



GA2, Land north of Great Ashby Environmental Statement

Chapter 10: Climate Change and GHG Emissions

Iceni Projects on behalf of
Picture Estates Limited

January 2026

Iceni Projects Ltd.

Da Vinci House, 44 Saffron Hill, London, ECN1 8FH

T: 020 3640 8508 **F:** 020 3435 4228 **W:** iceniprojects.com

10. CLIMATE CHANGE AND GHG EMISSIONS

Introduction

- 10.1 This chapter of the ES has been prepared by Icen Projects and presents an assessment of the likely significant effects of the Proposed Development with respect to climate change and greenhouse gas (GHG) emissions. Mitigation measures are identified, where appropriate, to avoid, reduce or offset any significant adverse effects identified and/or enhance likely beneficial effects. Taking into account the mitigation measures, the nature and significance of the likely residual effects are reported.
- 10.2 The scope of this chapter includes the following:
- The **Greenhouse Gas (GHG) Emissions assessment** focuses on the direct and indirect release of GHGs during construction works. The GHG assessment also estimates the GHG emissions associated with the operation of the Proposed Development once it is completed, taking a lifecycle approach. The numerous mitigation and specific design measures to be embedded within the Proposed Development to minimise its GHG footprint are also presented. This section of the chapter has been prepared in line with the Institute of Sustainability and Environment Professionals (ISEP) Guidance 'Environmental Impact Assessment Guide to Assessing Greenhouse Gas Emissions and Evaluating their Significance' (2022)ⁱ.
 - The **Climate Change Resilience assessment** considers the ability of the Proposed Development to operate as intended when accounting for the anticipated effects of projected climate change, including associated weather effects. This section of the chapter has been prepared in line with the ISEP Guidance 'Environmental Impact Assessment Guide to Climate Change Resilience and Adaption' (2020)ⁱⁱ.

Competence

- 10.3 For a summary of the competency of the author of this chapter, please refer to **Appendix 1.6**.

Legislation and Policy Context

Legislation Context

- 10.4 The following legislation is relevant to the Proposed Development:
- Climate Change Act (2008)ⁱⁱⁱ;
 - The Paris Agreement (2015)^{iv}; and
 - Environment Act (2021)^v.

National Planning Policy

10.5 The following national planning policy is relevant to the Proposed Development:

- National Planning Policy Framework (2019, updated 2021, 2023, 2024 and 2025)^{vi}; and
- Planning Practice Guidance (PPG)^{vii}.

Regional Planning Policy

10.6 The following regional planning policies are relevant to the Proposed Development:

- Sustainable Hertfordshire Strategy (2022, revised 2023)^{viii}; and
- Hertfordshire Energy Strategy^{ix}.

Local Planning Policy

10.7 The following local planning policies are relevant to the Proposed Development

- North Hertfordshire Local Plan 2011 – 2031 (2022)^x.
 - Policy SP1: Sustainable development in North Hertfordshire;
 - Policy SP6: Sustainable transport;
 - Policy SP9: Design and Sustainability;
 - Policy SP11: Natural resources and sustainability;
 - Policy SP12: Green infrastructure, landscape and biodiversity;
 - Policy D1: Sustainable design;
 - Policy D4: Air quality;
 - Policy NE1: Strategic green infrastructure;
 - Policy NE4: Biodiversity and geological sites;
 - Policy NE7: Reducing flood risk;
 - Policy NE8: Sustainable drainage systems;
 - Policy NE9: Water quality and environment; and
 - Policy NE10: Water conservation and wastewater infrastructure.
- North Hertfordshire Sustainability Supplementary Planning Document (2024)^{xi}.

Guidance

10.8 The following guidance is relevant to the Proposed Development:

- Royal Institute of Chartered Surveyors (RICS) Professional Standards and Guidance: Whole Life Carbon Assessment for the Built Environment (2017, updated 2023)^{xii};

- The Sixth Carbon Budget (2020)^{xiii};
- The Seventh Carbon Budget: Advice for the UK Government (2025)^{xiv};
- UK Greenhouse Gas Statistics (2025)^{xv,xvi};
- ISEP Environmental Impact Assessment Guide to Assessing Greenhouse Gas Emissions and Evaluating their Significance (2022); and
- ISEP Environmental Impact Assessment Guide to Climate Change Resilience and Adaption (2020).

Assessment Methodology and Significance Criteria

- 10.9 This section presents the methodology used to assess the potential effects of the Proposed Development in relation to climate change and greenhouse gases.

Consultation

- 10.10 **Table 10.1** presents a summary of the comments raised in the Council's EIA Scoping Opinion and other discussions with relevant consultees with respect to climate change and GHG emissions.

Table 10.1 Summary of Comments Raised in the Scoping Opinion

Consultee	Comment	Response
North Hertfordshire District Council	Natural England were consulted and provided a response. With regards to Climate Change this states: “The ES should identify how the development affects the ability of the natural environment (including habitats, species and natural processes) to adapt to climate change, including its ability to provide adaptation for people. This should include impacts on the vulnerability or resilience of a natural feature (i.e. what’s already there and affected) as well as impacts on how the environment can accommodate change for both nature and people, for example whether the development affects specifies ability to move and adapt. Nature-based solutions, such as providing green infrastructure on-site and in the surrounding area (e.g. to adapt to flooding, drought and heatwave events), habitat creation and peatland restoration, should be considered. TheES should set out the measures that will be adopted to address impacts.” Their comments also provide additional advice on this matter. Both the District and County Councils have declared Climate Change Emergencies. The Council’s own Climate Change Strategy sets out North Hertfordshire’s ambition to achieve a Net Zero District by 2040, 10 years ahead of the legally binding national target of 2050. On the basis of the advice from Natural England and the Councils’ declarations, the Council is of the view that Climate Change should be scoped into the Environmental Statement. I also refer you to the responses received from Great Ashby Community Council, Gravely Parish Council and Weston Parish Council who are all of the view that ‘Climate Change’ should be scoped in.	This chapter considers the effects of the Proposed Development with respect to climate change, as well as the measures embedded within the design that will ensure the Proposed Development is adapted and resilient to the effects of climate change. Additional detail, including a description of the energy standards and the anticipated operational energy demand being targeted, is provided within the Sustainability and Energy Statement, submitted as a standalone document with the planning application.

