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Mr and Mrs Davis
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Dear Mr and Mrs Davis

NEWDEEPS FARM: PROPOSED DOG KENNELS: SOUND ADVICE TECHNICAL NOTE

I have reviewed the Technical Note dated 13 February 2015 provided by Sound Advice Acoustics Ltd and I find that it is inadequate in several respects. I understand that this note was prepared in response to the Consultees Response provided by Neil Scott, Senior Scientific Office, Housing and Environmental Health Unit and that this response was sent after my letter dated 2 December 2014 was submitted to the local planning authority. I have also seen the second response from Neil Scott. My concerns are set out below.

Ventilation

The documents that accompanied the application appeared to contain no provision for ventilation of the kennels. It is now proposed to install "*A Manrose fan unit available from Screwfix has been selected with manufacturers data of Lw 45 dB confirmed*". No further details of the proposed fans are given, but the second figure in the Technical Note appears to show one fan in each of the 15 kennels and a further two fans on the north eastern side of the building, which houses the reception area and the kitchen. No fans are shown in the indoor play area or corridor.

The applicant provided additional information in a letter dated 30 December 2014 and stated that *for example Manrose in-line mixed flow fan 240V, IPX4* would be used. This is not a model number but inspection of the Screwfix catalogue indicates that it is that Manrose MF100 W 100mm Mixed Flow Fan which is referred to by the applicant. The applicant states that the fan provides an extraction rate of 245m3/hr. The kennels have a volume of approximately 30 m^3 which is equivalent to 8 air changes per hour. It is recommended that 12 – 15 air changes per hour are needed for adequate ventilation and odour control and therefore the proposed system is significantly under-capacity, notwithstanding that the play area and corridor are not serviced at all. Thus, the design is inadequate and is likely to be replaced by larger and noisier equipment once the kennels are operating.

My second and greater concern regarding the proposed ventilation is that the calculations of noise emission only address the fan generated noise and no allowance is made for the breakout of noise from

dogs barking through the airways. The noise from dogs barking inside the kennels would be significantly louder than the noise generated by a small axial fan and it is this noise that will dominate the noise radiated from the fan grilles and must be considered. This issue is always encountered when ventilating a noisy space and I am surprised that it has been overlooked.

I have discussed the design of axial extractor fans with the Manrose technical enquiries department and have been advised that the low noise levels are achieved using a quiet blade and motor design and that the unit does not include any silencing in the air pathway. Thus, any noise from inside the kennel would have an unimpeded passage to the outside. The Sound Advice Acoustics Ltd report uses a value for a bark of 102 dB(A) at 1 m from a dog. This level is equivalent to 92 dB(A) at 3 m and therefore is 65 dB(A) higher than the level quoted for the fan. The noise within the kennels is likely to be controlled by the reverberant field (multiple reflections of sound from walls, floor and ceiling) and the summary calculations provided in the report at section 4 suggest that this would be approximately 110 dB(A). This noise would be reduced by 6 dB(A) as it passes from the internal reverberant field to the outside free field[1] and may also be subject to come minor losses as it passes through the fan housing, but again the external noise is likely to be some 60 dB(A) higher than that caused by the fan itself. The report provides calculated levels of noise at the nearby houses due to the fan noise and this is approximately -7 dB(A) at the nearest house. The noise of dog barking within the kennels would therefore exceed 50 dB(A) at the houses and would be clearly audible.

Dog Barking Calculations

My first observation is that in both Sound Advice Acoustics Ltd reports they have only considered scenarios with up to 15 dogs in the kennels, but the planning application is for 30 dogs. Only 15 kennels are provided and I assume that this discrepancy allows for two or more dogs from one owner to share a kennel space. The assessment should acknowledge the possibility of 30 dogs being present at the kennels if the application is for that number of dogs.

