Mallard Pass
Solar Farm

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Chapter 13: Climate Change

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13.0 Climate Change

13.1. Introduction

13.1.1. This chapter of the ES presents the approach and findings of the assessment of potential climate change effects associated with the Proposed Development. Specifically, this chapter assesses the vulnerability of the Proposed Development to the effects of climate change, the effect of greenhouse gas (GHG) emissions associated with the Proposed Development on the global climate, and the effects of climate change on environmental receptors potentially affected by the Proposed Development.

13.1.2. The chapter presents the methodology followed and provides a review of the baseline conditions in the vicinity of the Proposed Development and surrounding area as well as Embedded Mitigation measures. The chapter then presents the results of the assessment and the impact of the Proposed Development on the baseline environment in order to determine the anticipated magnitude of impact and significance of effect. Additional Mitigation measures are presented and discussed to minimise the impacts of the Proposed Development during the construction, operation and decommissioning phases. Consideration is also given to Residual Effects and Cumulative Effects.

13.1.3. The relevant legislation, policy and guidance pertinent to the climate change assessment is provided in ***Appendix 13.1***.

13.1.4. The Climate Change Impact Assessment (CCIA) follows the general approach to undertaking EIA as detailed in ***Chapter 2: Overview of the EIA process*** of the ES, albeit it has been modified to take account of relevant industry guidelines and best practice (see ***Appendix 13.1***). The approach to the assessment of the sensitivity of receptors, magnitude of impacts and the significance of effects in relation to climate change is described in ***Appendix 13.2***.

13.1.5. A summary of the consultation undertaken, setting out the key matters raised by the stakeholders (including in the Scoping Opinion) and a description of how and where this matter has been addressed in the EIA and ES is provided in ***Appendix 13.3***.

13.1.6. This chapter concludes that the Proposed Development will not lead to any significant effects related to climate change nor will the Proposed Development be impacted by significant effects related to climate change and therefore no additional mitigation is proposed.

Assessment Methodology and Significance Criteria

13.1.7. There are currently only provisional guidelines for the assessment of climate change effects for EIA in the UK. The IEMA guidance on the assessment of GHG emissions in EIA (**Ref 13-1**, **Ref 13-2**) states that the combined environmental effect of GHG is environmental degradation, and that this degradation is reaching a defined limit. and therefore, "*GHG emissions or reductions from a project might be considered to be significant*". The level of significance associated with the GHG impact of a project within the CCIA is to be contextualised and assigned through the professional judgement of the appropriate practitioner in accordance with the IEMA guidance, which provides the framework for the assessment criteria within this assessment.

13.1.8. The categories of significance associated with climate change effects are based upon practitioner conclusions and judgement and combines sensitivity with magnitude of effect, with an outline matrix summarised as the following:

a. Negligible – no detectable or material change to a sensitive receptor;

b. Minor – a detectable but non-material change to a sensitive receptor;

c. Moderate – a material, but non-fundamental change to a sensitive receptor; or

d. Major – a fundamental change to a sensitive receptor.

13.1.9. The detailed methodology, terminology and significance criteria for this CCIA are further described in ***Appendix 13.2***.

Consultation

13.1.10. As part of the pre-application process, consultation has been undertaken with the Climate Change Officer at South Kesteven District Council, Lincolnshire County Council, and Derby University to discuss the assessment methodology and the positive effect when considering the transition towards renewable energy generation at a UK-wide level.

13.1.11. Further detail of the consultation undertaken, setting out the relevant matters raised by the stakeholders and a description of how and where these matters have been addressed within this assessment, including in relation to the Scoping Opinion, is provided in ***Appendix 13.3***.

Legislation, Planning Policy and Guidance

13.1.12. This assessment has been undertaken with regard to the following policy documents:

Legislation

a. Climate Change Act 2008 [**Ref 13-3**].

b. Carbon Budgets Order 2009 to 2021 [**Ref 13-4**, **Ref 13-5**].

National Planning Policy Statements

a. Overarching National Policy Statement for Energy (EN-1) [**Ref 13-6**].

b. Draft Overarching National Policy Statement for Energy EN-1 [**Ref 13-7**].

c. National Policy Statement for Electricity Networks Infrastructure (EN-3) [**Ref 13-8**].

d. Draft National Policy Statement for Renewable Energy Infrastructure (EN-3) [**Ref 13-9**].

e. National Policy Statement for Electricity Networks Infrastructure (EN-5) [**Ref 13-10**].

f. National Planning Policy Framework (NPPF) [**Ref 13-11**].

