17 OTHER ISSUES

17.1 Introduction

This Chapter of the Environmental Impact Assessment Report ('EIA Report') evaluates the effects of the Ladyfield Renewable Energy Park ('the Development') on any remaining topics that are within the scope of the Environmental Impact Assessment ('EIA') but are not covered in other chapters. This assessment was undertaken by ERM.

The topics included within this Chapter include:

- Shadow Flicker;
- Aviation; and
- Telecommunications, Television Reception and Utilities.

This Chapter of the EIA Report is supported by the following Technical Appendix documents provided in Volume 3 Technical Appendices:

- A6.5: Assessment of Visible Aviation Lighting.

This Chapter of the EIA Report is supported by the following Figures provided in Volume 2a - Figures excluding Landscape and Visual Impact Assessment (LVIA):

- Figure 17.1: Shadow Flicker Casting Map.

This chapter broadly follows the structure below:

- Legislation, Policy and Guidance;
- Assessment Methodology and Significance Criteria;
- Baseline Conditions;
- Assessment of Potential Effects;
- Cumulative Effect Assessment;
- Mitigation and Residual Effects;
- Summary of Effects; and
- Statement of Significance

17.2 Shadow Flicker

17.2.1 Introduction

This Section evaluates the effects of shadow flicker from the Development on nearby receptors. 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 a 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. The likelihood and duration of the effects depends on a range of factors including the direction, distance and aspect of residential dwellings in relation to the turbines, turbine height and rotor diameter, the topography between residential dwellings and turbines, the time of year and day, and the local weather conditions. Further details of contributing shadow flicker factors can be seen in Section 17.2.3.4.

If significant shadow flicker effects on residential dwellings are identified as part of this assessment, technical solutions to mitigate shadow flicker will be provided.

Where significant shadow flicker effects on residential dwellings are identified as part of this assessment, technical solutions to mitigate the shadow flicker are discussed in Section 17.2.6.

17.2.2 Legislation, Policy and Guidance

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

- National Planning Framework 4
- [549];
- Scottish Government Onshore Wind Turbines: Planning Advice[550];
- Argyll and Bute Local Development Plan (the LDP)[551]
- Review of Light and Shadow Effects from Wind Turbines in Scotland[552]; and
- The Northern Ireland Wind Energy Development Guidelines Best Practice Guidance to Planning Policy, Statement 18 'Renewable Energy'[553].

There is no UK, or Scottish legislation that directly addresses the assessment or control of shadow flicker. As such, no statutory legislation has contributed to any aspects of this assessment.

17.2.2.1 National Planning Framework 4

The NPF4 is the recently published national spatial strategy for Scotland, setting out the Scottish Government's spatial principles, regional priorities, national developments and national planning policy. This replaces NPF3.

Policy 11 (Energy) is intended to "*encourage, promote and facilitate all forms of renewable energy development onshore and offshore*" and requires renewable energy projects design and mitigation to demonstrate how impacts on communities and individual dwellings, including shadow flicker, are addressed. This assessment meets this criteria by identifying and addressing shadow flicker impacts on, in this case, nearby dwellings.

17.2.2.2 Scottish Government Onshore Wind Turbines: Planning Advice

This document provides planning advice for onshore wind developments including consideration of shadow flicker effects. This is the most current Scottish planning advice for Shadow Flicker and has been used to inform the methodology for this assessment. It states:

"Where this [shadow flicker] could be a problem, developers should provide calculations to quantify the effect. In most cases however, where separation is provided between wind turbines and nearby dwellings (as a general rule 10 rotor diameters), "shadow flicker" should not be a problem".

17.2.2.3 Argyll and Bute Local Development Plan

Regional planning is addressed in full in the Planning Statement which accompanies the EIA Report.

The LDP was adopted by the Argyll and Bute Council (the Council) in March 2015. The LDP provides a comprehensive spatial framework and settlement strategy for the future use and development of land within Argyll and Bute with setting out development opportunities and ways to enhance the rural and urban environment.

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[549] Scottish Government (2023) National Planning Framework 4 [Online] Available at: https://www.gov.scot/publications/national-planning-framework-4/documents/
[550] Scottish Government (2014) Onshore Wind Turbines: Planning Advice [Online] Available at: https://www.gov.scot/publications/onshore-wind-turbines-planning-advice/ (Accessed on 05/04/2023)
[551] Argyll and Bute (2015) Argyll and Bute Local Development Plan [Online] Available at: https://www.argyll-bute.gov.uk/sites/default/files/written_statement_0.pdf (Accessed on 05/04/2023)
[552] 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 on 05/04/2023)
[553] Department of the Environment, Best Practice Guidance to Planning Policy Statement 18 'Renewable Energy', (2009) [Online] Available at: https://www.infrastructure-ni.gov.uk/sites/default/files/publications/infrastructure/Best%20Practice%20Guidance%20to%20PPS%2018%20-%20Renewable%20Energy_0.pdf (Accessed on 05/04/2023)

Consideration must be given to relevant policies contained with the LDP and the design of the Development. The relevant policy with regards to shadow flicker within the LDP is:

Policy LDP 6 - Supporting the Sustainable Growth of Renewables states that all applications for wind turbine developments will be assessed against:

"Impacts on communities and individual dwellings, including visual impact, residential amenity, noise and shadow flicker".

17.2.2.4 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 Scottish Government Onshore Wind Turbines: Planning Advice remains extant.

