16 OTHER ISSUES

This Chapter of the Environmental Impact Report (EIA Report) evaluates the effects of the Ackron Wind Farm (the Development) on any remaining topics that are within the scope of the Environmental Impact Assessment (EIA). This assessment was undertaken by Heather Wylie, EIA Consultant, of Arcus Consultancy Services Limited (Arcus) and has been reviewed by Heather Kwiatkowski, Principal EIA Consultant at Arcus, and Stuart Davidson, Registered EIA Practitioner and Operational Director of Arcus.

This Chapter includes the following topics:

- Shadow Flicker;
- Telecommunications and other Utilities; and
- Aviation.

This Chapter is supported by the following Figures provided in Volume 2a: Figures excluding Landscape and Visual:

- Figure 16.1: Shadow Flicker Study Area.

16.1 HUMAN HEALTH & SAFETY, INCLUDING MAJOR ACCIDENTS & DISASTERS

16.1.1 Introduction

The Town and Country Planning (Environmental Impact Assessment) (Scotland) Regulations 2017[1] (hereafter referred to as the 'EIA Regulations') state than an EIA must identify, describe and assess in an appropriate manner, the expected effects deriving from the vulnerability of the Development to Major Accidents and Disasters (MADS) that are relevant to the Development, as well as upon human health and safety.

16.1.2 Assessment Methodology

In identifying relevant major accidents or disasters, the following definitions are used to guide this assessment which are informed by Institute of Environmental Management and Assessment (IEMA) EIA Quality Mark Article:

- Major Accident – uncontrolled occurrence in the course of the construction or operation of the Development, leading to serious danger to the environment, which may be either immediate or delayed;
- Disaster - An event not directly caused by the Development, leading to serious danger to the environment, which may be either immediate or delayed. It may result from natural sources, such as flooding, adverse weather, ground movement, or from man-made sources (e.g. escalation of a fire from an adjacent facility); and
- Relevance – a relevant major accident or disaster is defined as follows:
  - Caused by the Development;
  - Having the potential to impact upon the Development; and
  - Would be exacerbated or mitigated by the Development.

16.1.3 Vulnerability of the Development to Disasters

The land upon which the Development is proposed within the application boundary (the Site) is not located within an area known for natural disasters such as floods, hurricanes, tornadoes, volcanic eruptions, earthquakes or tsunamis.

[1] The Town and Country Planning (Environmental Impact Assessment) (Scotland) Regulations 2017 [Online] Available at: https://www.legislation.gov.uk/ssi/2017/102/schedule/4/paragraph/8/made?view=plain (Accessed 11/08/2020)

As stated in **Chapter 15: Climate Change and Carbon Balance** of this EIA Report, none of the identified climate change trends listed will affect the Development with the exception of increased high wind speed conditions. Due to the exposed nature of wind farm sites, wind turbines are designed to withstand extreme weather conditions. Brake mechanisms installed on turbines allow them to be operated only under specific wind speeds and, should severe wind speeds be experienced, then the turbines would be shut down. Although an unlikely event for Scotland, the brake mechanism could also apply to a hurricane scenario.

Flooding and ground saturation/landslips on slopes are the most probable natural disaster that could affect the Development. Flood risk is assessed within **Chapter 12: Hydrology and Hydrogeology.** The Development has been designed to minimise the impact of flooding by incorporating a buffer zone between watercourses and turbine bases of 50 m. Measures, including SuDS, to attenuate run-off and intercept sediment prior to run-off entering watercourses are described in the CEMP in Appendix A4.1 and are embedded as part of the Development design. Although no turbines, construction compounds, substations or meteorological masts are located within areas described as having a 0.5 % or greater annual risk of flooding, emergency response plans appropriate for the individual phases of the Development would be in place and implemented to deal with any occurrences. These would ensure the health and safety of employees and the protection of critical infrastructure.

No other natural or man-made disasters are considered to have the realistic potential to occur and therefore are not considered further within this Chapter.

Where the Development has the potential to exacerbate or mitigate effects of disasters this is assessed in other chapters within the EIA Report as relevant, particularly within the hydrological assessment in **Chapter 12: Hydrology and Hydrogeology** of this EIA Report (in relation to flooding), geological assessment within **Chapter 13: Geology and Peat**, and in relation to offsetting of greenhouse gas emissions and related climate change impacts in **Chapter 15: Climate Change and Carbon Balance**.

16.1.4 Potential for the Development to Cause Major Accidents

The risk of environmental accidents is covered, where relevant, in individual technical chapters. For example, the potential for accidents, like spillages, are considered in **Chapter 12: Hydrology and Hydrogeology** of this EIA Report, whilst aviation safety issues are assessed within Section 16.5 of this Chapter. Other general construction health and safety measures would be implemented by the principal development contractor in line with best practice prior to the commencement of construction, as discussed in Section 16.1.4.

No other major accidents are considered likely to occur. On-site accidents during construction and operation are assessed in the following subsections of this Chapter.

16.1.4.1 Construction Phase

Effects upon health and safety are managed through risk assessments, pursuant to legislation of the European Union such as Directive 2012/18/EU of the European Parliament[2] on the control of major-accident hazards. The Directive lays down rules for the prevention of major accidents which might result from certain industrial activities and the limitation of their consequences for human health and the environment. Directive 2012/18/EU requires the preparation of emergency plans and response measures which will be covered under equivalent documents relevant to the nature of the Development.

[2] European Parliament (2012) Directive 2012/18/EU [Online] Available at: https://eur-lex.europa.eu/eli/dir/2012/18/oj (Accessed on 13/08/2020)

The Construction (Design and Management) Regulations 2015[3] (CDM Regulations) are intended to ensure that health and safety issues are properly considered during development to reduce the risk of harm. In accordance with the CDM Regulations, a Principal Designer and Principal Contractor would be appointed.

The Principal Designer would have responsibility for coordination of health and safety during the pre-construction phase. Guidance published by the Health and Safety Executive in January 2015, defines principal designers as *"…designers appointed by the client in projects involving more than one contractor. They can be an organisation or an individual with sufficient knowledge, experience and ability to carry out the role."*

Principal contractors are defined in the 2015 CDM Regulations as *"contractors appointed by the client to coordinate the construction phase of a project where it involves more than one contractor …They … must possess the skills, knowledge, and experience, and (if an organisation) the organisational capability necessary to carry out their role effectively given the scale and complexity of the project and the nature of the health and safety risks involved."*

Throughout all phases of the Development, cognisance would be made of the following guidance documents produced by RenewableUK, and updated by SafetyOn:

- Wind Turbine Safety Rules Third Edition[4]; and
- Guidance & Supporting Procedures on the Application of Wind Turbine Safety Rules Third Edition[5].

