HELIOS RENEWABLE ENERGY PROJECT

PINS Document Number:
EN010140/APP/6.1.12

Pursuant to:
APFP Regulation 5(2)(a)

Environmental Statement Chapter 12: Climate Change

June 2024

12. Climate Change

12.1. Introduction

12.1.1. This chapter of the ES reports on the likely significant effects of the Proposed Development on the environment with respect to climate change.

12.1.2. The Infrastructure Planning (Environmental Impact Assessment) Regulations 2017 (as amended) ('the EIA Regulations') include a requirement for the assessment of development on the environment in relation to climate change:

> *'A description of the likely significant effects of the development on the environment resulting from, inter alia: ...(f) the impact of the project on climate (for example the nature and magnitude of greenhouse gas emissions) and the vulnerability of the project to climate change'.*

12.1.3. This chapter is supported by the following appendices:

- **Appendix 12.1: Helios Traffic Flows [EN010140/APP/6.3.12.1]**;
- **Appendix 12.2: Helios Emissions Factor Toolkit [EN010140/APP/6.3.12.2]**;
- **Appendix 12.3: Helios Carbon Calculations [EN010140/APP/6.3.12.3]**;
- **Appendix 12.4: Mean Air Temperature Anomaly [EN010140/APP/6.3.12.4]**;
- **Appendix 12.5: Average Annual Precipitation Anomaly [EN010140/APP/6.3.12.5]**;
- **Appendix 12.6: Max Summer Temperature Anomaly [EN010140/APP/6.3.12.6]**;
- **Appendix 12.7: Summer Precipitation Anomaly [EN010140/APP/6.3.12.7];**
- **Appendix 12.8: Minimum Winter Temperature Anomaly [EN010140/APP/6.3.12.8]**;
- **Appendix 12.9: Winter Precipitation Anomaly [EN010140/APP/6.3.12.9]**; and
- **Appendix 12.10: Annual Cloud Anomaly [EN010140/APP/6.3.12.10]**.

12.1.4. This chapter is supported by the following Figure:

- **Figure 12.1: UKCP 18 25km grid square [EN010140/APP/6.2.12.1]**.

12.2. Planning Policy Context

Climate Change Act 2008

12.2.1. The Climate Change Act 2008 set a legal duty to reduce greenhouse gas ('GHG') emissions, in particular carbon dioxide ('CO_2') by 80% by 2050. The Climate Change Act (2050 Target Amendment) Order 2019 amended this to increase the target for reducing GHG emissions by 100% from the 1990 baseline ('net zero') by 2050.

12.2.2. This is now the over-arching carbon reduction target for the UK Government. Carbon budgets set incremental limits on the amount of GHG emissions for the UK over a defined five-year period, with the most recent Sixth Carbon Budget being aligned to achieving the net zero by 2050 target.

National Planning Policy

12.2.3. Section 4.10 of the Overarching National Policy Statement EN-1 (2024)[1] ('NPS EN-1') sets out matters concerned with climate change adaptation, stating that:

> *'Climate change is already altering the UK's weather patterns and this will continue to accelerate depending on global carbon emissions. This means it is likely there will be more extreme weather events, such as heavy rainfall and very hot days which will be more intense and more frequent. As well as climatic and seasonal changes such as hotter, drier summers and warmer, wetter winters, there is also a likelihood of increased flooding, drought, heatwaves, and intense rainfall events, as well as rising sea levels, increased storms and coastal change. Adaptation is therefore necessary to deal with the potential impacts of these changes that are already happening.'*

12.2.4. The NPS EN-1 goes on to recommend steps for an Applicant to take as part of a proposal, stating that *'applicants should take reasonable steps to maximise the use of nature-based solutions alongside other conventional techniques.'*

12.2.5. Furthermore, an applicant's ES should set out how proposals will take account of the projected impacts of climate change adaptation, in accordance with the EIA

[1] Department for Energy Security & Net Zero (2024) Overarching National Policy Statement for Energy (EN-1) Available from: https://assets.publishing.service.gov.uk/media/65bbfbdc709fe1000f637052/overarching-nps-for-energy-en1.pdf Accessed February 2024

Regulations and:

> *'applicants must consider the direct (e.g. site flooding, limited water availability, storms, heatwave and wildfire threats to infrastructure and operations) and indirect (e.g. access roads or other critical dependencies impacted by flooding, storms, heatwaves or wildfires) impacts of climate change when planning the location, design, build, operation and, where appropriate, decommissioning of new energy infrastructure.*
>
> *The ES should set out how the proposal will take account of the projected impacts of climate change, using government guidance and industry standard benchmarks.*
>
> *Applicants should demonstrate that proposals have a high level of climate resilience built-in from the outset and should also demonstrate how proposals can be adapted over their predicted lifetimes to remain resilient to a credible maximum climate change scenario.'*

12.2.6. The NPS EN-1 also sets out measures and recommendations to address (GHG) climate change mitigation as a generic impact.

12.2.7. The NPS EN-1 states that *'All proposals for energy infrastructure projects should include a GHG assessment as part of their ES'* which should include:

- A whole life GHG assessment showing construction, operational and decommissioning GHG impacts;
- An explanation of the steps that have been taken to drive down the climate change impacts at each of those stages;
- Measurement of embodied GHG impact from the construction stage;
- How reduction in energy demand and consumption during operation has been prioritised in comparison with other measures;
- How operational emissions have been reduced as much as possible through the application of best available technology for that type of technology;
- Calculation of operational energy consumption and associated carbon emissions;
- Whether and how any residual GHG emissions will be (voluntarily) offset or removed using a recognised framework; and

- Where there are residual emissions, the level of emissions and the impact of those on national and international efforts to limit climate change, both alone and where relevant in combination with other developments at a regional or national level, or sector level, if sectoral targets are developed.

12.2.8. Measures to reduce GHG emissions should be considered at every stage of the Proposed Development and ensure that emissions are minimised as far as possible for the type of technology, taking into account the overall objective of a secure, reliable and affordable energy supply as we transition towards net zero.

12.2.9. The Overarching National Policy Statement EN-3 (2024)[2] ('NPS EN-3') highlights the UK Government's commitment to solar energy as a key part of the strategy for low-cost decarbonization of the energy sector and the transition to net zero.

12.2.10. The British Energy Security Strategy[3] states that the UK Government expects a five-fold increase in solar deployment by 2035 (up to 70 gigawatts ('GW')). Furthermore, it highlights that the Secretary of State should take into account the positive role that large-scale renewable projects play in the mitigation of climate change, the delivery of energy security and the urgency of meeting the net zero target.

12.2.11. The Climate Change Committee ('CCC') report on progress in reducing emissions[4] outlines that an average annual deployment rate of 4.3GW is required to deliver 70GW of solar generation by 2035.

Local Planning Policy

12.2.12. As of 1st April 2023, Selby District Council ('SDC'), merged with Craven District Council, Hambleton District Council, Harrogate Borough Council, Scarborough Borough Council, Richmondshire District Council, and Ryedale District Council to become one unitary authority, known as North Yorkshire Council ('NYC'). The Draft SDC Local Plan (Revised Publication 2024)[5] sets out a vision for the District up to

[2] Department for Energy Security & Net Zero (2024) Overarching National Policy Statement for Renewable Energy Infrastructure (EN-3) Available from: https://assets.publishing.service.gov.uk/media/65a7889996a5ec000d731aba/nps-renewable-energy-infrastructure-en3.pdf Accessed February 2024

[3] Policy paper British energy security strategy (2023). Available from: https://www.gov.uk/government/publications/british-energy-security-strategy/british-energy-security-strategy Accessed May 2023

[4] Climate Change Committee. Progress in Reducing Emissions 2023 Report to Parliament (June 2023). Available from: https://www.theccc.org.uk/publication/2023-progress-report-to-parliament/ Accessed August 2023

[5] Selby District Council Draft Local Plan Revised Publication (2024) Available from: https://edemocracy.northyorks.gov.uk/documents/s28009/Appendix%201%20Revised%20Publication%20Local%20Plan%20Consultation%20Document.pdf Accessed April 2024

2040.

12.2.13. There is also existing, adopted local planning policy documents including the SDC Local Plan (2005)[6] and the Core Strategy Local Plan (2013)[7].

12.2.14. NYC declared a climate emergency in July 2022. NYC currently have a climate change strategy (2023-2030)[8] which was approved in July 2023. The delivery of the strategy includes mitigation as a key theme and states mitigation can be done by 'Generating and storing low carbon energy such as solar power as an alternative to fossil fuels.' The strategy also includes a range of measures targeted towards climate change adaptation and resilience.

12.2.15. The following policies from the existing and emerging SDC Local Plan documents are considered most relevant to the Proposed Development:

SDC 2013 Core Strategy Local Plan – Low Carbon and Renewable Energy

'A. In future Local Plan documents, the Council will:

seek to identify opportunities where development can draw its energy from renewable, low carbon or decentralised energy supply systems and for co-locating potential heat customers and suppliers; and

consider identifying 'suitable areas' for renewable and low carbon energy sources and supporting infrastructure.

B. The Council will support community-led initiatives for renewable and low carbon energy developments being taken forward through neighbourhood plans including those outside any identified suitable areas.

C. All development proposals for new sources of renewable energy and low-carbon energy generation and supporting infrastructure must meet the following criteria:

i. are designed and located to protect the environment and local amenity or

[6] Selby District Council (2005). Available from: https://www.northyorks.gov.uk/planning-and-conservation/planning-policy/planning-policy-your-local-area/selby-planning-policy/selby-development-plan/selby-district-local-plan-2005 Accessed August 2023

[7] Selby District Council (2013). Available from: https://www.northyorks.gov.uk/planning-and-conservation/planning-policy/planning-policy-your-local-area/selby-planning-policy/selby-development-plan/selby-core-strategy-2013/selby-district-core-strategy-local-plan Accessed August 2023

[8] North Yorkshire Council (2023). Available from: https://www.northyorks.gov.uk/environment-and-neighbourhoods/climate-change/climate-change-strategy-2023-2030 Accessed March 2024

ii. can demonstrate that the wider environmental, economic and social benefits outweigh any harm caused to the environment and local amenity, and

iii. impacts on local communities are minimised.'