The Technical Note presents the results of calculations of noise from dog barking in the external covered areas and also in the outside recreation area. These calculations and the assumptions used are far from transparent and it is unclear how the results have been derived. The Technical Note states that dog barking at 102 dB(A) at 1 m has been used, but this is not the level previously stated by Sound Advice Acoustics Ltd and no explanation is given as to why this value has been used[2]. The level does, however, approximately equate to the level that I have quoted in my earlier letter although I note that an internet search yields higher values for barks from large dogs. The calculations have been carried out using Cadna A software, which can implement several noise propagation methodologies, but no information has been supplied regarding the particular methodology used for these calculations and it is therefore impossible to form a view on the validity or appropriateness of the calculations. The locations of dogs barking outside are predominantly close to the new bund that is proposed or the building, with only two dogs placed further from the bund. This disposition will provide a higher degree of screening attenuation than if the dogs were randomly spaced throughout the outside area. I also note that the calculations are made for free-field

[1] The internal reverberant sound field is the total sound reflected from all internal surfaces, but only the sound which has a direct component in the direction of the fan outlet will pass through the fan. The reverberant field is found to be 6 dB higher than the direct sound field in a room with relatively uniform sound absorption distribution.

[2] A level of noise level of 97 dB L_{Amax} at 4 m attributed to Miller Goodall in the first Sound Advice Acoustics Ltd report which is equivalent 109 dB L_{Amax} at 1 m and 89 dB L_{Amax} at 10 m. The calculations in the first report used a level 89 dB L_{Amax} at 10 m for the calculations of maximum noise levels; however, a level of 65.6 dB at 10 m which equates to 73.6 dB at 4 m was used for the other calculations, which is 6.4 dB lower than the Miller Goodall level which was stated to have been used.

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locations in the gardens close to the houses and not at the façades of each nearby house. Close inspection of the plans provided reveals higher noise levels at the façades (shown in very small circles). These levels should be approximately 3 dB higher than the free field levels to account for reflections from the façades. It will be these higher façade levels that anyone sitting on balconies or patios would experience. No consideration is given to the main garden areas which are all closer to the proposed exercise area than the houses and their immediate surroundings. Thus, higher levels of dog barking will be created in the gardens than those reported in the Technical Note. It is unclear if the dogs will have access to the bund, but if they can climb it any screening that it may provide would be lost. It would be essential that a fence would be provided at the foot of the bund to prevent dogs climbing it.

Notwithstanding these concerns I note that the calculations show levels of noise in excess of 54 dB(A) are predicted at the nearest house, with levels in excess of 50 dB(A) at several other properties. These levels of noise are up to 16 dB higher than the measured daytime background noise levels and up to 29 dB above the measured night-time background noise.

It is worth noting that noise from dog barking will be similarly audible within the neighbouring properties. The properties typically have large patio-door type windows facing the proposed site and the level difference between outside and inside will be 10 dB(A) or less when windows are open for ventilation, depending upon the amount of opening. The background noise will be subject to the same reduction in noise level as the barking and therefore the barking will exceed inside noise levels by 16 dB(A) or more. This will be very attention drawing and intrusive. Even with the windows closed the noise of dog barking will be audible within the properties. This means that neighbours would not be able to seek respite from the noise of barking by remaining indoors with windows closed even if they chose to do so, and it would not be reasonable for the planning system to expect that people should be expected to seek respite in this way.

Barking Inside Kennels

Calculations are provided for noise breakout from dogs barking inside the kennels. Again these are not transparent and the assumptions are not stated. A level of 109 dB(A) at 1 m is given in the first line of the summary and this is 7 dB(A) higher than that quoted in the previous calculations for dogs barking outside. The term *reflective field correction* is used and it is not stated what exactly this means. There is a relationship between the sound power of a source in a room and the reverberant sound field created in the room. This can be calculated and is dependent upon the sound absorption provided by the room's surfaces. In this case the surfaces will be reflective rather than absorptive and I calculate that the reverberant field would be numerically about 4 dB(A) higher than the sound power level. However, the calculations use a sound pressure level as a starting point and the other lines in the table appear to be calculating sound pressure levels incident on the inside of the wall/roof and also the sound pressure level immediately outside. In any case the correct assessment of breakout should include both the direct and reverberant sound incident on the wall/roof area and the -6 dB(A) factor for reverberant to free field only applies to the reverberant component[3]. The summary of the calculations contains several anomalies or errors and I consider that no weight should be placed on these calculations.