Study Area and Scope: GHG Emissions

Study Area

- 10.11 The study area includes the redline boundary of the Proposed Development, shown at **Figure 1.1** of **Chapter 1: Introduction and EIA Methodology**.
- 10.12 However, some of the GHG emissions associated with the Proposed Development occur beyond the redline boundary of the Site. These emissions include, for example, the embodied GHG emissions associated with the extraction, processing and transportation of materials associated with the construction of the Proposed Development. In this way, the effects of GHG associated with the Proposed Development is a local, national and global issue.
- 10.13 The likely significant effect of the Proposed Development has been considered through comparison against North Hertfordshire's, the East of England's and the UK's 4th, 5th, 6th and proposed 7th carbon budgets. Consideration against the North Hertfordshire and East of England budgets are for information purposes and the assessment of significance of effects are drawn from the UK budget only due to the global nature of the sensitive receptor (i.e. global climate). This is in line with the guidance provided within the ISEP 'Guide to Assessing Greenhouse Gas Emissions and Evaluating their Significance', which sets out significance criteria based on the GHG emissions contributions of a Proposed Development in the context of the UK's trajectory towards net zero.
- 10.14 At this stage, an indicative five-year build period has been assumed, with construction work anticipated to commence in 2027. As such, it has been assumed that the Proposed Development will be completed in 2032. Full details are provided at **Chapter 3: Utilities and Construction**. For the purposes of the assessment within this chapter, the programme of delivery presented in **Table 10.2** has been assumed:

Table 10.2 Estimated Programme of Delivery*

Year	Number of Dwellings	Non-Domestic Floorspace
2027/28	128	-
2028/29	128	-
2029/30	128	Community Hub
2030/31	128	-
2031/32	128	-

* The phasing is indicative, and subject to variation during the detailed design process.

Scope

- 10.15 The GHG emissions assessment focuses on the GHGs emitted during the construction works. The assessment also estimates the GHG emissions associated with the operation of the Proposed

Development once it is completed, taking a lifecycle approach. The scope of the GHG emissions assessment includes:

- Identification of the existing sources of GHG emissions at the Site, and consideration of how these may change under a 'do-nothing' scenario;
- Identification of the likely sources of GHG emissions arising from:
 - Construction activities associated with the delivery of the Proposed Development; and
 - The operation of the Proposed Development.
- Consideration of measures which may aid in reducing the GHG emissions associated with the Proposed Development.

10.16 It is highlighted that the recent ruling by the Supreme Court '*R (on the application of Finch on behalf of the Weald Action Group) v Surrey County Council and others* [2024] UKSC 20'^{xvii} concluded that it is necessary to consider the downstream, Scope 3 GHG emissions associated with a project within an EIA where there is a direct link between the project and the creation of GHG emissions, such as the combustion of fossil fuels to be extracted as part of the project, as was the case in the ruling. The Proposed Development for which this ES has been prepared seeks to deliver residential and community uses, and will therefore not result in the extraction of fossil fuels, nor any other activities that would directly result in the generation of GHG emissions. Downstream, Scope 3 emissions are therefore not considered further within this Chapter.

10.17 As set out in **Chapter 4: Description of Development**, the Proposed Development includes land on which a primary school is to be delivered. The primary school itself will not be built as part of the Proposed Development, however it will be delivered on land contained within the Site. An additional assessment of the potential GHG emissions associated with the delivery of a primary school on the land set aside within the Site has been undertaken to ensure the associated downstream emissions are considered. It is expected that the construction of the primary school will also be undertaken in line with the approach taken to the non-residential buildings to be delivered as part of the Proposed Development. The conclusions drawn within the Climate Change Resilience Assessment are therefore considered to be applicable to the primary school.

Assessment Methodology: GHG Emissions

Impact Areas

10.18 The assessment has adopted a project lifecycle approach to identifying the GHG emissions associated with each life cycle stage, or 'module', of the Proposed Development. This has enabled the identification of priority areas that require mitigation. This approach is in line with that set out within the ISEP 'Guide to Assessing Greenhouse Gas Emissions and Evaluating their Significance'.

10.19 In line with the guidance set out within the RICS 'Professional Standards and Guidance: Whole Life Carbon Assessment for the Built Environment', the following life cycle stages of the Proposed Development have been considered as part of the GHG Emissions assessment:

10.20 Construction phase (Modules A1 – A5):

- Extraction and processing of construction materials;
- Transport of construction materials;
- Number of construction workers predicted and an assumed daily travel commute distance; and
- Waste produced from enabling works and construction activities.

10.21 Operational phase (Modules B1 – B7):

- Regulated (i.e. those associated with lighting, hot water, pumps and fans, space heating, and space cooling) and unregulated (i.e. those associated with cooking, equipment, and small appliances) operational emissions;
- Operational traffic arising as a result of the Proposed Development; and
- Use, maintenance, repair, replacement and refurbishment of materials associated with the Proposed Development.

10.22 The reference study period for the assessment is 60 years¹, as is most commonly referenced within industry guidance, including the RICS 'Professional Standards and Guidance: Whole Life Carbon Assessment for the Built Environment'.

10.23 Emissions from construction Site activities, specifically the operation of machinery and plant on-Site, would form a very minor component of the GHG footprint during the construction works. These activities have therefore been scoped out of the assessment, however, consideration of how GHG emissions associated with these activities may be mitigated is provided in the Mitigation Measures section below.

¹ It is noted that there is no intention to decommission the Proposed Development after 60 years, however this reference period has been applied for the purposes of this assessment to ensure adequate consideration of the potential impacts of the Proposed Development during its operation.

Construction Assessment Methodology

- 10.24 GHG emissions associated with the construction of the Proposed Development relate to those embedded in the materials from which the Proposed Development is constructed, and with traffic movements generated during the enabling, earthworks and construction phases.
- 10.25 Embedded GHG emissions for the construction assessment have been calculated based on the GHG factors per square metre of Gross Internal Area (GIA) of the Proposed Development set out in the RICS 'Methodology to calculate embodied carbon of materials'. RICS information paper, IP 32/2012' (2012)^{xviii}, presented in **Figure 10.1**. The factors, which are provided as kilograms (kg) of carbon dioxide equivalent (CO₂e) per m² GIA, are determined for the appropriate development type and are then multiplied by the GIA for the Proposed Development. Owing to the outline nature of the planning application, only Gross External Areas (GEA) are available for the maximum quantum of land uses proposed and therefore an assumption has been applied to calculate the GIA.