Emerging SDC Local Plan Policy SG10 - Low Carbon and Renewable Energy (Strategic Policy)

'A. Proposals for low carbon and renewable energy storage and generation will be supported where:

1. Planning impacts of the development and associated infrastructure, both individually and cumulatively, are, or can be made, acceptable;

2. Appropriate weight, consideration and mitigation has been given to the following where applicable:

- *Landscape character and sensitivity;*
- *Designated nature conservation sites, features, functionally linked land, protected habitats and species;*
- *Designated and non designated heritage assets and their settings;*
- *Hydrology and water quality;*
- *Impact on Infrastructure and Transport Networks including highways, rail, aviation operations, navigational systems, PROW, television, radio, telecommunications systems;*
- *Living conditions and amenity including due to noise, odour, dust, vibration, visual intrusion, shadowing or flicker.*

3. Community engagement has been undertaken which demonstrates the delivery of environmental, social and economic benefits and how concerns will be addressed/mitigated for;

4. The site will be recovered to a safe condition, with a suitable use, to minimum of its original value and condition, within a defined and agreed period should the infrastructure cease to be operational.'

12.2.16. Further policies within the emerging SDC Local Plan such as SG11 (Flood Risk Strategic Policy), Policy NE2 (Protecting and Enhancing Green and Blue Infrastructure) and NE3 (Biodiversity Net Gain) are considered relevant to climate change mitigation and adaptation. However, these policies are captured in respective technical chapters in this ES.

12.3. Assessment Methodology

12.3.1. 'Climate' is generally understood to mean the weather conditions prevailing over a long period of time and climate change refers to changes in recorded long-term climate trends. As a topic for the assessment within EIA, climate change is relatively new. Guidance is evolving and there is no prescribed way in which climate change should be incorporated into an ES. However, some guidance has been prepared by the Institute of Environmental Management and Assessment ('IEMA'), discussed further below. It sets out the two main approaches that can be taken to determine a project's climate change impact. These involve identifying:

- The direct and indirect influence of the Proposed Development on climate change resulting from GHG emissions (climate change mitigation); and
- The vulnerability of the Proposed Development to climate change (climate change adaptation/ resilience).

12.3.2. The approach to climate change resilience therefore differs from the EIA methodology set out in **Chapter 2 [EN010140/APP/6.1.2]** of the ES. The methodology followed is set out below and is considered to be appropriate for this topic.

Institute of Environmental Management and Assessment (IEMA): Environmental Impact Assessment Guide to: Climate Change Resilience and Adaptation[9]

12.3.3. The Guide to Climate Change Resilience and Adaptation (June 2020) ('the 2020 IEMA Guidance') provides a framework for the effective consideration of climate change resilience and adaptation in the EIA process in line with the EIA Regulations.

12.3.4. A step-by-step method presented within this guidance is set out below and has been

[9] IEMA June 2020: IEMA Environmental Impact Assessment Guide to Climate Change Resilience and Adaptation. Available from: https://www.iema.net/download-document/31879. Accessed May 2023

incorporated within this chapter:

'Step 0 – Building climate resilience into the project by considering incorporating resilience during the designs stage and by identifying appropriate mitigation measures;

Step 1 – Scoping for the EIA; e.g. identify the climate change projections for use in the assessment and identify key climatic variables relevant to the project;

Step 2 – Defining the future (climate) baseline; define future conditions using selected climate change projections (i.e. increase in rainfall, increase in mean summer temperature and wind strength);

Step 3 – Identifying and determining sensitivity of receptors;

Step 4 – Reviewing and determining magnitude of the effect; consider probability and consequence to determine the magnitude of the effect;

Step 5 – Determination of significance;

Step 6 – Developing additional adaptation / EIA mitigation measures;

Step 7 (Development permitted) – Monitoring and adaptive management by implementing mitigation measures.'

12.3.5. The 2020 IEMA Guidance also introduced the concept of 'In-Combination Climate Impacts' ('ICCI'). An ICCI is when a projected future climate impact (e.g. increase in temperatures) interacts with an effect identified by another topic and exacerbates its impact. The ICCI have been assessed throughout the relevant chapters within this chapter and are summarised at section 12.5 'Likely Significant Effects'.

12.3.6. The 2020 IEMA Guidance stresses that climate change should be an integrated consideration within the impact assessment, by undertaking an assessment that is *'proportional to the evidence base available to support any assessment'* and focusses on impacts *'specific to project'*. Assessments undertaken in line with this guidance are to be proportionate in their approach and not include superfluous assessment that does not address likely material issues.

Approach to the assessment of Climate Change Resilience (Adaptation)

12.3.7. The vulnerability of the Proposed Development to climate change considers effects on any development and infrastructure as a receptor (this is referred to in the 2020 IEMA Guidance as 'Climate Change Resilience and Adaptation'). A high-level climate change risk and resilience assessment has been undertaken to identify the potential risks of climate change on the Proposed Development and to highlight design measures to increase its resilience and adaptation to climate hazards, such as extreme hot and cold weather, intense rainfall, high winds and storm events.

12.3.8. In line with the 2020 IEMA Guidance, this chapter utilises climate projections using the 'worst case scenario' of future weather projections, and therefore Representative Concentration Pathway ('RCP')[10] 8.5 scenarios are used. The 2020 IEMA Guidance sets out that the use of the high emissions scenarios (Met Office UKCP18 RCP8.5)[11] is generally recommended, unless the case can be made for using a different, lower emissions scenario.

12.3.9. Climate projections have been derived from the UKCP18 50th Percentile[12] Climate Projections at 25km grid square 462500, 412500 (where the Site is located, as shown in **Figure 12.1 UKCP 18 25km grid square [EN010140/APP/6.2.12.1]**) using baseline 1981-2000 scenario RCP 8.5.

12.3.10. This worst-case scenario assumes a 'business-as-usual' pathway through a combination of assumptions about high population levels, relatively slow income growth with modest rates of technological change and energy intensity improvements, leading in the long term to high energy demand and GHG emissions in absence of climate change policies.

12.3.11. Taking into account the nature and location of the Proposed Development, the following climate related parameters/ hazards are also considered to have the potential to impact upon its operation:

- Wind (speed, direction and gustiness);

[10] Established by the Intergovernmental Panel on Climate Change (IPCC).

[11] Met Office (2018) UKCP18 Guidance: Representative Concentration Pathways Accessed From: UKCP18 Guidance: Representative Concentration Pathways. Available From: https://www.metoffice.gov.uk/binaries/content/assets/metofficegovuk/pdf/research/ukcp/ukcp18-guidance---representative-concentration-pathways.pdf Accessed June 2023

[12] The 50th percentile is chosen as it is the average from the typical plume which shows the 5th, 10th, 25th, 50th, 75th, 90th and 95th percentiles for the chosen emissions scenario.

- Temperature;
- Precipitation; and
- Cloud cover.

12.3.12. This part of the chapter assesses the effects of climate change on the Proposed Development by:

- Establishing the existing baseline conditions (2023);
- Determining future baseline conditions by reviewing UK climatic projections (2018) up to 2066 (rationale for temporal scope explained below) (including identifying sensitive receptors);
- Assessing the likely significant effects of the Proposed Development, with embedded mitigation measures incorporated, on the established baseline and future conditions;
- Identifying additional mitigation measures; and
- Assessing residual effects.

Spatial Scope

12.3.13. Scientific evidence shows that our climate is changing; however, there are significant uncertainties in the spatial occurrence within the climate projections utilised in this assessment (25km grid square where the Site is located) (**Figure 12.1 [EN010140/APP/6.2.12.1]**). The UKCP18 are not predictions or forecasts but simulations of potential scenarios of future climate under a range of hypothetical emissions scenarios and assumptions, and therefore cannot be treated as exact or factual.

Temporal Scope

12.3.14. In considering future climate change scenarios, managing climate change resilience and adaptation, the 2020 IEMA Guidance recommends the use of the UK Climate Projections ('UKCP') platform[13]. The latest UKCP is UKCP18 which provides updated observations and climate change projections up to 2100 in the UK; therefore, this assessment assumes projections for 2066 as the most far-reaching projection and is

[13] DEFRA, BEIS UK Climate Projections User Interface (2023). Available from: https://ukclimateprojections-ui.metoffice.gov.uk/ui/home Accessed May 2023

considered to be appropriate for the operational design life of the Proposed Development (modelled to be up to 40 years). Therefore, the nature of effect in the assessment of significance for climate change resilience is considered to be temporary.

12.3.15. As the construction phase for the Proposed Development is anticipated to be 12 months, it is considered that changes in the climate that may give rise to potential significant effects are not anticipated to manifest in this timeframe so would not require construction techniques or plant to be modified within this period. Therefore, a climate resilience assessment during the construction phase of the Proposed Development has been scoped out of this chapter and is only considered for the operational phase. An assessment of climate resilience has also been scoped out for the decommissioning phase due to uncertainties of projecting climate in 40 years within a 12-month period (the anticipated timeframe of the decommissioning phase).

Determining Significance and Significance Criteria

12.3.16. This chapter draws on recognised climate change projections, existing guidance and emerging good practice, as well as relevant information presented in this ES, to ensure that appropriate project mitigation and risk management is included in the Proposed Development's design. In particular, this chapter draws upon the findings of **Chapter 8 Biodiversity [EN010140/APP/6.1.8**], **Chapter 9 Water Environment [EN010140/APP/6.1.9]** and **Chapter 10 Transport and Access [EN010140/APP/6.1.10]** of the ES.