Local Planning Policy:

a. South Kesteven District Council Local Plan SD1 Presumption in Favour of Sustainable Development 2011 to 2036 [**Ref 13-12**].

b. Rutland County Council Climate Change Action Motion [**Ref 13-13**].

c. Lincolnshire County Council Carbon Management Plan [**Ref 13-14**].

Guidance:

a. Institute of Environmental Management and Assessment (IEMA) EIA Guide to: Climate Change Resilience and Adaptation [**Ref 13-15**].

b. IEMA Assessing Greenhouse Gas Emissions and Evaluating their Significance 2nd Edition [**Ref 13-2**].

c. Intergovernmental Panel on Climate Change (IPCC) Annex III: Technology-specific cost and performance parameters (in Climate Change 2014: Mitigation of Climate Change. Contribution of Working Group III to the Fifth Assessment Report of the Intergovernmental Panel on Climate Change) [**Ref 13-16**].

d. Department for Levelling Up, Housing and Communities Planning Practice Guidance for Climate Change [**Ref 13-17**].

13.1.13. Further detail on these policies and guidance of relevance to this assessment is provided in ***Appendix 13.1*** [**EN010127/APP/6.2**].

Assumptions and Limitations

13.1.14. Climate change projections are based on global models (e.g., UKCP18 global projections are based on the Met Office HadGEM3-GC3.05. 13 model [**Ref 13-18**, **Ref 13-19**, **Ref 13-20**] for a range of GHG emissions scenarios and generally consider regional responses to climate change rather than local. For this assessment, regional (e.g. central England) and national (e.g. UK wide) data has been used to inform the assessments of climatic considerations.

13.1.15. The UK 2018 Climate Projections (UKCP18) website [**Ref 13-21**] provides future climate projections for land and marine regions as well as observed climate data for the UK. Future predictions for regional and national climatic changes are assessed for both a near-term period, 2040 – 2069, and longer-term period, 2070 – 2099.

13.1.16. The emissions of GHG to the atmosphere associated with the construction, operation and decommissioning of the Proposed Development has been estimated based on the Intergovernmental Panel on Climate Change (IPCC) Annex III: Technology-specific cost and performance parameters [**Ref 13-16**], which meets the methodology principles for greenhouse gas quantification set out in the IEMA Assessing Greenhouse Gas Emissions and Evaluating their Significance [**Ref 13-2**]. Values for a specific development will vary compared to the literature applied, and actual values for the Proposed Development cannot be known until the Proposed Development lifespan is complete. The values for GHG emissions are taken from the IPCC 'solar PV - utility' definition, which is based upon various peer reviewed publications referenced within the IPCC Annex III: Technology-specific cost and performance parameters [**Ref 13-16**]. The data used are therefore the most appropriate available for use in this assessment; however, it is noted that they are estimates only.

13.2. Baseline Conditions

Current Baseline

13.2.1. The current climate is the baseline for the CCIA.

13.2.2. Observed climate data within the UK at a regional scale produced by the Met Office [**Ref 13-18**] provides climate data from 1959 to 2022 with data for the nearest Met Office monitoring station in Sutton Bonington detailed in **Table 13-1**. Rainfall data was not available for 1959 and 1960 so data entries for rainfall start from 1961.

Table 13-1: Observed Climate Data

Climatic Variables	Month	Figure
Average annual maximum daily temperature (°C)	N/A	13.75
Warmest month on average (°C)	July	21.43
Coldest month on average (°C)	January	1.26
Mean annual rainfall (mm)	N/A	584.61
Wettest month on average (mm)	June	56.62
Driest month on average (mm)	February	41.83

13.2.3. The observed changes from 1961 to 2021 (the period of time which provides a full suite of data for all variables) is summarised in **Table 13-2**.

Table 13-2: Observed Changes in Climate Data

Climatic Variables	Change from 1960 to 2021
Average daily temperature (°C)	+0.92
Average daily maximum temperature (°C)	+0.69
Average daily minimum temperature (°C)	+1.14
Mean annual rainfall (mm)	+43.2
Percentage increase in mean annual rainfall	+7.9%

Future Baseline

13.2.4. The UK Climate Change Projections 2018 (UKCP18) [**Ref 13-21**] outline probabilistic climate change projections for a range of climatic variables. The variables which are considered relevant to the assessments within this CCIA are:

a. Temperature;

b. Wind speed;

c. Rainfall; and

d. Cloud cover.

