the eastern side, where the three units are roughly 20m, 26m and 27m from the NSR (reading from the plans). Assuming spherical propagation without obstacles, these would add a further 3.3 dB, making a sound pressure level of 33 dBA (fractions of a dB are meaningless in this context).

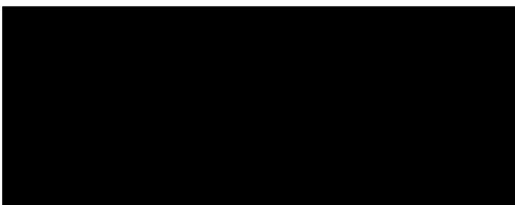
If this were indeed a "quiet residential area", there might be a case for further investigation. However, the reality is that the location is close to the main A3 London Road, with a steady flow of traffic, including cars, motorcycles and HGVs throughout the day. Moreover, it is close to a traffic light-controlled junction with cars frequently stopping, queueing, and starting. I have made a few rough measurements close to the NSR and found that sound level from passing traffic, though very variable, is typically around 55 to 65 dBA – that is between hundred and a thousand times more powerful than the sound level of the heat pump fans.

Another factor to consider is the number of air-conditioning units in the locality, including one directly across the road on the side of the Durley Dental Practice, and two on the corner with London Road, behind the Panthera office. Attachment 2 shows the locations of some 24 existing units in the vicinity. Surely, if the noise level of AC units were a nuisance, action would have been taken before now. Obviously, the question in the first response from the council about “significant adverse effects on health” is not relevant. Health risks may start to arise from continuous exposure to sound levels above 70 dBA, many thousands of times stronger than the sound of the heat pump units at the NSR. Later correspondence from HBC mentioned concerns about nuisance. Obviously, this is more subjective, but the sound pressure spectral curves from Mitsubishi show that the greatest sound spectral density is in the low frequencies (125 to 250 Hz), which will appear as a gentle hum, though in the locations, one would struggle to hear it at all, except when road traffic was very light and there was no wind. BS4241 would suggest an addition of around 2 dB for tonality in the sound, associated with the rotation rate of the fan in the external unit, but this is still extremely low at 35 dBA.

In conclusion then, a few elementary calculations show that the sound level from the heat pumps is predictable and would be negligible compared with typical ambient noise at the NSR. A full BS4142 report (costing around £2,000) seems a disproportionate expense for a registered charity. I do hope the council will appreciate this.

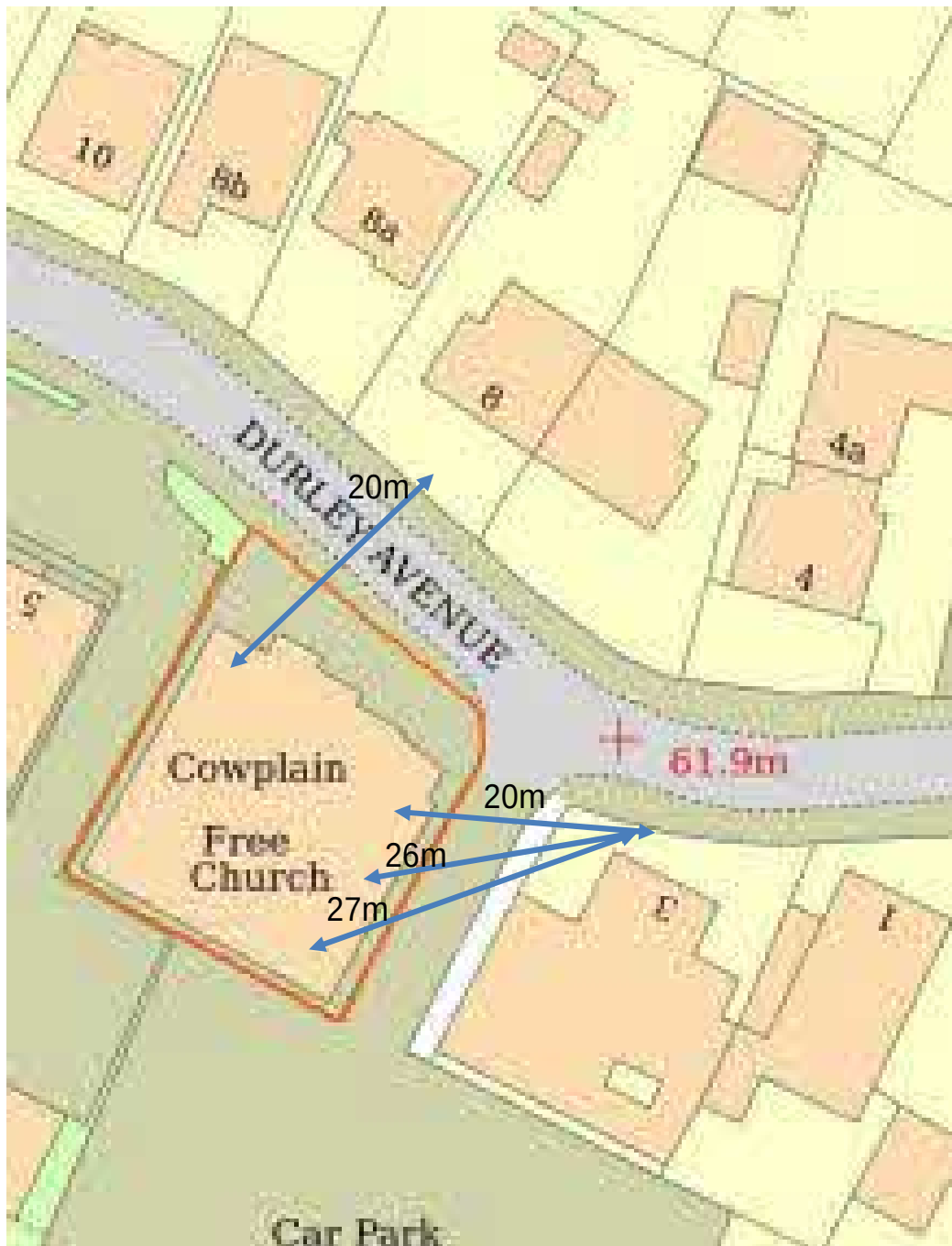
Please feel free to share the contents of this letter with the HBC Planning Department.

