

14 Aviation, Radar and Telecommunication

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14 Aviation, Radar and Telecommunication

14.1 Executive Summary

14.1.1 The aviation, radar and telecommunication assessment follows the same methodology outlined and undertaken for the Consented Development. The Applicant currently has a contract with NATS for the mitigation of the impacts of the Consented Development. This contract is now the subject of an amendment, to take account of the revised turbines heights and layout within the Revised Development. Once the amendment has been completed, NATS will be in a position to respond to a consultation on the Revised Development as they did for the Consented Development.

14.1.2 The conclusions to the aviation, radar and telecommunication assessment below are the same for the Revised Development as those reached for the Consented Development. It is anticipated that there will be no significant residual effects on aviation or telecommunication infrastructure as a result of the operation of the Revised Development.

14.2 Introduction

14.2.1 This chapter considers the potential effects of the Revised Development on existing and planned military and civil aviation activities, television and telecommunications infrastructure.

14.2.2 Wind turbines are not directly subject to the *Communications Act 2003* and require no authorisation from Ofcom in their management of the radio spectrum and granting of licenses under the *Wireless Telegraphy Act*. However, planning authorities do consider the potential impact of structures on existing infrastructure and they require that consideration of such impacts is made by wind energy developers.

14.2.3 Radio waves and microwaves are used in a variety of communications and any large structure has the potential to interfere with their reception. The magnitude of the effect of a structure is principally dependent upon the size, shape and materials of construction. Wind turbines are both very slender and the rotor is substantially constructed from non-conducting materials (Glass Reinforced Plastic), both of which reduce their potential for causing interference. However, the tower is usually steel and the rotor blades contain some conductive materials, for lightning conduction and in some cases structural carbon fibre. The blade movement may also have an effect on radar, which are designed to detect movement.

14.2.4 The potential effects on electromagnetic signals are highly dependent on the location of the wind farm and on the positions of the individual turbines. In some cases, there are no significant consequences and no mitigation is required, whilst in other cases the turbine specification or layout must be designed to accommodate local infrastructure. In the extreme, sites can be considered inappropriate for wind energy development.

14.2.5 The key sensitivities as a result of the Revised Development are the potential effects on civil aviation and defence radar, microwave and ultra-high frequency (UHF) band communications and television broadcasting. An Electromagnetic Interference Survey (EMI) was undertaken to determine the suitability of the site and any mitigation measures required to overcome any identified potential effects. The EMI assessment was conducted through a combination of consultation with the operators of these systems where possible, with independent impact assessment where this is not possible.

14.3 Legislation, Policy and Guidelines

Legislation

- 14.3.1 The primary planning policy document is the Scottish Planning Policy document (the SPP), published by the Scottish Government in June 2014. Criteria identified in the policy to be assessed in the determination of wind farm proposals include impacts on electromagnetic interference, aviation, other defence matters and seismological recording.
- 14.3.2 In addition to this some mention is made of wind farm EMI planning considerations in Planning Advice Note 62 (PAN 62) on Radio Telecommunications.
- 14.3.3 Civil Aviation Authority (CAA) guidance, within CAP 764 (CAA Policy and Guidance on Wind Turbines), sets out recommended consultation and assessment criteria for the impacts of wind turbines on all aspects of civil aviation.
- 14.3.4 The relevant sections of these documents are described below, which together place a responsibility on the planning authorities and the developer to assess potential impacts on aviation and telecommunications links in particular.

Policy

- 14.3.5 Chapter 5 of the ES sets out the planning policy framework that is relevant to the EIA. The policies set out include those from the adopted Strategic Development Plan and Local Development Plan (LDP) that cover South Lanarkshire (2015), those relevant aspects of Scottish Planning Policy (SPP), National Planning Framework 3 (NPF3), Planning Advice Notes and other relevant guidance. Of relevance to the aviation, radar and telecommunications assessment presented within this chapter, regard has been had to the following policies.

Scottish Planning Policy (SPP), 2014

- 14.3.6 The SPP states under paragraph 169 on Development Management, that consideration should be given to the, *“impacts on aviation and defence interests and seismological recording; [and] impacts on telecommunications and broadcasting installations, particularly ensuring that transmission links are not compromised”*.
- 14.3.7 It also highlights that *Planning Advice Note 62, Radio Telecommunications* provides advice on siting and design, as does the *Planning Circular 2/2003: Safeguarding of Aerodromes, Technical Sites and Military Explosives*.