17.2.2.5 The Northern Ireland Wind Energy Development Guidelines - Best Practice Guidance to Planning Policy, Statement 18 'Renewable Energy'

This is one of the only pieces of formal guidance which suggests a quantitative value to determine the severity of shadow flicker effects. It states:

"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 recommendation is based on research by Predac, a European Union sponsored organisation promoting best practice in energy use and supply which draws on experience from Belgium, Denmark, France, the Netherlands, and Germany. This guidance is referenced in the Department of Energy and Climate Change (DECC) Update of UK Shadow Flicker Evidence Base[554], published in 2011.

17.2.3 Assessment Methodology and Significance Criteria

17.2.3.1 Scoping Responses and Consultations

Consultation for this EIA Report topic was undertaken with the organisation shown in Table 17.1.

Table 17.1: Scoping and Consultation Response

Consultee	Type and Date	Summary of Consultation Response	Response to Consultee
Argyll and Bute Council	Scoping Response, 15th February 2022	It is noted that a Shadow Flicker Assessment will be undertaken to determine whether or not there will be any impacts on surrounding properties. This assessment should identify whether any shadow flicker effects would occur at any sensitive receptors and calculate the approximate times of day and year	A full shadow flicker assessment of 10 rotor diameters from each turbine has been

[554] Department of Energy and Climate Change (2011). Update of UK Shadow Flicker Evidence Base. [Online] Available at: Update of UK Shadow Flicker Evidence Base (publishing.service.gov.uk) (Accessed on 05/04/2023)

Consultee	Type and Date	Summary of Consultation Response	Response to Consultee
		that these effects would occur. In accordance with the Scottish Government's advice all properties within (10 rotor diameters – as a general rule) of the turbine locations should be taken into consideration in the assessment.	undertaken and can be seen in Section 17.2.5

17.2.3.2 Study Area

As detailed in Section 17.2.2.2, and identified by the Council in their Scoping Opinion, the Scottish Government's Onshore Wind Turbines: Planning Advice requires a shadow flicker assessment to be undertaken at properties within 10 rotor diameters of the Development. The area around each proposed turbine location extending to a distance of 10 rotor diameters has therefore been identified as the Study Area. The Study Area is a 1,360 m buffer based on the candidate turbine (the Vestas V136) with a hub height of 112 m and a rotor diameter of 136 m. The Study Area is shown in Figure 17.1: Shadow Flicker Casting Map. The Shadow flicker casting area (shown on Figure 17.1: Shadow Flicker Casting Map), is the modelled extent of shadow flicker effects, taking into account topography and sun positioning.

Potential sensitive receptors in the area around the Development were identified from Ordnance Survey (OS) 1:25,000 scale digital mapping and online aerial imagery. OS AddressBase data was used to confirm the locations and names of permanent dwellings in the Study Area, or close enough to be considered necessary for inclusion as a precautionary assumption. As shown in Figure 17.1: Shadow Flicker Casting Map, ten receptors are located within the Study Area. These receptors are all located to the west of the Site, along the River Aray.

17.2.3.3 Baseline 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 Applicant and other Arcus disciplines verifying the location and nature of surrounding receptors.

17.2.3.4 Methodology for the Assessment of Effects

A recognised computer software package[555] was used to calculate theoretical specific times and durations of shadow flicker effects at each receptor.

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

- Turbine locations, hub height, and rotor diameter;
- Locations of receptors within 10 rotor diameters of the turbines;
- Topography (obtained from Ordnance Survey Terrain 50 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).

A cut off distance of 1,360 m (i.e. 10 rotor diameters) from each turbine was employed during this calculation in accordance with the guidance noted in Section 17.2.2.2.

It is assumed that if shadow flicker effects experienced at receptors within the Study Area are not significant, then effects experienced by receptors outwith the Study Area will be reduced and therefore also not significant.

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;

[555] Resoft WindFarm 4.2.1.7

- The turbine rotor will always be facing directly towards the property and that the property has a window directly facing the turbines, 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, used as a standard approach to shadow flicker assessments, 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, and the duration potentially increased), 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 receptor is located at the easting and northing given in Table 17.2 (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 façade.

The above assumptions are intended to aid calculations and investigate a worst-case scenario by indicating 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.

The closest Met Office Climate Station is located in Lephinmore, approximately 25.5 km southwest of the Site. The average annual sunshine hours at the station from 1991 to 2020 was 1156.64 hours, which means bright sunshine occurred in this location for approximately 26% of daylight hours within this period[556]. 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 be aligned with the direction of the sun, such that shadows are 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.

17.2.3.5 Significance Criteria

No formal guidance is available regarding what levels of shadow flicker may be considered acceptable in the UK. However, the Best Practice Guidance to Planning Policy Statement 18 'Renewable Energy' published by the Planning and Environmental Policy Group (2009)[557] 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 Northern Irish guidance

[556] Met Office (2023) UK climate averages – Lephinmore (2023) [Online] Available at: https://www.metoffice.gov.uk/research/climate/maps-and-data/uk-climate-averages/gcur0c9pr (Accessed on 05/04/2023)
[557] Department of the Environment, Best Practice Guidance to Planning Policy Statement 18 'Renewable Energy', (2009) [Online] Available at: https://www.infrastructure-ni.gov.uk/sites/default/files/publications/infrastructure/Best%20Practice%20Guidance%20to%20PPS%2018%20-%20Renewable%20Energy_0.pdf (Accessed on 05/04/2023)

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

Mitigation is proposed in Section 17.2.6. to minimise or remove predicted effects in the event that levels of shadow flicker are found to be unacceptable.