13.2.5. These variables are considered relevant to this assessment due to the riparian location of the Order limits across agricultural land and the nature of the Proposed Development.

13.2.6. A range of Representative Concentration Pathways (RCPs) are used within UKCP18 to represent different GHG emission scenarios. The RCPs range from a low emissions scenario (RCP2.6) to a high emissions scenario (RCP 8.5) where global mean temperatures averaged over 2081 to 2100 are limited to 1.6°C and 4.3°C above pre-industrial levels, respectively. The 8.5 RCP scenario has been applied within this assessment to represent a worst case emissions scenario leading to significant increase in global mean surface temperatures. The worst case has been applied so that the assessment accounts for there being limited mitigation and prevention of increases in global temperatures. The worst-case scenario has been applied across the ES in order to assess the maximum possible effects so that, should there be any changes to the design of the Proposed Development prior to construction, effects will still be less than those assessed within the ES.

13.2.7. The operational design life of the Proposed Development for the purposes of the ES is 40 years. The 24-month construction period is proposed to commence from 2026 at the earliest. As such, the projected data is shown up to 2068.

13.2.8. The projected changes in temperature, wind speed, rainfall and cloud cover a displayed as anomalies relative to a baseline period of 1981 to 2000 are detailed in **Table 13-3** to **Table 13-6**.

13.2.9. Precipitation and cloud cover is derived from a regional scale 25 km² area in which the Order limits are located. The wind speed data is derived from a localised scale 12km² grid in which the Order limits are located and is an average figure across modelling methods applied within the given year.

Table 13-3: Projected Changes in Temperature

Climatic Variable	2026 Value	2068 Value
Mean annual air temperature anomaly at 1.5 m (ºC)	+0.94	+2.66
Mean summer air temperature anomaly at 1.5 m (ºC)	+1.16	+3.45
Mean winter air temperature anomaly at 1.5 m (ºC)	+0.83	+2.31
Maximum summer air temperature anomaly at 1.5 m (ºC)	+1.25	+3.84
Maximum winter air temperature anomaly at 1.5 m (ºC)	+0.86	+2.28
Minimum summer air temperature anomaly at 1.5 m (ºC)	+1.04	+3.10
Minimum winter air temperature anomaly at 1.5 m (ºC)	+0.82	+2.42

Table 13-4: Projected Changes in Precipitation

Climatic Variable	2026 Value	2068 Value
Annual precipitation rate anomaly (%)	+0.29	-2.96
Summer precipitation rate anomaly (%)	-7.54	-30.37
Winter precipitation rate anomaly (%)	+5.25	+13.09

Table 13-5: Projected Changes in Cloud Cover

Climatic Variable	2026 Value	2068 Value
Annual cloud cover anomaly (%)	-1.22	-4.53
Summer cloud cover anomaly (%)	-3.25	-11.65
Winter cloud cover anomaly (%)	-0.54	+0.43

Table 13-6: Projected Changes in Wind Speed

Climatic Variable	2026 Value	2068 Value
Annual wind speed anomaly at 10 m (m s-1)	+0.02	+0.03
Summer wind speed anomaly at 10 m (m s-1)	+0.06	-0.11
Winter wind speed anomaly at 10 m (m s-1)	+0.08	+0.34

13.2.10. **Table 13-3** to **Table 13-6** demonstrate that under the RCP 8.5 emissions scenario there will be increases in winter and summer air temperatures, increased intensity of rainfall during winter and a reduction in intensity in summer, a reduction in cloud cover providing potentially increases in UV penetration and increases in wind speeds in the winter and a reduction in the summer.

