λ Wright's Aerials

Television interference studies for wind turbine installations

We are able to provide you with comprehensive and scientifically meaningful reports regarding the effect (if any) your wind turbine project will have on television reception in the surrounding area. This includes baseline surveys before construction commences and confirmatory surveys after the turbines have become operational.

We can assess post-construction complaints from individuals objectively, referring back to the baseline study where necessary. We have a great deal of experience of dealing with the public regarding TV reception, and have a good understanding of the social as well as the technical aspects. We are prepared to attend public meetings if required.

In cases where it can be shown that the turbines might cause TV reception problems we can calculate potential amelioration costs. This is based on our pre-construction survey and the figures will be available to you before construction starts. We also give details of the most cost-effective way of providing amelioration in each individual case, choosing from the various alternative solutions. We have intimate knowledge of the TV aerial and satellite industry and in cases where work is necessary we can oversee it and help you obtain the best deal. Needless to say this can save a great deal of money.

Our reports are written in plain English with the minimum of technical jargon and are intended to be accessible to all readers. Our emphasis is on clarity and practicality rather than theory. Although we include the technical background the actual conclusions are presented in non-technical terms. The reports are written by Bill Wright, who has been contributing to specialist and non-specialist publications since 1978. The reports include many explanatory diagrams and maps, which are professionally prepared. The reports are typically 35 to 50 A4 pages (depending on the complexity of the case). In addition we provide a glossary and other appendices where appropriate. Reports can be supplied either electronically or on paper. Four typical pages are reproduced overleaf.

For a list of some previous customers please see *http://www.wrightsaerials.tv/our-customers.shtml* . Previous TV reception surveys of the kind we are concerned with here have been for Doncaster Council, Rugby Cement, Falck Renewables Wind Limited, and Npower Renewables (five surveys).

If you feel that we can be of help please contact Bill Wright.

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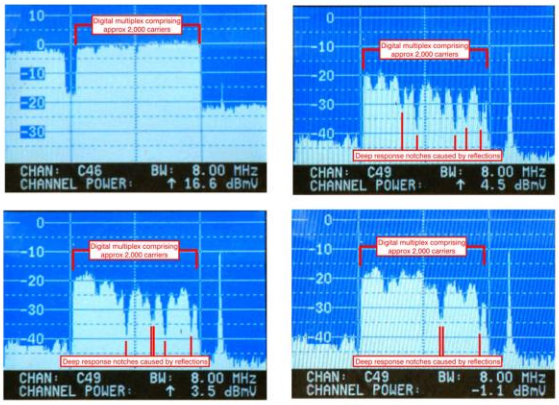

Fig 4.2.1. Screenshots from a spectrum analyser.
These four images are screenshots from a spectrum analyser, a device that produces a graph-like representation of radio signals. The vertical axis represents the strength of the signal (the unit is dB), and the horizontal axis is frequency. The multiplex is just less than 8MHz wide. The top left screen shows a multiplex as we like to see it, with little variation in strength across its range of frequencies. The generally higher level of this multiplex compared to the one in the other shots is not relevant. The other three shots were taken at 1 second intervals and show the rapidly changing effects of the reflections from the rotors. When a reflection arrives out of phase with the direct signal at a particular frequency, the signal level at that frequency will drop, creating a response notch. If the phase difference is exactly 180˚ and the two signal components are of the same strength the drop is, in theory, infinite. Fortunately this is statistically improbable and typically notches are between 0 and 35dB in depth. In practice this means that the amount of spectrum that falls to the extent that the signal cannot be recovered is small, and COFDM and error correction will generally do the rest.

Fig 4.2.2. The result of severe DTT signal degradation is ‘pixilation’ and a stop-start picture.

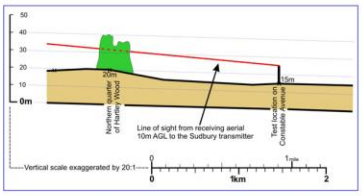

Fig 6.5.2. Large scale profile showing that the Constable Avenue area is screened from Sudbury by Hartley Wood.

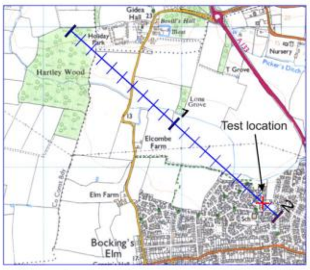

Fig 6.5.3. Location on the ground of the profile above.

analogue signal, so it is one that we need to consider as part of the amelioration work. It must be said however that Channel Five analogue from Sudbury is on such low power that many people must be watching it through a snowstorm. Mux A is transmitted using a modulation system called ‘64 QAM’, which is used in order to cram in more channels. Since 64 QAM has less error correction than the alternative (16 QAM) it needs a more robust signal. This makes it that little bit harder to receive, which in a marginal situation like this (levels of around –19dBmV) could be crucial.

Channel 49: Mux 1 (BBC). This mux is essential for amelioration purposes. Signal levels are adequate so there should be no particular problem.

Channel 50: Mux D and channel 54: Mux C. Reception is marginal, but since these muxes carry no PSB (Public Service Broadcasting) channels we don't need to worry them about them for amelioration purposes. If residents receive them, it’s a bonus.