The remoteness and the type of the Development will reduce the severity of accidents occurring and major accidents occurring as a result of construction are highly unlikely. In the unlikely event that such an event was to occur during construction, emergency response plans would be available and implemented to deal with any occurrences.

The risk of construction accidents as they relate to human health and safety would be covered in the Construction Method Statements (CMS) and Construction Environmental Management Pan (CEMP) and specific risk assessment method statements, prepared in response to conditions attached to any consent. These would include identifying site specific risks and preparing assessments to minimise and manage the risk such as equipment safe handling, personal protection equipment, amongst others. As a result, construction accidents are not considered further within this Chapter.

16.1.4.2 Operational Phase

Electrical infrastructure will be located across the Development in the form of an electrical substation and battery storage facility which will be subject to routine maintenance such that it is not considered to pose a significant risk of creating an accident. Additionally, effects upon population and human health are unlikely due to the remoteness of the Development, the low population density, and adherence to required safety clearances around turbines.

A possible but rare source of danger to human or animal life from a wind turbine would be the loss of a piece of the blade or, in the most exceptional circumstances, of the whole blade from an operational turbine. Many blades are composite structures with no bolts

[3] Scottish Government (2015) The Construction (Design and Management) Regulations 2015 [Online] Available at: http://www.legislation.gov.uk/uksi/2015/51/contents/made (Accessed on 13/08/2020)
[4] SafetyOn (2019) Wind Turbine Safety Rules, Third Edition - Issue 2 [Online] Available at: https://safetyon.com/__data/assets/pdf_file/0005/662729/Wind-Turbine-Safety-Rules-Edition-3-2015-Issue-2-December-2019.pdf Accessed on 13/08/2020)
[5] SafetyOn (2019) Guidance on the Application of Wind Turbine Safety Rules, Third Edition – Issue 3 [Online] Available at: https://safetyon.com/__data/assets/pdf_file/0006/662730/Wind-Turbine-Safety-Rules-Guidance-Edition-3-2015-Issue-3-Dec-2019.pdf (Accessed on 13/08/2020)

or other separate components. Even for blades with separate control surfaces on or comprising the tips of the blade, separation is highly unlikely. Wind turbines have an exemplary safety record with no recorded instances of fatalities to any member of the public anywhere in the world. The turbines are also designed to shut down automatically during high wind speed conditions, typically in excess of 60 mph.

There is a risk of ice accumulation on turbine blades, nacelles and towers under certain conditions such as periods of very cold weather with high humidity. In those instances where icing of blades occurs, fragments of ice might be released from blades, particularly when the machine is started. The wind turbines would be fitted with vibration sensors to detect any imbalance which might be caused by icing of the blades. This enables the operation of machines with iced blades to be inhibited to eliminate the risk of ice throw.

The possibility of attracting lightning strikes applies to all tall structures, and wind turbines are no different. Appropriate lightning protection measures are incorporated in wind turbines to ensure that lightning is conducted harmlessly past the sensitive parts of the nacelle and down into the ground.

The Scottish Government Online Advice (2014) states *"although wind turbines erected in accordance with best engineering practice should be stable structures, it may be advisable to achieve a set-back from roads and railways of at least the height of the turbine proposed, to assure safety".*

The distance between the nearest proposed turbines and public roads/footpaths is well in excess of tip height, with the nearest receptor over 1 km from the closest turbine.

16.1.5 Statement of Significance

Due to its location, the Site is not prone to natural disasters. Whilst adverse weather conditions, most notably high wind speed events, ice producing conditions and lightning strikes, do occur within Scotland, wind turbines are designed to withstand extreme weather conditions. Brake mechanisms, vibration sensors and lightning protection measures are installed on turbines allowing them to be operated under optimal conditions and inhibited during extreme weather events.

The risk of construction accidents as they relate to human health and safety are detailed and managed through the CDM Regulations and in the CEMP through specific construction risk assessment method statements, which will be prepared in accordance with conditions attached to any consent of the Development.

Therefore, the overall risk of health and safety including major accidents and disasters is considered negligible and **not significant** in terms of the EIA Regulations.

16.2 WASTE

Exact quantities and types of waste are unknown at this stage of the Development. It is expected that they could include:

- Excavated material;
- Woodland Residues;
- Welfare facility waste;
- Packaging;
- Waste chemicals, fuels and oils;
- Waste metals;
- Waste water from dewatering;
- Waste water from cleaning activities; and
- General construction waste (paper, wood, etc.).

A Site Waste Management Plan (SWMP) will detail how waste streams are to be managed, following the Waste Hierarchy[6] of prevention, reuse, recycle, recover and as a last resort, disposal to landfill. The SWMP will be agreed and implemented prior to construction commencing on Site via a planning condition.

Therefore, the effects of any waste generated would be negligible and **not significant** in terms of the EIA Regulations.

16.3 SHADOW FLICKER

16.3.1 Introduction

Under certain combinations of geographical position and time of day, the sun may pass behind the rotors of a wind turbine and cast a shadow over neighbouring properties. Shadow flicker is an effect that can occur when the shadow of a blade passes over a small opening (such as window), briefly reducing the intensity of light within the room, and causing a flickering to be perceived. Shadow flicker effects only occur inside buildings where the blade casts a shadow across an entire window opening.

This section evaluates the effects of shadow flicker from the Development on nearby receptors.

16.3.2 Legislation, Policy and Guidance

The following guidance, legislation and information sources have been considered in carrying out this assessment:

- Online Planning Guidance for Renewables and Low Carbon Energy[7];
- Highland-wide Local Development Plan (the HwLDP)[8];
- Onshore Wind Energy Supplementary Guidance[9]; and
- Review of Light and Shadow Effects from Wind Turbines in Scotland[10].