17.2.3.6 Assessment Limitations

The assumptions made in the assessment process, outlined in Section 17.2.3.4, are considered to be conservative and likely to make the assessment results the worst case.

17.2.4 Baseline Conditions

10 potential receptors (used as assessment locations) have been identified within the Study Area, or close enough to the Study Area that they could potentially be subject to shadow flicker effects and should be included for assessment. No further consented or proposed residential developments (potential future receptors) have been identified within the Study Area on the Council's planning portal at the time of the assessment. Table 17.2 details the identified receptors within the Study Area, as shown in Figure 17.1: Shadow Flicker Casting Map.

Table 17.2: Shadow Flicker Assessment Locations

Receptor Name	Easting	Northing	Nearest Turbine	Distance to Nearest Turbine (metres)
West Drimfern	208192	714656	11	1810
Drimfern	208319	714588	11	1699
Stronmagachan	208281	714112	11	1898
Stronmagachan Steading	208233	714085	11	1953
Druim Breac	208095	714617	11	1912
7-South Tullich	208505	715431	11	1514
9-North Tullich	208909	716076	6	1263
Ladyfield Farm	209085	715643	11	1102
Ladyfield Replacement Dwelling	209077	715618	11	1109
Ladyfield Barn Conversion	209059	715610	11	1119

17.2.5 Assessment of Potential Effects

17.2.5.1 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.

17.2.5.2 Operational Phase

Table 17.3 details the theoretical maximum hours of shadow flicker per annum, based on the worst-case assumptions discussed in Section 17.2.3.4. It also shows the calculation of the predicted likely number of hours of shadow flicker per annum, assuming 26% per annum bright sunshine.

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 could 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 17.2.3.4.

The theoretical maximum number of hours per annum, as shown in Table 17.3, is for all theoretical windows and accounts for any overlap where effects may be experienced at different windows or from different turbines simultaneously.

Table 17.3: Potential Shadow Flicker Effects at Assessed Location

Receptor	Days Per Year	Maximum Minutes Per Day	Theoretical Maximum Hours Per Annum	Likely Hours Per Annum[558]
West Drimfern	0	0	0	0
Drimfern	0	0	0	0
Stronmagachan	0	0	0	0
Stronmagachan Steading	0	0	0	0
Druim Breac	0	0	0	0
South Tullich	0	0	0	0
North Tullich	40	27.6	14.1	3.6
Ladyfield Farm	119	31.2	50.3	13.1
Ladyfield Replacement Dwelling	116	31.2	48.4	12.6
Ladyfield Barn Conversion	114	30.6	47.7	12.4

As can be seen from Table 17.3, it has been calculated that four of the ten receptors assessed in the Study Area are predicted to experience shadow flicker effects, of which three receptors experience 'significant' effects.

Based upon weather conditions required to facilitate shadow flicker occurring for only 26% of the time, the potential shadow flicker effects are predicted to occur for a maximum of 31.2 minutes per day and for a likely 50.3 hours per annum at Ladyfield Farm, for a maximum of 31.2 minutes per day a likely 48.4 hours per annum at Ladyfield Replacement Dwelling, and for a maximum of 30.6 minutes and a likely 47.7 hours per annum at Ladyfield Barn Conversion. Overall, as seen from Table 17.3, each of these three receptors will exceed the guidance threshold of 30 minutes per day. Based on the same weather conditions, the potential shadow flicker effects for North Tullich are predicted to occur for a maximum of 27.6 minutes per day and a likely 14.1 hours per annum, neither of which exceed the guidance threshold of 30 hours per annum or 30 minutes per day and are therefore not considered to be significant.Although figures are likely to comprise an over-estimate of actual effects, given the conservative aspects of this assessment as set out in the assessment methodology (Section 17.2.3.4), shadow flicker effects at Ladyfield Farm, Ladyfield Replacement Dwelling and Ladyfield Barn Conversion exceed the 30 minutes per day or 30 hours per year threshold, therefore, shadow flicker due to the Development is **significant** as per the EIA Regulations. Mitigation measures have therefore been specified in Section 17.2.6. No mitigation measures have been specifically identified for North Tullich as the effects are not anticipated to be significant.

None of the other six receptors are predicted to experience shadow flicker effects and as such no impact is anticipated to arise.

17.2.6 Mitigation and Residual Effects

Given that there are predicted significant shadow flicker effects at three of the ten assessed receptors, mitigation measures have been recommended to reduce effects to below the

[558] Assuming 26% of bright sunshine per annum as determined in section 17.2.3.4.

recommended threshold (of 30 minutes per day or 30 hours per year). A conservative approach has been taken, whereby the screening effects provided by trees or other buildings have not been taken into account, and it has been assumed that there are windows on all sides of each 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 this cannot be assumed to be forthcoming. In addition, screening via planting may take some time before it is effective.

Control at Source is the preferable method in the industry for mitigating shadow flicker and will be adopted by the Development. 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 will 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 will be incorporated into the SCADA system. This calculates the locations of shadows in real time, determines whether these coincide with 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 a shadow flicker complaint is received by the site operator or the Council, and an appropriate investigation confirms the occurrence is a result of the Proposed Development, then measures such as those outlined above will be used to prevent re-occurrence and protect residential amenity.