Planning Circular 2/03: Safeguarding of Aerodromes, Technical Sites and Military Explosives Storage Areas

- 14.3.8 This Circular summarises the Scottish Ministers’ understanding of the general effect of the relevant primary or secondary legislation.
- 14.3.9 It contains 4 Annexes. Annexes 1 and 2 describe the formal process by which planning authorities should take into account safeguarding, including in relation to wind energy developments. Annex 3 lists officially safeguarded civil aerodromes and Annex 4 lists planning authority areas containing civil en-route technical sites for which separate official safeguarding maps have been issued (as at 27 January 2003).
- 14.3.10 The circular also refers planning authorities, statutory consultees, developers and others to the interim guidelines, *Wind Energy and Aviation Interests – Interim Guidelines, published by the Department of Trade and Industry* in 2002.

Planning Advice Note (PAN) 62: Radio Telecommunications

- 14.3.11 PAN 62 states that, *“Large and prominent structures such as tall buildings and wind farms can cause disruption to radio telecommunications services by obstructing or reflecting the signals. The Radiocommunications Agency (Now Ofcom) may be able to suggest engineering solutions to overcome the problem, such as installing repeaters. Planning authorities can grant planning permission for such prominent structures subject to a condition that before development commences the developer will propose measures by which the quality of reception affected by the proposal will be maintained.”*

South Lanarkshire Local Development Plan (2015)

- 14.3.12 Policy 19 (Renewable Energy) of the LDP is relevant to the aviation, radar and telecommunication assessment.

SLC Supplementary Guidance 10 on Renewable Energy (2015)

- 14.3.13 SLC Supplementary Guidance 10 on Renewable Energy (2015) sets out policies and other advice in support of wind developments in South Lanarkshire. Paragraph 6.95 to 6.102 (Development Management Considerations) deals with aviation matters and states that *“the impacts of the proposal on radar performance, defence interests and other air safety and seismological recording considerations must be satisfactorily addressed and demonstrated to the satisfaction of the relevant technical authorities”* (paragraph 6.101).
- 14.3.14 Paragraphs 6.105 to 6.108 deal with matters relating to telecommunication and broadcasting installations and states, *“the siting of wind turbines must have regard to radio, television, telecoms and other communication systems particularly ensuring that transmission links are not compromised”* (paragraph 6.105).
- 14.3.15 Parts 15 and 16 of the assessment checklist (Table 7.1) address aviation and telecommunication impacts and the requirement for them to be assessed within the Environmental Statement.

Guidance

- 14.3.16 The CAA involvement in the Wind Farm Pre-Planning Consultation Process ceased on 25 December 2010. CAP 764 now states that *“developers are required to undertake their own pre- planning assessment of potential civil aviation related issues.”*
- 14.3.17 They provide a chapter describing the *“wind turbine development planning process”*, within which the main civil aviation stakeholders and their interests are listed and described in brief. Table 1 within the guidance document provides an overview of considerations and the following paragraphs detail what developers will need to consider, conducting associated consultations as appropriate.
- 14.3.18 The CAA note in section 5.25 that *“it is incumbent upon the developer to liaise with the appropriate aviation stakeholder to discuss – and hopefully resolve or mitigate – aviation related concerns without requiring further CAA input. However, if these discussions break down or an impasse is reached, the CAA can be asked to provide objective comment”*.
- 14.3.19 Section 5.26 states that *“the CAA will not provide comment on MoD objections or arguments unless such comments have been requested by the MoD.”*

14.4 Consultation

- 14.4.1 Consultations have been conducted with Ofcom, the licensee of the mobile phone and emergency services networks, the utilities who operate wireless data networks at microwave and UHF frequencies, Arqiva who operate microwave fixed links and off-air rebroadcast links and the National Air Traffic Service (NATS).

14.4.2 NATS, Glasgow Airport and the Ministry of Defence (MoD) were the only aviation stakeholders consulted. Initial screening determined that no aerodrome operators could be affected.