16.3.2.1 Online Planning Guidance for Renewables and Low Carbon Energy

Online planning guidance for onshore wind provides information for consideration surrounding shadow flicker. It states:

> *"…where separation is provided between wind turbines and nearby dwellings (as a general rule 10 rotor diameters), "shadow flicker" should not be a problem"*

16.3.2.2 Highland-wide Local Development Plan

The HwLDP Policy 67: Renewable Energy Developments states that all applications for renewable energy developments, including wind turbine developments, will be approved where they are satisfied that developments are located, sited and designed such that

[6] The Waste Management Licencing (Scotland) Regulations 2011 places a duty on all persons who produce, keep or manage waste to apply the 'Waste Hierarchy' in order to minimise waste production at all stages of a development.
[7] Scottish Government (2014) Onshore Wind Turbines: Planning Advice. [Online]Available at: https://www.gov.scot/publications/onshore-wind-turbines-planning-advice/ (Accessed on 31/08/2020)
[8] Highland Council (2012) Highland-wide Local Development Plan [Online] Available at: https://www.highland.gov.uk/info/178/local_and_statutory_development_plans/199/highland-wide_local_development_plan (Accessed on 31/08/2020)
[9] Highland Council (2016) Onshore Wind Energy Supplementary Guidance [Online] Available at: https://www.highland.gov.uk/download/downloads/id/18793/onshore_wind_energy_supplementary_guidance_november_2016.pdf (Accessed 31/08/20)
[10] LUC (2017) Review of Light and Shadow Effects from Wind Turbines in Scotland [Online] Available at: https://www.climatexchange.org.uk/research/projects/review-of-light-and-shadow-effects-from-wind-turbines-in-scotland/ (Accessed 31/08/20)

they will not be significantly detrimental overall (either individually or cumulatively with other developments) having regard in particular to any significant effects, which includes:

"the safety and amenity of any regularly occupied buildings and the grounds that they occupy- having regard to visual intrusion or the likely effect of noise generation and, in the case of wind energy proposals, ice throw in winter conditions, shadow flicker or shadow throw".

16.3.2.3 Onshore Wind Energy Supplementary Guidance

Highland Council have produced supplementary Guidance for Onshore Wind Energy Developments (November 2016). It states:

"Wind energy schemes should always be designed to avoid causing shadow flicker, blade glint, glare and light effects to any regularly occupied buildings not associated with the development. Where this cannot be achieved, the Council will expect wind energy developments to be located a minimum distance of 11 times the blade diameter of the turbine(s) from any regularly occupied buildings not associated with the development. Within a distance less than 11 times the blade diameter, a shadow flicker assessment will be required. The Council may support a scheme that relies on mitigation, where it is deemed to be effective. In such instances turbine shutdown systems will be the required mitigation. The increase in distance from the widely accepted 10 times rotor diameter to 11 is to account for the northern latitudes of Highland- this is in line with the conclusions of the DECC Update of UK Shadow Flicker Evidence Base, 2011."

16.3.2.4 Review of Light and Shadow Flicker Effects from Wind Turbines in Scotland

A review of light and shadow effects from wind turbines was commissioned by ClimateXChange to review how light and shadow flicker effects are considered in the development planning process in Scotland.

This document includes a review of current UK guidance, along with a review of how the current guidance is applied through the selection and review of case studies.

The review provides a number of recommendations regarding the content of guidance on shadow flicker. These include:

- Guidance should not include reference to the occurrence of shadow flicker throw 'within 130 degrees of north';
- Guidance should exclude reference to the 10 rotor diameter distance; and
- There is a need for guidance on the thresholds of exposure to shadow flicker in Scotland.

It should be noted that since the publication of this review (2017), shadow flicker guidance in Scotland has not changed, and as such, the guidance in the Online Planning Guidance for Renewables and Low Carbon Energy remains extant.

16.3.3 Assessment Methodology and Significance Criteria

16.3.3.1 Scoping Responses and Consultations

Consultation for this EIA Report topic was undertaken with the organisations shown in Table 16.1.

Table 16.1: Consultation Responses

Consultee	Type and Date	Summary of Consultation Response	Response to Consultee
The Highlands Council – Environmental Health Officer	Updated Scoping Response (06/06/2020)	The EIA Report needs to address general qualities of the local environment including issues such as shadow flicker.	Shadow flicker assessment has been undertaken and has considered 11 rotor diameters in line with the Council's response.

16.3.3.2 Study Area / Survey Area

Properties with the potential to be affected by shadow flicker as a result of the Development have been identified using Geographical Information Systems (GIS).

Shadow flicker is known to occur beyond 10 rotor diameters, as reflected in the Review of Light and Shadow Flicker Effects from Wind Turbines in Scotland; however, the intensity of shadows decreases as the distance to the turbines increases.

As detailed in Section 16.3.2, the Onshore Wind Energy Supplementary Guidance requires a shadow flicker assessment to be undertaken at properties within 11 rotor diameters of the Development.

A study area around each proposed turbine location extending to a distance of 11 rotor diameters has been identified (1,496 m based on the Vestas V136 4.0 / 4.2 MW turbine with a hub height of 82 m and rotor diameter of 136 m) as shown in Figure 16.1: Shadow Flicker Study Area.

Ordinance Survey AddressBase data, site visits and freely available online aerial photography was used to confirm the locations and names of permanent dwellings in the Study Area.

As shown in Figure 16.1, two properties, named Ackron Farm and Golval, are located within the Shadow Flicker study area. Both are financially involved properties.

16.3.3.3 Baseline Survey Methodology

The assessment of shadow flicker is a desk-based assessment, and as such, no on-site survey specific to shadow flicker has been undertaken, with the exception of more general site visits conducted by the Client and other Arcus disciplines verifying the location and nature of surrounding properties.

16.3.3.4 Methodology for the Assessment of Effects

A recognised computer software package[11] was used to calculate theoretical specific times and durations of shadow flicker effects at each property.

This software creates a mathematical model of the Development and its surroundings, based on:

- Turbine locations, hub height and rotor diameter;
- Topography (obtained from Ordnance Survey Land-Form Panorama elevation data on a 50 m horizontal grid); and
- Latitude and longitude of the Site (used in calculating the position of the sun in relation to time of day and year).

[11] Resoft WindFarm 4.2.1.7

A cut-off distance of 1,496 m (i.e. 11 rotor diameters) from each turbine was employed during this calculation in accordance with the guidance noted earlier.

Certain worst-case assumptions are made in the calculation, including:

- Weather conditions are such that shadows are always cast during each day of the year, i.e. bright sunshine every day;
- The turbine rotor will always be facing directly towards a given window, maximising the size of the shadow and hence the frequency and duration of the effect;
- The turbines will always be rotating; and
- There will not be intervening structures or vegetation (other than topography) that may restrict the visibility of a turbine, preventing or reducing the effect.