12.3.17. An assessment of the effect significance with regard to the Proposed Development's vulnerability to climate change is provided qualitatively with the most significant risks and opportunities for the project identified using professional judgement. The criteria for identifying the vulnerability of a receptor are outlined in **Chapter 2 EIA Methodology [EN010140/APP/6.1.2]** of this ES and, for the purposes of this chapter, the sensitivity of receptors to change is considered as high. The climate change risk assessment is included in Table 12.6 below.

12.3.18. This view has been taken given the longevity of the lifespan of the Proposed Development (modelled to be 40 years) and in consideration with the uncertainty of the projected pathway of climate change. Professional judgement is drawn as to whether climate changes (taking into account the future baseline) are likely to lead to a significant effect on the Proposed Development or not.

IEMA Environmental Impact Assessment Guide to: Assessing Greenhouse Gas Emissions and Evaluating their Significance[14]

12.3.19. In February 2022, IEMA published guidance (the 'IEMA GHG Guidance') to seek to assist practitioners with addressing GHG emissions assessment and mitigation in EIA. The guidance indicates that a 'good practice' approach is advocated where GHG emissions are always considered and reported but at varying degrees of detail depending on the project.

12.3.20. The IEMA GHG Guidance places a much more prominent role for mitigation within the EIA. It is no longer an element to be considered towards the later stages of the EIA process. Instead, mitigation should be considered from the outset and throughout the project's lifetime.

12.3.21. The guidance sets out that there are a number of different assessment methods available for measuring and quantifying the GHG emissions associated with the built environment, ranging from general guidance to form standards for the use of an EIA. The IEMA GHG Guidance recognises that *'qualitative assessments are acceptable, for example: where data is unavailable or where mitigation measures are agreed early on in the design phase with design and engineering teams'.*

12.3.22. The guidance outlines that an EIA must give proportionate consideration to whether and how the Proposed Development will contribute to the 2050 net zero target. Therefore, the crux of significance is not whether a project emits GHG emissions, nor even the magnitude of GHG emissions, but whether it contributes to reducing GHG emissions relative to a comparable baseline, consistent with a trajectory towards net zero by 2050. Notwithstanding, likely significant effects from the nature and magnitude of GHGs from the Proposed Development are still relevant for purposes of the EIA, under Schedule 4 of the EIA Regulations.

Approach to the Assessment of Climate Change Mitigation (GHG Emissions)

12.3.23. The second part of this assessment considers the direct and indirect effects of the Proposed Development on climate change. The GHG Protocol[15], which sets globally standardised frameworks for the measurement and management of GHGs, defines

[14] IEMA (2022) Assessing Greenhouse Gas Emissions and Evaluating their Significance. Available from: https://www.iema.net/preview-document/assessing-greenhouse-gas-emissions-and-evaluating-their-significance Accessed May 2023

[15] GHG Protocol: Available online at: https://ghgprotocol.org/ Accessed June 2023

direct and indirect emissions as follows:

- Direct GHG emissions are emissions from sources that are owned or controlled by the operator. Examples include vehicular emissions, plant use (such as generators and Non-Road Mobile Machinery) and independent on-site energy generation (oil, gas and diesel); and

- Indirect GHG emissions are emissions that are a consequence of the construction, operational, or decommissioning activities of the Proposed Development but are a result of procurement and/ or activities controlled by another entity. Examples include energy generation and the manufacture of materials used in the construction process (known as 'embodied' carbon).

Assessing Construction Vehicle GHG Emissions

12.3.24. The climate change impact is assessed as the difference between the carbon emissions associated with the baseline and that associated with the construction of the Proposed Development. The study area for carbon emissions assessment is defined by the Site boundary (**Figure 1.1 [EN010140/APP/6.2.1.1]**) and the transport network study area for **Chapter 10 Transport and Access [EN010140/APP/6.1.10]** of the ES.

12.3.25. The baseline conditions of the Site were based on the trip rates and existing published data sets (**Appendix 12.1 Helios Traffic Flows [EN010140/APP/6.3.12.1]**). The baseline for the Site is defined as the current carbon emissions arising from vehicles in the study area. In terms of transport-related emissions, whilst forecasting can be carried out to project potential increases in traffic flows, and, by inference, the impact on CO_2 levels, the impact of technological changes is harder to infer. This includes the introduction and uptake of electric vehicles. Hence, the assessment in this broadly assumes a conservative uptake of electric vehicles, other than assumptions which are inherent in the Emissions Factors Toolkit (EFT V12.0.1)[16] utilised for the assessment (**Appendix 12.2 Helios Emissions Factor Toolkit [EN010140/APP/6.3.12.2]**).

12.3.26. As the Proposed Development would generate minimal vehicle movements once operational, only a construction phase vehicular emissions assessment has been

[16] DEFRA, December 2023, Emissions Factors Toolkit v12.0 User Guide. Link: https://laqm.defra.gov.uk/wp-content/uploads/2023/11/EFTv12.0-user-guide-v1.0.pdf Accessed February 2024

undertaken. An assessment of vehicular emissions during the decommissioning phase has also been scoped out on the basis that effects would be no greater than the construction phase and the decommissioning phase is too far in the future to be able to accurately predict traffic flows and emissions.

Traffic Flow Data

12.3.27. A full analysis of the traffic data relevant to climate change is assessed in this chapter. 24-hour, Average Annual Daily Traffic ('AADT') flows have been provided by the Project's Transport Consultant, Transport Planning Associates (**Appendix 12.1 Helios Traffic Flows [EN010140/APP/6.3.12.1]**), for the following scenarios:

- 2022 Base Flows – AADT 24 Hr;
- Base 2027 (which shows projected traffic growth from the current baseline to the construction start year); and
- Base 2027 plus Development – AADT 24 Hr.

12.3.28. In the absence of pre-defined distances for vehicles, the most recent UK average journey distance is defined by the National Travel Survey[17] provided by the Department for Transport as 9.2km (5.7 miles). This is utilised as a constant factor across the assessment.

12.3.29. In order to assess the effects of the Proposed Development during the construction period, the peak construction traffic flows from Table 10.14 of **Chapter 10 Transport and Access [EN010140/APP/6.1.10]** of the ES has been utilised. The peak construction traffic flows are based on the volume of HGVs, cars and LGVs arriving and departing the Site. The assessment of construction vehicle GHG emissions arising from the Proposed Development is a reasonable 'worst-case' assessment, representing the peak period. On a typical day, traffic flows would be lower.

Vehicle Emissions Factors

12.3.30. The fleet comparison for the construction phase of the Proposed Development was taken from the baseline fleet projection and predicted changes in fleet composition due to the Proposed Development. The road type utilised was 'England – Not London'

[17] National Statistics. National Travel Survey: 2021 data tables. [Online]. Accessed from: https://www.gov.uk/government/statistics/national-travel-survey-2021. Accessed June 2023

to reflect the location of the Site.

Operational Emissions and Carbon Reductions

12.3.31. An assessment of likely carbon savings realised through the provision of renewable solar energy has been undertaken for the duration of the lifespan of the Proposed Development (modelled to be up to 40 years). This assessment is based on the stated maximum export of renewable electricity (from the Proposed Development, which is outlined in **Chapter 3 Site and Development Description [EN010140/APP/6.1.3]** of the ES).

12.3.32. The Carbon Factor (or Carbon Intensity) of the current electricity grid is derived from the Department for Energy Security and Net Zero ('DESNZ') (previously the Department for Business, Energy and Industrial Strategy ('BEIS')) conversion factors[18].

12.3.33. The efficiency of solar energy as an energy generation type is taken from the Government Digest of United Kingdom Energy Statistics ('DUKES')[19] which provides a 'load factor' (a proxy value for utilisation). This is a national figure and does not consider localised irradiation levels, nor site-specific attributes of the Site. Therefore, this assessment is considered to be a reasonable assessment of the potential carbon reductions compared to the future baseline scenario.

12.3.34. In order to calculate the carbon saving (t CO_2e/year) the MWh/Year is calculated by multiplying hours in a year (8,766) by the stated maximum output of the Proposed Development (190MW). This is then multiplied by 'load factor' to give a MWh/Year / Load Factor value, which is then multiplied by the carbon factor outlined above. Calculations for carbon savings from the Proposed Development are provided in **Appendix 12.3 Helios Carbon Calculations [EN010140/APP/6.3.12.3]**.

Temporal Scope

12.3.35. The assessment assumes a Proposed Development completion year no later than 2029 (refer to **Chapter 5 Construction and Decommissioning Methodology and Phasing [EN010140/APP/6.1.5]** of the ES for information). The data available to

[18] Department for Energy Security and Net Zero and Department for Business, Energy & Industrial Strategy (2022) Available from: https://www.gov.uk/government/publications/greenhouse-gas-reporting-conversion-factors-2022 Accessed June 2023

[19] Department for Business, Energy & Industrial Strategy (2022) Available from: https://www.gov.uk/government/statistics/renewable-sources-of-energy-chapter-6-digest-of-united-kingdom-energy-statistics-dukes Accessed June 2023

allow an assessment of GHG emissions from vehicle movements associated with the construction of the Proposed Development is limited to the modelling scenarios assessed in **Chapter 10 Transport and Access [EN010140/APP/6.1.10]** of the ES. This chapter is therefore aligned with **Chapter 10 Transport and Access [EN010140/APP/6.1.10]** and **Chapter 11 Noise and Vibration [EN010140/APP/6.1.11]** in assessing vehicular emissions from the construction phase (as set out in **Chapter 10 Transport and Access [EN010140/APP/6.1.10]**). The nature of effect in the assessment of significance for climate change mitigation (GHG Emissions) is considered to be permanent as once GHG emissions are emitted into the atmosphere it is a reasonable assumption to make that they stay there.