13.3. Embedded Mitigation

13.3.1. The Proposed Development includes embedded mitigation which will reduce the GHG footprint through the adoption of measures detailed in Table 3-9 of the ***outline Construction Environmental Management Plan (oCEMP) [EN010127/APP/7.6]*** and Table 3-9 of the ***outline Decommissioning Environmental Management Plan (oDEMP) [EN010127/APP/7.8]***. Some of the key measures are summarised below:

a. Adopting the Considerate Constructors Scheme (CCS) (or its equivalent) to assist in the reduction of pollution, including GHG;

b. Encouraging the use of lower carbon modes of transport by identifying and communicating local bus services and pedestrian and cycle routes to and from the Order limits to all construction staff and providing facilities for the safe storage of cycles;

c. Prevent idling vehicles by switching vehicles and plant off when not in use and ensuring that all construction vehicles conform to current EU emissions standards;

d. Increasing recyclability by segregating construction waste and disposing of construction waste locally;

e. Implementing design and construction techniques to minimise the creation of waste and maximise the use of alternative materials with lower embodied carbon; and

f. Reusing site-won materials to minimise the use of natural resources and unnecessary materials (e.g. reusing excavated soil for fill requirements).

13.3.2. The Proposed Development has been designed to be resilient to a 1 in 100-year fluvial flood event through sequential design through the removal of PV Arrays within areas identified to be at risk of flooding during a 1 in 100-year rainfall event (secured through the Works Plans **[EN010127/APP/2.2]**) and the raised nature of the PV arrays secured through the minimum height parameters as set out in ***Appendix 5.1***. This accounts for increases in rainfall and fluvial flows associated with climate change, as detailed in ***Appendix 11.6: Flood Risk Assessment.***

13.3.3. In addition, at least one designated Flood Warden (or similar), secured through the ***oCEMP***, ***outline Operational Management Plan (oOEMP)*** **[EN010127/APP/7.7]** and ***oDEMP***, will be appointed who is familiar with the risks and remains vigilant to news reports relating to extreme weather

events, Environment Agency flood warnings and water levels of the local waterways.

13.4. Potential Effects

13.4.1. This section describes the potential climate change effects during the construction, operation and decommissioning phases of the Proposed Development. The embedded mitigation measures as described within ***Chapter 5: Project Description*** of this ES and **Section 13.3** have been considered as part of the Proposed Development when considering the potential effects of the Proposed Development.

13.4.2. This assessment comprises three parts within which different receptors are applicable:

a. The vulnerability of the Proposed Development to the effects of climate change.

b. The effect of GHG emissions associated with the Proposed Development on the global climate.

c. Effects of Climate Change on environmental receptors potentially affected by the Proposed Development.

Vulnerability of the Proposed Development to Climate Change

13.4.3. PV Arrays are designed to capture the sun's energy with in-built resilience to extreme climatic conditions and are purposefully located in open locations. However, the Proposed Development could potentially be sensitive to changes in climatic variables, including atmospheric circulation, land cover changes, rainfall/flooding and temperature increases, given its riparian location. The Proposed Development could also be sensitive to the increased frequency of extreme weather events (e.g., storms) which could cause damage to the PV Arrays.

13.4.4. The Mounting Structures for the PV Modules will be designed to withstand the modelled maximum force of wind speed, which is secured through the ***Design Guidance*** within the ***Design and Access Statement (DAS)*** **[EN010127/APP/7.3]**. This accounts for the changes in extreme wind speeds expected over the lifespan of the Proposed Development, which will ensure that it is not vulnerable to increases in maximum wind speed associated with climate change.

13.4.5. As reported in ***Chapter 12: Water Resources and Ground Conditions*** of this ES, modelling of various flooding scenarios has been carried out, in consultation with the Environment Agency, taking into account increases in rainfall intensities associated with climate change. As a result, the Proposed Development infrastructure has been located out-with areas identified to be at risk of flooding during a 1 in 100-year rainfall event, accounting for the increases in rainfall associated with climate change. This sequential design methodology ensures that the Proposed Development is not vulnerable to increases in rainfall intensities leading to extreme flood events.

13.4.6. Changes in maximum and average temperatures associated with climate change may have adverse effects on temperature sensitive electrical infrastructure thereby requiring greater cooling or heating capabilities. The detailed design (i.e. specific plant selection) of the Proposed Development will ensure electrical infrastructure is resilient to climate change (as set out in the ***Design Guidance*** within the ***DAS***) by taking into account these changes in maximum and average temperatures. The operators of the Proposed Development will also monitor weather forecasts as set out in the ***oOEMP*** to anticipate periods of extreme weather. Taking this into account, the sensitivity of the Proposed Development as a receptor is considered to be negligible.

