
**THREE OAKS RENEWABLE
ENERGY PARK
EXTENSION**

**Environmental
Statement Chapter 10: Other
Considerations**

MAY 2026



Contents

10 Other Considerations	10-2
Introduction	10-2
Electromagnetic Interference.....	10-2
Shadow Flicker	10-5
Aviation	10-7
Soil Resource and Land Take.....	10-9
Climate.....	10-11
Economics	10-14
Tourism	10-14
Waste and Hazardous Materials	10-16
Accidents and Disasters	10-18
Hydrology and Flood Risk	10-20
Air Quality	10-21
Lighting	10-21
Heat and Radiation.....	10-21
Human Health.....	10-21

10 **Other Considerations**

Introduction

10.1 Three Oaks REP Extension Ltd (hereafter referred to as 'the Applicant') has identified that the Three Oaks Renewable Energy Park Extension (hereafter referred to as the 'Proposed Development') may give rise to other environmental effects as listed under the Town and Country Planning (Environmental Impact Assessment) Regulations 2017 (the EIA Regulations) in addition to those described in Chapters 5 – 9, relating to the following topics:

- Electromagnetic Interference (EMI);
- Shadow Flicker;
- Aviation;
- Soil Resource and Land Take;
- Climate;
- Economics;
- Tourism;
- Waste and Hazardous Materials;
- Accidents and Disasters;
- Hydrology and Flood Risk;
- Air Quality;
- Lighting;
- Heat and Radiation; and
- Human Health.

10.2 Notwithstanding that the Applicant has scoped the above topics out of a detailed assessment owing to the unlikelihood of significant effects, proportionate consideration and assessment has been undertaken in this chapter. For the topics of EMI, shadow flicker, aviation, hydrology and flood risk, climate (carbon balance) and economics, independent reporting has been undertaken by competent experts in their field which are summarised in this chapter. For soil resource and land take, waste, accidents and disasters, air quality, lighting, heat and radiation and tourism (drawing from Chapter 5 (LVIA) – Volume 2), the Applicant has provided a proportionate and qualitative narrative to identify possible impacts from the Proposed Development. Furthermore, this chapter draws on comments received through a pre-application process with East Riding of Yorkshire Council (hereafter referred to as 'the Council') and direct consultation with statutory advisors as relevant, as well as professional judgement.

Electromagnetic Interference

10.3 Due to the size and nature of wind turbines, there is the potential for them to interfere with electromagnetic signals passing above ground during the operational phase. In particular, the tower and rotating blades of wind turbines have the most potential for interference with EMI signals. The degree and nature of the interference will depend on:

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

- 10.4 This section of the ES details the consultation that has been undertaken with link operators, the existing EMI baseline and likely effects as a result of the Proposed Development. Full details are provided in Appendix 10.1 (Telecommunications Impact Assessment) – Volume 4. Further information on the iterative design undertaken for the Proposed Development, to account for identified EMI links, can be found in Chapter 3 (Site Selection, Design Evolution and Alternatives) – Volume 2.

Consultation

- 10.5 Telecommunication operators were consulted as part of the iterative EIA development process. Table 10.1 below identifies the relevant consultees contacted to provide information on assets they managed within the area of the Proposed Development. On all occasions, proposed turbine coordinates and dimensions were provided as part of the consultation process.

Table 10.1 – EMI consultation

Stakeholder	Summary
Airwave	09/10/2025 – Assessment requested 18/12/2025 – Assessment received No objection
Arqiva	30/09/2025 – Link details requested 03/10/2025 – Response received No objection
Atkins	30/09/2025 – Link details requested 03/10/2025 – Response received No objection
BT	30/09/2025 – Link details requested 03/10/2025 – Response received No objection
JRC	30/09/2025 – Link details requested 02/10/2025 – Response received Objection raised – details of link infrastructure not provided, with confidentiality stated as the reason. A separate assessment undertaken by the JRC has informed the design. Objection addressed by micrositeing.
MBNL	30/09/2025 – Link details requested 06/10/2025 – Response received Safeguarding distances specified – details of link infrastructure not provided, with confidentiality stated as the reason.
MLL Telecom	30/09/2025 – Link details requested 14/10/2025 – Response received No objection
Virgin Media O2	30/09/2025 – Link details requested 17/10/2025 – No objection 18/12/2025 – Reconsulted on updated layout (due to proximity of their assets) 23/12/2025 – Response received No objection

Stakeholder	Summary
Vodafone	30/09/2025 – Link details requested 03/10/2025 – Response received No objection

Appraisal

- 10.6 In this appraisal, construction and decommissioning are not considered as it is during the operational stage (the physical presence of the assembled turbine component parts) where impacts could occur.
- 10.7 The Applicant appointed competent experts (Pager Power) to undertake the consultation process and advise on mitigation arising from results of the consultation process.
- 10.8 Airwave, Arqiva, Atkins, BT, MLL, Virgin Media and Vodafone have confirmed, through the consultation process, that they have no objections to the Proposed Development.
- 10.9 Following a separate assessment undertaken by JRC, the proposed wind turbines were micrositied to avoid conflicting with the asset and thus it is considered that there would be no associated impacts.
- 10.10 In relation to MBNL's assets, Turbines 1, 3, 4 and 6 are clear of the link operator's 100 m-buffer for two identified links;
- 10.11 Turbine 2 is clear of the link operator's 100 m-buffer for one MBNL link (ID/reference 9121505), but infringes the 100 m buffer for another MBNL link (ID/reference 9115766) by 59.18 m. When mitigating this by micrositied the turbine (and considering the Fresnel Zone of this link (MBNL link ID/reference 9115766) for the assumed frequency of 3 GHz), Turbine 2 is clear of the Fresnel Zone by 31.71 m; and clear of the Fresnel Zone + additional 25m buffer by 6.71 m.
- 10.12 Turbine 5 is clear of the link operator's 100m-buffer for one MBNL link (ID/reference 9121505), but infringes the 100 m buffer for another MBNL link (ID/reference 9115766) by 90.07 m. When mitigating this by micrositied the turbine (and considering the Fresnel Zone of this link (MBNL link ID/reference 9115766) for the assumed frequency of 3 GHz), Turbine 5 infringes the Fresnel Zone by 3.08 m; and infringes the Fresnel Zone + additional 25m buffer by 28.08 m.
- 10.13 Through micrositing allowances (25 m for Turbines 1-5 and 10 m for Turbine 6), it is predicted that the Proposed Development has the ability to be clear of the Fresnel Zones. T5 can therefore be micrositied if necessary.
- 10.14 All turbines are clear of the link operator's 250 m safeguarding distance for all masts.
- 10.15 Notwithstanding the mitigation implemented by way of micrositing proposed turbines and the above conclusions, in the event that interference which is directly attributable to the Proposed Development is experienced, the Applicant commits to the implementation of a suitably worded planning condition against any consent, requiring it to implement a suitable mitigation solution which outlines an investigative process of establishing whether or not the Proposed