Figure 10.1 GHG Emission Factors for Materials used in Construction

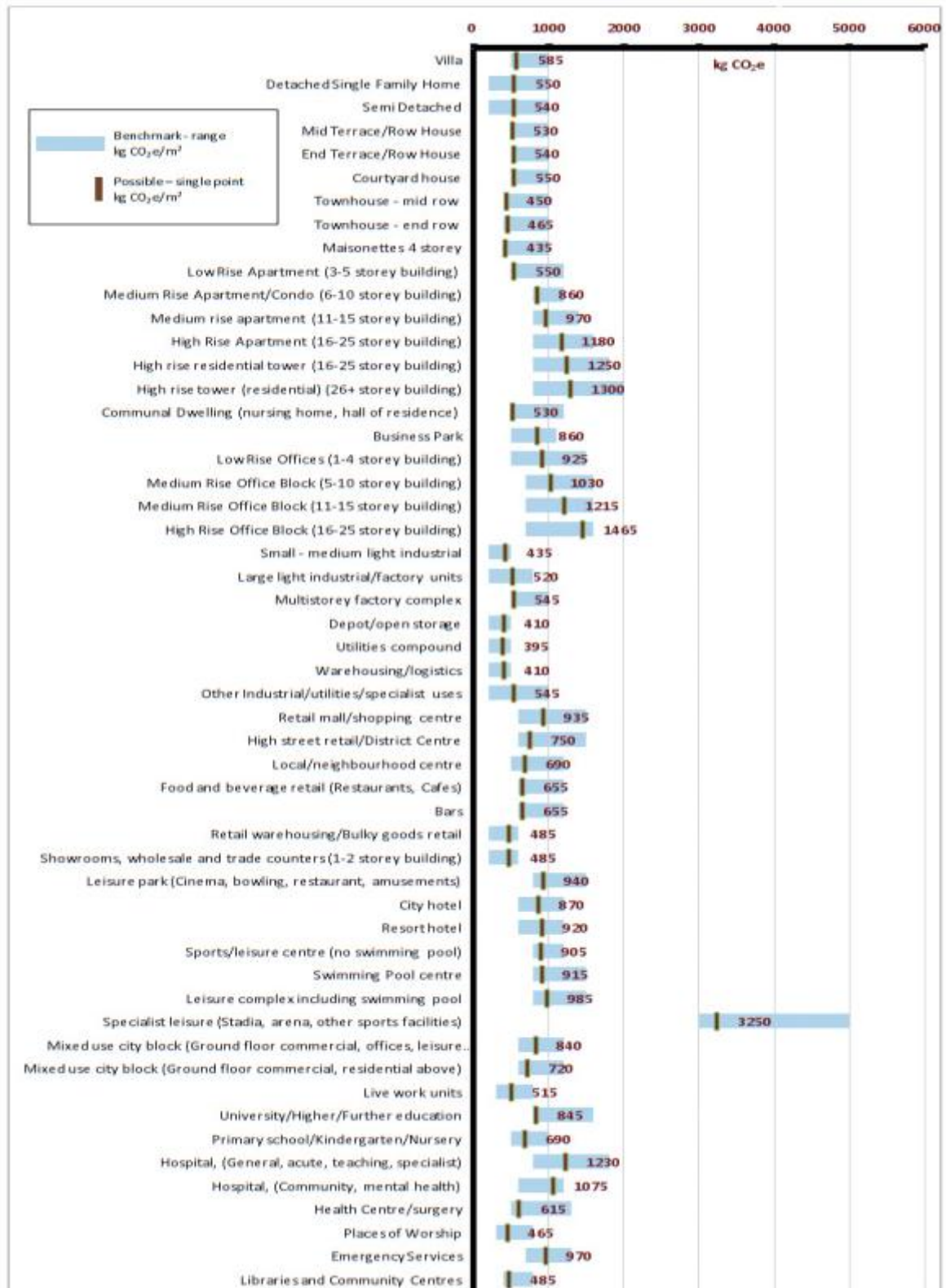


Figure reproduced from RICS, 'Methodology to calculate embodied carbon of materials. RICS information paper, IP 32/2012'.

- 10.26 Owing to the outline nature of the planning application, the maximum quantum of floorspace for each land use proposed within the Proposed Development along with the RICS categories are presented in **Table 10.3**. In order to account for the flexibility and to provide a reasonable worst-case assessment, the embedded GHG calculations are based on the maximum permissible areas for each proposed use, as set out below in **Table 10.3**. The relevant GHG factor set out in **Figure 10.1** above has then been applied for each proposed use.

Table 10.3 Selected Embedded GHG Factors

Use Class	Use	RICS GHG Factor (kg/CO ₂ e/m ²)	RICS Category	Proposed Development - Maximum Floorspace GIA (m ²)
C3	Dwelling Houses	550	Detached Single Family Home / Low Rise Apartment (3 – 5 Storey building)*	62,616**
F2	Community	940	Leisure Park (Cinema, Bowling, Restaurant, Amusements)	1,900***

* For the purposes of this assessment, it has been assumed that the residential component of the Proposed Development will comprise a mix of Detached Single Family Homes / Low Rise Apartments (3 – 5 storey building), as this forms a reasonable worst-case representation of the proposed mix of dwelling types, including the custom/self-build provision, likely to be brought forward as part of the Proposed Development.

** For the purposes of this assessment, it has been assumed that the average GIA of the dwellings, including the self-build provision, will be 97.8 m². This is based on the indicative mix of dwellings.

*** The community hub would extend up to 2,000m². For the purposes of this EIA, it has been assumed that this is equivalent to the GEA of the community hub, and that the GIA is 95% of this GEA.

- 10.27 The estimated number of construction trips to and from the Site during the construction works have been provided within **Chapter 15: Transport** of the ES. These have been provided for Heavy Goods Vehicles (HGVs) and Light Duty Vehicles (LDVs). The precise origin/destination of these trips is not known and so the average travel distance for all articulated HGVs has been assumed to be 85km. This distance is based on the distance by road from the Site to London Gateway, from which imported

construction materials may be sourced². The assumed travel distance for rigid HGVs, such as tippers to deliver aggregates, concrete mixers and waste removal vehicles was assumed to be 85km, which is sufficient to encompass key distribution locations for the construction materials and waste disposal used for the Proposed Development, such as concrete batching sites and construction waste transfer stations. The average travel distance for LDV (cars and vans) was assumed to be 13.2km, which was based on data collected as part of the National Transport Survey: 2023 (2024)^{xix} and is consistent with the trip distance applied to LDVs for operational transport. Although these distances are estimates, and vehicle trips to and from the Site during construction works will vary greatly in origin and destination, the distances are intended to be overestimates that, when applied to all construction vehicles, will result in a robust estimate of overall construction traffic emissions.