13.4.7. Hence, there is no significant effect predicted as a result of increased wind speeds, rainfall/flooding or extreme temperatures during the operational phase of the Proposed Development. Therefore, the receptor (the Proposed Development) (Very Low Sensitivity) would be subject to an impact of High Magnitude which would result in a Negligible Significance of Effect which is not significant.

13.4.8. Cloud cover will also likely decrease during the operational lifetime of the Proposed Development relative to the current baseline as detailed in **Table 13-5**. The decrease in cloud coverage would improve the performance of the Proposed Development, providing a minor beneficial effect which is not significant.

Influences of the Proposed Development on Climate Change

13.4.9. The influences of the Proposed Development on climate change are estimated through the emission or reduction in emissions of CO_2.

13.4.10. When operational, the Proposed Development will generate electricity from a renewable source and export this to the National Grid. The Proposed Development is anticipated to have an installed capacity of 350 MWp, a capacity factor estimated at 10 % and would be available to operate for 8,760 hours per year.[1] This means that the Proposed Development is anticipated to generate approximately 350,000 MWh of renewable electricity per year.

13.4.11. During the construction phase, the Proposed Development will require sourcing materials, manufacturing components, transporting to the Order limits and installation of materials which will account for the GHG emissions associated with this stage of the Proposed Development. The

[1] Assumed by the author that the Proposed Development will be operational on a '24/7' basis.

embedded emissions associated with the processes within these activities are for example plant machinery and vehicles using petrol or oil, manufacturing and construction equipment and facilities powered by non-renewables sources and the embedded GHG within the manufacturing of materials which make up elements of the Proposed Development.

13.4.12. During the operational phase, the Proposed Development will not emit substantial gases to the atmosphere, and hence not adversely contribute to climate change. The GHG emissions associated with the operational phase are assessed to be primarily associated with the provision of potable water, wastewater treatment and material and waste associated with maintenance procedures.

13.4.13. Decommissioning of the Proposed Development will involve removing components, the reinstatement of land and transporting components away from the Site. The GHG emissions associated with the decommissioning phase are associated with the consumption of energy from plant which may be sourced, at least partly depending on grid decarbonisation, from non-renewables sources, vehicles and machinery using non-renewable sources, the disposal and transportation of waste and the transportation of staff using transport measures powered by non-renewable sources.

13.4.14. Each of these phases requires energy which involves CO_2 emissions through the production of energy consumed. The IPCC [**Ref 13-16**] estimated emissions of CO_2 for a range of electricity generation types. For utility scale solar photovoltaic cells, it estimated a lifecycle emission of 48 kgCO_2eq/MWh (based on the median value from a range between 8 and 180 kgCO2eq/MWh) from construction through to decommissioning. In 2014, solar farms were expected to operate for 25 years, and the emissions data would have been based on this lifetime. The lifetime of solar farms is now estimated to be approximately 40 years which is an adequate assessment period for the ES. However, the GHG emissions

within the lifecycle are generally weighted primarily to the construction and decommissioning of solar farms and therefore the additional 15-year lifespan of operational time will have limited GHG emissions. This leads to a total CO2 cost of the Proposed Development of approximately 672,000 tonnes (te) of CO2 over an assumed operational lifespan of 40 years with an annual total of 16,800 te assuming zero decarbonisation of lifecycle emissions.