Development is responsible. Examples of technical solutions include: changing the receptor height or re-orientating the receptor to receive signals from an alternative transmitter.

- 10.16 Due to the ability to microsite turbines outside of Fresnel Zones and owing to the available mitigation in the event an issue should be attributable to the Proposed Development, no EMI impacts are anticipated.
- 10.17 No cumulative schemes affect the same links as affected by the Proposed Development. Accordingly, no adverse cumulative effects are anticipated in relation to EMI.

Shadow Flicker

- 10.18 This section evaluates the effects of shadow flicker from the Proposed Development on nearby receptors.
- 10.19 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.
- 10.20 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.
- 10.21 Further details of contributing shadow flicker factors can be seen in Appendix 10.2 (Shadow Flicker) – Volume 4.

Consultation

- 10.22 Table 10.2 below outlines the consultation undertaken relevant to shadow flicker.

Table 10.2 – Shadow Flicker consultation

Stakeholder	Summary	Response
The Council	Within their pre-application response (25/10744/STPREP) dated 24 th December 2025, the Council referred to shadow flicker in relation to compliance with Policy EC5 (A.3) of the East Riding Local Plan Strategy Document, in reference to a previous Secretary of State (SOS) ruling, impact to living conditions and that a shadow flicker survey was necessary as a local validation requirement.	Appendix 10.2 (Shadow Flicker) – Volume 4 and this summary are provided to address these requirements.

Appraisal

- 10.23 The following sources of technical guidance has been considered when conducting the assessment reported in Appendix 10.2 (Shadow Flicker) – Volume 4:
- Scottish Government Onshore wind turbines: Planning Advice;
 - Parsons Brinckerhoff 2011 – Update of UK Shadow Flicker Evidence Base; and
 - Department for Communities & Local Government (2013): Planning practice guidance for renewable and low carbon energy.
- 10.24 There is no formal limit on the amount of shadow flicker that is considered acceptable in the UK, however (based on available guidance) the threshold of 30 minutes per day or 30 hours per year is generally used in assessments. Standard practice, informed by industry guidance states that beyond a distance of 10 rotor diameters from each wind turbine, shadow effects would not be likely to occur. Accordingly, this distance has been used for the study area for the assessment reported in Appendix 10.2 (Shadow Flicker) – Volume 4.
- 10.25 The assessment makes a number of robust assumptions such that the output is likely to overstate the actual effect that would be identified on the ground:
- The sun is at a minimum elevation of 2° above the horizon which would cast the longest shadows;
 - Assumed clear skies with no cloud coverage;
 - One window per dwelling which is 1 x 1 m with a centre point 1.5 m above ground level (AGL), orientated toward the nearest turbine; and
 - A viewing height of 1.5 m AGL.
- 10.26 The assessment identified five residential dwellings within 10 rotor diameters of the turbines, all within Haisthorpe to the south-east of the Proposed Development. The assessment concluded that Turbine 6 was the only turbine that would potentially result in shadow flicker occurring, and that four of the five properties (identified in the report as dwelling 1, 2, 4 and 5) could be theoretically affected above the thresholds, as shown in Table 10.3 below:

Table 10.3 – Shadow Flicker Analysis

Dwelling	Days per year of potential shadow flicker	Maximum hours per day	Mean hours per day	Total hours per year
1	63	0.51	0.39	24.9
2	89	0.54	0.45	40.2
3	55	0.47	0.36	20.0
4	85	0.49	0.41	34.6
5	55	0.52	0.40	22.0

- 10.27 Without mitigation, and presuming the above worst case assumptions are evident, there would be an adverse effect.

- 10.28 However, mitigation for shadow flicker is readily adopted across the UK. Mitigation can take the form of remote automatic wind turbine shut down for specific turbines under specific climatic conditions such that no neighbouring property would experience an occurrence above the threshold. It can also take the form of the provision of blinds / shutters at affected properties or new screening planting around affected properties subject to landowner consent.
- 10.29 Controlling the impact at source is preferred, and the Applicant commits to the implementation of a Shadow Flicker mitigation strategy, to be controlled by planning condition in the event of a planning approval. Applying such mitigation would reduce theoretical impacts to acceptable levels, and as such it is concluded that there would be no adverse effects from shadow flicker to residents.
- 10.30 Upon consideration of Appendix 4.2 (Cumulative Long List) – Volume 4, there are no cumulative schemes where a 10 x rotor diameter study area would overlap with that of the Proposed Development, and thus cumulative shadow flicker effects cannot occur.

