

Re: Brookside Road CDN/21/0610

Adam Mitchell <Adam.Mitchell@manchester.gov.uk>

Tue 9/28/2021 3:52 PM

To: Graeme Souter <graeme.souter@manchester.gov.uk>

Hi Graeme,

The applicant has responded to your initial assessment and has stated the following:

Please find our consultants response to the comments on condition 18 below:

In terms of determining a specific sound (in this case the plant noise) BS 4142:2014 'Methods for rating and assessing industrial and commercial sound' states:

7.3.5 Where it is not possible to determine the specific sound level by measurement of the ambient sound level and the residual sound level at the assessment location(s), for example, because the difference between the ambient sound level and the residual sound level is ≤ 3 dB, determine the specific sound level by a combination of measurement and calculation. Report the method of calculation in detail and give the reason for using it.

NOTE *In some cases, measurements can be supplemented by calculations. Calculations are often more reliable than a single short-term measurement when long-term averages are to be determined and in other cases where it is impossible to carry out measurements because of high residual sound levels. In case of the latter, it is sometimes convenient to carry out the measurements closer to the source and then use a calculation method to estimate the specific sound level at the assessment location(s).*

I measured at the residential properties and could not hear or measure the plant noise and concluded the above methodology would best suit.

As such I chose to measured close the plant items and calculated back based on a simple distance attenuation calculation ($L_{p2} = L_{p1} - 20\log(R2/R1)$) where L_{p2} is the noise level at the receiver, L_{p1} is the noise level measured close to the plant, $R1$ is the distance to the receiver and $R2$ is the distance from the plant that the noise level was measured at.

Hence, in Table 4.2 of the letter where I have stated -39dB for distance attenuation this relates to $20\log(90/1)$ which is -39dB. 90 relates to the distance between the houses and plant and 1m relates to my near-field plant noise measurements that I undertook on the roof. I accept that some of the plant items will be slightly further aware but this will make a negligible difference so I simply assume that all plant items are at the same (nearest) distance. Apart from the equation, this is clearly stated in the report.

In terms of the screening used, perhaps I could have explained myself a bit better in the report. To the houses on Croft Hill Road, Table 4.2 clearly states that there line of site screening of the plant from the residential windows. With regard to this BS 5228-1: 2009 'Code of practice for noise and vibration control on construction and open sites – Part 1: Noise' states:

receiving position in relation to the source and the barrier are required. Calculations may be made in octave bands instead of "A" weighting to provide a more accurate barrier attenuation; if the octave band sound levels (see Tables C.1 to C.11) and the positions of the sources, receiver and barrier are known. The barrier attenuation can be calculated from Figure F.3. The final results of this analysis then needs to be logarithmically summed and weighted to provide an "A" weighted level.

In the absence of spectral data, as a working approximation, if there is a barrier or other topographic feature between the source and the receiving position, assume an approximate attenuation of 5 dB when the top of the plant is just visible to the receiver over the noise barrier, and of 10 dB when the noise screen completely hides the sources from the receiver. High topographical features and specifically designed and positioned noise barriers could provide greater attenuation. Subtract the attenuation from the value of L_{Aeq} calculated at the point of interest. Where the point of interest is 1 m from the façade of a building, make an allowance for reflection by adding 3 dB to the calculated (free field) levels.

Although the plant is completely screened from the residential windows, in my assessment I have erred on the side of caution and assumed -5dB screening (as identified in table 4.2 of the report). This is just a shorthand method.

In terms of the 15dB attenuation for screening stated in Table 4.2 I have used the following calculation method presented in ISO 9613-2:1996 'Acoustics – Attenuation of sound during propagation outdoors – Part 2: General method of calculation'. See below.

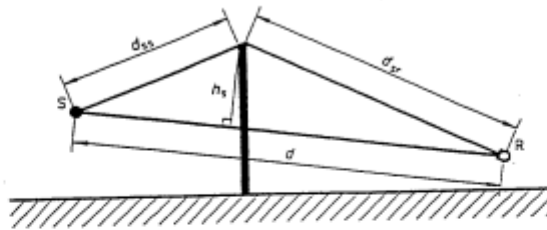


Figure 6 — Geometrical quantities for determining the pathlength difference for single diffraction

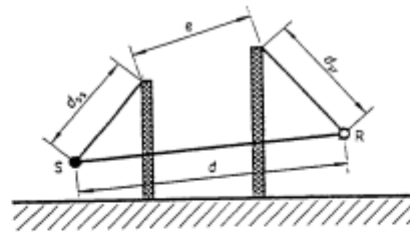
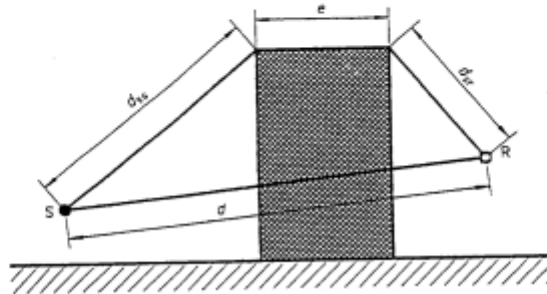


Figure 7 — Geometrical quantities for determining the pathlength difference for double diffraction

If the line of sight between the source S and receiver R passes above the top edge of the barrier, z is given a negative sign.

For double diffraction, as shown in figure 7, the pathlength difference z shall be calculated by

$$z = \left[(d_{ss} + d_{sr} + e)^2 + a^2 \right]^{1/2} - d \quad \dots (17)$$

The correction factor K_{met} for meteorological conditions in equation (14) shall be calculated using equation (18):

$$K_{met} = \exp \left[- (1/2000) \sqrt{d_{ss} d_{sr} d / (2z)} \right] \quad \text{for } z > 0 \quad \dots (18)$$

$$K_{met} = 1 \quad \text{for } z \leq 0$$

For lateral diffraction around obstacles, it shall be assumed that $K_{met} = 1$ (see figure 5).

NOTES

17 For source-to-receiver distances less than 100 m, the calculation using equation (14) shows that K_{met} may be assumed equal to 1, to an accuracy of 1 dB.

18 Equation (15) provides a continuous transition from the case of single diffraction ($e = 0$) where $C_3 = 1$, to that of a well-separated double diffraction ($e \gg \lambda$) where $C_3 = 3$.

19 A barrier may be less effective than calculated by equations (12) to (18) as a result of reflections from other acoustically hard surfaces near the sound path from the source to the receiver or by multiple reflections between an acoustically hard barrier and the source.

This is quite an involved calculation for which we have developed a spreadsheet. The reduction of 15dB I have used was actually 17dB theoretically, however, it is good practice to use the maximum reduction from a barrier of -15dB.

I hope the above clarifies the matter for MCC. As the above clearly demonstrates, we have used technically sound and correct methods. So the planning condition for the noise should be discharged.

We are still awaiting comments regarding conditions 11 and 23 but will keep you informed once I'm made aware.

Many thanks,