14. Infrastructure, Telecommunication, Television, Aviation, Public Safety

14.1 Introduction

14.1.1 This chapter has been prepared by Angela Jones of Entec UK Ltd (AIEMA, MSc Pollution and Environmental Control), and assesses the potential effects on infrastructure, telecommunications, aviation and public safety as a result of the construction (including demolition activities) and operation of the proposed Blackstone Edge wind farm development.

14.2 Context

Site context

14.2.1 The site is located in a rural area within South Yorkshire, approximately 15km to the west of Barnsley, 7km south-east of Holmfirth and approximately 1km to the north east of the village of Crow Edge. The nearest road is Whitley Road that runs parallel to the site's western boundary.

Policy context

National

14.2.2 PPS 22 Renewable Energy

Regional and local

14.2.3 There are no planning policies at the regional or local level that specifically relate to this assessment.

Legislative context

14.2.4 There is no legislative context that is relevant to this assessment.

14.3 Methodology

Scope of study

Effects requiring further consideration

14.3.1 The following effects have been scoped-in.

- Potential effect on amenity caused by a change in television reception as a result of the operational turbines.
- Potential effects on people associated with public safety as a result of construction activities and also during the operational phase of the development.

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- Potential effects on aviation functioning caused by interference with radar and other relevant communication links as a result of the operational turbines.

Effects not requiring further consideration

14.3.2 The following effects have been scoped-out.

- Potential effect on infrastructure caused by direct, physical disruption during the construction period. There is no infrastructure within the vicinity of the site that could be affected by the development (see Table 14.1).
- Potential effects on the activities of the Huddersfield & District Model Aircraft Club. The Club operates on an area of land known as "the Whams", which is located about 230m north of the proposed wind turbine no. 2 (see Figure 1.2). The Huddersfield & District Model Aircraft Club expressed concerns that this wind turbine will affect their activities. E.ON have considered the possibility of moving the wind turbine but it was concluded that this was not possible due to noise/residential amenity constraints. E.ON UK and the Club have identified a mutually satisfactory solution that will enable the model aircraft flying activities to co-exist with the existence of the wind turbines. Based on this, the potential effects of the development on model aircraft flying activity have been scoped-out.

Assessment and evaluation methodologies

14.3.3 The assessment presented in this chapter is based upon consultation with a number of organisations known to have an interest in telecommunications, television, aviation, safety and infrastructure in the area. Consultees for transmission interference were determined following the process described in the PPS 22 Companion Guide.

14.4 Description of baseline conditions

14.4.1 Table 14.1 presents a list of all consultees contacted as part of this assessment, and provides a summary of initial responses.

Table 14.1 Consultee responses

Consultee	Date (s) Consulted	Date (s) Responded	Response
Telecommunications and infrastructure			
Arqiva	20/12/2005	22/12/2005 (by email)	Arqiva had no objections to the proposed development.
BT	20/12/2005	21/12/2005	BT raised no objections.
Cable & Wireless	20/12/2005	04/01/2006	Cable & Wireless had no objections to the proposed development.
CSS Spectrum	20/12/2005	11/04/2006	CSS Spectrum raised no objections to the proposal.

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Table 14.1 (continued) Consultee responses

Consultee	Date (s) Consulted	Date (s) Responded	Response
JRC	20/12/2005	19/01/2006 by email)	Link coordinates were provided. The proposal is unlikely to affect any links, but if the turbines move more than 200 metres from the initial layout, JRC will need to be informed.
National Grid Wireless	20/12/2005	21/12/2005 (by email)	The proposed site falls in an area for which Arqiva has responsibility.
Ofcom	20/12/2005	31/12/2005 (by email)	Ofcom responded with a letter identifying a BT link that may be affected by the proposal.
Orange	20/12/2005	19/01/2006 (by email)	Orange had no objections.
T Mobile	20/12/2005	04/01/2006 (by email)	T Mobile had no objections.
Aviation Safety			
Civil Aviation Authority (CAA)	30/11/2005	18/01/2006 (by letter)	The CAA had no objections.
National Air Traffic Services (NATS)	30/11/2005	01/05/2007	Pre-planning assessment identified a potential detrimental effect on the performance of Claxby radar. A study undertaken by Pager Power Ltd concluded there is a low risk of NATS/NERL objecting to the proposal. The Pager Power Study is provided in Appendix E.
Military Aviation Safety			
Ministry of Defence	30/11/2005	30/3/2006 (by letter)	The MoD had no concerns with the proposal (3 turbines, 122 metres to blade tip) but any changes would require them to be notified.
Television			
BBC	31/01/2006	31/01/2006 (by email)	The development is likely to have a potential impact for 227 houses for which there is no alternative off air service. An additional 24 homes may also be affected for whom there may be alternative off air services.

14.4.2 There are no telecommunications or infrastructure constraints known of in the area. However, the development may potentially affect the Claxby radar and there are a number of residential properties for whom television reception may be affected.