The following assumptions have been made for all potential receptors in order to identify all potential effects as a worst case:

- All windows have been assumed to measure 1 m by 1 m (for larger windows the intensity of the effect would be reduced), to be situated at a height of 3 m above ground level, to the window's centre (representing an average of ground and first floor levels that may be typically 1.5 and 4.5 m, respectively);
- Each property is located at the grid reference given in Table 16.2 (as per details from OS AddressBase data); and
- Windows facing towards each of the cardinal compass point directions (North, South, East and West) have been modelled in order to identify effects from all possible directions. In practice, not all of these directions face the Development, and the buildings may not have windows on each facade.

The above assumptions are intended to indicate a theoretical maximum potential duration of effects and to provide an approximation of the times of day and year that these would occur rather than a precise prediction.

For much of a given year, weather conditions will be such that shadows would not be cast, or would be weak and thus would not give rise to shadow flicker effects.

In Thurso, Caithness, bright sunshine occurs for around 32% of daylight hours from March 2019 to March 2020[12]. Of this time, some would be in non-windy conditions when the turbine blades would not be rotating. In windy conditions, the wind direction may not have been aligned with the direction of the sun, such that shadows were not being cast as widely as in the worst-case. In practice, other factors such as the potential for screening by vegetation or intervening structures will also reduce or prevent flicker incidence even further, as compared to the theoretical maximum period or the likely period of effect suggested by the calculations. The actual potential impact is therefore likely to be only a fraction of the theoretical maximum.

Significance of Effect

No formal guidance is available regarding what levels of shadow flicker may be considered acceptable in the UK. However, *Wind Energy Development Guidelines* published by the Northern Ireland Department of the Environment, Heritage and Local Government (2006)[13] states that:

> *"It is recommended that shadow flicker at neighbouring offices and dwellings within 500 m should not exceed 30 hours per year or 30 minutes per day."*

This assessment predicts the potential maximum effects that occur, and a likely maximum duration for effects once prevailing weather conditions are taken into account. The Irish

[12] Average Sunshine hours based on 68 % cloud cover at Thurso over past year. [Online] Available: https://www.worldweatheronline.com/thurso-weather-averages/highland/gb.aspx (Accessed 30/08/2020)
[13] Department of the Environment, Best Practice Guidance to Planning Policy Statement 18 'Renewable Energy', 2009

guidance threshold has been adopted for all residential receptors as a measure of assessing the significance of predicted shadow flicker effects.

16.3.3.5 Assessment Limitations

The assumptions made in the assessment process, outlined in this Chapter, are considered to be conservative and likely to make the assessment results worst case.

16.3.4 Baseline Conditions

As detailed in Section 16.3.3.2, two properties (potential receptor, used as the assessment location) have been identified within Study Area (1,496 m). Both are financially involved. Table 16.2 details the property within the shadow flicker Study Area, as shown in Figure 16.1.

Table 16.2: Shadow Flicker Assessment Locations

Property Name	Easting	Northing	Nearest Turbine	Distance to Nearest Turbine (metres)
Ackron Farm	289966	962491	T2	941
Golval	289889	962122	T2	1,055

16.3.5 Assessment of Potential Effects

16.3.5.1 Construction Phase

Shadow flicker is a phenomenon that only occurs once the turbines are installed and operational and thus no shadow flicker effects are anticipated during the construction phase of the Development.

16.3.5.2 Operational Phase

Table 16.3 details the theoretical maximum hours of shadow flicker per annum, based on the worst-case assumptions discussed in Section 16.3.3.4. It also shows the calculation of the predicted likely number of hours of shadow flicker per annum, assuming 32% per annum bright sunshine.

It has been calculated that theoretical shadow flicker could occur at the assessed properties, Ackron Farm and Golval.

A conservative approach has been taken, initially, whereby the screening effects provided by trees or other buildings have not been taken into account, nor has any account been taken of which building facades actually do have windows (it has been assumed that all facades have windows). This will reduce or eliminate flicker from occurring in practice. The degree of effects will depend on the precise position of windows facing the proposed turbines and the precise location of screening, which itself may change over time as vegetation grows or is removed. In addition, the atmospheric conditions will further reduce the actual effects arising, as described in Section 16.3.3.4.

The theoretical maximum number of hours per annum, as shown in Table 16.3, are for all windows and account for any overlap where effects may be experienced at different windows or from different turbines simultaneously. As such, shadow flicker effects are calculated as being possible for up to a theoretical maximum of 86 hours per annum, or 43 minutes per day at Ackron Farm and 73 hours per annum, or 33 minutes per day at Golval.

Table 16.3: Potential Shadow Flicker Effects at the Assessed Locations

Property Name	Window Orientation	Days per year	Theoretical Maximum Minutes per Day	Theoretical Maximum Hours per Annum	Likely Minutes per Day	Likely Hours per Annum
Ackron Farm	North	110	31	44	10	14
	East	207	43	86	14	28
	South	97	43	42	14	13
	West	0	0	0	0	0
Golval	North	160	32	63	10	20
	East	188	33	73	11	23
	South	28	24	9	8	3
	West	0	0	0	0	0

Based upon weather conditions required to facilitate shadow flicker occurring for only 32% of the time, the likely number of hours per year where shadow flicker could potentially occur is reduced to 28 hours per annum at Ackron Farm and 23 hours per annum at Golval. This equates to likely minutes per day to be 14 minutes per day at Ackron Farm and 11 minutes per day at Golval.

This figure is likely to comprise an over-estimate of actual effects, given the conservative aspects of this assessment as set out in the assessment methodology.

As Table 16.3 shows, shadow flicker effects at both properties within the study area do not exceed the 30 minutes per day or 30 hours per year, as discussed in Section 16.3.3.5. Therefore, shadow flicker due to the Development is **not significant** as per the EIA Regulations.

16.3.6 Mitigation Measures and Residual Effects

It has been demonstrated that shadow flicker effects may occur at two receptors within the shadow flicker study area. A conservative approach has been taken, whereby the screening effects provided by trees or other buildings have not been taken in account, and is has been assumed that there are windows on all sides of the receptor. Screening, or the absence of windows may reduce or eliminate flicker from occurring in practice.

Several forms of shadow flicker mitigation are available, including;

- Control at Property: the provision of blinds, shutters or curtains to affected properties;
- Control on Pathway: for example, screening via planting close to an affected property; and
- Control at Source: for example, shutdown of turbines at times when effects occur.

In practice, Control at Property and Control on Pathway is only possible with the cooperation of the residents, and as both are financially involved, this is assumed to be forthcoming. In addition, screening via planting may take some time before it is effective.