Aviation

- 10.31 This section summarises an aviation safeguarding assessment undertaken for the Proposed Development as reported in Appendix 10.3 (Aviation Safeguarding Assessment) – Volume 4, providing analysis of line of sight and radio path profiles for civilian and military radars, as well as other NAVAIDS and communication systems. An airspace assessment was also undertaken, identifying airspace designations in the locale of the Proposed Development. The following were identified:

Royal Air Force (RAF) Fylingdales

- 10.32 RAF Fylingdales was identified for radar. It was determined that any radar returns would be unlikely to be detectable, however that the MOD may have a concern.

Remote Radar Head (RRH) Staxton Wold

- 10.33 RRH Staxton Wold was identified for its Primary Surveillance Radar (PSR) and Secondary Surveillance Radar (SSR) which are part of the UK's Air Surveillance and Control System (ASACS). It was determined that the Proposed Development would be fully visible, and that a MOD objection may be raised. It was also identified that technical solutions could be achievable, and that similar objections were raised for nearby wind farm developments which then proceeded to become operational following the inclusion of a planning condition (requiring mitigation to be agreed prior to construction commencing).

Humberside Airport

- 10.34 Humberside Airport was identified for its PSR and Aerodrome. No operational impacts are expected.

Claxby

- 10.35 Identified for its PSR. NATS Enroute Ltd (NERL) are currently working towards the mitigation of wind turbine clutter by installing Indra 3D radars across their fleet. This will benefit potential impacts from the Proposed Development.

Airspace Assessment

- 10.36 RAF Leeming, Leeds East, Sherburn and Sandtoft and the unlicensed airstrips (Bridlington and Eddsfield) were identified. The Proposed Development is not underneath any air lines, and it is possible that no concerns would be raised which would affect the Proposed Development.
- 10.37 Due to their distance from the proposed development, the military and civilian licensed aerodromes identified in the survey are unlikely to be affected. The unlicensed aerodromes in the vicinity of the proposed development are also sufficiently distant that it is unlikely their operations would be affected.

Vale of York Area of Intense Aerial Activity (AIAA) & Southern Military Danger Area (MDA)

- 10.38 This area is used for military aircraft on training and exercise tasks, and potentially for transiting between civilian and military aerodromes and the southern MDA. Whilst these designations are primarily used to notify civilian aircraft of the hazards of navigating through these areas, the MOD may have concerns should they assess that the development will introduce restrictions on radar coverage and / or increase hazards in the airspace.

Humberside North Helicopter Night Training Area (HNTA)

- 10.39 The MOD may have concerns regarding impact on low flying training within this area, however it is noted that other wind farms are in operation within this area and thus mitigation, if necessary, is anticipated to be identified.

Conclusion

- 10.40 It is considered that the MOD will likely have technical and airspace concerns with the Proposed Development, however there may be the potential for mitigation and it has been recommended that the Applicant consults with the MOD. Mitigation is currently being worked on by NERL which is considered likely to address concerns should they be raised.
- 10.41 The Applicant liaised with the MOD on 5th February 2026 to discuss the Proposed Development. Through this liaison, the MOD confirmed that it is standard protocol to issue letters of concern pre-application, and that they would look at the scheme in detail once the planning application is validated. The Applicant commits to further engagement with the MOD following validation.

- 10.42 Mitigation, in the form of the existing upgrading of assets, or through liaison is anticipated to remove any aviation safeguarding concerns which may be raised. It is expected that appropriately worded planning conditions will be applied to any planning consent, such that the Proposed Development would not proceed until such time as the relevant aviation bodies are satisfied. Accordingly, no adverse impacts are predicted in relation to Aviation.
- 10.43 Following further liaison and the implementation of expected planning conditions as mitigation, no adverse effects are likely to result from the Proposed Development. As potential cumulative developments would require to liaise with the MOD to mitigate its own impacts, no cumulative aviation effects are anticipated.

Soil Resource and Land Take

- 10.44 This section considers the impact of the Proposed Development upon Best and Most Versatile Land (BMV) and soil resource.
- 10.45 As identified in Chapter 2 (Project and Site Description) – Volume 2 of this ES, no intrusive soil testing has taken place for the Proposed Development. However, such an assessment was undertaken for the adjacent Three Oaks Renewable Energy Park, which confirmed that site comprised a mix of Grade 2 (10.6%), 3a (19.8%) and 3b (69.6%) land (Baird, D., 2021). To provide a proportionate worst case assumption, it is assumed that land at the Site is Grade 2, and thus would be considered Best and Most Versatile (BMV) land.
- 10.46 The area taken by the development (that is, the wind turbines, site access and maintenance tracks and crane hardstandings) would be in the order of 5.34 hectares (13.19 acres), and would be 6.09 ha (15.04 acres) when including the Temporary Construction Compounds. When incorporating the 5 ha of land allocated (within the Application Boundary) for Biodiversity Net Gain (see Appendix 7.11 (outline Landscape and Biodiversity Mitigation and Enhancement Plan) – Volume 4), the operational footprint of development would be 10.34 ha.

Consultation

- 10.47 Table 10.4 below outlines the consultation undertaken relevant to soil resource and land take.

Table 10.4 – Soil resource consultation

Stakeholder	Summary	Response
The Council	Within their pre-application response (25/10744/STPREP) dated 24 th December 2025, the Council referred to BMV land and soil resources in relation to compliance with Policy EC5 (A.3) of the East Riding Local Plan Strategy Document.	This section identifies impacts upon BMV and soil resources.