14.4.3 Residential properties around the site (see Appendix F for further details) are served (location dependent) by the following analogue television transmitting stations:

- BBC1, BBC2, ITV1 and Channel 4 from the Belmont transmitter (NGR: TF 218836);
- BBC1, BBC2, ITV1 and Channel 4 and Five from the Emley Moor transmitter (NGR: SE 222 128); and

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- BBC1, BBC2, ITV1 and Channel 4 from the Millhouse Green transmitter (NGR: SE 229 028).

14.4.4 The area is also served (location dependent) by Digital Terrestrial Television (DTT) services from the same transmitting sites at Belmont and Emley Moor.

14.4.5 Approximately 10 - 15% of households in the area surrounding the site (see Appendix G for details of the area considered) have satellite-receiving equipment in place.

14.4.6 The nearest road to the site is Whitley Road, which runs adjacent to the western boundary of the site (see Figure 1.2). There are no footpaths or Public Rights of Way within the immediate surrounds of the site (see Figure 11.1). However, there is a bridleway to the south east of the site, which runs off Whitley Road in a south east direction towards "The Lanes".

Predicted future baseline

14.4.7 It is anticipated that nationally, air traffic movements will increase over the 25 year operational period of the wind farm, based on the forecast increase in passenger numbers over future years (Department for Transport, 2003).

14.4.8 During 2011 the Belmont and Emley Moor transmitting sites are expected to cease analogue television transmissions and be converted to DTT only, in line with the UK schedule for Digital Television Switchover.

Information gaps

14.4.9 There are no information gaps relevant to this assessment.

14.5 Mitigation, offsetting and enhancement measures incorporated into the proposed development

Public safety

14.5.1 A safety buffer has been applied around roads and bridleways that is based on the topple distance of a wind turbine (the height of the turbine is 101m from base to blade tip) plus an additional safety margin of 10%. Overall there will be a buffer of 115m from all roads and bridleways (there are no footpaths or Public Rights of Way within the immediate surrounds of the site that could be affected by the development and hence for which a buffer zone is required). No turbines are located within the buffer area.

14.5.2 During the construction phase of the proposed development, the relevant statutory requirements would be adhered to. All potentially hazardous areas such as excavations and electrical installation works would be fenced off and all unattended machinery would be stored in the site compound or immobilised to prevent unauthorised use. Appropriate signage would be provided to indicate any hazards, areas to avoid or that are barred from entry.

14.5.3 After completion of construction works and commissioning of the wind farm, the wind turbines and access tracks will be accessible to visitors and stock will be able to graze close up to the turbine tower bases.

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14.5.4 Wind farms have a proven track record for safety. A very small number of wind turbines have been known to lose parts of the rotor assembly through accidental damage due to lightning or mechanical failure. Such incidents are very rare. As with any tall structure, wind turbines can be susceptible to lightning strike and appropriate measures are included in the turbine design to conduct lightning strike down to earth and minimise the risk of damage to turbines. Occasionally however, lightning can strike and damage a wind turbine blade. Modern wind turbine blades are manufactured from a glass-fibre or wood-epoxy composite in a mould, such that the reinforcement runs predominantly along the length of the blade. This means that blades will usually stay attached to the turbine if damaged by lightning. In all cases, the turbine will automatically shut down if damaged by lightning.

14.5.5 In cold weather, ice can build up on blade surfaces when operating. The turbine can continue to operate with a very thin accumulation of snow or ice, but will shut down automatically as soon as there is a sufficient build up to cause aerodynamic or physical imbalance of the rotor assembly. Once the ice has thawed and the turbine re-starts in circumstances such as this there is a slight possibility that fragments of ice or snow will be released from the rotor and will drop within close vicinity of the turbine. The risk to public safety is considered extremely low due to the initial slow rotational speed of the rotor and because such fragments are sufficiently small and lightweight to allow the rotor assembly to be back in balance before restarting. Within the final proposal layout, the nearest turbine is 300m from the bridleway to the south east of the site, the remaining wind turbines are more than 300m from bridleways and other public rights of way. The nearest wind turbine to Whitley Road is located at a distance of 115m.

14.5.6 Turbine control and monitoring systems operate with several levels of redundancy to protect the plant from damage. In the case of faults arising, including over-speed of the blades, overpower production, or loss of grid connection, turbines shut down automatically through braking mechanisms. In addition, turbines are fitted with vibration sensors so that if, in the unlikely event a blade is damaged, the turbine will automatically and immediately shut down.

14.5.7 The operation of the proposed wind farm would comply with relevant health and safety regulations. Appropriate warning signage would be installed concerning restricted areas such as transformers, switchgear and metering systems and to alert users of public rights of way to potential increased risks under certain meteorological and operating conditions. Wind turbines installed at the Development Site would comply with BS EN 61400-1: 1995 'Wind turbine generator systems - safety requirements'.

Television

14.5.8 It is known that wind farms have the potential to adversely affect terrestrial reception up to a maximum distance of 5km (BBC et al.1999). As there are a significant number of dwellings within 5km of the development site, this is a matter for further consideration.

14.5.9 All television signals are transmitted using UHF. There are two main mechanisms whereby a wind farm could potentially interfere with television reception. These are 'shadowing' effects and 'reflection'/'scattering' effects.