As discussed in Section 17.2.5.2, shadow flicker effects have been assessed as being significant at three receptors located within the 10 rotor diameters of the proposed turbine locations; however, application of the above Control at Source measures will ensure that these significant effects are mitigated to be **not significant**, and any previously not significant shadow flicker effects on receptors are minimised or removed entirely.

17.2.7 Assessment of Cumulative Effects

A search of other existing wind farms and wind farms currently applied for and awaiting planning approval has found that there are no other existing or proposed wind farm developments within 10 rotor diameters of any of the assessed receptors. Cumulative shadow flicker effects have therefore not been considered further.

17.2.8 Summary of Effects

An assessment of potential shadow flicker effects associated with the Development has been carried out as per the Scottish Government and local supplementary guidance from the Council. The theoretical maximum and likely hours of shadow flicker occurrence per year have been calculated for receptors located within 10 rotor diameters of the turbines.

During the operational phase, it has been found that three of the ten assessed receptors have potential to experience shadow flicker, with these receptors exceeding the threshold of 30 minutes per day; however, as the modelling is conservative and doesn't take into account other factors such as wind direction, screening and daily varied cloud cover, the maximum minutes per day figures for these residential properties are likely to be an overestimation. Upon completion of the

Development, the SCADA system will be programmed as per the mitigation measures detailed in Section 17.2.6 to address shadow flicker. Thus, shadow flicker, due to the Proposed Development is **not significant.**

17.2.9 Statement of Significance

No shadow flicker effects will occur during construction and decommissioning.

The effect of shadow flicker has been assessed using appropriate guidance in respect of the operational period.

Following mitigation, if required, the Proposed Development will not have significant adverse shadow flicker effects on any residential properties and is deemed **not significant** in terms of the EIA regulations.

17.3 Aviation

17.3.1 Introduction

Wind turbines have the ability to reflect radio waves and therefore have the potential to interfere with radar systems. In addition, wind turbines can present a physical obstruction at, or close to, an aerodrome or other aviation activity site, such as areas of low flying.

The general approach to wind farm development is to avoid adverse 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.

17.3.2 Legislation, Policy and Guidance

There are a number of aviation publications relevant to the interaction of wind turbines and aviation containing guidance and legislation, which cover the complete spectrum of aviation activity in the UK as shown below:

- Civil Aviation Publication (CAP) 764 Civil Aviation Authority (CAA) Policy and Guidance on Wind Turbines Version 6, Feb 2016 (CAA, 2016)[559];
- CAP 168 Licensing of Aerodromes, Version 11 March 2019 (CAA 2019)[560];
- CAP 670 ATS Safety Requirements Version 3 June 2019 (CAA 2019)[561];
- CAP 774 UK Flight Information Services, Ed 4 December 2021 (CAA 2021)[562];
- CAP 738 Safeguarding of Aerodromes Version 3 Dec 2006 (CAA 2020)[563];
- CAP 793 Safe Operating Practices at Unlicensed Aerodromes Ed 1 July 2010 (CAA 2010)[564];

[559] Civil Aviation Publication (2016) CAP 764: CAA Policy and Guidelines on Wind Turbines [online] Available at: https://publicapps.caa.co.uk/docs/33/CAP764%20Issue6%20FINAL%20Feb.pdf (Accessed on 05/04/2023)
[560] Civil Aviation Publication (2019) CAP 168: Licensing of Aerodromes [online] Available at: https://publicapps.caa.co.uk/docs/33/CAP%20168%20Issue11_Licensing%20of%20Aerodromes%2013032019.pdf (Accessed on 05/04/2023)
[561] Civil Aviation Publication (2019) CAP 670: Air Traffic Services Safety Requirements [online] Available at: https://publicapps.caa.co.uk/docs/33/CAP670%20Issue3%20Am%201%202019(p).pdf (Accessed on 05/04/2023)
[562] Civil Aviation Publication (2021) CAP 774: UK Flight Information Services [online] Available at: https://publicapps.caa.co.uk/docs/33/CAP774_UK%20FIS_Edition%204.pdf (Accessed on 05/04/2023)
[563] Civil Aviation Publication (2020) CAP 738: Safeguarding of Aerodromes [online] Available at: https://publicapps.caa.co.uk/docs/33/CAP738%20Issue%203.pdf (Accessed on 05/04/2023)
[564] Civil Aviation Publication (2010) CAP 793: Safe Operating Practices at Unlicensed Aerodromes [online] Available at: https://publicapps.caa.co.uk/docs/33/CAP793.pdf (Accessed on 05/04/2023)

- CAP 493 Manual of Air Traffic Services Part 1 Version 9 April 2021 (CAA 2021[565]);
- CAP 393 Regulations made under powers in the Civil Aviation Act 1982 and the Air Navigation Order 2016 Version 6 February 2021(CAA 2021)[566];
- CAP 660 Parachuting Ed 5 March 2020 (CAA 2020)[567];
- Military Aviation Authority Regulatory Article 2330 (Low Flying) (MOD MAA 2019)[568];
- UK Aeronautical Information Publications (AIP) (NATS 2021)[569];
- CAA Policy Statement: Lighting of Onshore Wind Turbine Generators in the United Kingdom with a maximum blade tip height at or in excess of 150m Above Ground Level[570];
- CAA Policy Statement: Lighting of En-Route Obstacles and Onshore Wind Turbines 01 April 2010 (CAA 2010)[571]; and
- Wind Energy and Aviation Interests Interim Guidelines[572].