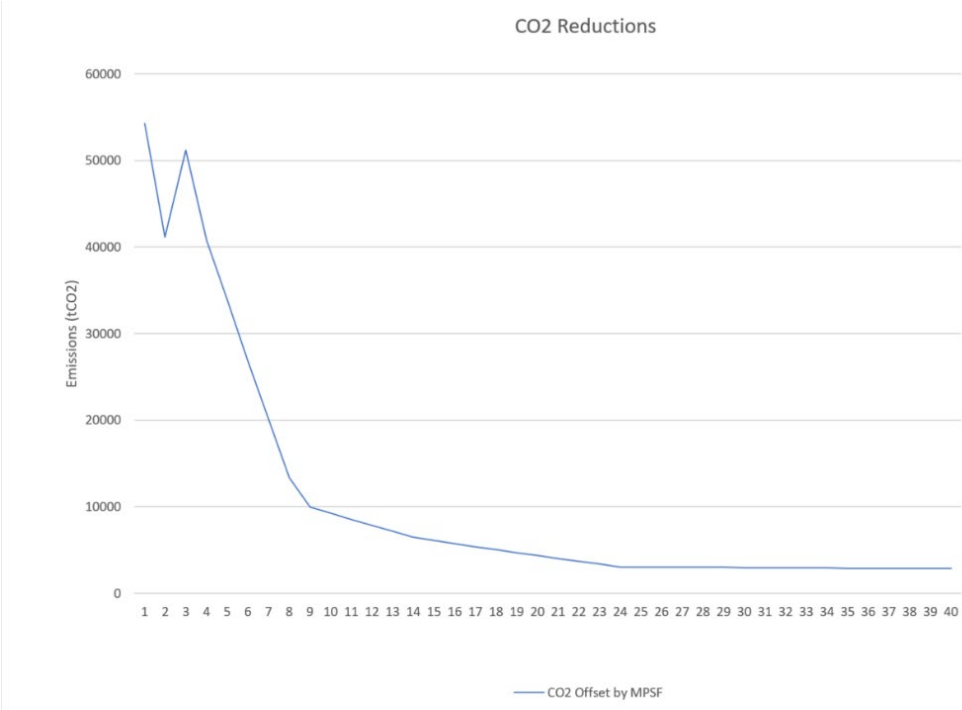
13.4.15. The generation of electricity from the Proposed Development will displace and would replace the generation of electricity from other conventional power sources over time. The Digest of UK Energy Statistics (DUKES) [**Ref 13-22**, **Ref 13-23**] indicate across the mix of sources of electricity that currently contribute power to the grid, the average emission of CO2 in 2020 was estimated as 182 kg/MWh. If this emission of CO_2 was avoided as a result of the Proposed Development, it would equate to a reduction of approximately 64,000 teCO_2/y entering the atmosphere over the operational lifetime of the Proposed Development.

13.4.16. The technical specification of solar panels indicates power degradation for the first year will be no more than 2% followed by no more than 0.45 % in subsequent years. The reduction in efficiency will reduce the amount of renewable energy serving the grid and will therefore reduce the potential reduction in CO_2 savings associated with the Proposed Development over time.

13.4.17. Grid decarbonisation will reduce the average emissions of CO_2 and therefore the total reduction of savings above associated with the Proposed Development correspondingly. To achieve decarbonisation of the grid, energy sources such as the Proposed Development are required to meet Government targets relating to GHG emissions. Therefore, whilst the decarbonisation of the grid would reduce the savings associated with the Proposed Development, infrastructure such as the Proposed

Development is a pre-requisite to such decarbonisation. In the National Grid Future Energy Scenario (FES) 'best case' decarbonisation scenario, grid CO_2 intensities and the output of Proposed Development accounting for panel degradation have been utilised to calculate the potential reduction of CO_2 emissions avoided as a result of the Proposed Development, which accounts for decarbonisation and degradation with results in Plate 13-1. This shows a total reduction in CO_2 of 423,580 teCO_2 across the lifetime of the Proposed Development and an average of 10,589 teCO2/y.

Plate 13-1 Proposed Development CO2 Reductions



13.4.18. The CO_2 emissions of the Proposed Development would therefore be displaced within approximately 10.5 years, and all savings beyond that would be a net benefit of the Proposed Development to reducing climate change, relative to the baseline. Over 40 years, for example, the saving is estimated at approximately 1.9 million tonnes of CO_2.

13.4.19. This is considered to be a material beneficial change to the UK's emissions of climate-changing GHG and is therefore a moderate beneficial effect that is significant.

Effects of Climate Change on Environmental Receptors Potentially Affected by the Proposed Development

13.4.20. The effects of climate change, where these are greater than zero, are summarised in **Table 13-7**. The assessment of these effect on environmental receptors in combination with the Proposed Development are set out in the relevant technical chapters.

Table 13-7: Potential Effects of Climate Change on Environmental Receptors

Chapter	Receptor	Climate Change Effect	Potential Effect on Receptor
Chapter 6: Landscape and Visual Impact	Landscape character	Rainfall/flooding	Rise in precipitation levels is not anticipated to have any effect on landscape character or existing trees/vegetation that provide visual screening of the Order limits during the operational phase of the Proposed Development.
		Increase in temperature	A rise in temperatures may have an effect on the growth rates of vegetation. However, it is not possible to predict to any degree of accuracy what this would be.
Chapter 7: Ecology (Including Ornithology)	Protected species, habitats	Increase in temperature	While a rise in temperature could affect the composition and growth rates of plant communities and invertebrates, and hence protected species and habitats, the uncertainties are high.
	Ornithology Population	Increase in temperature	While a rise in temperature could affect migration paths, the Order limits have not been identified as suitable for supporting wintering birds.

