11 Infrastructure, Telecommunications & Shadow Flicker

11.1 Introduction

Due to the production of low levels of electromagnetic radiation, wind turbines can have an effect on communication systems that utilise electromagnetic waves as their means of transmission. It is necessary to ensure a suitable separation distance between telecommunications links and wind turbines. Shadow flicker has rarely been a problem with wind energy developments although it is accepted that it can, on occasion, present a nuisance to amenity when people are within the rooms affected by the phenomenon.

11.2 Existing Environment

11.2.1 Electromagnetic Interference

An initial OFCOM consultation was undertaken in June 2011. This consultation identified a number of links which are within the vicinity of the site boundary. The service providers of these identified links are Airwave Solutions Ltd, Cable & Wireless PLC, Everything Everywhere Ltd (responsible for the Orange and T-Mobile networks), BT, Scottish and Southern Energy PLC, Atkins, the Joint Radio Company (JRC) and Hutchison 3G. These service providers were contacted directly and responses were received from all except Scottish and Southern Energy PLC.

Atkins had no objection to the proposal at this stage, and Everything Everywhere had no affected links in the area.. The other providers identified links which are within the vicinity of the site boundary, but none that intersect it. Any links confirmed to cross the site following consultation are shown on Figure 3. Airwave solutions charge for a detailed consultation which will be undertaken when the site has a layout design.

A further consultation will be undertaken with OFCOM to identify any changes to the links mentioned above. Service providers will be contacted as a result of this consultation.

11.2.2 Shadow Flicker

Properties are present to the west of the site (along the A83) at Muasdale, Beacharr and Gelnnbarr, and the closest at Low Clachaig, approximately 0.5km from the land available for turbine and associated development. Shadow flicker effects have been proven to only occur within ten rotor diameters of a turbine and only properties within 130^{o} either side of north, relative to the turbines can be affected.

11.2.3 Infrastructure

No gas pipelines have been identified within the site boundary. An electricity transmission line runs to the east and intersects the edge of the site.

11.3 Methods

11.3.1 Electromagnetic Interference

AECOM has initiated consultation with OFCOM to identify any links which could potentially affect the site. This is because turbines have the potential to interfere with the operations of radio-communication equipment and it is necessary to design the wind farm to minimise the effects on this equipment or seek appropriate mitigation.

AECOM will continue this consultation and re-consult with OFCOM regarding radio-communication links and infrastructure. The results of the consultation will be used to demonstrate that the site design process has been completed to ensure that the wind farm has no detrimental effect on the infrastructure.

The ES chapter will detail consultation with the various parties and confirm mitigation measures should they be necessary.

11.3.2 Shadow Flicker

Whilst there is no specific standard for the assessment of shadow flicker in the UK and no guidelines on acceptable levels of shadow flicker, planning guidance is contained within the Scottish Government Specific Advice Sheet for Onshore Wind Turbines. On page 6, the advice sheet states:

> *'Under certain combinations of geographical position, time of day and time of year, the sun may pass behind the rotor and cast a shadow over neighbouring properties. When the blades rotate, the shadow flicks on and off; the effect is known as "shadow flicker". It occurs only within buildings where the flicker appears through a narrow window opening. The seasonal duration of this effect can be calculated from the geometry of the machine and the latitude of the potential site.*
>
> *Where this could be a problem, developers should provide calculations to quantify the effect. In most cases however, where separation is provided between wind turbines and nearby dwellings (as a general rule 10 rotor diameters), "shadow flicker" should not be a problem. However, there is scope to vary layout / reduce the height of turbines in extreme cases.'*

The aim of this section of the EIA will therefore be to quantify the predicted level of shadow flicker that could potentially be experienced by affected dwellings (generally within 10 rotor diameters of a turbine).

Specialist computer software (WindPRO or similar) will be used to quantify the theoretical maximum level of shadow flicker occurrence in the vicinity of the wind turbines.

A site visit will establish locations of potentially affected properties. After collating the findings of the site visit, the model will be refined to establish a more accurate understanding of shadow flicker potential.

11.3.3 Assessment of Significance

For electromagnetic interference, assessment of the proposed development will be based upon whether there is a direct interference. Since this effect is either present or absent it is not considered appropriate to define sensitivity or the magnitude of change in respect of these effects. Rather, it is considered that if an effect is present, then it will be deemed to be Significant and, if the effect is absent, then it will be deemed to be Not Significant.

Should a significant effect be identified, further consultation to agree an appropriate measure to mitigate the effect to provide an insignificant residual impact will be undertaken.

In relation to shadow flicker and infrastructure, the layout of the turbines can minimise the potential effects on properties and infrastructure. Specifically in relation to infrastructure, the construction phase will be assessed in relation to either direct (Significant) or indirect (Not Significant) effects.

11.4 Conclusions

There are numerous radiocommunication links in the vicinity of the site; however the proposed layout can be designed to ensure that there is no detrimental effect on the infrastructure. Baseline information gathered has informed the location of proposed development. Further consultation with the link operators will be conducted during the ongoing design of the wind farm to finalise and eliminate any effect on these links.

There are some properties that have the potential to be affected by shadow flicker due to their proximity and orientation to the proposed development. The layout of the turbines will be developed to minimise the potential effects of shadow flicker on properties within and adjacent to the site, and also and will be further verified using specialist computer software during advanced design stages.