Control at source is the preferable method for mitigating shadow flicker. This involves shutting the turbine down at times that flicker is likely to occur. These times can be pre-calculated and programmed into the shutdown calendar of the Development's SCADA system (Supervisory Control and Data Acquisition system which is the central computerised monitoring system), although this does not take account of weather

conditions occurring at specific times, resulting in excessive shutdowns. Photocells can be installed that determine whether ambient light levels are sufficient for distinct shadows (and therefore shadow flicker) to be generated to prevent unnecessary shutdowns.

Alternatively, a shadow flicker protection system can be incorporated into the SCADA system. This calculates the locations of shadows in real time, determines whether these coincide the pre-programmed locations and takes into account ambient lighting before triggering shutdowns. These systems provide greater flexibility than shutdown calendars as it allows for new locations to be programmed.

In the event of a complaint received by the site operator or the Council, and an appropriate investigation confirms occurrence as a result of the Development, then measures such as those outlined above will be used to prevent re-occurrence and protect residential amenity.

As discussed in Section 16.3.5, shadow flicker effects have been assessed as being not significant at the properties located within the 11 rotor diameters of the proposed turbine locations; however, application of the above measures will ensure that effects are minimised or removed entirely.

16.3.7 Assessment of Cumulative Effects

Beyond the Development, there are two small scale turbine developments. Ackron Farm is a 100 kilowatt (kW) turbine, located approximately 450 m north-east of the Ackron Farm property and has a rotor diameter of 20.8 m. Kirkton Farm is located approximately 585 m west of the Golval residential property and is a 12 kW turbine with a rotor diameter of 8.5 m. The 11 rotor diameter study areas for Ackron Farm and Kirkton Farm are 229 m and 94 m respectively. Given that properties are located beyond the both study areas, no cumulative effects are likely to occur from these single development turbines.

The next nearest potential wind farm is a submitted application for the Drum Hollistan 2 Wind Farm[14], a 7 turbine, 93 m rotor diameter development, located approximately 700 m north-east of the Development. The nearest turbine to the Ackron Farm property is located approximately 2.8 km to the north-northeast, and 3 km north-east from Golval property. As these distances exceed the 11 rotor diameter distance for likely shadow flicker effects (1,023 m), it is considered that shadow flicker impacts from Drum Hollistan 2 at both properties are unlikely to occur in practice.

There are no other wind farm developments within 11 rotor diameters of either of the assessed properties. Cumulative shadow flicker effects have therefore not been considered further.

16.3.8 Statement of Significance

No shadow flicker effects will occur during construction or decommissioning.

The effect of shadow flicker has been assessed using appropriate guidance in respect of the operational period, and effects are considered to be **not significant** in terms of EIA Regulations.

Mitigation measures will be implemented via the SCADA system to shut down the turbine at times that flicker is likely to occur.

[14] Status of wind farms is as of 15 September 2020.

16.4 TELECOMMUNICATIONS AND UTILITIES

16.4.1 Introduction

Due to the size and nature of wind turbines, they have the potential to interfere with electromagnetic signals passing above ground during operation. Infrastructure affected can include telecommunication links, microwave links and television reception. Aviation can also be affected by turbines and is addressed separately in Section 16.5 of this Chapter.

In particular, the tower and rotating blades of wind turbines have the most potential for interference with electromagnetic signals. The degree and nature of the interference will depend on:

- The location of the wind turbines with respect to the receiver and the transmitter;
- Characteristics of the rotor blades;
- Signal frequency; and
- The radio wave propagation in the local atmosphere.

In addition, other infrastructure such as buried utilities may be affected by the construction of the Development.

This section of the EIA Report details the relevant guidance, consultation that has been undertaken with infrastructure operators, the existing baseline for these elements as relevant to the Development and an assessment of the likely effects as a result of the Development.

16.4.2 Legislation, Policy and Guidance

There are a number of documents which provide guidance on telecommunications considerations for wind energy developments. The guidance considered in this assessment are:

- British Wind Energy Association (BWEA), (1994) Best Practice Guidelines of Wind Energy Developments[15];
- Ofcom (2009) Tall Structures and Their Impact on Broadcast and Other Wireless Services[16]; and
- The Scottish Government (2014) Onshore Wind Turbines[17].

The potential effects as a result of the Development have been assessed with reference to the above documents.

16.4.3 Assessment Methodology

The potential telecommunications and utilities effects assessed in this Chapter have been identified through consultation and desk-based assessment. Effects during the construction and decommissioning phases are classed as temporary, short term effects. Potential effects which are associated with the operational phase of the Proposed Development are classified as long-term effects.

It is industry practice not to assess the short-term effects on telecommunications and utilities from wind farms during the construction and decommissioning phases. Previous engagement with infrastructure operator consultees has indicated that any effects will

[15]BWEA (1994) Best practice Guidelines of Wind Energy Developments [Online] Available at: https://www.thenbs.com/PublicationIndex/documents/details?Pub=BWEA&DocID=258180 (Accessed 30/08/2020)
[16] Ofcom (2009) Tall Structures and Their Impact on Broadcast and Other Wireless Services [Online] Available at: https://www.ofcom.org.uk/__data/assets/pdf_file/0026/63494/tall_structures.pdf (Accessed 30/08/2020)
[17] Scottish Government (2014) Onshore Wind Turbines [Online] Available at: https://www.gov.scot/publications/onshore-wind-turbines-planning-advice/ (Accessed 01/09/2020)

only occur as a result of turbine erection and operation. Consequently, this assessment does not consider effects associated with construction and decommissioning activities on these receptors.

Effects on telecommunications and utilities receptors are of a technical nature, and where unacceptable effects are predicted to occur, a technical solution must be sought with the owner/operator of the infrastructure to ensure the continued acceptable technical operation of the infrastructure. Following this approach, it is inappropriate to assess the level of significance of these effects in relation to the EIA Regulations in the same way as for other receptors; therefore, any potential effect is considered significant. Where a potential significant effect has been identified, the nature of the effect and appropriate mitigation is described in this Chapter.

Should the construction and operation of the Development materially affect the operation of telecommunication links, such as through degradation of signal quality to the extent that it warrants an objection from the link operator, this would be considered a significant effect. Mitigation is generally available either through rerouting of any affected links or upgrades to the transmitting and / or receiving apparatus.

Consultation with the relevant organisations was undertaken during the initial stages of the EIA to identify any potential microwave or telecommunication links that could be affected by the Development. Ofcom monitors the fixed microwave links throughout the UK, whereas JRC manages the radio spectrum used by the UK Fuel and Power Industry. Atkins undertakes a similar role for the water industry. Arqiva operates the Freeview terrestrial transmission network including BBC and ITV.