Appraisal

- 10.48 There is no adopted methodology or guidance relating to the appraisal of the extent of agricultural land take (regardless of its ALC) by new development in context against national or regional areas. The Applicant has therefore adopted a transparent and repeatable methodology as reported in this section, using professional judgement.
- 10.49 The most recently published baseline data was gathered from existing Government sources, reporting Grade 1 to Grade 5 agricultural land provision at the national and local (East Riding of Yorkshire (EROY)) level (Natural England, 2026). A simple area comparison was then undertaken to identify the percentage of national and local agricultural land across each grade likely to be taken temporarily by the Proposed Development.
- 10.50 Notwithstanding the assumption that land at the Site is Grade 2, applying the 10.34 ha of land temporarily lost, Table 10.5 below identifies the % of Grade 1 to 5 land lost against national and local agricultural land provision (discounting urban and non-agricultural land):

Table 10.5 – % agricultural land lost

National / EROY	Grade	Provision (ha)	% temporarily lost due to the 10.34 ha operational land take
National	1	354,562	0.0029
National	2	1,848,874	0.0006
National	3	6,290,210	0.0002
National	4	1,839,583	0.0006
National	Combined	10,333,229	0.0001
Local	1	6745.24	0.1533
Local	2	106,080	0.0097
Local	3	106,945	0.0097
Local	4	11,329	0.091
Local	5	724	1.428
Local	Combined	231,824	0.0045

- 10.51 Agricultural land will not be lost, as the Proposed Development is temporary. Further, over the lifetime of the Proposed Development soil health can recover from intensive agricultural use (outside the direct footprint of the Proposed Development). Following decommissioning, other than access tracks which would be left in situ, land would be returned to agriculture with an increased soil organic carbon content.
- 10.52 The UK Government Food Security Report, published in December 2021, is explicit:

“The biggest medium to long term risk to the UK’s domestic production comes from climate change and other environmental pressures like soil degradation, water quality and biodiversity.”

- 10.53 The report quantifies this risk, noting that under a medium emissions scenario, climate change could reduce the proportion of 'Best and Most Versatile' agricultural land from a baseline of 38.1% to 11.4% by 2050. This would mean a reduction in the UK's prime agricultural land of almost three quarters.
- 10.54 The United Kingdom Food Security Report (.GOV 2021) confirmed that UK food production and consumption was basically equal for grain, meat, milk and eggs. This can be paired with the UK Food Security Index 2024 (.GOV 2024) which confirmed that taking a holistic view, the indicators show a broadly stable picture regarding food production and reiterated the longer term risk of climate change.
- 10.55 As identified in Table 10.5 above, applying the land temporarily lost against each agricultural grading, the Proposed Development would cause the temporary loss of 0.15%, 0.01% and 0.01% of local Grade 1, 2 and 3 agricultural land (BMV) respectively, and 0.003%, 0.0006% and 0.0002% of national grade 1, 2 and 3 agricultural land (BMV) respectively. Owing to such small and temporary losses, in the broader context as set out above, impacts to BMV land from the Proposed Development are considered negligible.
- 10.56 Table 10.5 also identifies that the Proposed Development would result in the temporary loss of 0.005% of agricultural land locally and 0.0001% of agricultural land nationally. Therefore, land take from the Proposed Development is considered negligible.

Climate

- 10.57 Environmental topics scoped in for detailed assessment proportionately outline the likely evolution of the identified baseline without implementation of the development (as far as natural changes can be assessed with reasonable effort on the basis of the availability of environmental information and scientific knowledge). Appendix 4.1 (Climate Projections) – Volume 4 uses UKCP18 probabilistic projection maps for the relevant 25 km square surrounding the Proposed Development to identify the likely influence of climate change on current climatic conditions.
- 10.58 This data has been used within Chapter 5 (LVIA) – Volume 2, Chapter 6 (Historic Environment) – Volume 2, and Chapter 7 (Biodiversity) – Volume 2 to consider how the observed baseline conditions could evolve and whether this could affect identified assessment results. Baselines for Chapters 8 (Traffic and Transport) – Volume 2 and Chapter 9 (Noise and Vibration) – Volume 2 are not considered to be materially affected by the data.

Vulnerability to Climate Change

- 10.59 As identified in Appendix 4.1 (Climate Projections) – Volume 4, over the lifetime of the Proposed Development (using the 50th percentile projection), it is anticipated that annual temperatures will increase and annual precipitation will remain fairly constant albeit with a slight fall. Seasonally, over the lifetime of the Proposed Development it is projected that summers will become warmer and drier, whilst winters will become warmer and wetter.
- 10.60 The component parts of the Proposed Development are not considered to be structurally or mechanically vulnerable to the effects of Climate Change (such as warmer drier summers or warmer wetter winters). Furthermore, routine maintenance of component parts will ensure they remain in good working order throughout the operational phase. No effects are therefore anticipated.

Nature and Magnitude of Greenhouse Gas Emissions

- 10.61 A Carbon Balance Assessment (see Appendix 10.4 (Carbon Balance Assessment) – Volume 4) has been undertaken for the Proposed Development, which determines the carbon cost of the Proposed Development against the carbon savings made by the Proposed Development's generation of renewable energy.
- 10.62 The Scottish Government's Carbon Calculator tool for Windfarms in Scottish Peatland has been applied to the Proposed Development. Despite the site not containing peat, such a tool is considered the most reliable tool for estimating carbon payback.
- 10.63 Table 10.6 outlines the total CO₂ losses due to the Proposed Development, showing that 53% of emissions are as a result of losses due to manufacturing, construction and decommissioning. Losses due to the requirement for back up power in the grid equates to 47% of carbon emissions. A total of 41,399 tonnes of CO₂ equivalent (t CO₂e) would be lost due to the Proposed Development.