Spatial Scope

12.3.36. The data available to allow an assessment of GHG emissions from vehicle movements associated with the construction of the Proposed Development is aligned with the study area of **Chapter 10 Transport and Access [EN010140/APP/6.1.10]** of the ES. The study area involves a detailed study area and a wider general modelling area, covering five road links surrounding the Site and was agreed in consultation with NYC. The study area links, provided by the Project Transport Consultant, Transport Planning Associates, are included in **Appendix 12.1 Helios Traffic Flows [EN010140/APP/6.3.12.1].**

12.3.37. Emissions will be contextualised against the UK and local carbon budgets. Given that climate change is a global issue, a qualitative assessment of the Proposed Development's effects is also made at the global scale.

Significance Criteria

12.3.38. In the absence of any significance criteria or a defined threshold, it might be considered that all carbon emissions are significant and beneficial effects only arise if there is a net loss in carbon and emissions. The IEMA GHG Guidance outlines that it is essential to provide context for the magnitude of GHG emissions reported in the ES in a way that aids evaluation of effects. The impacts have therefore been defined as either negligible, beneficial, or minor, moderate, or major as set out in Table 12.1 below. As per the IEMA GHG Guidance, when evaluating significance, all new GHG emissions contribute to an adverse environmental effect. However, some projects will replace existing development or baseline activity that has a higher GHG profile. The significance of a project's emissions should therefore be based on its net impact

over its lifetime, which may be positive, negative, or negligible.

12.3.39. IEMA provide examples of significance criteria, which are outlined below in Table 12.1. These examples have been utilised alongside professional judgement for assessing the impact of the Proposed Development at the national level.

12.3.40. The IEMA GHG Guidance states that the significance of the impact of GHG emissions should be determined by considering whether a project contributes to reducing GHG emissions relative to a comparable baseline, consistent with a trajectory towards net zero by 2050. The trajectory towards net zero is mandated within the relevant carbon budget through which the specific activity falls.

12.3.41. Effects that are described as 'minor' or 'negligible' are determined to be 'Not Significant' and effects that are described as 'moderate', or 'major' are determined to be 'Significant'.

Table 12.1: IEMA GHG Guidance Emissions Significance Criteria

Effect Significance	Description of Criteria
Beneficial	*'The project's net GHG impacts are below zero and it causes a reduction in atmospheric GHG concentration, whether directly or indirectly, compared to the without-project baseline. A project with beneficial effects substantially exceeds net zero requirements with a positive climate impact'*
Negligible	*'The project's GHG impacts would be reduced through measures that go well beyond existing and emerging policy and design standards for projects of this type, such that radical decarbonisation or net zero is achieved well before 2050. A project with negligible effects provides GHG performance that is well 'ahead of the curve' for the trajectory towards net zero and has minimal residual emissions.'*
Minor	*'The project's GHG impacts would be fully consistent with applicable existing and emerging policy requirements and good practice design standards for projects of this type. A project with minor adverse effects is fully in line with measures necessary to achieve the UK's trajectory towards net zero.'*
Moderate	*'The project's GHG impacts are partially mitigated and may partially meet the applicable existing and emerging policy requirements but would not fully contribute to decarbonisation in line with local and national policy goals for projects of this type. A project with moderate adverse effects falls short of fully contributing to the UK's trajectory towards net zero.'*
Major	*The project's GHG impacts are not mitigated or are only compliant with do-minimum standards set through regulation, and do not provide further reductions required by existing local and national*

Effect Significance	Description of Criteria
	policy for projects of this type. A project with major adverse effects is locking in emissions and does not make a meaningful contribution to the UK's trajectory towards net zero.'

UK Carbon Budgets

12.3.42. Carbon Budgets are a five-year statutory cap on total GHGs, introduced under the Climate Change Act 2008 (as amended). The Climate Change Act originally targeted an 80% reduction in GHGs by 2050 until it was amended in 2019; therefore, the first five carbon budgets (with the fifth budget running from 2028-2032) are aligned to the 80% reduction. The most recent sixth carbon budget is aligned to the new objective of achieving a 100% reduction in GHGs and covers the period from 2033-37. As the sixth carbon budget is the most recently adopted budget (enacted through the Carbon Budget Order 2021), the sixth carbon budget is utilised within this chapter for operational assessments, whilst the fourth Carbon Budget (2023-2027) has been adopted for the construction phase assessments.

12.3.43. The relevant UK Carbon Budget will be utilised for the contextualisation of how the Proposed Development's emissions are likely to contribute, positively or negatively, towards a pathway to net zero by 2050. As previously stated, the IEMA GHG Guidance outlines that the crux of significance is not whether a project emits GHG emissions, nor even the magnitude of GHG emissions, but whether it contributes to reducing GHG emissions relative to a comparable baseline, consistent with a trajectory towards net zero by 2050; therefore, the UK Carbon Budgets will not be used in order to determine significance of effects. They will provide contextualisation to aid professional judgement of significance, supported by the IEMA GHG Guidance outlined in Table 12.1.

Local Carbon Budgets

12.3.44. In order to provide context for the Proposed Development and the contribution it makes to climate change, local carbon budgets have been utilised alongside professional judgement and the IEMA GHG Guidance. Therefore, the local carbon budget will not be used in order to determine the significance of effects.

12.3.45. The Tyndall Centre carbon budget tool[20] scales down the UK national carbon budget between LPAs, to show how each LPA can make its 'fair' contribution towards a 1.5-degree warming trajectory and net zero.

12.3.46. Table 12.6 presents a carbon budget in the format of the 5-year carbon budget periods in the Climate Change Act for NYC, which has been aggregated using the Tyndall Centre tool by combining the seven former LPA's that merged to form NYC.

UK GHG Statistics

12.3.47. The Department for BEIS[21], now known as DESNZ, reports on energy and emissions projections by source, and reports on local and regional GHG emissions. This has allowed the collection of baseline data for the period 2005-2021 for North Yorkshire.

Consultation

12.3.48. The consultation process for the Proposed Development is set out in **Chapter 2 EIA Methodology [EN010140/APP/6.1.2]** of the ES.

12.3.49. The comments provided by the Planning Inspectorate in their EIA Scoping Opinion (**Appendix 2.2 [EN010140/APP/6.3.2.2]** of the ES), and where these are addressed is set out in Table 12.2 below.

12.3.50. Following Statutory Consultation on the PEIR in October 2023, no comments have been received in relation to climate change that require consideration within this ES chapter.

[20] Tyndall Centre for Climate Research (2024). Available at: https://carbonbudget.manchester.ac.uk/reports/ Accessed March 2024

[21] Department for Energy Security & Net Zero (2023). Available from: https://www.gov.uk/government/statistics/uk-local-authority-and-regional-greenhouse-gas-emissions-national-statistics-2005-to-2021. Accessed August 2023

Table 12.2: Response to PINS Scoping Comments

Scoping ID Reference	Topic	Summary of Consultation Response	Response to Consultee: ES
12.6.1	Climate Change – Decommissioning Phase	*'The Scoping Report proposes to scope out an assessment of the decommissioning phase on the basis that there are uncertainties surrounding this phase however, there is no commitment to assess impacts during the decommissioning phase of the development. The Inspectorate would expect to see a Decommissioning Plan, agreed with the Local Authority, secured through the inclusion of an Outline Decommissioning Plan or similar with the Application. The ES should clearly set out if and how impacts to/from climate change are to be assessed for the decommissioning phase.'*	As requested, it has been considered if climate change will have an impact on the decommissioning phase and it has been scoped out of the climate change assessment. An Outline DEMP ('oDEMP') is included in the ES (**Appendix 5.3 [EN010140/APP/6.3.5.3]**) (the final DEMP will be secured via DCO requirement).
12.6.2	Transport emissions during decommissioning phase	*'The Inspectorate is content to scope this matter out on the basis that effects would be no*	Noted, scoped out.

Scoping ID Reference	Topic	Summary of Consultation Response	Response to Consultee: ES
		greater than the construction phase and the decommissioning phase is too far in the future to be able to accurately predict traffic flows and emissions.'	
12.6.3	Provision of renewable energy during construction phase	*'On the provision that the application secures that no energy will be transported to the national grid during construction as proposed, the Inspectorate is content to scope this matter.'*	Noted, scoped out.
12.6.4	Vulnerability to climate change during construction	*'The Inspectorate is content to scope this matter out during construction on the basis that climatic conditions are unlikely to change over the construction period (12 months).'*	It is considered that climatic changes that could lead to likely significant effects are not expected to manifest in this timeframe. A climate resilience assessment during the construction phase of the Proposed Development has therefore been scoped out of this chapter. The same approach has been taken for the decommissioning phase of the Proposed Development.

Limitations and Assumptions

Climate Change Resilience (Adaptation)

12.3.51. The UKCP18 climate change projections are not climate change predictions as they include a degree of uncertainty. As stated in the UKCP18 Science Overview Report[22].

> *'While the global and regional projections of future climate use the latest climate models and are diverse they cannot cover all potential future climate outcomes out to 2100 (or beyond in the case of sea level) …'*

12.3.52. The 21st century projections presented in this report are produced for the RCP climate change scenarios. The results are therefore subject to any inherent limitations of the assumed emissions scenarios including:

> *'The probabilities represent the relative strength of evidence supporting different plausible outcomes for UK climate, based on the climate models, physical insight, observational evidence and statistical methodology used to produce them. However, they may not capture all possible future outcomes, because, for example, some potential influences on future climate are not yet understood well enough to be included in climate models.'*

12.3.53. The assessment of the Proposed Development's direct contributions to climate change, and the resultant resilience of the Proposed Development has been based on the information available at the time of writing. A qualitative appraisal of resilience to climate change is provided for the Proposed Development.