Channel 56: Mux 2 (ITV). Saving the worst news until last, reception of this multiplex is difficult in areas screened from Sudbury. Unfortunately this mux is essential for amelioration purposes. As well as the low transmitted power, there are other problems.

1. The mux is 64 QAM.
2. The mux is outside Channel Group B, so existing aerials will not receive it.
3. Channel 56 is quite near the top of the UHF band, where tree screening problems and signal losses on downlead cables are always more acute.

The broadcasters obviously had a problem with this allocation. They were unable to find a completely clear channel; hence the use of channel 56 in some directions and channel 68 in others. The original planning parameters for DTT said that the two PSB multiplexes would have the best coverage and would be ‘in Group’ wherever possible, this being essential for a smooth transition to DTT. In this particular case, for reasons that escape us, the second PSB mux has been allocated to two highly unfavourable channels, with one of them on greatly restricted power.

9.3. The small scale topographical profiles

Each profile is based on a receiving site that has the wind turbine in exactly the same direction as the transmitter. Therefore the turbine will always fall somewhere along the signal path. The profiles show a cross-section of the ground below the transmission path, and the transmission path itself. The vertical scale is exaggerated by a ratio of 70:1 compared with the ‘across the ground’ horizontal scale. The vertical scale is in metres. The horizontal scale is in miles and kilometres. The faint vertical lines are one mile apart across the ground. The receiving aerial is on the extreme left and is shown 10m above ground level. The green line is the line-of-sight path from the transmitter. In cases where the line-of-sight path is obstructed by the topography a dark yellow line has been added. This represents the signal path that might exist as the result of signal refraction and diffusion over the horizon. The pink line represents the outer extremity of the Fresnel area. The Fresnel area is a theoretical envelope surrounding the line-of-sight path that needs to be clear for perfect propagation, but for our purposes Fresnel paths can largely be ignored. The red line with three cross members represents the height of the wind turbine. The ground shown in red indicates areas where the surface obstructs the line-of-sight path. Note that the depiction of the topography is relatively approximate, so in some cases the bottom of the turbine tower appears to be slightly above or below ground level. The profile below is an annotated sample. It shows a rather extreme example of topography in order to include all possible features, but the profiles for the present study are considerably less ‘interesting’.

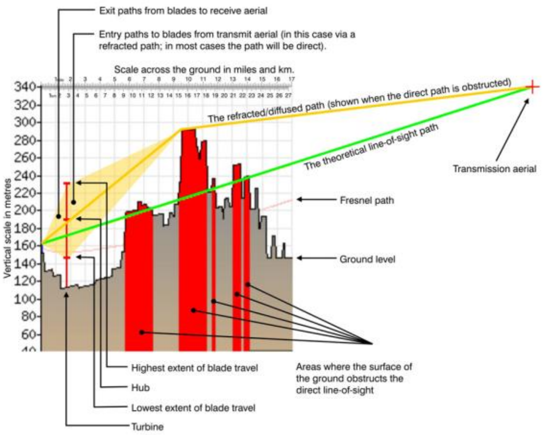

Fig 9.3.1. Annotated example of a topographical profile.

Section 7.0. Areas where there is a significant chance of wind turbine interference

7.1. Interference to Dover reception

Fig 7.1.1 (below) shows the area where there is a real possibility that TV reception from Dover, using a correctly installed aerial, will be affected. Dover is in almost exclusive use in the whole of the shaded area. The likely severity of the interference and the amelioration options will be discussed in sections 8 to 16, which deal with various small areas individually.

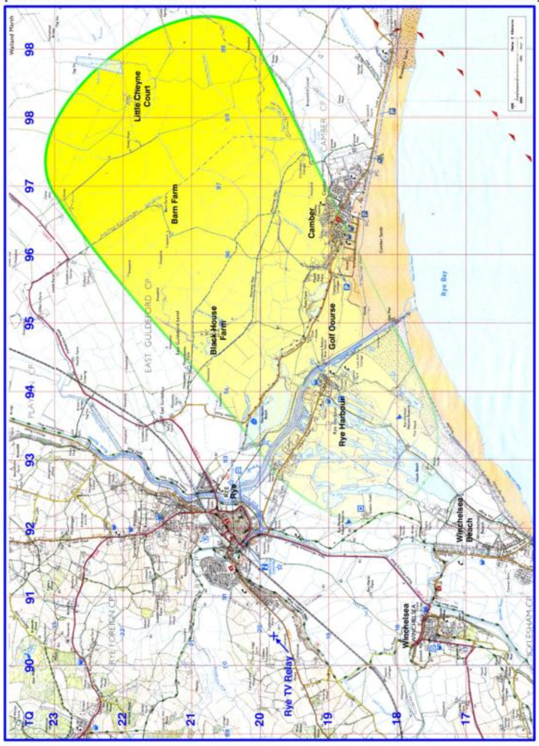

Fig 7.1.1 The area in which there is a significant chance that Dover reception (using a correctly aligned aerial) could be affected by the turbines is enclosed in green and shaded yellow. The depth of the shading is an approximate indication of the severity of the interference.