16.4.4 Study Area

The search for existing telecommunication and microwave links was undertaken within a 2.5 km radius of the approximate centre of the Site, which covers all turbine locations, and approximately 1 km beyond the boundary of the Site. This ensures all telecommunication and microwave links potentially affected are identified.

16.4.4.1 Scoping Responses and Consultations

Telecommunication operators were initially consulted in February 2019 and information requested for any telecommunication links which may be affected due to the Development. Further consultation was undertaken outwith scoping throughout the different design stages of the Development.

Further pre-application consultation was then undertaken in August 2020 with various consultees following turbine design freeze with regard to the potential effects that could arise on telecommunication and utilities from the Development. Consultation was either undertaken directly with the consultees listed or via records searches for infrastructure data.

Table 16.4 provides a summary of the consultation undertaken for this EIA Report topic.

Table 16.4: Consultation Responses

Consultee	Type and Date	Summary of Response	Action
BT	Email – Pre-application Consultation Response, 14/08/20	The Development should not cause interference to BT's current and presently planned radio network. There are currently no links within 100 m allowance.	No further assessment required.

Consultee	Type and Date	Summary of Response	Action
Ofcom – Spectrum Licencing	Email – Pre-Scoping Response, 25/02/2019	Ofcom stated it did / does not have any further involvement with entering into the co-ordination / planning discussions between the concerned parties and information regarding link is provided via the Spectrum Information System[18]	No further assessment required.
Arqiva	Email – Pre-Scoping Response, 25/02/2019	No objection, Arqiva stated the Development is located 25 km west of the nearest SHF link.	No further assessment required.
Atkins	Email – Pre-Scoping Response, 25/02/2019 Pre-application Consultation Response, 25/08/2020	Examined in relation to UHF Radio Scanning Telemetry communications - No objection.	No further assessment required.
Joint Radio Company (JRC)	Email – Pre-Scoping Response, 25/02/2019 Pre-application Consultation Response, 17/08/2020	No objection, JRC identified that no links are affected.	No further assessment required.
The Highland Council	Scoping Response, 06/06/2020 Updated Scoping Response, 11/12/2019	The ES needs to recognise community assets that are currently in operation for example TV, radio, tele-communication links, etc.	Assessment of telecommunications and utilities is provided in Chapter 16: Other Issues; Section 16.4.
LinesearchbeforeUDig	Email - Pre-Application Response – 25/05/2020	No utilities identified on site. Site. SSE Networks identified a Low Voltage Mains located approximately 850 m west of the nearest turbine and runs parallel to the western boundary of the Site from Ackron Farm to Golval.	No further assessment required.

[18] https://www.ofcom.org.uk/spectrum/information/spectrum-information-system-sis/spectrum-information-portal

16.4.5 Baseline Conditions and Assessment of Potential Effects

16.4.5.1 Telecommunications

JRC, Atkins and Arqiva identified no links within the telecoms study area and have raised no objection to the Development. No further response was received from Ofcom.

Digital television signals are rarely affected by the operation of wind turbines; however, in some cases, interference can be caused by blocking or reflections. A minimum signal strength is required for digital television to operate effectively, if a property already receiving a weak digital signal experiences additional blocking or reflections from wind turbines, the signal level may drop, causing the television to pixelate or cut out intermittently. Reflections and blocking from other objects (such as trees) close to a receptor can cause similar effects. Simple measures to boost the signal through an improved receiver are usually sufficient to correct the issue.

The area surrounding the Site receives television signals that were made exclusively digital, after the digital switchover was completed, and hence no analogue TV signals are broadcast in the area. As a result, it is considered that the television reception received by the properties close to the Site will not be affected, and no significant effects will occur. However, in the event that interference which is directly attributable to the Development is experienced, the Applicant will endeavour to implement a suitable mitigation solution. Examples of technical solutions include: changing the receptor height, re-orientating the receptor to receive signals from an alternative transmitter, upgrading the receptor system or installation of satellite television. The requirement for a corrective action would be most appropriately identified after the onsite survey is complete, and the Development is operational.

Broadcast radio (FM, AM and DAB digital radio) are transmitted on lower frequencies than those used by analogue TV signals. Lower frequency signals tend to pass through obstructions more easily than the higher frequency TV signals, and diffraction effects also become more pronounced at lower frequencies. Both of these factors will tend to lessen the impact of wind turbines on radio reception. Should interference to radio signals be experienced as a result of the Development, the technical solutions described in the above paragraph are considered as suitable mitigation measures.

16.4.5.2 Utilities

Other below ground infrastructure, such as utilities, could be affected during construction; however, implementation of best practice would ensure that these are not negatively affected during construction or operation.

Consultation with Scottish Water was undertaken offering no objection to the Development.

A linesearch[19] utility search was undertaken during the EIA process, which identified no utilities within the Site. Scottish Gas Networks responded that the Development is in a no gas area but is within their operational boundaries, and as such have no objection. SSE Networks identified a Low Voltage Mains located approximately 850 m west of the nearest turbine and runs parallel to the western boundary of the Site from Ackron Farm to Golval. SSE Network confirmed that they have no other assets in the wider vicinity. Given the large separation distance, the Development is unlikely to affect the Low Voltage Mains identified though offsite works along the A897 could be affected.

Prior to construction, a further linesearch for undergrounded utilities would occur and any services located. Negative effects would be avoided through the implementation of safe systems of work. During construction, there may be construction traffic passing

[19] Linesearch Online Tool [Online] Available at: http://www.linesearchbeforeudig.co.uk/# (Search undertaken 30/08/2020)

beneath electricity lines along the transportation route. Although it is very unlikely that any damage to this infrastructure will occur, appropriate management measures will be put in place to ensure that electricity lines are not affected by the Development, and that the Development is constructed in accordance with relevant health and safety legislation as appropriate. Following the implementation of such measures, if necessary, there will be no effect on utility infrastructure as a result of the Development, and it is not considered further.

16.4.6 Statement of Significance

Consultation undertaken with the telecommunications consultees has confirmed no fixed communication links operating across the Site and that therefore the Development will not interfere with telecommunications and electromagnetic signals. Effects on television reception are unlikely, and technical solutions are readily available as suitable mitigation measures should negative effects be present. Negative effects on infrastructure such as utilities would be avoided through safe systems of work. Therefore, it is considered that there will be **no significant** effects in terms of the EIA Regulations upon telecommunications and utilities as a result of the Development.