12.3.54. The following receptors identified in other ES chapters and other supporting documents, are considered potentially sensitive to climate change:

- Biodiversity;
- Water Environment;
- Transport;
- Air Quality;
- Noise and Vibration; and

[22] Met Office (Nov 2018, updated March 2019) UKCP18 Science Overview Report. Available at: https://www.metoffice.gov.uk/pub/data/weather/uk/ukcp18/science-reports/UKCP18-Overview-report.pdf Accessed June 2023

- Socio-economics.

Climate Change Mitigation (GHG Emissions)

12.3.55. The assessment of climate change and GHG emissions is based on available best practice information.

12.3.56. The initial modelling of carbon emissions for vehicles during operation is illustrative as real – time carbon emissions associated with the Proposed Development are not available.

12.3.57. There are inherent assumptions and limitations with adopting local carbon budgets for contextualisation. Local carbon budgets are assumed from the UK national carbon budget and local carbon budgets are not legally binding. Furthermore, carbon budgets are across a 5-year period, whereas the construction and operational GHG assessment only compares the effects from emissions for one year within a carbon budget.

12.3.58. Local carbon budgets do not distinguish carbon emissions into different sectors (domestic, transport, industrial and commercial) as is the case in the DESNZ data. Therefore, emissions from construction phase transport, for example, will be compared against the entire NYC carbon budget, as opposed to an allocated transport budget based on transport emission sources.

12.3.59. The assessment of the operational carbon savings from the Proposed Development is based on a number of assumptions, including that all the renewable energy created would go to domestic sources, and that the energy created would only be distributed locally (i.e. within NYC).

12.4. Baseline Conditions

Climate Change Resilience (Adaptation)

Current Climate Conditions

12.4.1. This section summarises current climate conditions for the local area based on historic weather data and information about extreme weather events. The information presented below presents average weather conditions along with exceptional weather occurrences. To maintain relevance to current weather trends the displayed

information has been calculated using data collected over the past two decades. The climate profile is taken from the closest available data source to the Site[23], which is the Topcliffe climate station, approximately 58km north from the Site.

12.4.2. Climatic averages (1991-2020) for the weather station indicate the following:

- Average annual maximum temperature was 13.67°C;
- Warmest month on average was July (mean maximum temperatures of 21.11°C);
- Coldest month on average was December (mean minimum temperature of 0.17°C);
- Average total annual rainfall was 646.93 mm (approximately 18.5% below the District (England East & North East) average);
- Wettest month on average was August (average monthly rainfall of 67.47mm); and
- Driest month on average was March (average monthly rainfall of 40.16mm).

12.4.3. Data on the average annual sunshine hours for the Topcliffe climate station was not available; however, the average annual sunshine hours for the District level (England East & North East) is 1,492.79 hours, which is higher than the annual Regional average of 1,432.90 hours and the national annual average of 1,402.73 hours.

Future Baseline Conditions

Future Climate Conditions (up to 2066)

12.4.4. Climate projections in Table 12.3 show a continuous increase in annual average air temperature over the next 40 years. Annual precipitation is also projected to decrease slightly over this time.

The projections suggest that summers will become warmer and drier, with an expected increase in maximum summer temperatures and overall significant decline in summer precipitation over the lifespan of the Proposed Development. Natural variations may mean that cooler and/or wetter summers will occur.

[23] Available From: https://www.metoffice.gov.uk/research/climate/maps-and-data/uk-climate-averages Accessed June 2023

Table 12.3: 50th Percentile Climate Projections at 25 km grid square 462500, 412500 using baseline 1981-2000 scenario RCP 8.5

Date	Climate Variable 50th Percentile						
	Mean air temperature anomaly* at 1.5 m (Â°C)	Annual Precipitation rate anomaly (%)	Maximum Summer air temperature anomaly at 1.5 m (Â°C)	Average Summer Precipitation rate anomaly (%)	Minimum Winter air temperature anomaly at 1.5 m (Â°C)	Average Winter Precipitation rate anomaly (%)	Total Cloud Anomaly (%)
2023	0.86	1.33	1.07	-6.78	0.75	2.15	-0.62
2038	1.29	0.29	1.65	-10.75	1.19	3.84	-1.39
2050	1.76	-0.80	2.32	-16.34	1.63	5.73	-2.15
2065	2.46	-1.27	3.35	-22.81	2.23	10.03	-3.47

*Anomaly refers to the change compared to the baseline. The projections are not absolute values.

12.4.5. Winters may become milder and wetter, with an overall increase in both minimum winter temperature and winter precipitation. Natural variations may mean that cold and/or dry winters may still occur.

12.4.6. The climate projections also indicate that cloud cover will decrease slightly over the lifespan of the Proposed Development.

12.4.7. The full datasets for the climate projections can be viewed in Appendices 12.4-12.10.

12.4.8. Winds associated with major storm events can be some of the most damaging and disruptive events for the UK with implications for property, power networks, road and rail transport and aviation. Calm periods with little wind, particularly over prolonged periods, can affect air quality whilst winds from a particular direction can be a critical factor in the spread of particulates. Both cases are also examples where a combination of factors such as wind, temperature and precipitation can exacerbate their impacts (e.g. air quality issues tend to be worse under conditions of light winds and higher temperatures.

12.4.9. Changes in wind speeds are not currently available at the regional level and there remains considerable uncertainty in the projections with respect to wind speed; however, there are small changes in projected wind speed (Met Office, 2019). Across the UK, near surface wind speeds are expected to increase in the second half of the 21st century with winter months experiencing more significant impacts of winds (Met

Office, 2019). This is accompanied by an increase in frequency of winter storms over the UK. However, the increase in wind speeds is projected to be modest. There are no compelling trends in storminess as determined by maximum gust speeds from the UK wind network over the last four decades[24].

Climate Change Mitigation (GHG Emissions)

12.4.10. The historic GHG emissions from NYC are provided in Table 12.4 below. A breakdown of GHG emissions from the four main sources for NYC are provided form 2005-2021, utilising the most recent dataset.

12.4.11. Overall, carbon emissions have steadily declined in the period 2005 to 2021. There has been a downward trend in the contribution of each of the four main sources of emissions with commercial emissions seeing the greatest percentage decrease of approximately 75% over the 15-year period.

[24] Royal Meteorological Society (July 2018): International Journal of Climatology; State of the UK Climate 2017. Available online https://rmets.onlinelibrary.wiley.com/doi/epdf/10.1002/joc.5798. Accessed June 2023

Table 12.4 GHG Emissions within NYC 2005-2021

Year	Industry Total (kt CO_2e)	Commercial Total (kt CO_2e)	Domestic Total (kt CO_2e)	Transport Total (kt CO_2e)	Grand Total* (ktCO_2e)	Population ('000s, mid-year estimate)	Per Capita Emissions (tCO_2e)
2005	1,257.0	613.8	1,791.3	2,160.0	8,561.0	584.0	14.7
2006	1,225.8	646.5	1,799.2	2,182.7	8,532.1	587.3	14.5
2007	1,192.4	625.0	1,720.5	2,228.4	8,299.0	591.2	14.0
2008	1,059.2	628.1	1,728.8	2,083.5	7,932.7	595.0	13.3
2009	979.2	564.3	1,605.4	2,002.6	7,616.4	596.4	12.8
2010	1,079.7	576.2	1,739.4	1,999.6	7,852.9	599.0	13.1
2011	965.6	547.4	1,523.2	1,961.3	7,360.3	601.2	12.2
2012	991.5	585.4	1,612.6	1,921.4	7,508.4	602.3	12.5
2013	1,002.3	550.0	1,572.9	1,945.2	7,353.8	602.7	12.2
2014	938.7	469.6	1,346.6	1,970.3	6,980.6	604.1	11.6
2015	881.1	419.5	1,306.5	2,021.4	6,927.8	605.9	11.4
2016	864.6	362.0	1,236.7	2,079.8	6,781.4	612.3	11.1
2017	839.4	267.4	1,173.0	2,084.4	6,633.9	614.0	10.8
2018	920.1	180.0	1,157.0	2,109.7	6,517.1	615.1	10.6
2019	891.0	157.3	1,119.3	2,094.6	6,364.6	616.5	10.3
2020	899.2	123.7	1,084.2	1,731.6	5,856.9	618.6	9.5
2021	1,078.0	150.1	1,120.4	1,937.8	6,391.6	618.8	10.3

*includes sectors not shown in the table (Public Sector, Land Use and Land Use Change and Forestry, Agriculture and Waste Management)

UK and Local Carbon Budgets

12.4.12. Table 12.5 below shows the current adopted Carbon Budgets up to 2037. This sets the maximum amount of GHG that the UK can emit.

Table 12.5: Relevant UK Carbon Budgets

Carbon Budget	Total Budget ($MtCO_2e$)
3rd (2018-2022)	2,544
4th (2023-2027)	1,950
5th (2028-2032)	1,725
6th (2033-2037)	965

12.4.13. Table 12.6 below shows the local carbon budgets for NYC up to 2037.

Table 12.6: Relevant NYC Carbon Budgets

Carbon Budget	Total Budget ($MtCO_2e$)
3rd (2018-2022)	19.3
4th (2023-2027)	9.6
5th (2028-2032)	4.6
6th (2033-2037)	2.2

12.5. Likely Significant Effects

Embedded Measures

Flood Risk

12.5.1. The design of the equipment and floodplain compensation has been finalised following the results of the site-specific flood modelling and the **Flood Risk Assessment [EN010140/APP/7.6]** in support of the DCO application. In addition to level for level floodplain compensation, calculations demonstrating the effect of the flood defense bund earthworks has been assessed as part of the site-specific flood model.

12.5.2. Interception swales will be located at low points across the Site to intercept extreme flows which may already run off-Site. The design of the swales is to intercept runoff and encourage depression storage within the features, promoting interception losses by infiltration and evapotranspiration.

12.5.3. The interception swales will enhance the quality of runoff and contribute to the

sedimentation and removal of fine sediments from overland flows. Flood risk measures outlined above will be secured by detailed design.