[3] As noted in footnote 1, the reverberant sound field is the sum of all reflected sound components in a room. The direct sound is that sound that reaches a point without previously being reflected from any surface. The sound at any point is the sum of these two components. Where, for example, the sound falling on the fan comprises equal levels of direct and reverberant sound the total incident sound is 3 dB higher than each component (eg 100 dB+100 dB=103 dB). When the reverberant sound passes through the fan, only the sound travelling towards the fan can pass through and this results in the 6 dB loss for reverberant to free field, but this is not the case for the direct sound, which is by definition travelling towards the fan. Thus for the example above the total sound at the outlet of the fan is 94 dB + 100 dB = 101 dB.

I noted at page 4 in my previous letter that the author of the Sound Advice Acoustics Ltd had apparently made errors in the calculation of the attenuation that would be provide by the façade of the kennel building. I again have reservations that the calculations in the Technical Note are also incorrect. A value has been derived for the Rw of the walls and roof of the kennels, but Rw is a laboratory test result (Rw being the weighted sound reduction measured under laboratory conditions). The calculation of sound transmission through building elements should be made using the Dw (the weighted sound level difference). This is the attenuation that is achieved in the installed situation and takes account of "field losses" such as flanking and any construction deficiencies when compared to the perfect laboratory conditions. In general a difference of between 5 and 8 dB would be used to account for the difference between Dw and Rw. **I therefore consider that calculations in the Technical Note are underestimated by at least 5 dB** because of this use of Rw rather than Dw.

Dog Barking Noise Levels

I have noted that the noise source levels used in the two calculations appear to be inconsistent. 102 dB L_{Amax} at 1 m is used in the external noise calculations and 109 dB $L_{A\ max}$ is used for the internal calculations. The latter value corresponds to the level of 97 @ 4m dB L_{Amax} quoted in the first Sound Advice Acoustics Ltd report and attributed to Miller Goodall. I cannot link the lower level to any of the levels quoted in the first report and clearly both calculations should be made using consistent source data. Looking again at the first report I note that the author reports a level of barking of 65.6 dB(A) @ 10m and attributes this to "The Essential Guide to Creating Your Perfect Kennels". This level is approximately 6 dB(A) lower than the free field levels quoted for Miller Goodall (*80 dB(A) @ 4m which equates to 72 dB(A) @ 10m*). The author concludes his discussion of source noise levels with: *Therefore, these noise levels are to be used as the basis for this assessment and calculations*. From this we might expect that the higher values recorded by Miller Goodall (an established acoustic consultancy) would have been used in preference to a figure given in a non-specialist publication. However, it is the lower level that has been used and therefore the results are some 6 dB lower than would have resulted with the Miller Goodall L_{Aeq} data. I have previously noted that the Miller Goodall data is consistent with measurements that I have made of dog barking.

The calculations presented in both reports are based on inconsistent source data and in the first report explicitly use data lower than presented in the introductory discussion. The calculations also appear to contain other significant errors as discussed above. These errors all result in the calculated level being lower than would be expected if the calculations had been correctly performed. I conclude that little weight should be placed on these calculations by the local planning authority and if they are considered at all they must be regarded as minimum possible levels.

Using the Miller Goodall data of 109 dB LAmax at 1 m, a single dog barking in the outside exercise area would create approximately 73 dB LAmax at the nearest house is the propagation path is not screened. Depending on the location of the dog either the building or the newly proposed bund would provide some screening, but this is unlikely to exceed 10 dB unless the dog is very close to the screen. **Thus the maximum noise at the nearest house is likely to be about 63 dB $L_{A\ max}$ due to a single dog, with higher levels being created in the garden.** The Sound Advice Acoustics Ltd report presents levels in excess of 50 dB L_{Amax} at the nearest properties but this was derived using 102 dB L_{Amax} and not the value of 109 dB L_{Amax} which should have been used. If the correct sound level had been used the author would have reported levels of over 57 dB L_{Amax} at the nearest house.