10.28 GHG emission factors for construction transport in 2025 have been obtained from the Department for Energy Security and Net Zero, Department for Science, Innovation and Technology, and Department for Business and Trade (DESNZ; formerly Department of Business, Energy and Industrial Strategy (BEIS)) publication on GHG Conversion Factors for Company Reporting (2025)^{xx}. This sets out GHG emissions factors for a range of modes of transport valid for 2025 and includes the most up-to-date factors available at the time of writing. The GHG emissions factors were applied to the calculated total construction travel distances to estimate the GHG emissions from construction transport. It is considered that the use of 2025 factors for construction transport is a conservative approach, as emissions from road transport are likely to decarbonise in future years as vehicles become more fuel efficient and there is a continued shift towards the use of electric vehicles.

10.29 A summary of the GHG emission factors for selected modes of transport are provided in **Table 10.4**.

Table 10.4 Transport GHG Factors by Mode

Mode	Type	Unit	GHG Factor (kgCO ₂ e)
LDV (car and van)	Average car	km	0.256
HGV	Average rigid HGV	km	0.891

Completed Development Assessment Methodology

10.30 GHG emissions associated with the operation of the Proposed Development relate to emissions from transport and energy use.

10.31 GHG emission factors for transport in 2025 which represents the latest data available at the time of writing have been obtained from the DESNZ publication on GHG Conversion Factors for Company Reporting. Factors for 2028, which is the first likely year of occupation of the Proposed Development,

² London Gateway is the nearest port to the Site and has therefore been employed for the assumptions made as part of this assessment. The detailed construction logistics will be determined post-planning.

were determined by applying engine and fuel efficiency factors, sourced from the WebTAG data book^{xxi}, to the 2024 DESNZ factors, for different types of fuel/energy source, and vehicle size/type. Transport emissions (taking into account the transportation of materials to and from the Site) have then been calculated by applying GHG emission factors for the anticipated first year of occupation (2028) of the Proposed Development to the total kilometres travelled by each transport mode, in line with the information provided by the Transport Consultants, Woods Hardwick. This assumes that the first year of occupation of the Proposed Development as a whole will be 2028 as a worst-case assumption, despite the full build-out anticipated to 2032, when the Proposed Development is anticipated to be fully occupied and operational.

Table 10.5 2028 Transport GHG Factors by Mode

Mode	Type	Unit	GHG Factor (kgCO ₂ e)
Car	Average car	km	0.163
Motorcycle	Average motorcycle	km	0.114
Taxi	Average taxi	km	0.208
Bus/coach	Local bus	passenger.km	0.104
Rail	National Rail	passenger.km	0.035
Cycle	Pedal-powered bicycle	km	-
Walk	-	km	-

10.32 Operational GHG emissions associated with the regulated energy use, i.e. lighting, hot water, pumps and fans, space heating, and space cooling, of the Proposed Development have been calculated using the operational energy benchmarks set out within the Royal Institute of British Architect's (RIBA) '2030 Climate Challenge' (2021)^{xxii}. These benchmarks, which are provided as kilowatt-hours (kWh) per m² GIA per year, were determined for the appropriate development type, and were then multiplied by an assumed GIA for the Proposed Development. GHG emission factors for operational energy have been obtained from 'The Government's Standard Assessment Procedure for Energy Rating of Dwellings', published by the Building Research Establishment (BRE), on behalf of BEIS (now DESNZ; 2023)^{xxiii,3}. The factors, which are provided as kgCO₂e per kWh, were determined for the appropriate fuel type, and were then multiplied by the calculated energy demand (kWh/year) for the Proposed Development.

10.33 A description of the Proposed Development is set out in **Chapter 4: Description of Development** of the ES. The maximum quantum of floorspace for each land use within the Proposed Development along with the use categories set out within RIBA's '2030 Climate Challenge' are presented in **Table**

³ Note that the emissions factors set out within 'The Government's Standard Assessment Procedure for Energy Rating of Dwellings' are also applicable to non-residential uses, as these factors apply to standard fuel sources.

10.6. In order to account for the flexibility and to provide a reasonable worst-case assessment, the embedded GHG calculations are based on the maximum permissible areas for each proposed use. The relevant operational energy benchmark, as set out in **Table 10.6**, has then been applied for each proposed use.

Table 10.6 Selected Operational GHG Factors

Use Class	Use	RIBA Operational Energy Benchmark (kWh/m ² /year)	RIBA Category	Proposed Development - GIA (m ²)
C3	Dwelling Houses	60	Domestic / residential	62,616*
F2	Community	75	New build offices	1,900**

* For the purposes of this assessment, it has been assumed that the average GIA of the dwellings, including the self-build provision, will be 97.8 m². This is based on the indicative mix of dwellings.

** The community hub would extend up to 2,000m². For the purposes of this EIA, it has been assumed that this is equivalent to the GEA of the community hub, and that the GIA is 95% of this GEA.

- 10.34 There will also be GHG emissions associated with the repair, maintenance and refurbishment⁴ of the buildings during the lifetime of the Proposed Development. These emissions are effectively “unregulated” as there is no policy or standard for establishing compliance, nor is there published data on good practice against which developments can be benchmarked. Nonetheless, to consider a reasonable worst-case scenario, emissions from repair, maintenance and refurbishment have been accounted for within the GHG assessment. To estimate embedded GHGs associated with repair, maintenance and refurbishment, data from the RICS ‘Professional Standards and Guidance: Whole Life Carbon Assessment for the Built Environment’ have been used. For estimates of office development, embedded GHG emissions during use (i.e. repair, maintenance and refurbishment) are around 48% of the total lifetime embedded GHG, and for residential development, embedded GHG emissions during use are around 26% of total lifetime embedded GHG. The embedded GHG emissions to practical completion, as described in **Table 10.3** above, have therefore been uplifted by 48% for commercial floorspace and 26% for residential floorspace to account for repair, maintenance and refurbishment.