The proposed turbines, at 180 m to blade tip, would require lighting under Article 222 of the Air Navigation Order (ANO, 2016), which requires that 'en-route obstacles' at or above 150 m above ground level are lit with visible lighting to assist their detection by aircraft. This would constitute a single, medium intensity, 'steady' red aviation light (emitting 2,000 candela) to be fitted at hub level to each turbine. In addition, the CAA requires 3 low intensity lights to be fitted at the intermediate level on the turbine tower (CAA, 2017), to provide 360 degree visibility around the tower. The intermediate 'tower' lights will be 32 candela.Air Navigation Order 2016 (CAP393) Article 223 (8) states that *"If visibility in all directions from every wind turbine generator in a group is more than 5km the light intensity for any light required by this article to be fitted to any generator in the group and displayed may be reduced to not less than 10% of the minimum peak intensity specified for a light of this type."* This reduction affords valuable mitigation of light intensity and allows the minimum intensities identified above to be dimmed to 10% of their values if meteorological conditions permit. For example, the 2,000 cd minimum intensity may be dimmed to 10%, or 200 cd, if visibility is greater than 5 km, in moderate to excellent or 'clear' visibility.

[565] Civil Aviation Publication (2021) CAP 493: Manual of Air Traffic Services – Part 1 [online] Available at: https://publicapps.caa.co.uk/docs/33/CAP493%20Edition%209%20Corrigendum%20%20(May%202021).pdf (Accessed on 05/04/2023)
[566] Civil Aviation Publication (2021) CAP 393: Regulations made under powers in the Civil Aviation Act 1982 and the Air Navigation Order 2016 [online] Available at: https://publicapps.caa.co.uk/docs/33/CAP393%20Regulations%20made%20under%20powers%20in%20the%20Civil%20Aviation%20Act%201982%20and%20the%20Air%20Navigation%20Order%202016.pdf (Accessed on 05/04/2023)
[567] Civil Aviation Publication (2020) CAP 660: Parachuting [online] Available at: https://publicapps.caa.co.uk/docs/33/CAP%20660%20Parachuting%20March%202020.pdf (Accessed on 05/04/2023)
[568] Military Aviation Authority (2021) RA 2330 - Low Flying [online] Available at: https://assets.publishing.service.gov.uk/government/uploads/system/uploads/attachment_data/file/996200/RA2330_Issue_5.pdf (Accessed on 05/04/2023)
[569] NATS (2021) Aeronautical Information Publication [online] Available at: https://nats-uk.ead-it.com/cms-nats/opencms/en/Publications/AIP/ (Accessed on 05/04/2023)
[570] Civil Aviation Publication (2017) Policy Statement: Lighting of Onshore Wind Turbine Generators in the United Kingdom with a maximum blade tip height at or in excess of 150m Above Ground Level [Online] Available at: https://publicapps.caa.co.uk/docs/33/DAP01062017_LightingWindTurbinesOnshoreAbove150mAGL.pdf (Accessed on 05/04/2023)
[571] Civil Aviation Publication (2010) Policy Statement: Lighting of En-Route Obstacles and Onshore Wind Turbines [online] Available at: https://publicapps.caa.co.uk/docs/33/DAP_LightingEnRouteObstaclesAndWindTurbines.pdf (Accessed on 05/04/2023)
[572] 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 on 05/04/2023)

17.3.3 Assessment Methodology and Significance Criteria

Where consultation has highlighted potential effects, an assessment has been undertaken to quantify the predicted effects and assess the resulting impact 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. 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 located within an area of high priority military aviation activities, this would be considered a significant effect and mitigation would be required.

17.3.3.1 Overview and Study Area

The assessment of effects of the Development is based upon the guidance laid down in CAA Publication CAP 764 Policy and Guidelines on Wind Turbines Version 6 (dated February 2016) with the consultation criteria for aviation stakeholders defined in Chapter 4 of CAP 764.

CAP 764 states the distances from various types of airfields where consultation should take place. These distances include:

- Airfield with a surveillance radar – 30 km;
- Non-radar licensed aerodrome with a runway of more than 1,100 m – 17 km;
- Non-radar licensed aerodrome with a runway of less than 1,100 m – 5 km;
- Licensed aerodromes where the turbines would lie within airspace coincidental with any published Instrument Flight Procedure (IFP);
- Unlicensed aerodromes with runways of more than 800 metres – 4 km;
- Unlicensed aerodromes with runways of less than 800 metres – 3 km;
- Gliding sites – 10 km; and
- Other aviation activity such as parachute sites and microlight sites within 3 km – in such instances developers are referred to appropriate organisations.

CAP 764 goes on to state that these distances are for guidance purposes only and do not represent ranges beyond which all wind turbine developments will be approved or within which they will always be objected to. These ranges are intended as a prompt for further discussion between developers and aviation stakeholders which may result in a study area being modified as required based on specific airspace and operational considerations.

The assessment considers effects on both civil and military aviation receptors.

As well as examining the technical impact of wind turbines on Air Traffic Control (ATC) facilities, it is also necessary to consider the physical safeguarding of ATC operations using the criteria laid down in CAP 168 Licensing of Aerodromes to determine whether a proposed development will breach obstacle clearance criteria.