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14.5.10 Just as a solid object causes a shadow to develop in the visible spectrum, a similar effect can occur in the UHF spectrum. If an object is placed between a TV transmitter and a receiver, a 'shadow' zone may develop whereby there is a reduction in signal strength, which may reduce picture and audio quality. In relation to a wind turbine, the size of the shadow is dependent on the blade orientation and is greatest when the axis of the rotor is in line with the direction of the transmitted signal. The signal strength within a shadow caused by a turbine will vary in a cyclic manner related to the rotor frequency, though will decrease in overall effect with distance.

14.5.11 When a transmitted television signal is incident upon a static or moving wind turbine, there is the potential for the signal to be scattered, i.e. reflected. If a receiver then picks up a scattered signal, a time delay would have occurred between the originally received signal and the scattered signal (i.e. it would have travelled a longer path). This can cause a reduction in picture quality through a phenomenon known as 'ghosting' for analogue receivers. This is less likely to occur with digital receivers, which are more robust.

14.5.12 When several turbines are sited in close proximity, the interactions of these interference mechanisms are complex and difficult to predict. There are, however, several ways that any potential problems can be mitigated.

14.5.13 The BBC et al. (1999) recommend that turbines should be sited at least 500m away from a viewer. This will help reduce the likelihood and severity of any interference. Design iteration has ensured that a maximum distance between turbines and residential dwellings was applied wherever possible.

14.5.14 Impaired viewing quality can be improved by considering each or a combination of the following mitigation techniques:

- replace the receiving aerials for affected households;
- re-tune the television receivers at affected households;
- provision of digital television for affected households (this could be achieved by terrestrial, cable or satellite receivers); and
- provision of a bespoke 'self-help' solution (this could comprise a new low powered transmitter, a cable network, a satellite receiver or a combination of these measures).

14.6 Assessment of potential effects

Public Safety

14.6.1 The proposed wind farm has been designed to take account of public safety constraints and as such there are not considered to be any significant effects related to public safety.

Aviation

14.6.2 The National Air Traffic Services identified a possible effect on the performance of Claxby radar and as a result of this E.ON UK appointed Pager Power Ltd, a consultancy that specialises in aviation and communication studies for wind farms, to

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further investigate the potential effect. The study undertaken by Pager Power considered the likely operational effects of the proposed wind farm, including a cumulative assessment of operational and consented wind farms, on the provision of en-route air traffic services from National Air Traffic Services (NATS) En-Route plc (NERL). An analysis of significant airspace in the vicinity of the site was conducted and an assessment made of En-Route plc's (NERL) likely concerns. An estimation was provided regarding the likelihood of a sustained NERL objection. Following the full technical and operational assessment undertaken by Pager Power they advised that "...that there is a low risk of NATS/NERL objecting to a wind farm at this location...". Hence there are not considered to be any significant effects associated with aviation. Pager Power's study is provided in Appendix E.

Television

14.6.3 A desktop study and field survey has been undertaken by National Grid Wireless in May 2007 to assess the possible effects on television services in the area around the proposed wind farm (the National Grid Wireless study is provided in Appendix F). The results of this study concluded that the existing wind turbines at Royd Moor have had no reported effects on television reception in the surrounding area and no adverse findings were identified during the survey. The Blackstone Edge Wind Farm is considered unlikely to give rise to any new adverse effects, including cumulative effects with the consented Hazlehead wind farm at Crow Edge. Therefore the potential effects of the proposed wind farm on television reception in the surrounding area are not considered to be significant.

14.7 Summary of significance evaluation

14.7.1 A summary of the significance evaluation for the telecommunications, infrastructure, aviation and public safety assessment is provided in Table 14.2.

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Table 14.2 Summary of significance of effects

Receptor and summary of predicted effects	Type of effect[1]	Significance[2]
Potential effects on people associated with public safety as a result of construction activities and also during the operational phase of the development. The development has been designed to take account of public safety and as such there are considered to be no residual significant effects.	-ve	NS
Potential effects on Claxby radar arising from operation of the proposed wind turbines. A study provided by Pager Power Limited concludes that the risk of a sustained objection from NATS/NERL is considered to be low.	-ve	NS
Potential effect on amenity caused by a change in television reception as a result of the operational turbines. Based on a survey undertaken by National Grid Wireless in May 2007 it is considered unlikely that the proposal will have any adverse effects on television reception in the surrounding area.	-ve	NS

Key/footnotes:

1. Type of effect	-ve = negative	**2.**	S	Significant
	+ ve = positive		or	
	N = Neutral		NS	Not-significant
	? = unknown			

14.8 References

BBC, Radiocommunications Agency and Independent Television Commission, ca1999. The Impact of Large Buildings and Structure(s) on Terrestrial Television Reception.

Department for Transport (2000) Air Traffic Forecasts for the United Kingdom [online]. URL: http://www.dft.gov.uk/stellent/groups/dft_aviation/documents/page/dft_aviation_503314.hcsp

Planning Policy Statement 22: A Companion Guide.

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