Table 10.6 – Total CO₂ losses due to wind farm (t CO₂e)

Description of loss	Expected (t CO ₂ e)	Minimum (t CO ₂ e)	Maximum (t CO ₂ e)	% of overall emissions (expected scenario)
Losses due to turbine life (manufacture, construction and decommissioning)	22,105	22,105	22,105	53.4
Losses due to backup	19,294	19,294	19,294	46.6
Total losses of carbon dioxide	41,399	41,399	41,399	100.0

- 10.64 The carbon payback time for the Proposed Development is calculated by comparing the net loss of carbon with the carbon savings achieved by the displacement of electricity from other / traditional sources. Appendix 10.4 (Carbon Balance Assessment) – Volume 4 considers three electricity grid mix scenarios:
- Coal Fired electricity generation (this is a standard output from the carbon calculator tool which is not representative of the current, more diverse, grid mix);
 - The grid mix - the annual average mix of fuels used to produce electricity for the GB electricity grid (including nuclear and renewables); and
 - Fossil Fuel mix – the annual average mix of fuels used to produce electricity for GB electricity grid excluding nuclear and renewables.
- 10.65 Table 10.7 below provides the annual and lifetime savings of carbon dioxide emissions for each electricity grid mix scenario:

Table 10.7 – CO₂ emission savings by displacing other generators of electricity

Counterfactual Emission Factor	Expected	Minimum	Maximum
Annual Savings			
Coal-fired electricity generation (t CO ₂ /yr)	59,343	53,409	65,277
Grid-mix of electricity generation (t CO ₂ /yr)	11,747	10,572	12,921
Fossil fuel-mix of electricity generation (t CO ₂ /yr)	24,792	22,313	27,272
Lifetime savings (40 years)			
Coal-fired electricity generation (t CO ₂)	2,373,720	2,136,360	2,611,080
Grid-mix of electricity generation (t CO ₂)	469,880	422,880	516,840
Fossil fuel-mix of electricity generation (t CO ₂)	991,680	892,520	1,090,880

10.66 Table 10.8 below shows the carbon payback time for the Proposed Development.

Table 10.8 – Carbon payback time (years)

Description	Expected	Minimum	Maximum
Coal-fired electricity generation (years)	0.7	0.6	0.8
Grid-mix of electricity generation (years)	3.5	3.2	3.9
Fossil fuel-mix of electricity generation (years)	1.7	1.5	1.9

- 10.67 Accordingly, the Proposed Development is expected to have a carbon payback time of 3.5 years based on the grid-mix scenario, however given the capacity factor used is lower than the expected actual CF, this 3.5 figure is considered likely to be an overestimation.
- 10.68 In summary, the Proposed Development is estimated to have an expected carbon payback of 3.5 years based on the current grid mix, which is ~9% of the 40 year lifetime of the Proposed Development. After this period, the Proposed Development will generate carbon savings for the remainder of its operational life.
- 10.69 Based on qualitative professional judgement of the quantitative analysis provided within Appendix 10.4 (Carbon Balance Assessment) – Volume 4, the Proposed Development would have a beneficial effect on carbon emissions.

- 10.70 As wind turbines generally pay back their carbon debt within a short number of years, further / cumulative wind farms are only considered to result in further beneficial effects on carbon emissions.

Economics

- 10.71 An Economic Impact Report (see Appendix 10.5 (Economic Impact Report) – Volume 4) was prepared for the Proposed Development.
- 10.72 The local economy within the East Riding of Yorkshire is strong in construction, manufacturing and land-based industries, with low unemployment. It is considered that there is good local capacity to support construction.
- 10.73 During the development and construction, it is estimated that the Proposed Development would generate:
- £1 million Gross Value Added (GVA) and 12 years of employment in East Riding of Yorkshire;
 - £2 million GVA and 24 years of employment in Yorkshire and the Humber; and
 - £5.3 million GVA and 63 years of employment in the UK.
- 10.74 During its operation and maintenance, each year the Proposed Development could also generate:
- £0.1 million GVA and 1 job in East Riding of Yorkshire;
 - £0.3 million GVA and 3 jobs in Yorkshire and Humber; and
 - £1.3 million GVA and 11 jobs in the UK.
- 10.75 An annual community benefit fund of £5,000/MW (£126,200) is proposed as part of the Proposed Development.
- 10.76 Non-domestic rates are a tax paid by businesses to local authorities. The Proposed Development is expected to pay non-domestic rates on an annual basis to the Council, the payment of which would contribute directly to public sector finances.
- 10.77 Applying the appropriate non-domestic rating multiplier, it is projected that over its operational period, the Proposed Development is expected to make an annual contribution of approximately £0.35 million to public finances.

Tourism

- 10.78 As wind farms have become established across the UK, studies have been undertaken to identify possible impacts to tourism receptors. Owing to the *de facto* ban on onshore wind development in England through the previous iteration of the National Planning Policy Framework (NPPF), more recent evidence can be taken from Scotland.