Measures to be Adopted by the Project

Climate Change Resilience (Adaptation)

Operational Phase

Infrastructure

12.5.4. Design specifications of infrastructure including solar PV panels, the Substation, battery energy storage system ('BESS'), cabling etc. will be confirmed through DCO requirements.

12.5.5. The operation of the BESS will be managed in line with the BESS Safety Management Plan (**Appendix 3.1 [EN010140/APP/6.3.3.1]** of the ES). The final BESS Safety Management Plan will be secured by a DCO requirement.

Future Site Users

12.5.6. As mentioned in Table 12.6, it is anticipated that on-Site workers during operation will adhere to appropriate health and safety measures when working on-Site at all times. Furthermore, site visits for maintenance or landscaping purposes can be re-scheduled to prevent site visits during periods of climatic extremes, such as heatwaves or elevated flood risk. These measures will be set out in the detailed OEMP, to be secured by a DCO requirement.

Natural Environment (Ecology, Landscaping and Planting)

12.5.7. It is anticipated that the future management of the Proposed Development will be carried out in compliance with a Landscape and Environmental Management Plan ('LEMP') to secure the successful long-term establishment of proposed planting. An Outline LEMP ('oLEMP') has been included in this ES (**Appendix 7.7 [EN010140/APP/6.3.7.7]**), submitted in support of the DCO application, with the final LEMP to be secured via a DCO requirement.

12.5.8. The oLEMP outlines that proposed native woodland planting is composed of a mix of locally characteristic trees and shrubs from a broad palette, to provide greater diversity and therefore better capacity to adapt to changing climatic conditions, which

are projected in Table 12.3, as well as providing both under-storey and canopy planting. The species selection has been informed by tree survey information and specialist ecologist input.

12.5.9. During the Proposed Development's operational phase, created and existing semi-natural habitats within the Site will be subject to long-term management by suitably qualified/ experienced professionals. The management of these semi-natural habitats will be informed by the final LEMP. The LEMP will ensure proposed planting and landscaping is resilient to future climatic changes such as periods of low rainfall and drought, heatwaves, and flood risk.

Climate Change Mitigation (GHG Emissions)

Construction Phase

12.5.10. An Outline Construction Environmental Management Plan ('oCEMP') (refer to **Appendix 5.1 [EN010140/APP/6.3.5.1]**) and Outline Construction Traffic Management Plan ('oCTMP') (**Appendix 5.2 [EN010140/APP/6.3.5.2]**) are included within this ES. Final, detailed versions would be subject to approval by the relevant authority and secured by DCO requirement. The documents detail the measures to be adopted by the project to reduce environmental impacts.

12.5.11. With respect to reducing the number of vehicle movements and subsequent emissions, the oCTMP sets out measures to be adopted by the project including construction access arrangements, construction vehicle routing, construction vehicle trip generation, and the management/ mitigation measures. It also summarises the requirements for vehicles transporting abnormal loads (for elements such as transformers).

Operational Phase

12.5.12. There will be ongoing maintenance throughout the Proposed Development's operational lifespan to ensure the solar PV panels are cleaned and to maintain vegetation to prevent shading of the solar PV panels, ensuring efficiency of energy generation.

Assessment of Effects

Climate Change Resilience (Adaptation)

Operational Phase

12.5.13. Table 12.7 below shows the climate change risk assessment for the Proposed Development with embedded mitigation measures accounted for.

Table 12.7: Climate Change Risk Assessment

Climate Conditions/ Hazard	Receptor	Receptor Sensitivity	Potential Impact (with embedded mitigation and measures to be adopted by the project)	Significance
Long Term Changes to Climate Norms	Infrastructure	High (as stated in paragraph 12.3.17)	Infrastructure may require more maintenance and repair as changes to climatic norms may cause increased stress on, for example, below ground cables and pipes. This will be managed at the detailed design stage, where risk assessments will be undertaken to manage risks from future climate change in accordance with nationally accepted standards and guidance. Table 12.3 above shows that over the lifespan of the Proposed Development, cloud cover may slightly decrease, which would improve the operational generating potential of the Proposed Development.	Negligible
	Future Users of Site (e.g. workers)		The climate is expected to become drier and hotter in summers and wetter and milder in winters in the region where the Site is located. Workers may therefore be at more risk during periods of climatic extremes; however, it is anticipated that all health & safety procedures would be followed when people are working on-Site implemented via the CEMP to be secured through DCO requirement.	Negligible
	The Natural Environment (Ecology, Landscaping and Planting)		Within the Site there are three priority habitats, these are deciduous woodland, hedgerows, and ponds. Furthermore, there are two habitats within the Site that are listed in the Local Biodiversity Action Plan, these are arable farmland and ditches. Habitats within the Site predominantly comprise of arable fields that are bounded by a combination of hedgerows, tree lines, grassland field margins, woodlands, and ditches. One dry pond is located within the Site. A range of species have also been identified within the Site including breeding birds including, corn bunting, greenfinch, house martin, and house sparrow. Bats and reptile species. The 2km area surrounding the Site supports a	Minor Adverse

Climate Conditions/ Hazard	Receptor	Receptor Sensitivity	Potential Impact (with embedded mitigation and measures to be adopted by the project)	Significance
			range of other species including invertebrates, non-breeding birds, commuting and foraging bats, water voles, otters, amphibians (Great Crested Newt, common toad, common frog, and smooth newt), and brown hare. These habitats and species can be considered as sensitive to climate change. A range of mitigation measures are embedded into the design of the Proposed Development including: • Retaining identified higher value habitat features such as hedgerows, ditches, and woodlands. • Focusing the large majority of the built development proposals within lower ecological value agricultural land. • The removal of land from arable production will lead to a reduction (or complete removal) of agricultural chemical overspray and drift where this currently occurs on the Site. Leading to improved conditions for terrestrial and aquatic invertebrates, which in turn will benefit dependent species, such as foraging bats or some farmland birds. • Grid connection works will largely comprise of minor excavation impacts to existing arable and developed land (existing tracks, roads and Drax grid connection compound). A limited amount of semi-natural habitats (mainly associated with trenching works through modified grassland within the Drax Golf Course) will result in minor short-term disturbance. • Hedgerow removal will be minimised as far as possible. Access tracks for the Proposed Development will utilise upgraded existing ditch crossing points or new culverts will be required. Existing gaps in hedgerows and existing field entrance gates etc. • Sensitive, or high value ecological features outside the Site	

Climate Conditions/ Hazard	Receptor	Receptor Sensitivity	Potential Impact (with embedded mitigation and measures to be adopted by the project)	Significance
			have been protected as part of the design which sets in place buffer zones and other safeguarding measures. Notwithstanding the mitigation measures outlined above, landscaping, ecology and planting will require management during periods of climatic extremes to avoid stress or failure, either from intense heat or rainfall.	
	Flood Risk		As shown in Table 12.3, the average annual precipitation is anticipated to decrease slightly over the lifespan of the Proposed Development. The risk of flooding from long term climatic changes is therefore considered to be negligible.	Negligible
Heatwaves	Infrastructure	High (as stated in paragraph 12.3.17)	Infrastructure may require more maintenance and repair as changes to climatic norms may cause increased stress on, for example, below ground cables and pipes. This will be managed at the detailed design stage, where risk assessments will be undertaken to manage risks from future climate change in accordance with nationally accepted standards and guidance. The operation of the BESS will be mitigated by the implementation of the BESS Safety Management Plan (refer to **Appendix 3.1 [EN010140/APP/6.3.3.1]** of the ES). According to Solar Energy UK[25], solar panel performance falls by 0.34 percentage points for every degree that the temperature rises above 25C. Therefore, the generating capacity of the Proposed Development may be slightly affected during periods of heatwaves. However, as shown in Table 12.3, cloud cover is anticipated to slightly decrease over the Proposed Development's lifespan, therefore the longer days and clearer skies may mean solar power generates much more electricity during the summer.	Negligible
	Future Users of		As shown in Table 12.3, summer temperatures are anticipated to	Negligible

[25] Solar Energy UK. Fact check: Solar power works best in the summer (2023) Available from: https://solarenergyuk.org/news/fact-check-solar-power-works-best-in-the-summer/ Accessed June 2023

Climate Conditions/ Hazard	Receptor	Receptor Sensitivity	Potential Impact (with embedded mitigation and measures to be adopted by the project)	Significance
	Site (e.g. workers)		increase, and heatwaves will become more frequent placing workers at potential risk. The Proposed Development's green and blue infrastructure will provide a level of thermal cooling during heatwaves. Site workers will be on-site infrequently, with minimal visits for general maintenance (5 visits per month). It is anticipated that site workers/operators would have health & safety procedure in place to avoid working in extreme conditions. Furthermore, site visits during periods of extreme heatwave's can be easily avoided and re-scheduled.	
	The Natural Environment (Ecology, Landscaping and Planting)		New and existing plant species will be increasingly vulnerable to extreme high temperatures throughout the lifespan of the Proposed Development.	Minor Adverse
Low Rainfall and Drought	The Natural Environment (Ecology, Landscaping and Planting)	High (as stated in paragaph12.3.17)	Periods of prolonged low rainfall and drought are projected to become more frequent, as suggested in Table 12.3 with rising summer temperatures and declining summer rainfall over the next 40 years. These conditions will put more stress on new and existing plant species throughout the Site, which, without management, will be more likely to fail. As outlined in Section 12.5.7-8, planting will be managed through a LEMP, to be secured by DCO requirement to ensure that planting is resilient to climate change and that it is managed appropriately.	Minor Adverse
Heavy Rainfall and Flooding	Infrastructure	High (as stated in paragraph 12.3.17)	As shown on Figure 2 of the **Flood Risk Assessment [EN010140/APP/7.6**], the Site is predominantly located within Flood Zones 2 and 3. Flood Zone 3 is defined as being at the highest risk of flooding from fluvial sources (>1% chance in any given year), whereas Flood Zone 2 has a 0.1-1% chance of flooding in any given year. The **FRA [EN010140/APP/7.7**] states	Negligible – Moderate Beneficial