⁴ Refurbishment refers to ongoing refurbishment of elements of the building as required during its estimated 60-year lifetime and does not include a complete whole-building refurbishment, as this would occur at the end of the building's practical life and would be subject to a future lifecycle GHG assessment.

Significance Criteria

10.35 The scale attributed to each effect identified was determined by the sensitivity of the receptor and magnitude of impact arising as a result of the Proposed Development. Professional judgement, experience and, where guidance is available, have been drawn upon to assess the significance of the effect.

10.36 As stated in the ISEP 'Guide to Assessing Greenhouse Gas Emissions and Evaluating their Significance':

"GHG emissions have a combined environmental effect that is approaching a scientifically defined environmental limit, as such any GHG emissions or reductions from a project might be considered to be significant."

10.37 It is noted within the ISEP Guidance that there is no single preferred methodology for the evaluation of significance, but that the greater the proportion of a relevant carbon budget (see below) the GHG emissions of a development represent, the greater the significance. With respect to GHG emissions, the global climate is considered as the sole receptor, meaning the magnitude of emissions generated drives the significance of the effect. As stated above, it is therefore practical for the assessment to be based on professional judgement, and in both a qualitative and comparative manner.

Receptors and Receptor Sensitivity

10.38 In line with the relevant ISEP Guidance, the sole receptor considered as part of the GHG emissions assessment is the global climate. This is considered to be highly sensitive to changes in GHG emissions.

Magnitude of Impact

10.39 The following magnitudes of impact to the sole receptor (i.e. the global climate) has been determined by considering the proportion of the relevant carbon budgets (the North Hertfordshire, East of England and UK 4th, 5th, 6th and proposed 7th carbon budgets) represented by the estimated whole life carbon emissions of the Proposed Development. The scale used for determining the magnitude of an impact has been based on **Table 10.7** below.

Table 10.7 Magnitude of Impact Description

Impact Magnitude	Description
High	GHG emissions associated with the Proposed Development represent >10.0% of relevant carbon budget.
Medium	GHG emissions associated with the Proposed Development represent between 1.00% and 9.99% of relevant carbon budget.
Low	GHG emissions associated with the Proposed Development represent between 0.10% and 0.99% of relevant carbon budget.

Very Low	GHG emissions associated with the Proposed Development represent <0.09% of relevant carbon budget.
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The Carbon Budgets

- 10.40 As detailed above, North Hertfordshire's, the East of England's and the UK's 4th, 5th, 6th and proposed 7th carbon budgets have been employed to assess the likely effects of the Proposed Development against.
- 10.41 Based on the anticipated construction programme set out in **Chapter 3: Utilities and Construction** of the ES, the 4th (2023 – 2027) and 5th (2028 – 2032) carbon budgets represent the appropriate carbon budgets for the construction works of the Proposed Development. With the first year of occupation assumed to be 2028, and the completion of the Proposed Development anticipated to occur in 2032, the appropriate carbon budgets for the fully operational phase of the Proposed Development are the 5th (2028 – 2032), 6th (2033 – 2037) and proposed 7th (2038 – 2042) carbon budgets.
- 10.42 The relevant UK carbon budgets for the assessment are set out in **Table 10.8** below, which demonstrates the decrease in the amount of GHG emissions that the UK may legally emit up to the year 2037, which at this time, the Proposed Development is expected to be completed and fully operational. This will result in the relative significance of GHG emissions associated with the Proposed Development increasing over time.

Table 10.8 Relevant UK Carbon Budgets

Carbon budget	Total budget (MtCO ₂ e)
4 th (2023 – 2027)	1,950
5 th (2028 – 2032)	1,725
6 th (2033 – 2037)	965
7 th (2038 – 2042)	535

- 10.43 The Tyndall Carbon Budget Tool^{xxiv} presents targets for UK Local Authority areas that are aligned with the commitments set out within the United Nations Paris Agreement (2015).
- 10.44 **Table 10.9** below presents the East of England's carbon budgets, aligned with the 5-year format employed for the UK carbon budget periods set out under the UK Climate Change Act (2008). In order to align the East of England's carbon budgets to the periods within the Climate Change Act, the Tyndall Carbon Budget Tool includes an estimate of the CO₂ emissions for the East of England for 2018 and 2019, which has been based on the provisional national emissions data published by BEIS (now DESNZ) for 2018. The same year-on-year reduction rate has then been applied to 2019.

Table 10.9 Relevant East of England Carbon Budgets

Carbon budget	Total budget (MtCO ₂ e)
4 th (2023 – 2027)	66.9
5 th (2028 – 2032)	32.4
6 th (2033 – 2037)	15.7
7 th (2038 – 2042)	7.6

- 10.45 Similarly, **Table 10.10** below presents the carbon budgets for North Hertfordshire, as calculated using the Tyndall Carbon Budget Tool. The same assumptions set out above with respect to the calculation of the East of England's carbon budgets apply to the calculations of the North Hertfordshire carbon budgets.

Table 10.10 Relevant North Hertfordshire Carbon Budgets

Carbon budget	Total budget (MtCO ₂ e)
4 th (2023 – 2027)	1.4
5 th (2028 – 2032)	0.7
6 th (2033 – 2037)	0.3
7 th (2038 – 2042)	0.1

Assessing Significance

- 10.46 **Table 10.11** provides a matrix for determining the significance of an effect based on the sensitivity of the receptor and the magnitude of impact.

Table 10.11 Significance of Effect Matrix

Receptor Sensitivity	Magnitude of Impact			
	High	Medium	Low	Very Low
High	Major Beneficial / Adverse	Moderate Beneficial / Adverse	Minor Beneficial / Adverse	Minor Beneficial / Adverse
Medium	Moderate Beneficial / Adverse	Minor Beneficial / Adverse	Minor Beneficial / Adverse	Negligible
Low	Minor Beneficial / Adverse	Minor Beneficial / Adverse	Negligible	Negligible
Very Low	Minor Beneficial / Adverse	Negligible	Negligible	Negligible

- 10.47 Effects classified as major or moderate are considered 'significant' in EIA terms. Effects classified as minor or negligible are considered 'not significant' in EIA terms.