- 10.79 A study by Biggar Economics (2021) hypothesised that after more than 25 years since the first commercial scale wind farms were established in Scotland, if wind farms had discouraged tourism activity there should be some evidence of such effect.
- 10.80 The report considered 44 wind farm case studies across Scotland and identified no correlation between the rate of change in the number of onshore wind turbines and in tourism related employment in local authority areas.
- 10.81 The research also analysed trends in tourism employment in the immediate vicinity of wind farm developments, including 16 wind farms that became operational between 2015 and 2019. Analysis found that 11 of the 16 areas experienced more growth in tourism employment than for Scotland as a whole, and that for 12 of the areas, trends in tourism employment in the locality had outperformed the local authority area in which they were based.
- 10.82 The research also re-examined 28 wind farms constructed between 2009 and 2015 that had been analysed in a previous study published in 2017, concluding that the localities in which they were based outperformed Scotland and their local authority areas in the majority of cases.
- 10.83 This concurred with studies from a decade prior, with an academic review of other studies as part of the Scottish Government's Renewable Inquiry by ClimateXChange (Dinnie, 2012) finding that:
- “there is no new evidence to contradict the earlier findings that wind farms have little or no adverse impact on tourism in Scotland”*
- 10.84 Notwithstanding the above, this ES does provide evidence against which tourism impacts surrounding the Proposed Development can be considered. Chapter 5 (LVIA) – Volume 2 provides consideration of visual impact to visitor receptors where intervisibility is anticipated. Impacts are identified to one location along the Hockney trail (noting that the existing view at this location does not match the associated painting) during construction, with impacts to the same receptor as well as the All Saints Church churchyard and Rudston Monolith during operation.
- 10.85 The World Health Organisation Community Noise Guidelines (1999) set a threshold of 55dB LAeq to prevent serious annoyance, and 50dB LAeq for moderate annoyance in external amenity areas. For wind turbine noise this is equivalent to 53 dB and 48 dB LA90 respectively. Figure 9.1 (Noise Contours (dB LA90) at Rated Power) – Volume 3 shows that such thresholds would only be experienced in immediate proximity to each proposed wind turbine.
- 10.86 Chapter 8 (Traffic and Transport) – Volume 2 identifies that construction related impacts would be acceptable.
- 10.87 When considered together, it is not anticipated that effects would be materially different from those reported, and when considered in the context of the above review of relevant studies, tourism is not anticipated to be materially affected by the Proposed Development.

Waste and Hazardous Materials

Construction Waste

- 10.88 Waste will be generated during construction as a result of site clearance, earthworks and general construction activities (such as packaging, off-cuts of materials, canisters and containers etc). Waste will also be generated during decommissioning, associated with the removal of above ground structures. There will also be some excavation to enable access, installation of electric services and foundations. Soil excavated during construction on site will be utilised where possible in either construction activities (such as areas of required fill), or for landscaping requirements. Any remaining soil (top soil or subsoil) would be utilised by the landowners.
- 10.89 As part of the Proposed Development there will be aspects that are manufactured offsite, such as the wind turbines, where they are delivered and erected on-site. This will reduce the waste generated from direct construction works on-site.
- 10.90 Construction / decommissioning waste arisings will be controlled through the implementation of a Waste Management Plan, as part of the Construction Environment Management Plan (CEMP) (included within the outline CEMP, see Appendix 2.1 – Volume 4) / Decommissioning Environment Management Plan (DEMP) (secured by way of condition). This will be informed by the waste provisions of relevant legislation, including the Environmental Protection Act 1990 and the Environmental Protection (Duty of Care) Regulations 1991 and will set out the principles and legal requirements relating to waste. The plan will describe how materials will be managed efficiently and disposed of legally during construction / decommissioning. It will also outline the aims, objectives and ongoing management responsibilities, including management practices, to be implemented during the construction / decommissioning stage and will set targets for the reduction, diversion from landfill and reuse of waste.
- 10.91 Specific controls / management measures will be sought where possible, s Environmental Protection (Duty of Care) Regulations 1990 98/ES
- 10.92 uch as those below:
- Ordering of materials will be on an 'as needed' basis to prevent over supply;
 - Co-ordination with suppliers enabling them to take / buy back surplus stock;
 - Purchase of materials pre-cut to length to avoid excess scrap waste generated on-site;
 - Request that suppliers use least amount of packaging possible on materials to be delivered;
 - Ensuring correct storage and handling of goods to avoid unnecessary damage that would result in their disposal; and
 - Use of reclaimed materials in the construction works where possible.
- 10.93 Construction / decommissioning waste arisings will also be separated to maximise material recycling. The appointed contractor(s) will take responsibility for inspecting and classifying waste materials generated by the works in accordance with relevant guidance, such as Waste Classification: Guidance on the classification and assessment of waste.
- 10.94 As a result of the above measures, it is considered that waste generated from construction or decommissioning activities would be minimal and would not require a noticeable or material reduction in local, regional or national waste management capacity.

Operational Waste

- 10.95 Once operational, the following wastes will be generated:
- Operational activity and maintenance waste, including oils, greases, damaged / worn components and associated packaging of new components (e.g. metals, wood / timber, cardboard, paper and plastics); and
 - Organic / green waste from ongoing management.
- 10.96 As the Proposed Development will be monitored remotely, with personnel / maintenance engineers only required to visit for maintenance, minimal amounts of operational waste will be generated. Wastes will be managed in accordance with the general principles of the waste duty of care.
- 10.97 It is considered that waste generated from operation would be minimal and would not require a noticeable or material reduction in local, regional or national waste management capacity.

Hazardous Materials

- 10.98 Any substances classed by regulation as hazardous that are used during the construction, operation (either scheduled maintenance or major component replacement or repair) and decommissioning phases of the Proposed Development will be used and disposed of responsibly offsite in accordance with the manufacturer's guidance and regulations governing use of the material. Materials with the potential to be classified as hazardous are most likely to be coolants, oils, fuels and lubricants.
- 10.99 Fuels and oils kept in temporary construction and decommissioning site compounds will be stored in double-walled containers or lined bunds in accordance with all relevant and applicable regulations.
- 10.100 Any hazardous materials stored on site during construction or decommissioning will be stored securely and in accordance with all relevant and applicable regulations and manufacturer / supplier's guidelines. No routine bulk storage of hazardous materials is proposed during operation, other than temporary controlled storage associated with maintenance activities.
- 10.101 No hazardous materials would be stored on site during the operational phase of the Proposed Development.
- 10.102 An outline Construction Environment Management Plan (oCEMP) has been prepared and submitted as part of this application (Appendix 2.1 (oCEMP) – Volume 4), which includes principles for the management of waste during the construction phase.
- 10.103 A Waste Management Plan (as part of the CEMP / DEMP) will be prepared which follows the waste hierarchy, as outlined within article 4 of the Waste Framework Directive 2008/98/EC. The waste hierarchy, as defined within legislation, is as follows:
- Prevention;
 - Re-use;

- Recycling;
- Other recovery; and
- Disposal.