Considering my own calculations and making reasonable adjustments to the Sound Advice Acoustics Ltd calculations, **I remain of the opinion that the level of dog barking will regularly exceed 55 dB(A) at the nearby houses.**

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Assessment of Impact

The author of the second Sound Advice Acoustics Ltd report claims that the calculated results show compliance with the CIEH publication "Clay Target Shooting - Guidance on the Control of Noise"; however, the shooting noise level threshold of 55 dB is quoted completely out of context. The Shooting Noise Level (SNL) is the L_{Amax} for a shot and therefore only levels calculated from the Miller Goodall L_{Amax} data can be assessed against this guidance. I consider that this threshold will be exceeded, but it must be emphasised that this refers to established shooting ranges where these are audible in the surrounding community it is recommended that severe restrictions on times and days of use are imposed. The advice states:
Where justified complaints of noise have been received or are anticipated by the local authority, or where noise levels are measured or predicted to exceed the levels given in Section 6 of this guidance, then restricting shooting to the following times may provide a suitable remedy:

(i) Mondays to Fridays: 09.00 to 18.00 with a maximum cumulative duration of 4 hours
(ii) Saturdays: 10.00 to 18.00 with a maximum cumulative duration of 3 hours
(iii) Sundays: 10.00 to 14.00 with a maximum cumulative duration of 3 hours

On those sites where shooting occurs on more than 28 days within any calendar year it may, in some circumstances, be appropriate to further restrict the times of operation and/or the number of days per week and/or weeks per year that shooting may take place.

In this case the noise of dog barking will be significantly above the level of background noise and complaints would therefore be highly likely. If this were a shooting range it would be appropriate for the LPA to restrict the noise to times more onerous that those given in the guidance as the noise will occur on a daily basis throughout the year. In the case of the kennels this is not possible as barking noise will be audible from both outside and inside and on an uncontrolled basis and cannot be limited to say 3 hours per day. I note that the applicants propose that any dog that barks outside would be taken inside, but a dog barking outside would be audible to dogs inside and could provoke barking in those dogs – a barking dog does not need to be visible to another dog to provoke a response. It can be assumed that during the day dogs will have access to their individual outside areas and so any dog provoked into barking will be audible at a high level at the nearby houses.

The local planning authority has a duty not to permit any development that is likely to result in a statutory noise nuisance. There is no precise definition of the levels of noise that would cause a statutory nuisance and ultimately this is a decision for the courts; however, the planning process should avoid creating such decisions and therefore has to anticipate what the courts may decide. Where the introduced noise, in this case dog barking, will be at a level considerably in excess of background noise it will be clearly audible at the neighbouring houses. This intrusive noise will occur on a daily basis (rather than be limited to 28 days per year as with many sporting activities) and could occur at any time of day or night (rather than be limited to a restricted time period as sports or industrial activities). As such it is likely to be considerably more intrusive and annoying than noise from properly regulated sports. The courts apply the test of what would be unacceptable to a notional "ordinary man" and with the level and frequency of intrusive noise likely in this proposal **I would expect a court to find this to be a statutory nuisance**.

Senior Scientific Officer's Comments

The Senior Scientific Officer has proposed a number of conditions, but some appear unworkable. It is proposed to allow outside exercise only on an individual dog basis. This would mean that a dog may only get outside exercise for 12 to 16 minutes per day if the time limits from the Clay Target Shooting guidance are adopted. This would be inadequate, particularly for large dogs. The exercise period would be even less if the number of dogs at the kennels were greater than 15 (the application is for 30 dogs).

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The comments on ventilation are based on incorrect calculations provided by the applicant and appear to assume that any dog barking within the building will be inaudible, which is not the case. He implies that ventilation is required for summer only, but it is recommended for all year for odour control and welfare. The comments are also based on the incorrect analysis made by the applicant's consultant that is based on an inadequate air flow and ignores the main source of noise, the dogs themselves.

I conclude that the additional information only adds to the evidence that the noise of dog barking from the proposed kennels will be significantly higher than the existing background noise at the neighbouring houses and would be a cause of significant annoyance to residents. If permitted, I would expect the noise from the kennels to constitute a statutory nose nuisance. Although I have noted that the Clay Target Shooting guidance is possibly the closest guidance available to assess the noise impact the test in a noise nuisance hearing would be what a normal person may be expected to accept. Comparisons may be made with other similar cases and I think that this would show the impact to be unacceptable. However, the presence of random, but regular barking at levels well above background noise levels on a daily basis throughout the year would be likely to convince a court that the impact is unacceptable to the normal person. For this reason the LPA should reject the application as it should not permit any development that is likely to result in a noise nuisance.



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Consultant

cc. Nuala Rochfort and Steve Cockshott - Willows
Sean and Jo Sims - Robin's Rest

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