17.3.3.2 Significance Criteria

Should the construction and operation of the Development materially cause disturbance to any aviation users or affect the operation of any of the various radar systems, such as through degradation of signal quality to the extent that it warrants an objection from the radar operator, this would be considered a significant effect for the purposes of the EIA Regulations.

17.3.3.3 Scoping Responses and Consultations

Consultation with relevant aviation stakeholders is a routine part of wind farm development and the consultation process that is required to be undertaken is also laid down in CAP 764 (for civil

aviation issues) and the Wind Energy and Aviation Interests Interim Guidelines (for both civil and military consultation).

Consultation for this EIA Report topic was undertaken with the organisations shown in Table 17.4.

Table 17.4: Consultation Responses from Aviation Consultees

Consultee	Type and Date	Summary of Response	Response to Consultee
ECU	Scoping Response, 2nd March 2021	It is recommended by the Scottish Ministers that with regards to impacts of night time aviation lighting the Company should discuss and agree with Argyll & Bute Council and NatureScot the range (in kilometres from the Proposed Development) for night time assessments of the impacts of night-time aviation lighting and receptors therein to be assessed. As well as the scope, methodology, findings and recommendations of such assessments, full details of all mitigation of aviation lighting impacts subsequently identified should be provided in the EIA report.	An assessment of aviation lighting has been carried out and is included in Technical appendix A6.5: Assessment of Visible Aviation Lighting. NatureScot advised that lighting should be shown at both 200cd and 2000cd on separate visuals, on the basis that aviation light visibility depends on night time lighting context and real world conditions so both scenarios should be visualised to prevent underplaying aviation lighting effects. Lighting has therefore been shown at both 2,000 cd and 200 cd on separate visualisations within Appendix 6.5 and ES chapter 6: LVIA.
Highlands and Islands Airports Ltd.	Scoping Response, 19th July 2021	The development lies outwith the safeguarding zone for any Highlands and Islands Airport. Therefore, HIAL has no objections to the proposed Development and do not need to be consulted further.	Noted.
NATS Safeguarding	Scoping Response, 21st July 2021	The proposed development has been examined from a technical safeguarding aspect and does not conflict with our safeguarding criteria. Accordingly, NATS (En Route) Public Limited Company ("NERL") has no safeguarding objection to the proposal.	Noted. NATS were reconsulted following revisions to the Development since July 2021, and responded on 31/05/2023 confirming that "*The proposed development has been examined from a technical safeguarding aspect and does not conflict with our safeguarding criteria. Accordingly, NATS (En Route) Public Limited Company ("NERL") has no safeguarding objection to the proposal*".
Glasgow Airport	Scoping Response, 29th July 2021	The site is located outwith the obstacle limitation surfaces and radar consultation for Glasgow Airport. It is within the instrument flight procedure safeguarding area, however, development below 300 m above ground level will not require further assessment.	Noted.
Glasgow Prestwick Airport (GPA)	Scoping Response, 6th August 2021	Preliminary Line of Sight (LOS) analysis at proposed tip heights of the Lady Field Wind Farm– indicates all turbines will be significantly terrain shielded from GPA's primary radars and our initial Operational	Noted. As per the MOD request, the Development will be fitted with MOD accredited aviation safety lighting in accordance with the Civil

Consultee	Type and Date	Summary of Response	Response to Consultee
		Assessment indicates no operational impact to ATC. The proposed development has no impact on our published Instrument Flight Procedures (IFP's). Consequently, GPA would be unlikely to object to this development should it come to a full section 36 planning application. GPA however remain interested in how the Developer proposes to address the issue of aviation warning obstruction lighting scheme as required by the UK CAA for obstacles greater than 150m in height above local ground level in accordance with Article 222 of the UK Air Navigation Order (ANO) 2016.	Aviation Authority, Air Navigation Order 2016.
	Gatecheck Response 25th March 2023	On behalf of Glasgow Prestwick Airport, I have reviewed the Gatecheck report for Ladyfield Renewable Energy Park. The Airport is content with the Developer response to the Airport's position and has no further comment to make.	Noted.
Defence Infrastructure Organisation (DIO) - MoD	Scoping Response, 8th September 2021	Subject to the provision of appropriate lighting, the MOD has no objection to the proposed development. The development falls within Low Flying Area 14, an area within which fixed wing aircraft may operate as low as 250 feet or 76.2m above ground level to conduct low level flight training. In the interests of air safety, the MOD will request that the development should be fitted with MOD accredited aviation safety lighting in accordance with the Civil Aviation Authority, Air Navigation Order 2016. Defence Infrastructure Organisation Safeguarding wishes to be consulted and notified of any alterations or other submissions relating to this proposal in order that amendments can be checked for any additional impact on defence interests.	Noted. The Development will be fitted with MOD accredited aviation safety lighting in accordance with the Civil Aviation Authority, Air Navigation Order 2016. The DIO were reconsulted following revisions to the Development since July 2021, but have not responded as of the time of writing.

17.3.4 Baseline Conditions

The closest radar equipped civilian airport to the Site is Glasgow Airport, approximately 61 km to the southeast of the Site and is also the closest licensed aerodrome. Glasgow Prestwick Airport is located approximately 90 km to the south.

The Development is located in an area relatively remote from military aviation infrastructure. There are no military airfields in the region, the closest is Prestwick located approximately 91 km south. The former RAF Leuchars, now an army base, is located approximately 130 km northeast in which the MOD continue to safeguard radar there.