Chapter	Receptor	Climate Change Effect	Potential Effect on Receptor
Chapter 12: Water Resources and Ground Conditions	Population	Increase in precipitation and flooding	Increases in fluvial flooding associated with precipitation increase caused by climate change.
	Land Use	Increase in precipitation and flooding	Increases in the probability of flooding and rainfall intensity associated with climate change could impact agricultural land use.

13.4.21. Given the relatively limited magnitude of change in climate parameters predicted over the operational period of the Proposed Development, the baseline for environmental receptors is anticipated to change imperceptibly during this period and the effect of the Proposed Development on that altered baseline is negligible.

13.4.22. Nevertheless, the potential for in-combination climate change impacts on environmental receptors to be impacted by the Proposed Development under an altered-climate scenario is considered within relevant technical chapters.

13.4.23. This means that no additional significant effects will occur as a result of climate change during the operational phase of the Proposed Development.

13.4.24. Therefore, the effects of climate change on environmental receptors (High Sensitivity) would be subject to an impact of Negligible Magnitude which would result in a Negligible Adverse Significance of Effect which is Negligible.

13.5. Proposed Additional Mitigation

13.5.1. This assessment has identified that all effects are either beneficial or, if adverse, are of such limited nature that they are not significant and therefore no additional mitigation is required.

13.6. Residual Effects

13.6.1. The Proposed Development will reduce GHG emissions associated with energy production, with the embedded mitigation providing resilience to potential impacts of climate change on the Proposed Development.

13.6.2. Therefore, there are no identified significant residual impacts arising from the Proposed Development.

13.7. Monitoring Requirements

13.7.1. There are no identified significant effects and therefore no monitoring is required.

13.8. Cumulative Effects

13.8.1. The Proposed Development along with other renewable energy schemes will offset a greater amount of GHG emissions through the input of renewable energy into the grid than the GHG emissions embedded within such schemes.

13.8.2. The Proposed Development, in conjunction with other renewable energy developments, will contribute to the UK's aims to reduce carbon emissions and achieve its ambitious GHG emissions reduction targets.

13.8.3. Table 5.6 of DUKES 2021 [**Ref 13-22**] shows renewable electricity generation (sourced from solar, wind, wave, tidal, natural flow hydro and thermal sources) represented 43.1% of total electricity generation in 2020.

13.8.4. In 2021, 13.6 % of total energy consumption came from renewable sources as detailed within Chapter 6 of DUKES 2021 [**Ref 13-23**]. The cumulative

effect of the Proposed Development with other UK renewables generation is considered to be a fundamental change in the climate effects of UK energy supply, which is a major beneficial effect that is significant and will contribute to the UK's legally binding emission reduction targets.

13.9. Conclusion

13.9.1. The Proposed Development, in conjunction with other renewable energy developments, will contribute to the UK's aims to reduce carbon emissions and achieve its ambitious GHG emissions reduction targets.

13.9.2. The Proposed Development will not lead to any residual significant effects related to climate change.

13.9.3. No additional mitigation is proposed.

Table 13-8: Summary of Effects

Description of Effect/Activity	Nature of Effect	Receptor	Value of Receptor	Embedded Mitigation Measures	Magnitude of Impact	Potential Significance of Effect	Additional Mitigation Measures	Residual Effect Significance	Monitoring Requirement
Vulnerability of the Proposed Development to Climate Change	Adverse, Short-term	Proposed Development	Very low	oCEMP, oOEMP and oDEMP as detailed in paragraph 13.3.1.	High	Negligible (non-significant)	None	Negligible (non-significant)	None
Influences of the Proposed Development on Climate Change	Positive, Long-term	Climate	High	oCEMP, oDEMP and oDEMP as detailed in paragraph 13.3.1.	Negligible	Moderate beneficial (non-significant)	None	Moderate beneficial (non-significant)	None
Effects of Future Climate Change Scenario on Environmental Receptors Sensitive to Climate Change	Environmental Receptors	Dwellings	High	None	Negligible	Minor (non-significant)	None	Minor (Non-significant)	None

13.10. References

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