16.5 AVIATION

16.5.1 Introduction

Wind farm developments can affect airports predominantly by presenting a collision risk to aircraft approaching/departing the airport or by interfering with radar/other navigation aids. The potential for collision risk is safeguarded via Obstacle Limitation Surfaces (OLS) – defined in accordance with the CAA Civil Aviation Publication (CAP) 168 'Licensing of Aerodromes'.

The general approach to wind farm development is to avoid negative effects on aviation infrastructure where possible, and to find appropriate technical mitigation solutions where this cannot be achieved. Policy guidance and extant regulations in respect of the potential interference effects of wind turbines on air traffic control (ATC) radars are highlighted in civil and military publications. Furthermore, there are airfield physical safeguarding and telecommunication and navigational infrastructure safeguarding requirements.

16.5.2 Legislation, Policy and Guidance

This assessment takes into account consultation, regulatory, safeguarding and operational requirements outlined by Civil Aviation Authority Guidance[20] which is detailed in Section 16.5.3 below.

The primary sources of information for the technical assessments were:

- Pager Power's database of installations – continuously updated based on stakeholder consultation, field surveys and official publications;
- NATS (formerly National Air Traffic Services) Aeronautical Information Package – which includes coordinate information for navigation aids at licensed aerodromes;
- The Developer's information pertaining to the development including consultation responses; and
- Civil Aviation Publication (CAP) 764 Civil Aviation Authority (CAA) Policy and Guidance on Wind Turbines Version 6[21];

[20] Civil Aviation Authority, 2016, CAP 766 Policy and Guidelines on Wind Turbines [Online] Available at: https://publicapps.caa.co.uk/modalapplication.aspx?catid=1&pagetype=65&appid=11&mode=detail&id=5609 (Accessed 30/08/2020)
[21] Civil Aviation Authority (2016) CAP 764: Policy and Guidelines on Wind Turbines [Online] Available at: https://publicapps.caa.co.uk/modalapplication.aspx?catid=1&pagetype=65&appid=11&mode=detail&id=5609 (Accessed 30/08/2020)

- CAP 168 Licensing of Aerodromes, Version[22];
- CAP 670 ATS Safety Requirements Version[23];
- CAP 774 UK Flight Information Services, Version 3[24];
- CAP 738 Safeguarding of Aerodromes Version 2[25];
- CAP 793 Safe Operating Practices at Unlicensed Aerodromes[26];
- CAP 764 Policy and Guidelines on Wind Turbines[27]
- CAP 493 Manual of Air Traffic Services[28];
- Military Aviation Authority Traffic Management (3000 series) Regulatory Articles[29];
- Military Aviation Authority Regulatory Article 2330 (Low Flying)[30];
- UK Military Aeronautical Information Publication (MIL AIP)[31];
- UK Aeronautical Information Publications (AIP)[32]; and
- CAA 1:250,000 and 1:500,000 Aviation Charts[33].

16.5.3 Assessment Methodology

Where consultation has highlighted potential impacts, an assessment has been undertaken to quantify the predicted effects and assess the resulting significance. Where impacts are significant, mitigation will be applied.

The process for determining impact significance is by:

- Determining the receptor sensitivity;
- Determining the magnitude of change; and
- Combining the above to determine the significance of effects.

The search for aviation assets included all assets across Scotland to ensure all potentially affected assets are identified. The Study Area is therefore defined as Scotland.

If the Development is found to have any adverse impacts on stakeholders' operations, for example the safeguarding of a civilian airport, or if the Development is found to be

[22] Civil Aviation Authority (2019) CAP 168: Licensing of Aerodromes [Online] Available at: http://publicapps.caa.co.uk/modalapplication.aspx?appid=11&mode=detail&id=6114 (Accessed 30/08/2020)
[23] Civil Aviation Authority (2019) CAP 670: Air Traffic Services Safety Requirements [Online] Available at: http://publicapps.caa.co.uk/modalapplication.aspx?catid=1&pagetype=65&appid=11&mode=detail&id=9124 (Accessed 30/08/2020)
[24] Civil Aviation Authority (2017) CAP 774: UK Flight Information Services [Online] Available at: https://publicapps.caa.co.uk/modalapplication.aspx?catid=1&pagetype=65&appid=11&mode=detail&id=7890 (Accessed 30/08/2020)
[25] Civil Aviation Authority (2006) CAP 738: Safeguarding of Aerodromes [Online] Available at: https://publicapps.caa.co.uk/modalapplication.aspx?appid=11&mode=detail&id=576 (Accessed 30/08/2020)
[26] Civil Aviation Authority (2010) CAP 793: Safe Operating Practices at Unlicensed Aerodromes [Online] Available at: https://publicapps.caa.co.uk/modalapplication.aspx?appid=11&mode=detail&id=4141 (Accessed 30/08/2020)
[27] Civil Aviation Authority (2016) CAP 764: Policy and Guidelines on Wind Turbines [Online] Available at: https://publicapps.caa.co.uk/modalapplication.aspx?catid=1&pagetype=65&appid=11&mode=detail&id=5609 (Accessed 30/08/2020)
[28] Civil Aviation Authority (2017) CAP 493: Manual of Air Traffic Services Part 1 [Online] Available at: https://publicapps.caa.co.uk/modalapplication.aspx?catid=1&pagetype=65&appid=11&mode=detail&id=8106 (Accessed 30/08/2020)
[29] Scottish Government (2014) 3000 Series: Air Traffic Management Regulations (ATM) [Online] Available at: https://www.gov.uk/government/collections/3000-series-air-traffic-management-regulations-atm#3000-series-complete-download (Accessed 30/08/2020)
[30] Scottish Government (2014) Regulatory Article (RA) 2330: Low Flying [Online] Available at: https://www.gov.uk/government/publications/regulatory-article-ra-2330-low-flying) (Accessed 30/08/2020)
[31] UK Military AIP (2019) Military Aeronautical Information Publication [Online] Available at: https://www.aidu.mod.uk/aip/aipVolumes.html (Accessed 30/08/2020)
[32] NATS (n.d.) Aeronautical Information Service [Online] Available at: http://www.nats-uk.ead-it.com/public/index.php.html (Accessed 30/08/2020)
[33] CAA (n.d.) Data and Analysis [Online] Available at: https://www.caa.co.uk/Data-and-analysis/(Accessed 30/08/2020)

located within an area of high priority military aviation activities, this would be considered a significant effect and mitigation would be required.