14.4.3 Table 14.1 provides a summary of the consultation responses received.

Table 14.1 – Summary of Consultee Responses

Consultee	Response	Actions
NATS	A no objection position was arrived at for the Consented Development at the site, described in NATS letter dated 22 October 2015, reference W(F)20867. This states, <i>“An agreement has been entered into between NERL and 3R Energy Solutions Limited dated 21st October 2015 for the agreement of suitable planning conditions and the implementation of an identified and defined mitigation solution”.</i>	The mitigation solution has been contracted. This solution remains valid for the Revised Development, with the contract in the process of being amended to reflect the revised layout. The conditions applied to the Consented Development are considered as suitable for application to the Revised Development and a response from NATS along these lines is anticipated. Subject to completing the contract amendment with NATS, no further action is required.
Ministry of Defence (MoD)	The MOD did not object to the Consented Development. This was detailed in their response dated 13 August 2015, MoD reference DIO22855.	The Revised Development is not materially different with respect to the potential impacts on MoD infrastructure and operations, hence no objection is anticipated and no further action is required.
Glasgow Airport	No objection response received for the Consented Development in their letter dated 23 September 2015, reference GLA3174	The revised layout should not have any effect on the impacts to Glasgow Airport. No further action required.
Ofcom (Licensee for all fixed links)	Ofcom were consulted and conducted a survey of fixed links across the area of the site. They responded by email on 06 March 2015 identifying no links.	No further action required.
Joint Radio Company (JRC) (safeguarding communications for the electricity and gas utilities)	JRC were consulted and responded by email on 18 March 2015 with no objections.	No further action required.
Atkins (safeguarding communications for the water utilities)	Atkins were consulted and responded by email on 05 March 2015 with no objections	No further action required
Arqiva (Operator of the television broadcasting infrastructure)	Arqiva were consulted and responded by email on 16 April 2015 with no objections	No further action required

14.5 Assessment Methodology

Aviation and radar

- 14.5.1 This area was substantially assessed against the consented application on the site in 2015, which was for 15 turbines up to 126.5 m in height (Planning Ref: CL/15/0273). A position was established with all the relevant stakeholders which managed all identified impacts. In May 2016, South Lanarkshire Council (SLC), following consultation with key stakeholders such as NATS, granted a non-material variation to planning permission ref. CL/15/0273 which increased the height of the 15 consented turbines to 131m, and increased the rotor size to 113m.
- 14.5.2 The initial scoping study conducted for the Consented Development, identified those stakeholders potentially affected by the Revised Development. The scoping process involves considering all military and civil aerodromes in the wider area out to circa 60 km, all radar installations out to the limit of their range, all navigational aids and low flying activities. The scoping process identified NATS, the MoD and Glasgow Airport as relevant stakeholders.
- 14.5.3 The requirement for the assessment of the potential impacts of the current application, is to consider any changes in impacts that might arise as a result of the revised layout. The changes are to the turbine tip heights, up to 149.9m from 131m and to their locations.
- 14.5.4 The principle sensitivity is the visibility of the turbines to those radar potentially affected. Because of this, studies have been conducted prior to submission to assess the change in visibility between the Consented Development and the Revised Development to the radar at Glasgow Airport and to the NATS radars at Lowther Hill and Cumbernauld. These studies determined that there was no change; that the Revised Development remains undetectable by the Glasgow Airport radar and that it remains detectable by the NATS radars at Lowther Hill and Cumbernauld.
- 14.5.5 It has been determined that there is no potential for impacts to Glasgow Airport. With no change to the impacts in moving from the consented layout to the proposed layout, there remain no potential effects on Glasgow Airport, hence this is not considered further. It is anticipated that Glasgow Airport will not object to the Revised Development.
- 14.5.6 There is a contract with NATS for the mitigation of the impacts of the Consented Development. This contract is now the subject of an amendment, to take account of the revised turbines and layout within the Revised Development. At the time of writing NATS are in the process of reviewing the application to amend the contract. Once the amendment has been completed NATS will be in a position to respond to a consultation on the Revised Development as they did for the Consented Development. This response confirmed that NATS had no objection to the application, subject to the imposition of a planning condition to ensure that the mitigation scheme was implemented prior to the erection of the turbines.
- 14.5.7 The applicant accepts the need to mitigate the impacts to the NATS radars at Lowther Hill and Cumbernauld and any associated planning conditions.
- 14.5.8 The MoD had no objection to the Consented Development. The Revised Development has been assessed to determine if the potential impacts differ from those of the Consented Development; that assessment considering impacts to infrastructure, including radar and operations in terms of physical obstruction. There are no apparent differences in impacts and it is anticipated that the MoD will adopt the same position with no objection to the Revised Development.