Limitations and Assumptions

- 10.48 The GHG Emissions assessment has been based on the Proposed Development, as described in **Chapter 4: Description of Development**. The assessment has been based upon the validity of the collated information.
- 10.49 Construction of the Proposed Development is likely to be phased across a number of years, as set out in **Chapter 3: Utilities and Construction**. This assessment does not directly account for the phasing and is based on the whole of the Proposed Development being first occupied in 2028. This provides a reasonable worst-case assessment as in future years, gradual decarbonisation of construction materials, energy supply and transport sectors mean that the GHG emissions would likely be lower than has been assumed in this assessment.
- 10.50 This assessment does not account for projected decarbonisation of the national grid, and instead assumes that the GHG intensity of grid-supplied electricity will remain as per the factors set out within 'The Government's Standard Assessment Procedure for Energy Rating of Dwellings'. This provides a reasonable worst-case assessment as in future years, gradual decarbonisation of the national grid means that the GHG emissions associated with the operation of the Proposed Development would likely be lower than those calculated as part of this assessment.
- 10.51 The GHG emissions, both embodied and operational, have been calculated based on assumed GIAs, calculated using the parameter plans (**Appendix 4.1**) and maximum quantum of uses. Owing to the outline nature of the Proposed Development, no detailed internal layouts, elevations or sectional plans of the proposed built form have been prepared for submission as part of the planning application, which means indicative operational energy or embodied carbon modelling cannot be undertaken.
- 10.52 Due to the flexible nature of the non-residential use classes, a reasonable worst-case approach has also been applied when selecting the relevant GHG emissions factors for the calculation of both operational and embedded emissions for the Use Class.
- 10.53 For the purposes of this assessment, it has been assumed that the Proposed Development will be gas-free.
- 10.54 The GHG emissions associated with traffic generated by the Proposed Development have been calculated using reasonable assumptions for construction-related traffic, and data provided by the Transport Consultants, Woods Hardwick, for operational-related traffic. GHG emissions arising during construction and operation have been quantified using the DESNZ publication on GHG Conversion Factors for Company Reporting, and the WebTAG data book.

- 10.55 CO₂e is a term describing GHG in a common unit. For any quantity and type of GHG, 'CO₂e' signifies the amount of carbon dioxide (CO₂) which would have the equivalent global warming impact.
- 10.56 The current baseline for GHG emissions has been taken to be zero, representing a conservative worst-case scenario.
- 10.57 GHG emissions from the end-of-life stage of the Proposed Development have been scoped out of the assessment due to the anticipated operational length of the Proposed Development.
- 10.58 The GHG Emissions assessment was undertaken on the basis of the information available at the time of the assessment, based on professional judgement and evidence gathered by the Proposed Development design team.

Study Area and Scope: Climate Change Resilience

Study Area

- 10.59 The study area includes the redline boundary of the Proposed Development, shown at **Figure 1.1 of Chapter 1: Introduction and EIA Methodology**, and includes all the physical infrastructure of the assets associated with the Proposed Development.
- 10.60 The Climate Change Resilience assessment considers the entire lifetime of the Proposed Development, which therefore covers the construction works as well as the Proposed Development once completed and operational, with an operational lifespan of 60 years assumed.

Scope

- 10.61 All aspects identified within the Scoping Report have been considered in the ES, as the potential effects on these receptors are considered likely to be significant. These aspects are as follows:
- Surface water flooding;
 - Overheating and associated health implications;
 - Soft landscaping failure due to increased frequency of extreme weather events and summer temperatures; and
 - Water shortages for internal use and for landscaping due to summer droughts.

Assessment Methodology: Climate Change Resilience

- 10.62 The methodology set out within the ISEP 'Guide to Climate Change Resilience and Adaptation' has been followed. Within the guidance, the following main steps have been considered:
- Pre-EIA Stage: How has climate resilience and adaptation been embedded in the design;
 - Scoping climate change adaptation into the EIA;

- Defining the future baseline;
- Identifying climate change vulnerability;
- Identifying and determining magnitude of effects;
- Significance assessment;
- Develop mitigation measures; and
- Post-EIA Stage: monitoring and adaptive management.

10.63 In line with the steps above, and using data provided as part of the United Kingdom's Climate Impact Programme (UKCIP)^{xxv}, a qualitative assessment for both the construction works and for the Proposed Development once completed and operational has been undertaken using professional judgement and the guidance set out by ISEP.

Impact Areas

10.64 The UK Climate Change Projections (UKCP18)^{xxvi} set out that, as a result of increasing global GHG emissions, climate change is projected to lead to increased annual temperatures, decreased summer rainfall and increased winter rainfall across the UK, including the Site.

10.65 The Climate Change Resilience assessment considers the ability of the Proposed Development to operate as intended when accounting for the anticipated effects of projected climate change, including associated weather effects. This assessment has been prepared in line with the ISEP 'Guide to Climate Change Resilience and Adaptation', as well as UKCP guidance.

10.66 The UK Climate Change Risk Assessment (UKCCRA3; 2022)^{xxvii} states that, whilst the international community agreed to make efforts to limit global warming to 1.5°C above pre-industrial levels within the United Nations Paris Agreement (2015), preparation should be made to warming of up to 4°C. Within UKCCRA3, the following potential risks and impacts of climate change relevant to the Proposed Development are identified:

- N1 – Risks to species and habitats from climate change;
- I2 – Risks to infrastructure from flooding;
- I7 – Risks to subterranean and surface infrastructure from subsidence;
- H1 – Risks to health and wellbeing from high temperatures;
- H3 – Risks to people, communities and buildings from river and surface water flooding;
- H5 – Risks to building fabric;
- H10b – Risks to health from household water supply;
- B1 – Risks to business sites from flooding;
- B3 – Risks to businesses from water scarcity; and

- B5 – Risks to businesses from reduced employee productivity due to infrastructure disruption and higher temperatures in working environments.

- 10.67 The qualitative assessment takes account of the design of the Proposed Development, as defined in **Chapter 4: Description of Development** and the parameter plans (**Appendix 4.1**), and how the Proposed Development may be appropriately adaptable to the potential effects of climate change. It allows for the inherent uncertainty of climate change projections and seeks to reflect the realities of these changes.
- 10.68 An In-Combination Climate Change assessment has also been undertaken. This assessment considers the receptors associated with the topics scoped into the ES (**Chapters 6 to 9, and 11 to 16**). Using professional judgement, risks to these receptors are identified and the likelihood of their occurrence considered. The future climate change scenario (Representative Concentration Pathway (RCP) 8.5) has been considered in relation to each of the technical topics covered within this ES. The level of assessment and methodology is proportional to the available evidence base. The aim of this assessment is to consider whether the likely residual effects on receptors, both under current and future conditions without climate change, are likely to be difference under an alternative future climate regime. In particular, the assessment aims to identify whether the potential impacts and likely residual effects of the Proposed Development would be worse, or if they would improve, under the future baseline, and therefore if these changes may alter the significance of the effects identified for the Proposed Development under the climate conditions in the present day, without climate change.