The Met Office safeguards its network of radars using a European methodology known as OPERA (Operational Programme on the Exchange of Radar data). In general, they will object to any turbine within 5 km in line of sight and will examine the impact of any turbines within 20 km. Where a site is within 20 km, the Met Office will undertake an operational assessment based on three main criteria, having determined if there is a technical effect on the radar. In this case the closest Met Office radar is at Holehead over 60 km to the southeast of the Development and therefore well beyond 20 km. Given this distance, no impacts are expected and impacts on Met office Radars have been scoped out of further assessment.

An online search for private airfields has been conducted and none were identified within consultation distance, as mentioned in Section 17.3.3.1. The closest airfield identified is Oban Airport approximately 26 km to the northwest of the Development. A limitation of this methodology is that not all private strips are listed in publications or marked on charts.

17.3.5 Assessment of Potential Effects

17.3.5.1 Licenced Aerodromes

Glasgow Prestwick Airport (GPA)

Consultation was held with Glasgow Prestwick Airport who confirmed in their scoping response that analysis of proposed tip heights of the Development indicates all turbines would be significantly terrain shielded from GPA's primary radars and our initial Operational Assessment indicates no operational impact to Air Traffic Control.

The scoping response also highlighted that the Development would have no impact on GPA's published Instrument Flight Procedures (IFP's) and, consequently, GPA would be unlikely to object to this development.

Further consultation with GPA through had not raised any concerns for GPA and as a result, there will be **no significant effects** on GPA operations.

Glasgow Airport

Consultation was held with Glasgow Airport who did not raise any radar concerns, stating "*The site is located outwith the obstacle limitation surfaces and radar consultation for Glasgow Airport. It is within the instrument flight procedure safeguarding area, however, development below 300 m above ground level will not require further assessment"*.

It is noted that Glasgow Airport was consulted and responded with no objection, confirming that the Site is outwith the consultation zone, therefore no assessment is required. Glasgow Airport were included in Gatecheck consultation but did not provide any response.

The lack of any effect on Glasgow Airport is confirmed in the consultation responses listed in Table 17.4.

As a result, there will be **no significant effects** on Glasgow Airport operations. The magnitude of change is 'no change' and considered **not significant** in terms of the EIA Regulations.

Oban Airport

Argyll and Bute Council (the owners of Oban Airport) were contacted to establish whether the airfield hosts surveillance radar, which if present may require the airport to be considered within this assessment. As yet no response has been received and so the potential for effects upon any radar systems is unknown. In terms of obstruction to low flying, any effects will be mitigated by the use of nighttime lighting to MOD specs, as for the other identified receptors.

17.3.5.2 National Air Traffic Services (EN Route) Ltd Facilities (NERL)

NATS operates en-route radar and navigation aids throughout the UK, which are safeguarded against wind developments. The most significant concern for Primary Surveillance Radar (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[573] indicate that the Site is not within an area where turbines are likely to interfere with the primary or secondary surveillance radar of NATS En-Route Ltd (NERL). This has been confirmed through consultation with NATS. The magnitude of change is 'no change' and considered **not significant** in terms of the EIA Regulations.

17.3.5.3 Ministry of Defence

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 MOD response in Table 17.4 refers to Military Low Flying and details how mitigation will likely be required due to the Development being within Low Flying Area 14 where fixed wing aircraft may operate as low as 250 feet or 76.2m above ground level to conduct low level flight training. Without mitigation, there would be a **significant** effect on Military Low Flying.

17.3.6 Mitigation and Residual Effects

17.3.6.1 Lighting for Military Low Flying

To mitigate any effects on military low flying, the MOD response states that *"In the interests of air safety, the MOD will request that the development should be fitted with MOD accredited aviation safety lighting in accordance with the Civil Aviation Authority, Air Navigation Order 2016."*

This lighting will be fitted to the turbines, with the final lighting arrangement agreed with the MOD pre-construction.

17.3.6.2 Residual Effects

Following the implementation of mitigation measures for low flying, no effects are anticipated to arise for aviation receptors. Therefore there will be **no significant effects** on aviation receptors as a result of the Development.

17.3.7 Cumulative Effect Assessment

No residual effects would occur as a result of the Development, therefore there is no prospective of cumulative effects occurring. There will be no significant cumulative effects on aviation receptors as a result of the Development.

17.3.8 Visible Aviation Lighting Assessment

As stated in Section 17.3.6.1, the turbines associated with the Development will be required to be installed with visible aviation lighting.

As summarised in Appendix 6.5, the Assessment of Visible Aviation Lighting has concluded that the aviation lighting on the turbines of the proposed Development will not have a significant night time effect under either the 2,000 cd or 200 cd scenarios. Therefore, **no significant impact** is anticipated as a result of the Development. Further details are presented in Appendix 6.5.

[573] NATS Self-assessment maps [Online] Available at: https://www.nats.aero/services-products/catalogue/n/wind-farms-self-assessment-maps/ (Accessed on 05/04/2023)

17.3.9 Summary of Effects

An assessment of potential impacts on aviation associated with the Development has been carried out, specifically investigating the potential effects on licenced and unlicensed aerodromes, National Air Traffic Services, the MOD, Air Defence Radars and Met Office Radars.

Following the installation of aviation lighting for low flying, no significant effects are anticipated as a result of the Development on aviation receptors.