Telecommunications

- 14.5.9 Interference with mobile phone networks and other wireless data networks can occur through the interference of microwave and UHF band fixed links. These are operated by or on the behalf of the mobile service providers, the utility companies, the emergency services and occasionally by small private networks.
- 14.5.10 The impact assessment has been conducted through consultation with the operators of these systems. Ofcom manages the allocation of frequencies and holds a database of licensed links. Upon consultation, Ofcom interrogate their database to determine the presence of any fixed links in the Revised Development area; in this case a radius of 1.5 km centred on national grid coordinates 281600 632600. Ofcom do not comment on impacts or consider mitigation, which must be conducted in direct discussions with the system operators.

Television

- 14.5.11 Terrestrial television services within the United Kingdom are the joint responsibility of the BBC and Ofcom. The transmission network is provided and operated on behalf of the broadcasters' Arqiva. With television broadcasting now having completed the conversion to a digital only service, only potential effects on the digital system need be considered.
- 14.5.12 Written consultation is required with the network operator Arqiva to address potential impacts on the television infrastructure. Consultation with Arqiva covers all the elements of the television broadcast infrastructure, with the exception of domestic television reception. Arqiva has confirmed that the development will not affect any of their re-broadcast links or microwave links (refer to Table 14.1 above).
- 14.5.13 Potential effects on domestic television reception are assessed by consideration of the geography and topology of the local conurbations, the transmitter network, the off-air signal strength and the terrain.
- 14.5.14 The potential for negative effects on domestic television reception are greatly diminished post digital switchover. Currently there is no widely accepted method of determining the potential effects of wind turbines on digital reception. However, it is documented that digital television signals are much better at coping with signal reflections and digital television pictures do not suffer from ghosting. Digital transmitter powers increased to around ten times previous levels at digital switchover. At the same time, digital signals were added to the relay transmitter network. These improvements greatly increased the availability and robustness of digital terrestrial reception. Since digital switch over, there are no known cases of wind turbine interference with domestic television reception.

14.6 Baseline Conditions

Aviation

- 14.6.1 There were no objections from the MoD or Glasgow Airport to the Consented Development at the site. There has been no substantive change to the impacts in relation to these stakeholders.
- 14.6.2 Impacts to the NATS Cumbernauld and Lowther Hill radars are anticipated, which if unmitigated are unacceptable to NATS. A contract exists for the mitigation of these impacts arising from the Consented Development, which fully satisfies NATS. This contract will be amended to reflect the Revised Development.
- 14.6.3 No aerodromes have the potential to be affected by the Revised Development. No military radars have the potential to be affected by the Revised Development. No weather radars, Navigational Aids or Air-Ground-Air communication stations have the potential to be affected by the Revised Development.

Telecommunications

- 14.6.4 The baseline was established by consultation with the regulator Ofcom, on behalf of the telecommunications operators, JRC on behalf of the electricity and gas utilities and Atkins on behalf of the water utilities. The consultation responses are detailed in section 14.4.3 above. The consultation process determined that the no infrastructure was sufficiently close to the Revised Development to be affected.

Television

- 14.6.5 The baseline for potential Impacts to television comprises two elements, broadcast infrastructure and domestic reception.
- 14.6.6 As for communications links the baseline for impacts to the broadcast infrastructure was established by consultation with the system operator, Arqiva. They responded with no concerns detailed in section 14.4 above.
- 14.6.7 Post digital switch-over impacts to domestic television reception are rare. Arqiva do not assess these impacts and the BBC does not provide a tool for the assessment of impacts to digital television reception. The impacts were therefore considered independently.
- 14.6.8 There are few properties in the immediate area of the Revised Development. The nearest settlements of Coalburn and Douglas are primarily serviced from the main transmitter at Black Hill to the north. The coverage from the Black Hill transmitter to these areas is strong indicating a high resilience to interference. Other areas to the south and south west are remote from the Revised Development. These areas are serviced by local transmitters at Glespin and Muirkirk.
- 14.6.9 Overall it was determined that the baseline conditions were of few receptors (properties) with the potential to be affected, mitigated by a high digital signal strength and the inherently resilient nature of digital television reception.

14.7 Assessment of Potential Effects

Construction

- 14.7.1 No EMI effects are anticipated to occur during construction of the Revised Development. Given that any occurrence of EMI effect during the short commissioning period would replicate itself during operation of the Revised Development, it is considered appropriate to consider the commissioning activities as part of the operational stage of the development.

Operation

Aviation

- 14.7.2 There will be no unmitigated impacts to aviation during the operational phase of the Revised Development. The anticipated impacts to the NATS radars will be mitigated through the implementation of the agreed mitigation scheme.