Significance Criteria

- 10.69 The ISEP 'Guide to Climate Change Resilience and Adaption Guidance' sets out a specific significance aspect that was considered for climate change resilience. Determination of the level of risk associated with a climate hazard, and therefore the significance of an associated effect, is based on a combination of the likelihood of and resultant consequence(s) of that hazard occurring. The assessment is qualitative and uses professional judgement, informed by a review of relevant literature.

Likelihood of Occurrence

- 10.70 The categories of likelihood of a climate hazard occurring are set out in **Table 10.12** below.

Table 10.12 Likelihood Categories

Likelihood Category	Description (probability and frequency of occurrence)
Very High	It is highly probable that the impact would occur during the construction or lifetime (assumed as 60 years) of the Proposed Development.
High	The impact is expected to occur during the construction or lifetime (assumed as 60 years) of the Proposed Development.
Medium	The impact may occur during the construction or lifetime (assumed as 60 years) of the Proposed Development.

Low	The impact is not expected to occur during the construction or lifetime (assumed as 60 years) of the Proposed Development.
Very Low	It is highly improbable that the impact would occur during the construction or lifetime (assumed as 60 years) of the Proposed Development.

Measure of Consequence

- 10.71 The categorisation of the measures of potential consequences associated with climate hazards are set out in **Table 10.13** below.

Table 10.13 Measure of Consequence

Magnitude of Consequence	Description
Very Large Adverse	Regional level (or greater) disruption lasting longer than one week. Disruption to the Proposed Development lasting longer than one week. Very significant damage or harm to human and/or ecological systems.
Large Adverse	Regional level (or greater) disruption lasting longer than one day but less than one week. Disruption to the Proposed Development lasting longer than one day but less than week. Significant damage or harm to human and/or ecological systems.
Moderate Adverse	Local level (or greater) disruption lasting longer than one day but less than one week. Disruption to a section of the Proposed Development lasting longer than one day but less than one week. Moderate damage or harm to human and/or ecological systems.
Minor Adverse	Local level (or greater) disruption lasting less than one day. Disruption to a section of the Proposed Development lasting less than one day. Minor damage or harm to human and/or ecological systems.
Negligible	Disruption to an isolated section of the Proposed Development lasting less than one day. Negligible damage or harm to human and/or ecological systems.

Assessing Significance

- 10.72 **Table 10.14** provides a matrix for determining the risk, and resultant significance, of an effect based on the likelihood of a climate hazard occurring and the resulting consequence(s).

Table 10.14 Significance of Effect Matrix

Likelihood of Climate Change Impact	Magnitude of Consequence				
	Very Large Adverse	Large Adverse	Moderate Adverse	Minor Adverse	Negligible
Very High	Major Beneficial / Adverse	Major Beneficial / Adverse	Moderate Beneficial / Adverse	Moderate Beneficial / Adverse	Negligible
High	Major Beneficial / Adverse	Moderate Beneficial / Adverse	Moderate Beneficial / Adverse	Moderate Beneficial / Adverse	Negligible
Medium	Moderate Beneficial / Adverse	Moderate Beneficial / Adverse	Moderate Beneficial / Adverse	Negligible	Negligible
Low	Moderate Beneficial / Adverse	Moderate Beneficial / Adverse	Negligible	Negligible	Negligible
Very Low	Negligible	Negligible	Negligible	Negligible	Negligible

- 10.73 Effects classified as major or moderate are considered ‘significant’ in EIA terms. Effects classified as minor or negligible are considered ‘not significant’ in EIA terms.

Limitations and Assumptions

- 10.74 There are a number of assumptions and limitations inherent to the assessment of adaptation to projected climate change, as well as the risks that may be associated with more extreme weather and climate conditions. The assessment has employed climate projections provided as part of the UKCP18 study, with an appropriate RCP and timescale applied. It is noted, however, that there will be fluctuations within and deviations from the projections included within this dataset due to the inherent uncertainties within the modelling undertaken as part of UKCP18.
- 10.75 Given the long-term nature of the assessment, which assumes a 60-year lifespan for the Proposed Development, and which employs climate projection data for up to the year 2100, a broad consideration of receptor types has been used when determining the likely significant effects of projected climate change, rather than specific receptors, as identified within other chapters of this ES.

Baseline Conditions

Establishing Baseline Conditions: GHG Emissions

Existing Baseline

- 10.76 A baseline period of 2005 to 2023 has been used due to the fact that data published by DESNZ^{xxviii} in 2025 was the latest data available at the time of writing.

- 10.77 For the GHG Emissions assessment, the baseline is a reference point against which the GHG impact of the Proposed Development may be compared against. The Site currently comprises arable fields and areas of woodland, and is therefore considered to have no material operations. For the purposes of this assessment, and to assess the worst-case scenario, a zero-emission baseline has therefore been adopted and is considered a reasonable worst-case assumption as the assessment is based on net GHG emissions, i.e. the relative increase or decrease between the baseline and the Proposed Development, and therefore assuming there are no baseline GHG emitted from the Site will result in a worst-case quantification of the net change in GHG emissions.

Future Baseline

- 10.78 If the Proposed Development was not to come forward, it is expected that, when also accounting for projected climate change, the Site would remain in its current state, as described in **Chapter 2: Description of the Site, Surroundings and Background** of this ES. For the purposes of this assessment, the future baseline is therefore also assumed to be zero emissions. The natural evolution of the Site and surrounding area has been qualitatively considered.
- 10.79 Under the UK Climate Change Act, the UK Government has committed to the achievement of net zero GHG emissions by 2050. The trend across all sectors for reducing GHG emissions will therefore continue into the future to ensure this target is met.
- 10.80 Whilst new development within the area surrounding the Site will result in an incremental increase in baseline GHG emissions in the short term, when accounting for the projected decarbonisation of the national grid, the increased take up of and improvements to low and zero carbon transport technology, and improvements to building design and systems, it is likely that the UK will achieve the net zero GHG emissions target by 2050 required by the UK Climate Change Act.