Yours sincerely

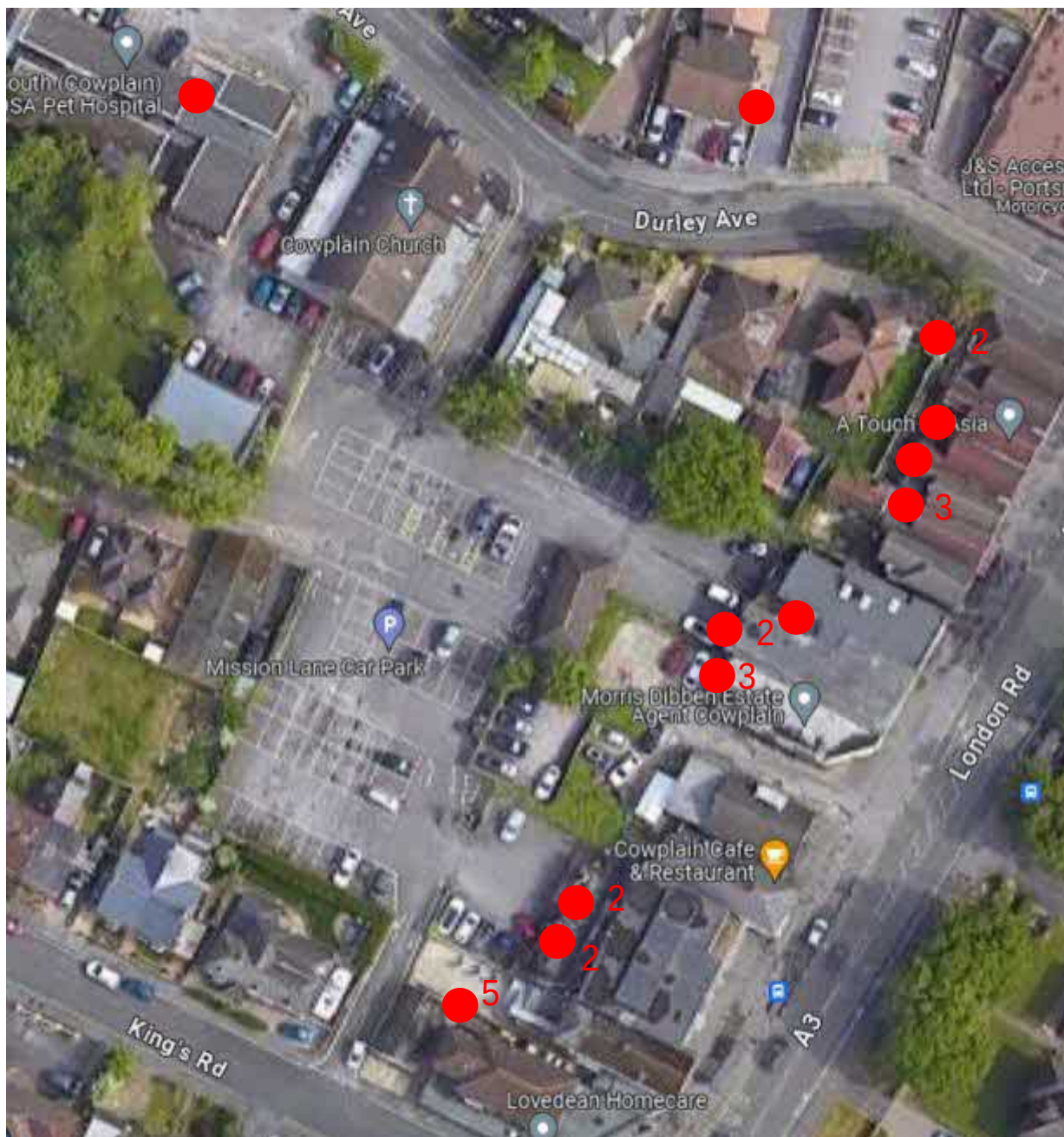


Stuart A W Bennett MA MSc CEng MIET
Director

Attachment 1: Nearest Sensitive Receptors



Attachment 2: Locations of nearby heat-pump or aircon units



● Locations of existing A/C units (with quantity when more than 1)