Telecommunications

- 14.7.3 Ofcom identified no links in the area and no objection responses were received from the other operators: JRC and Atkins.
- 14.7.4 It is therefore considered that the Revised Development will have **no impact** on local telecommunication infrastructure.

Television

- 14.7.5 The nearest settlements of Coalburn and Douglas are primarily serviced from the main transmitter at Black Hill to the north. The location of the turbines is such that the strength of reflected signals can be expected to be weak. The coverage from the Black Hill transmitter to these areas is strong indicating a high resilience to interference. The turbines are therefore highly unlikely to have any impacts on domestic television reception.
- 14.7.6 Other areas to the south and south west are remote from the Revised Development. These areas are serviced by local transmitters at Glespin and Muirkirk. The development will have **no impact** on these areas.
- 14.7.7 Given the strength of the digital signal in the key settlements and the inherently resilient nature of digital television reception, there is a **very low risk** of any interference from the Revised Development to domestic television reception.

Decommissioning

- 14.7.8 No effects are anticipated to occur during the decommissioning and restoration phase of the Revised Development.

14.8 Mitigation

- 14.8.1 There exists an agreed and contracted radar mitigation scheme to remove the identified impacts on the Lowther Hill and Cumbernauld radars and maintain a full air picture to enable NATS to continue to provide its service effectively and safely. This contract will be amended to reflect the change to the Revised Development from the Consented Development at the site.
- 14.8.2 The MoD has requested that aviation lighting be fitted to some wind farms in this area because of their location within the Tactical Training Area, including the Consented Development at the site. In the expectation that the MoD will make the same request for aviation lighting, this will be provided in accordance with their specified requirements.

14.9 Cumulative Assessment

- 14.9.1 It is considered that as none of the consented wind farm developments have significant residual effects on aviation, radar or telecommunication interests, the potential for cumulative effects is **negligible**.
- 14.9.2 Therefore, it is considered that there will be **no significant cumulative effects** on aviation, radar or telecommunication interests.

14.10 Residual Effects

- 14.10.1 There will be no residual effects during the construction or decommissioning phases of the Revised Development with respect to aviation, radar and telecommunications.
- 14.10.2 Following implementation of appropriate mitigation with respect to NATS radar concerns, in line with the amended mitigation contract, there will be no residual effects on aviation infrastructure during the operation of the Revised Development.

14.11 Summary

- 14.11.1 This chapter has considered the potential effects of the Revised Development on existing and planned military and civil aviation activities, television and telecommunications infrastructure.

- 14.11.2 Consultations have been conducted with Ofcom, the licensee of the mobile phone and emergency services networks, the utilities who operate wireless data networks at microwave and UHF frequencies, Arqiva who operate microwave fixed links and off-air rebroadcast links and NATS.
- 14.11.3 Ofcom identified no links in the area. In addition, no objection responses were received from JRC and Atkins, representing the utilities and from the operators of the television broadcast infrastructure Arqiva. There is a very low risk of any interference from the Revised Development to domestic television reception.
- 14.11.4 The only impact identified was to NATS En-route radar at Lowther Hill and Cumbernauld. Dialogue with NATS in relation to the Consented Development at the site resulted in a contracted mitigation scheme. The contract will be amended to reflect the change to the Revised Development from the Consented Development such that NATS can again provide their approval, conditional upon the implementation of the mitigation scheme prior to turbine erection. The Revised Development will then generate no residual impacts.

Table 14.2 – Summary Table

Description of Effect	Significance of Potential Effect		Mitigation Measure	Significance of Residual Effect		Comparison with the Consented Development
	Significance	Beneficial / Adverse		Significance	Beneficial / Adverse	
Effects on aviation, radar and telecommunication interests during construction and decommissioning	Negligible	Neutral	Aviation lighting will be installed if requested by the MoD.	Negligible	Neutral	No Change
Effects on telecommunications and TV reception during the operational period	Negligible	Neutral	None required	Negligible	Neutral	No Change
Effects on MoD low flying interests during the operational period	Negligible	Neutral	Aviation lighting will be installed if requested by the MoD.	Negligible	Neutral	No Change
Effects on NATS infrastructure during the operational period	Major	Adverse	Mitigation measure agreed between the Applicant and NATS	Negligible	Neutral	No Change

14.12 References

Civil Aviation Authority (Feb 2016). CAP 764: CAA Policy and Guidelines on Wind Turbines.

Ofcom (2009). Tall structures and their impact on broadcast and other wireless services.

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