16.5.4 Scoping Responses and Consultations

Consultation with relevant aviation stakeholders is a routine part of windfarm development and the consultation process that is required to be undertaken is also laid down in Civil Aviation Publication (CAP) 764 (for civil aviation issues) and the Wind Energy and Aviation Interests Interim Guidelines[34] (for both civil and military consultation). In relation to the Development the following consultees have been identified:

- Highlands and Islands Airports Limited (HIAL);
- Ministry of Defence (MoD) (Defence Infrastructure Organisation);
- National Air Traffic Services (NATS); and
- Civil Aviation Authority (CAA).

Consultation for this EIA Report topic was undertaken with the organisations shown in Table 16.3.

Table 16.3: Consultation Responses

Consultee	Type and Date	Summary of Response	Action
HIAL	Updated Scoping Opinion – 8/11/2019	Development would not infringe the safeguarding surfaces for Wick Airport. HIAL unlikely to object to the Development.	No further assessment required.
MoD	Updated Scoping Opinion – 10/12/2019	The MoD have no concerns with the proposal. In the interests of air safety, the MoD will request that the development should be fitted with 25 candela (cd) omni-directional red lighting or infrared lighting with an optimised flash pattern of 60 flashes per minute.	No further assessment required. Turbines to be fitted with infrared lighting scheme.
NATS Safeguarding	N/A	No response to the Scoping Requests.	N/A
CAA	N/A	No response to the Scoping Requests.	N/A
The Highland Council	Scoping Response, 6/06/2019 Updated Scoping Response, 11/12/2019	The ES needs to recognise community assets that are currently in operation for example radar, MoD safeguards, etc.	Assessment of aviation is provided in Chapter 16: Other Issues; Section 16.5.

[34] Wind Energy, Defence and Civil Aviation Interests Working Group (2002) Wind Energy and Aviation Interests Interim Guidelines [Online] Available at: https://assets.publishing.service.gov.uk/government/uploads/system/uploads/attachment_data/file/48101/file17828.pdf (Accessed 30/08/2020)

16.5.4.1 Baseline Conditions

The Development is located in an area which is remote from military and civilian aviation infrastructure. The closest civilian airport is at Wick Airport, 45 km south east of the Development. The closest military airfield is the Tain Royal Air Force (RAF) base, located 80 km south.

The nearest known MoD training facility is the Cape Wrath Training Area, located approximately 66 km north-west of the Site. Given the distance between the training area and the Site, and the nature of the facility, which is used for fire and dry exercises, this would not conflict with the Development.

The Site is located within an area of Low Priority Military low flying military low flying which according to the MoD is 'less likely to raise concerns'.

16.5.5 Assessment of Potential Effects

16.5.5.1 MoD

There is no military radar predicted to be affected by the Development. Therefore, the magnitude of change for radar would be 'no change' and considered **not significant** in terms of the EIA Regulations.

The Development is within a 'low priority' military low flying area. Military low flying areas are of regional scale. The level of acceptable development within a low flying area is variable and complicated to determine, however the overall sensitivity is considered 'low'.

The MoD has not objected to the Development and consultation has been undertaken to establish the associated aviation lighting requirements. The magnitude of change is 'minor' and the resulting is considered **not significant** in terms of the EIA Regulations, subject to the provision of adequate lighting (discussed in Section 16.5.6 of this Chapter).

16.5.5.2 HIAL

There is no Primary Surveillance Radar (PSR) at Wick Airport and so no radar impact assessment is required with HIAL. The standard consultation distance for a non-radar Airfield is 17 km and Ackron wind farm is 45 km from Wick.

HIAL confirmed during Updated Scoping in November 2019 that they are unlikely to object to the Development as it would not infringe the safeguarding surfaces for Wick Airport.

In April 2020, HIAL commenced a safeguarding strategy for a new radar with automatic objections to any new developments within 40 nautical miles of Wick Airport. This strategy ceased in August 2020 and any objections were withdrawn.

The magnitude of change is 'no change' and any effects is considered **not significant** in terms of the EIA Regulations.

16.5.5.3 NATS

NATS operates en-route radar and navigation aids throughout the UK, which are safeguarded against wind developments. The most significant concern for PSR is the potential for false returns, or 'radar clutter' caused by the spinning rotor. Secondary Surveillance Radar (SSR) can also be affected by reflection issues; however, these are safeguarded to shorter distances. No SSR concerns are applicable for the Development.

The NATS online self-assessment maps[35] indicate that the Site is not within an area where turbines are likely to interfere with the primary or secondary surveillance radar of NATS

[35] NATS Self-assessment maps [Online] Available at: https://www.nats.aero/services/information/wind-farms/self-assessment-maps/ (Accessed 30/08/2020)

En-Route Ltd (NERL). The magnitude of change is therefore 'no change' and the overall impact is **not significant** in terms of the EIA Regulations.

16.5.6 Mitigation and Residual Effects

16.5.6.1 MoD

The MoD requires aviation lighting due to the potential to create a physical obstruction to air traffic movements and cause interference to the Air Traffic Control and Air Defence radar installations. Consultation with the MoD has confirmed that their requirement is for infra-red lighting only, specifically:

- The cardinal turbines should be fitted with infra-red lighting; and
- The lighting should have an optimised flash pattern of 60 flashes per minute of 200 milliseconds (ms) to 500 ms at the highest practicable point.

It has been confirmed with the MoD that visible lighting is not a requirement. The highest practicable point for a wind turbine in the context of aviation lighting is the turbine hub.

The precise lighting scheme has not been finalised; this will be designed in accordance with the MoD requirements above.

16.5.7 Residual Effects

Any mitigation strategies will be designed to ensure that negative impacts are remedied such that any residual effects will be non-existent or insignificant. The lighting scheme will be designed in accordance with the MoD requirements such that safety is maintained in the area.

16.5.8 Statement of Significance

The potential effects of the Development on aviation activity has been assessed technically and operationally. Consultation has been undertaken with the relevant stakeholders including the MoD and HIAL. Significant effects are not predicted for any MoD infrastructure. As the turbines are less than 150 m to tip and not in close proximity to any airfield, there is no requirement for visible spectrum aviation lighting[36] and the turbines would be fitted with infra-red lighting scheme. This is assessed as **not significant** in terms of the EIA Regulations.

[36] CAA (2017) Policy Statement: Lighting of Onshore Wind Turbines Generators in the United Kingdom with a maximum blade tip height at or in excess of 150m Above Ground Level. Available at https://publicapps.caa.co.uk/docs/33/DAP01062017_LightingWindTurbinesOnshoreAbove150mAGL.pdf (Accessed 30/11/2020)