- 10.104 As a result of the above measures, it is considered that hazardous materials & waste from the Proposed Development would be acceptable. With such measures in place it is not considered that there would be any cumulative effect from the Proposed Development in relation to waste and hazardous materials.

Accidents and Disasters

- 10.105 This section identifies reasonably foreseeable accidents and disasters associated with the construction, operation and decommissioning of the Proposed Development. Accidents are taken to be human induced (direct or indirect) incidents, and disasters are taken to be natural incidents.

Accidents – Utilities

- 10.106 The design of the Proposed Development has accounted for known utility assets, including underground pipelines and overhead electricity cables such that operational issues are not anticipated.
- 10.107 During the construction / decommissioning stage, working areas will be secured with restricted access so only suitably qualified personnel are present. Works to confirm the location of identified utilities (see Chapter 3 (Site Selection, Design Evolution and Alternatives) – Volume 2) will be undertaken before the commencement of activities in liaison with the relevant operators.
- 10.108 Good practice working measures will be put in place in accordance with the Construction (Design and Management) Regulations and other health and safety regulations, such as the preparation of specific method statements and making workers aware of the location of utilities and their easements where works are undertaken close to utilities. In addition, relevant HSE guidance will be adhered to, including avoiding danger from underground services. These measures will be implemented as part of a CEMP / DEMP and secured by way of planning condition.

Accidents – Unexploded Ordnance (UXO)

- 10.109 The Site is located within an area that is identified as being at low risk from UXO (Zetica 2026). Nevertheless, as part of the CEMP / DEMP, the potential risks of UXO will be communicated to all construction workers, provision of safety training by a competent UXO expert and safety monitoring.

Accidents – Road Traffic

- 10.110 No transport of dangerous goods (ADR-classified) is anticipated during the construction, operation or decommissioning phases of the Proposed Development. Should any ADR-classified consignments be required, they would be transported and managed in accordance with applicable legislation and agreed procedures with the relevant authorities.

- 10.111 Abnormal Indivisible Loads (AIL) movements will be limited in number, infrequent, and subject to detailed route planning, escort arrangements and temporary mitigation measures. As such, the potential for accidents or disasters associated with these movements is considered to be low and is appropriately managed through established regulatory controls rather than a standalone quantitative risk or catastrophe assessment.
- 10.112 Construction traffic (routing and delivery scheduling) will be managed to reduce interaction with other highway users, alongside implementation of on-site controls and temporary traffic management measures.
- 10.113 Through the above and the implementation of a Construction Traffic Management Plan (CTMP) and Abnormal Load Management Plan (ALMP) (to manage AIL and construction traffic), secured by planning condition, accidents in relation to road traffic are not considered likely. An Outline CTMP is included as part of this submission, see Appendix 8.4 – Volume 4.

Accidents – Wind Turbine Structure

- 10.114 Modern wind turbines are built to detailed design specifications and are engineered to withstand the dynamic climate in which they are situated. They are distributed throughout the world including both onshore and offshore. There have been isolated cases where the structural integrity of a tower / blade has been compromised. To date, these are rare events.
- 10.115 Regular maintenance checks will be undertaken of the turbines which are remotely monitored, such that a turbine collapse event is considered unlikely.
- 10.116 Notwithstanding the above, as identified in Chapter 3 (Site Selection, Design Evolution and Alternatives) – Volume 2, appropriate buffer distances have been maintained from publicly accessible routes (in accordance with the Council's request made through pre-application consultation).

Accidents – Ice Throw

- 10.117 Ice throw is the process of ice falling or being launched from the blades of a moving wind turbine. The wind turbines will have sensors on them to detect the build-up of ice and automatically prevent the turbines spinning if ice has developed. In addition, service crews will be trained regarding the potential for ice throw, ice risk conditions will be monitored during operation and public notices will be displayed at access points, alerting members of the public and staff of possible risk of ice throw under certain weather conditions. With such measures in place, ice throw events are considered unlikely. For these reasons, the approved Three Oaks Renewable Energy Park is not considered to be under any risk from ice throw.

Accidents – Fire

- 10.118 Works during construction will be undertaken in line with relevant guidance, such as Fire Prevention on Construction Sites: Joint Code of Practice and HSE's Fire safety in construction, specified within a CEMP / DEMP to be secured by way of planning condition.
- 10.119 Potential ignition sources are mainly inside the nacelle where there is fast moving machinery (generators, gearboxes, etc.) which creates heat alongside combustible oil and solid materials.

Fire risk is also associated with the electrical systems and chemicals / substances stored on-site.

- 10.120 The wind turbines will be fitted with an active fire protection system, which includes but is not limited to detection (of flames, heat, gas, and smoke), alerting personnel and rescue services, and activating systems for fire suppression or extinguishing.
- 10.121 In addition, all operational plant / infrastructure will be designed, installed and maintained in line with relevant legislation, standards and guidance, including Electrical Equipment (Safety) Regulations 2016 and Electricity Safety, Quality and Continuity (Amendment) Regulations 2006. The control measures for the prevention of fire will be in accordance with legislation, standards and guidance.

Disasters

- 10.122 The submitted Flood Risk Assessment (FRA) which accompanies this ES, identified that the Proposed Development is not located in an area prone to flooding. Furthermore, the FRA identifies that the Proposed Development would not contribute to flood risk.
- 10.123 The probability, frequency and likelihood of natural disasters arising such as earthquakes, tsunamis or hurricanes are considered to be very low due to the natural climatic or geological condition of the UK within the global climate system.