17.3.1 Statement of Significance

The potential effects of the Development on aviation activity have been assessed technically and operationally. Consultation has been undertaken with the relevant stakeholders including the NATS, and the MoD. The magnitude of change is 'no change' and considered **not significant** in terms of the EIA Regulations.

17.4 Telecommunication and Utilities

17.4.1 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.

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.

17.4.2 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 - Best Practice Guidelines of Wind Energy Developments[574];
- The Scottish Government - Onshore Wind Turbine: Planning Advice[575]; and
- Ofcom – Tall Structures and Their Impact on Broadcast and Other Wireless Service[576].

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

[574] BWEA (1994) Best Practice Guidelines of Wind Energy Developments [Online] Available at: https://www.thenbs.com/PublicationIndex/documents/details?Pub=BWEA&DocID=258180 (Accessed on 05/04/2023)
[575] Scottish Government (2014) Onshore wind turbines: planning advice [Online] Available at: https://www.gov.scot/publications/onshore-wind-turbines-planning-advice/ (Accessed on 05/04/2023)
[576] Ofcom (2009) Tall Structures and Their Impact on Broadcast and Other Wireless Service [Online] Available at: https://www.ofcom.org.uk/__data/assets/pdf_file/0026/63494/tall_structures.pdf (Accessed on 05/04/2023)

17.4.3 Scoping Responses and Consultation

Telecommunication operators were consulted throughout the EIA process. As detailed within Table 17.5, all relevant consultees were contacted to provide information relating to utilities and telecommunication links which may be affected due to the Development. On all occasions, turbine co-ordinates and dimensions of the then layouts were provided to telecommunications consultees. Table 17.5 provides a summary of the consultation undertaken.

Table 17.5: Telecommunication Consultation

Consultee	Type and Date	Summary of Consultation Response	Response to Consultee
British Telecom (BT)	Pre-application Consultation 26/07/2021	The conclusion is that the Project indicated should not cause interference to BT's current and presently planned radio network.	Noted. BT will be reconsulted once a final turbine layout has been confirmed, to determine if their stance remains the same.
	Updated Consultation 08/06/2023	No objection. BT have studied this Wind Farm proposal with respect to EMC and related problems to BT point-to-point microwave radio links. The conclusion is that the Turbine locations provided should not cause interference to BT's current and presently planned radio network.	Noted.
Joint Radio Company (JRC)	Pre-application Consultation 03/08/2021	Objection to T8, T19, and T22	Noted. Design work will resolve the issue
	Updated Consultation	No Objection. All turbines have JRC clearance at 200m height.	Noted, JRC will be reconsulted once a final turbine layout has been confirmed, to determine if their stance remains the same.
	Updated Consultation 31/05/2023	No objection. JRC does not forsee any potential problems.	Noted.

17.4.4 Baseline and Assessment of Effects

17.4.4.1 Telecommunications

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 re-routing any affected links or upgrades to the transmitting and / or receiving apparatus.

Consultation with the relevant organisations was initiated during the EIA to identify any potential microwave or telecommunication links that could be affected by the Development.

The search for existing telecommunication and microwave links was undertaken by providing consultees with turbine coordinates in order for the consultees to model the Development. This ensures all telecommunication and microwave links potentially affected are identified.

BT and JRC identified no links that might be impacted by the Development and have raised no objection to the Development.

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 and considering the intervening distance between the turbines and property, television reception received by the nearest properties to the Site will not be affected, and no effects are predicted to occur.

Notwithstanding this, in the event that interference which is directly attributable to the Development is experienced, the Applicant will endeavour to implement a suitable mitigation solution via an appropriately worded condition which outlines an investigative process of establishing whether or not the Development is responsible. 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. As consultation has indicated that TV interference is unlikely to arise from the Development, unforeseen specific issues would be investigated following a complaint to establish whether the wind farm gave rise to the interference and suitable corrective action would be implemented (depending on the nature of the issue) when the Development is operational. Any interference experienced before the wind farm is operational is unlikely to relate to the Development.

Broadcast radio (FM, AM and DAB digital radio) are transmitted on lower frequency signals which tend to pass through obstructions more easily, 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 also able to provide suitable mitigation.

17.4.4.2 Utilities

Other below ground infrastructure, such as utilities, could be affected during construction; however, implementation of best practice would ensure that these are not adversely affected during construction or operation. Scottish Water did not raise concerns to the Development via their Scoping Opinion.

Chapter 10 - Hydrology and Hydrogeology provides a full assessment of potential impacts on public and private hydrology related utilities.

A linesearch[577] utility search was undertaken during the EIA process which found that no utility links are located within the area of the Site where infrastructure is proposed. Overhead lines were identified over the southern access track.

During construction, there may be construction traffic passing beneath electricity lines along the delivery 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.

17.4.5 Statement of Significance

The Development will not have significant adverse effects on telecommunication links or utilities, subject to the Applicant ensuring best practice construction methods are followed. Consultation undertaken with the telecommunications consultees has confirmed that there are no fixed

[577] Linesearch Online Tool [Online] Available at: http://www.linesearchbeforeudig.co.uk/# (Search undertaken 05/04/2023)

communication links operating across proposed turbine locations. 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 unexpected adverse effects arise. Adverse effects on infrastructure such as utilities would be avoided through safe systems of work.

Therefore, **no significant** effects upon telecommunications and utilities are anticipated as a result of the Development.