Climate Conditions/ Hazard	Receptor	Receptor Sensitivity	Potential Impact (with embedded mitigation and measures to be adopted by the project)	Significance
			that floodwaters spread out over the floodplain and flood depths and extent vary across the Site. The Site has varying risk of flooding from other sources. Surface water flood risk is considered to range from High to Very Low, with the majority of the Site being at very low risk with areas of elevated risk associated with isolated low points and the route of on-site ordinary watercourses where surface waters could collect. The risk of groundwater flooding ranges from High to Very Low. The risk of flooding from overwhelmed sewers and artificial sources (such as reservoirs) is considered to be Low to Very Low. Infrastructure throughout the Site (solar PV panels, BESS, and Substation) is therefore considered to be at risk from flooding of various sources on the Site. A range of embedded mitigation measures are incorporated for flood resilience and resistance of site equipment, these include: • Ancillary control equipment, BESS Facility and 132 kilovolt ('kV') Substation will be preferentially located in areas of very low surface water flood risk. • Non-flood sensitive infrastructure (solar PV arrays) will be designed to be resistant and resilient to flood waters in the combined fluvial and tidal design flood event. • During times of elevated tidal and fluvial flood risk, and when an Environment Agency flood alert is issued, solar arrays within the areas of elevated flood risk will be rotated to the horizontal position ('the stow position') to ensure the solar PV panels are raised above the flood level. This action will be performed remotely, and no operatives will be required on-site during periods of elevated flood risk. • It is proposed to provide a minimum of a 0.3m freeboard between the combined fluvial and tidal design flood level and	

Climate Conditions/ Hazard	Receptor	Receptor Sensitivity	Potential Impact (with embedded mitigation and measures to be adopted by the project)	Significance
			the stow position of the solar PV array. • Solar PV panel supports in flood risk areas will be securely piled into the ground. • The proposed earth flood defense bunds will be raised at least +0.6m above the combined fluvial and tidal design flood level to protect the equipment from inundation. • The BESS will be raised 0.3m above ground which provides additional protection from the ingress of surface water within the bunded area. These embedded mitigation measures reduce the risk of flooding to infrastructure resulting in a Negligible – Moderate Beneficial effect.	
	Future Users of Site (e.g. workers)		Solar farm developments are not 'occupied', and only occasional maintenance visits are required for landscape maintenance and equipment repairs. Maintenance visits will be scheduled to avoid periods of elevated flood risk. No maintenance operatives will be on-site during periods of elevated flood risk and access to the Site will be restricted.	Negligible
	The Natural Environment (Ecology, Landscaping and Planting)		Elevated flood risk on-Site may result in potential significant effects on ecological receptors through flooding from various sources and pollution. There is potential for polluting substances to have a detrimental effect on the water quality of the surface water runoff and consequently the receiving water body. These substances include spillages from maintenance vehicles; spillages from on-Site plant, such as transformers; and sediment introduced to the Site from vehicle movement. Despite the Site having direct hydrological connectivity to the Humber Estuary Ramsar site, Special Protection Area, Special Area of Conservation and Site of Special Scientific Interest from the River Ouse. The River Ouse and Lendall Drain/Common Drain	Minor Adverse - Negligible

Climate Conditions/ Hazard	Receptor	Receptor Sensitivity	Potential Impact (with embedded mitigation and measures to be adopted by the project)	Significance
			to the north of the Site. Measures to be adopted by the project via a CEMP, secured through DCO requirement, will prevent pollution to ecological receptors during flooding and therefore avoid significant environmental effects on these receptors. Measures include: • Any relevant materials including oil filled plant in the 132kV Substation will be stored in accordance with the appropriate pollution prevention principles to reduce the likelihood of spillage and with an impermeable base and suitable bunding to prevent discharge in the event of spillage and leakage. • Protective earth flood defence bunds surrounding the ancillary equipment, BESS Facility and 132kV substation in areas of elevated flood risk are proposed so that the combined fluvial and tidal design flood level does not affect the on-Site control equipment. • The land will be sown with the appropriate seed mix upon construction of the solar PV panels to reduce the risk of soil erosion, enhance potential for runoff 'interception losses' (from infiltration / evapotranspiration) and reduce the overland flows. The risk of an accidental pollution incident can never be completely removed but the risk can be minimised to an acceptable level and the potential effects identified are not significant.	
	Flood Risk		As highlighted above, embedded mitigation measures ensure that all control and sensitive equipment including solar panels are elevated above ground level or protected by a suitably designed earth flood defense bund and would be unaffected by shallow overland flows, emergent groundwater, or combined fluvial and tidal flooding.	Negligible – Moderate Beneficial

Embedded Mitigation and measures to be adopted by the project

12.5.14. Embedded mitigation and measures to be adopted by the project in relation to climate change resilience and adaptation for the Proposed Development's operational phase is set out in paragraphs 12.5.1-12.5.9 and Table 12.7 above.

Climate Change Mitigation (GHG Emissions)

Construction Vehicle Emissions

12.5.15. The increase in road traffic on the local road network attributable to the Proposed Development during the 12-month construction phase is set out in Table 12.8.

Table 12.8: Construction Traffic Flows

Variable	2022 Base		2027 Base		2027 Base + Development	
24-hour Average Annual Daily Traffic (AADT) of the Proposed Development*	Flow (vehicles/ day – AADT)	83,913	Flow (vehicles/day – AADT)	86,858	Flow (vehicles/day – AADT)	87,806
Link Length	9.2km					
Road Type	England – Not London					
Average Vehicle Speed**	Posted Speed Limits					
*Trips are two way **Based on the posted speed limit of the road link, provided by the Project Transport Consultant, Transport Planning Associates						

12.5.16. The Proposed Development will result in an increase in vehicle movements on the local road network. As shown in Table 12.8 above, the AADT traffic flow associated with the 2022 baseline scenario is 83,913 vehicle trips per day. The 2027 Development scenario (Baseline Growth + the Proposed Development) is 87,806 vehicle trips per day; therefore, resulting in an uplift of 3,893 vehicle trips per day.

12.5.17. Notwithstanding paragraph 12.5.16 above, this uplift represents the wider road network that has been assessed as part of **Chapter 10 Transport and Access [EN010140/APP/6.1.10]** of the ES. The daily peak of construction traffic flows for the Proposed Development, as outlined in Table 10.14 of **Chapter 10 Transport and Access [EN010140/APP/6.1.10]**, is a total of 210 two-way trips. This includes for the provision of shuttle buses to transport construction workers to and from the Site. This is intended for non-local workers, who will stay in local accommodation and be

transported to the Site. It can also be utilised by other local workers as appropriate. These measures will contribute to a reduction of construction vehicular emissions by reducing the volume of private car journeys to and from the Site.

12.5.18. In total, the peak construction traffic flows represent 150.01 tCO_2/year of vehicular emissions locally. This accounts for 0.000007% of the UK's 4th carbon budget (1,950 $MtCO_2e$). Globally, the increase in emissions is not considered significant. Furthermore, this accounts for 0.0016% of NYC's 4th carbon budget. The timescales for emissions to occur are fixed to the construction period (12 months) and are therefore not permanent.

12.5.19. In line with IEMA GHG Guidance and the significance criteria displayed in Table 12.1, the uplift in vehicular movements and emissions as a result of construction of the Proposed Development would result in a minor adverse effect, which is **not significant**.

Operational Phase

12.5.20. When operational, the Proposed Development will generate electricity from solar radiation and export this to the National Grid. In line with the NPS EN-3, the Proposed Development is scaled to maximise its generating efficiency. The Proposed Development will have a maximum export capacity of 190MW. It should be noted that due to the continual evolution of solar PV panel technology, the panels installed as part of the Proposed Development at the point of construction may have a higher power rating than panels currently available in the market. As such, the calculations presented herein represent a conservative assessment of impact based on the export capacity rather than an installed capacity.

12.5.21. At times when the installed capacity of solar PV generates energy in addition to this export capacity, electricity will be stored within containerised energy storage solutions. There is also potential for energy to be imported from the grid and stored on the Site, for use in the future when energy demand rises.

12.5.22. The generation of electricity from the Proposed Development will displace the generation of electricity from other conventional power sources, including fossil-fuel reliant sources. In 2023, the average emission of carbon dioxide equivalent was

estimated as 0.207074 $kgCO_2e/kWh$[26]. Using a load factor of 10.6%, if these emissions were avoided as a result of the Proposed Development, then a saving of approximately 36,558 tCO_2e per year would occur. This is a total saving of 1,462,334 tCO_2e over the Proposed Development lifespan.

12.5.23. In the context of NYC's total domestic emissions for 2021 (1,120.4 $ktCO_2e$), this saving per year would constitute a 3.3% reduction as a result of renewable energy created from the Proposed Development. In line with the IEMA GHG Guidance set out in Table 12.1, this would, at the local level, comprise a major beneficial effect that is **significant**.

12.5.24. In the context of the UK's Sixth Carbon Budget (965$MtCO_2e$), this saving would constitute a 0.02% reduction over the five-year allowance. Carbon savings outlined above constitute a 1.66% reduction in the context of NYC's 6th carbon budget (2.2 $MtCO_2e$). The Proposed Development is determined to have a Minor Beneficial effect at the national level and is in keeping with the trajectory to net zero by 2050.

12.6. Additional Mitigation Measures

Climate Change Resilience (Adaptation)

Operational Phase

12.6.1. There are no additional mitigation measures proposed in relation to climate resilience over and above embedded mitigation measures and measures which are to be adopted by the project.

Climate Change Mitigation (GHG Emissions)

Construction Phase

12.6.2. There are no additional mitigation measures proposed in relation to construction phase climate change mitigation (GHG emissions) over and above embedded mitigation measures and measures which are to be adopted by the project.