Hydrology and Flood Risk

- 10.124 Owing to the size of the application boundary, a standalone Flood Risk Assessment (FRA) has been prepared and submitted alongside this ES as part of the wider application submission.
- 10.125 Consideration of Hydrology and Flood Risk has been scoped out of detailed assessment within this EIA due to the unlikelihood of significant effects (as concluded in the FRA). The footprint of the Proposed Development, including temporary construction compounds, is 6.09 ha and lies wholly within Flood Zone 1. The Proposed Development also falls outside of any area prone to surface water flooding.
- 10.126 With the rolling implementation of the surface water drainage strategy as installation of infrastructure progresses during the construction phase, (see Appendix 2.1 (outline CEMP) – Volume 4) and a Surface Water Drainage Strategy (see Appendix 8.6 (Surface Water Drainage Strategy) – Volume 4) to mitigate operational surface water runoff, any effects are anticipated to be acceptable.
- 10.127 The Proposed Development would not cause an increase in flood risk, nor would it be vulnerable to flooding. As no impacts are anticipated, there would be no cumulative effects in relation to hydrology and flood risk.

Air Quality

- 10.128 The Council has not declared any Air Quality Management Areas (AQMA) within its boundary (incorporating the main construction access route), nor has Hull City Council declared an AQMA along the AIL route.
- 10.129 There are no material operational emissions or impacts to air quality from the Proposed Development.
- 10.130 During the temporary construction period the increase of construction vehicles above background levels would be minimal, and risk of emissions (such as dust from construction processes or vehicles) would be appropriately controlled through the implementation of a CEMP, therefore air quality has been scoped out of detailed assessment. Owing to the mitigation proposed, no cumulative effects are anticipated.

Lighting

- 10.131 The Application Boundary does not lie within or in proximity to a designated International Dark Skies Park or associated buffer zone. The Application Boundary is also not situated within a National Park or National Landscape (formerly Area of Outstanding Natural Beauty).
- 10.132 During operation, the Proposed Development is not expected to require visible lighting as the turbines fall below the 150 m requirement for civil aviation lighting. As the Proposed Development would be remotely monitored, only occasional and infrequent visits to site would occur for maintenance, with associated lighting being minimal.
- 10.133 It is anticipated that construction work will be undertaken during daylight hours, where possible, in order to prevent disturbance to nearby residents and local wildlife. In addition to this, a start-up and close down period for up to an hour before and after the core working hours is proposed. This does not include the operation of plant or machinery that may cause a disturbance.
- 10.134 If work is to be undertaken outside of daylight hours, lighting will be used for the works areas only and shall not to be allowed to spill onto nearby residential property or neighbouring wildlife habitats by using directional fittings and directing lights toward the centre of the site. Any lighting required during works will be deployed in accordance with a CEMP (secured by way of condition). Accordingly, no material effects are anticipated.

Heat and Radiation

- 10.135 There are no heat or radiation emissions from the Proposed Development.

Human Health

- 10.136 The topic of human health is not addressed within a dedicated chapter or assessment; however, it is proportionately addressed through the following considerations:

- Residential Visual Amenity Assessment (RVAA) see Chapter 5 – (Landscape and Visual Impact) – Volume 2;
- Acoustic impacts, see Chapter 9 (Noise and Vibration) – Volume 2;
- Shadow flicker, see Chapter 10 (Other Considerations) – Volume 2; and
- Air Quality – see Chapter 10 (Other Considerations) – Volume 2.

- 10.137 Consideration of RVAA has been given within Chapter 5 of this ES to four residential receptors within and close to 10 x rotor diameters from the nearest wind turbine. It reports that whilst there would be significant adverse effects, 'in the round' the Proposed Development would not, by scale and proximity, be an unpleasantly oppressive and unavoidable presence in views from each property assessed.
- 10.138 Chapter 9 of this ES has considered acoustic impacts to local dwellings. It reported that acoustic impacts from construction would not be significant, and for the most part fall below the Lowest Observed Adverse Effect Level (LOAEL). Construction vibration would be attenuated (by distance) to an acceptable level with no significant effects. Operational noise limits are met in all instances.
- 10.139 Appendix 10.2 contains a shadow flicker assessment which demonstrates theoretical effects will be mitigated to be at, or below, acceptable thresholds.
- 10.140 During construction, potential air quality effects will be mitigated by good practice techniques as reported in an outline Construction Environmental Management Plan (oCEMP) (see Appendix 2.1, Volume 4). A detailed CEMP will be secured by way of planning condition.
- 10.141 Drawing from the conclusions of the above chapters, no significant effects to Human Health are anticipated.

References

- Baird, D. (2021) *Land at Thornholme, Agricultural Land Classification Report*. Available at <https://www.ridgecleanenergy.com/wp-content/uploads/2023/03/Agricultural-Land-Classification-Assessment-THO-1.pdf> (Accessed January 2026).
- BiGGAR Economics. (2021). Wind Farms & Tourism Trends in Scotland: Evidence from 44 Wind Farms. Penicuik: Biggar. Available at: <https://biggareconomics.co.uk/wp-content/uploads/2021/11/BiGGAR-Economics-Wind-Farms-and-Tourism-2021.pdf> (Accessed March 2026)
- Dinnie, E. (2012). The Impact of Wind Farms on Scottish Tourism. Edinburgh: ClimateXChange. Available at: https://www.climateexchange.org.uk/wp-content/uploads/2023/09/the_impact_of_windfarms_on_scottish_tourism.pdf (accessed March 2026)
- Natural England (2026) *Provisional Agricultural Land Classification (ALC)*. Available at <https://www.data.gov.uk/dataset/952421ec-da63-4569-817d-4d6399df40a1/provisional-agricultural-land-classification-alc2> (Accessed January 2026)
- Zetica (2026) Risk Maps. Available at <https://zeticauxo.com/guidance/risk-maps/> (Accessed March 2026).