[26] Department for Energy Security and Net Zero and Department for Business, Energy & Industrial Strategy (2023) Available from: https://www.gov.uk/government/publications/greenhouse-gas-reporting-conversion-factors-2023 Accessed August 2023

Operational Phase

12.6.3. There are no additional mitigation measures proposed in relation to operational phase climate change mitigation (GHG emissions) over and above embedded mitigation measures and measures which are to be adopted by the project.

12.7. Residual Effects

Construction Phase

Climate Change Mitigation (GHG Emissions)

12.7.1. In accordance with the IEMA GHG Guidance outlined in Table 12.1, the anticipated residual effects have been classified. The measures to be adopted by the project outlined in paragraphs 12.5.10 to 12.5.11 has the potential to further minimise carbon emissions arising from the Proposed Development during the construction phase.

12.7.2. With regards to construction vehicle emissions, through the implementation of measures to be adopted by the project within the oCEMP and oCTMP, to be expanded upon through the full CEMP and CTMP, which will be secured by DCO requirements, a minor adverse effect is expected, which is **not significant**.

Operational Phase

Climate Change Resilience (Adaptation)

Infrastructure

12.7.3. The residual effect on infrastructure due to climate change is considered negligible and **not significant** with respect to long term changes to climatic norms and heatwaves. Due to flood mitigation embedded into the Proposed Development, the residual effect on resilience to flood risk is considered negligible from sources of flood risk such as groundwater and reservoirs to moderate beneficial from surface water flood risk and the drainage regime, which is **significant.**

Future Site Users

12.7.4. Following the implementation of embedded mitigation measures and measures to be adopted by the project outlined in section 12.5 ‘Likely Significant Effects’ of the chapter, the residual effects on future site users due to climate change is considered

to be negligible and **not significant**.

The Natural Environment

12.7.5. Following long-term management and maintenance of planting, landscaping and ecology, the residual effect on the natural environment from climatic changes over the Proposed Development's modelled operational lifespan is considered to be negligible and **not significant**.

12.7.6. The residual effect of environmental quality of surface water on-Site and polluting substances on surface water quality and the receiving waterbody (i.e. River Aire, River Ouse and Humber Estuary and its designations) is considered to be negligible-minor adverse and **not significant**.

Flood Risk

12.7.7. The residual effect of flood risk is considered to be moderate beneficial and **significant** with respect to surface water flood risk and the drainage regime.

12.7.8. The residual effect of flood risk from other sources is considered to be negligible and **not significant**.

Climate Change Mitigation (GHG Emissions)

12.7.9. The Proposed Development will result in a major beneficial effect with respect to the offset of carbon emissions through the generation of renewable electricity at a local level within NYC. This is a **significant** beneficial effect.

12.7.10. At the national level, the Proposed Development will result in a minor beneficial effect with respect to the offset of carbon emissions, which is **not significant**.

12.8. Cumulative Effects

12.8.1. The cumulative impact of carbon emissions arising from global human activity is high. This is due to the nature of climate change as a global, cumulative problem.

12.8.2. There is a range of cumulative schemes outlined in **Chapter 15 Cumulative Effects [EN010140/APP/6.1.15]** of the ES, including employment uses, industrial uses and renewable energy generation projects.

Construction Phase

Climate Change Mitigation (GHG Emissions)

12.8.3. Construction of the cumulative schemes is likely to result in GHG emissions owing to the scale and type of these schemes (energy, industrial and employment uses). It is assumed that all these schemes will be managed in accordance with a detailed CEMP and detailed CTMP, and the likelihood of cumulative schemes being constructed concurrently is low. In line with Table 12.1, it is assumed that all cumulative schemes will adhere to best practice and policy requirements, in line with a net zero trajectory, therefore the cumulative effect will likely be minor adverse and **not significant** at the local level.

Operational Phase

Climate Change Resilience

12.8.4. It is assumed that the cumulative schemes identified would achieve policy compliance with regards to facets of climate resilience, such as biodiversity net gain ('BNG') and flood risk modelling accounting for climate change projections. Therefore, negligible (**not significant**) cumulative resilience issues are anticipated with the Proposed Development's operational phase.

Climate Change Mitigation (GHG Emissions)

12.8.5. Of the 17 cumulative schemes identified, nine (including two Nationally Significant Infrastructure Projects, one 400MW solar scheme and one Bioenergy with Carbon Capture and Storage scheme) are directly related to the generation or storage of renewable energy. It is therefore likely that the operation of the energy related cumulative schemes would contribute to a reduction in carbon emissions commensurate to the scale of that development; therefore, in combination with the Proposed Development, when balanced out with the operational emissions (traffic and process emissions) that would be associated with the industrial and employment schemes, there is likely to be a minor beneficial (**not significant**) effect at the local and national level with respect to climate change mitigation.

12.9. Summary

12.9.1. To reflect the requirements of the EIA Regulations, an assessment has been

undertaken of the potential effects of the Proposed Development on climate change. This includes the effects of the Proposed Development on climate change (climate change mitigation) and the vulnerability of the Proposed Development to climate change (climate change adaptation/resilience).

12.9.2. The assessment has been undertaken in accordance with published guidance on considering climate change in EIA and consequently reviews how climate change has been considered at the current stages of project progression and assessment, as well as how future assessment will be conducted.

12.9.3. Construction of the Proposed Development is likely to result in GHG emissions from direct and indirect sources. This includes emissions from construction vehicles used during the phase. The assessment of GHG emissions from construction vehicle movements is anticipated to be minor adverse and not significant, following implementation of mitigation measures to be adopted by the project, such as the detailed CTMP.

12.9.4. During the operation of the Proposed Development, there will be a carbon saving resulting from the export of renewable electricity to the grid, in lieu of the current energy mix, which include fossil fuels. This is anticipated to be a carbon saving of approximately 36,558 tCO_2e per year. This is a total saving of 1,462,334 tCO_2e over the Proposed Development lifespan. This is a major beneficial effect at the local level, which is significant and a minor beneficial effect at the national level, which is not significant.

12.9.5. UKCP18 Projections for the 25km grid square where the Site is located project that summers are going to get drier and hotter, whereas winters will get wetter and milder. The Proposed Development is host to receptors of varying sensitivity to climate change, such as future users, infrastructure, the natural environment, and flood risk.

12.9.6. The Proposed Development is considered to be resilient to projected climate change. This is particularly with the proposed surface water drainage regime as set out in the Drainage Strategy. Following embedded mitigation measures for flooding, residual effects from climatic changes on infrastructure and flood risk is considered to be moderate beneficial and significant. Effects on future site users and the natural environment are not significant.

12.9.7. Table 12.9 contains a summary of the assessment of the likely significant effects of

the Proposed Development.

Table 12.9: Table of Significance – Climate Change

Potential Effect	Nature of Effect*	Significance **	Secondary Mitigation/ Enhancement Measures	Geographical Importance ***						Residual Effects ****
				I	UK	E	R	UA	L	
Construction Phase (Climate Change Mitigation)										
Effects resulting from the Proposed Development's construction vehicle emissions	Permanent	Minor Adverse (Not Significant)	Not required further to embedded mitigation and those adopted by the project	*						Minor Adverse (**Not Significant**)
Operational Phase (Climate Change Mitigation)										
Effects resulting from the Proposed Development's provision of renewable energy to the grid	Permanent	Major Beneficial (Significant)	N/A	*						Major Beneficial (local level) (**Significant**) Minor Beneficial (national level) (**Not Significant**)
Climate Change Resilience										
Effects of climate change on infrastructure	Temporary	Negligible – Moderate Beneficial	Not required further to embedded mitigation and those adopted by the project						*	Negligible – Moderate Beneficial (**Significant**)
Effects of climate change on future site users	Temporary	Negligible	Not required further to embedded mitigation and those adopted by the project						*	Negligible (**Not Significant**)
Effects of climate change on the natural environment (Ecology,	Temporary	Negligible – Minor Adverse	Not required further to embedded mitigation and those adopted by						*	Negligible – Minor Adverse (**Not Significant**)

Potential Effect	Nature of Effect*	Significance **	Secondary Mitigation/ Enhancement Measures	Geographical Importance ***						Residual Effects ****
				I	UK	E	R	UA	L	
Landscaping and Planting)			the project							
Effects of climate change on flood risk	Temporary	Negligible – Moderate Beneficial	Not required further to embedded mitigation and those adopted by the project						*	Moderate Beneficial (surface water drainage regime) (**Significant**) Negligible (all other flood sources) (**Not Significant**)
Decommissioning Phase										
N/A										
Cumulative Effects										
Construction Phase										
Emissions associated with construction	Permanent	Moderate Adverse (Significant)	Not required further to embedded mitigation and those adopted by the project	*						Minor Adverse (**Not Significant**)
Operational Phase										
Climate Change Mitigation (GHG Emissions)	Permanent	Moderate Beneficial (Local Level) Minor Beneficial (National	N/A	*						Minor Beneficial (Local Level (**Not Significant**) Minor Beneficial (National Level)

Potential Effect	**Nature of Effect***	**Significance ****	**Secondary Mitigation/ Enhancement Measures**	**Geographical Importance *****						**Residual Effects ********
				I	UK	E	R	UA	L	
		Level)								(**Not Significant**)
Climate Change Resilience	Temporary	Negligible	Other cumulative schemes to achieve policy compliance with regards to facets of climate resilience, such as BNG and flood risk						*	Negligible (**Not Significant**)
Nature of Effect * Significance** Geographical Importance *** Residual Effects ****	Permanent or Temporary Short-term, Medium-term, or Long-term Major/ Moderate/ Minor/ Negligible Beneficial/ Adverse I = International; UK = United Kingdom; E = England; R = Regional; UA = Unitary Authority; L = Local Major / Moderate / Minor / Negligible Beneficial / Adverse									