Establishing Baseline Conditions: Climate Change Resilience

Existing Baseline

- 10.81 A baseline year of 2020 has been used because the most up-to-date Met Office data^{xxix} available at the time of writing comprises an averaged 30-year (1991 – 2020) dataset.
- 10.82 For the Climate Change Resilience assessment, the baseline represents the average climatic conditions at the Site in the existing case. This has been established through the use of Met Office data, which has enabled the compilation of a current climate baseline for the wider region within which the Site is located.

Future Baseline

- 10.83 The future baseline employed within the Climate Change Resilience assessment has been established in line with the ISEP 'Guide to Climate Change Resilience and Adaption', as set out below.

- 10.84 The UKCP18 project has been reviewed to establish an appropriate future baseline. The assessment has established the climatic data surrounding current seasonal temperatures and precipitation from the Met Office. This data has been used to analyse the current climate and compare these findings, in relation to the Proposed Development, to the RCPs used in the UKCP18. The RCPs reflect the concentration of GHGs that have been modelled to occur within the global atmosphere in the year 2100.
- 10.85 Due to inherent uncertainties associated with the projection of future climate and that the modelling undertaken to support the UKCP18 project is underpinned by vast datasets, the 'UKCP18 Factsheet: Derived Projections'^{xxx} has been used to establish the future baseline used in this assessment. This Factsheet provides a clear summary of the data employed within the UKCP18 project, as well as the assumptions made and associated limitations.
- 10.86 A future assessment timeframe of 2081 to 2100 has been used, as this represents a period within which the Proposed Development, with an assumed lifespan of 60 years, is expected to still be in operation.

Existing Baseline Conditions: GHG Emissions

- 10.87 The Site is a greenfield site, comprising of arable fields and areas of woodland that are considered to have limited material operations. For the purposes of this assessment, therefore, a zero-emission baseline has been adopted.
- 10.88 To understand the trends in GHG emissions within North Hertfordshire, a review of emissions associated with transport, domestic and industrial/commercial uses has been undertaken for the period 2005 to 2023 and is displayed in **Table 10.15**, below. This review has employed the UK Local Authority and regional CO₂ emissions national statistics, published by DESNZ in 2025.

Table 10.15 Historic GHG Emissions within North Hertfordshire

Year	Industry and Commercial Total (ktCO ₂)	Domestic Total (ktCO ₂)	Transport Total (ktCO ₂)	Grand Total (ktCO ₂)	Population ('000s; mid-year estimate)	Per Capita Emissions (tonnes CO ₂)
2005	245.6	322.0	326.9	1,069.0	120.8	8.9
2006	262.1	321.0	342.3	1,098.3	121.9	9.0
2007	253.7	313.4	334.2	1,084.2	123.0	8.8
2008	243.2	313.9	325.0	1,045.0	124.4	8.4
2009	202.5	287.4	315.6	1,077.0	125.3	8.6
2010	222.9	310.5	305.3	1,053.5	126.3	8.3
2011	196.3	272.5	300.7	957.6	127.5	7.5
2012	218.5	293.3	294.4	996.6	128.5	7.8

2013	211.9	286.8	290.6	951.7	129.5	7.4
2014	191.7	243.1	299.2	887.7	131.1	6.8
2015	165.4	236.6	302.8	865.6	131.7	6.6
2016	150.8	223.8	310.7	817.0	133.1	6.1
2017	130.3	209.0	317.3	781.2	133.6	5.8
2018	132.5	204.3	306.8	775.7	133.3	5.8
2019	124.3	196.0	300.6	764.1	133.2	5.7
2020	110.0	195.8	248.2	678.5	133.1	5.1
2021	124.8	197.8	253.9	691.9	133.6	5.2
2022	122.2	170.0	253.6	650.8	134.2	4.9
2023	104.7	156.4	248.7	619.2	135.6	4.6

- 10.89 When considering GHG emissions in the context of population growth, the above demonstrates that there has been a reduction in per capita emissions over the past 19 years. It is therefore expected that this trend will continue.

Existing Baseline Conditions: Climate Change Resilience

- 10.90 Met Office data for the region within which the Site is located has been compiled to establish the baseline conditions at the Site. Regional data for Eastern England over a 30-year averaging period (1991 – 2020) is presented within **Table 10.16** below. The southern part of the Eastern England region contains a number of satellite or dormitory towns around London such as Luton, Basildon, Stevenage and Southend. Other major centres of population include Peterborough, Norwich, Ipswich, Cambridge, Lincoln, Grimsby and Hull. This information has been used to establish the baseline against which the potential vulnerability of the Proposed Development to projected climate change may be assessed.

Table 10.16 Climate Baseline for Eastern England (1991 – 2020)

Climate Variable	Description
Temperature	Mean daily minimum temperatures can range from 0°C to 2°C in winter, whilst summer mean daily maximum temperatures are in the region of 20°C to 23°C.
Rainfall	Eastern England includes some of the driest areas in the country, with the majority of the region receiving less than 700mm of rainfall annually, distributed fairly evenly throughout the year. On average, the region experiences approximately 30 rain days during the winter months (December to February) and under 25 days during the summer period (June to August). Despite generally low levels of precipitation, the area has encountered a number of severe storms which can contribute significantly to total annual rainfall and may also result in the occurrence of hail.

Wind	Eastern England is one of the more sheltered parts of the UK, however the winter months are when the strongest winds are experienced. Wind directions between south and north-west account for the majority of occasions, with north-east directions occurring more frequently in the spring. Wind speeds are generally greater in coastal locations than inland, with gales expected 1-2 days per year inland and up to 10 days per year in coastal locations. The frequency of tornadoes is high in Eastern England relative to other parts of the UK, nevertheless, the intensity of these events remains minor.
Sunshine	Parts of Eastern England, such as the Norfolk Coast, are affected by low cloud from the North Sea, which results in this area receiving approximately 10% fewer sunshine hours throughout the year compared to coastal resorts in Southwest England. Across the region, annual averages range from approximately 1,450 sunshine hours over Lincolnshire and East Yorkshire, to in excess of 1,600 hours in east Norfolk, Suffolk and Essex.
Air Frost	The average number of days with air frost ranges from less than 30 at the coast to approximately 55 further inland per year.

- 10.91 In addition to the above, meteorological data from the Rothamsted climate station, which is the nearest Met Office^{xxxi} climate station to the Site, has been obtained over a 30-year averaging period (1991 – 2020). This data has been used to further inform the climate baseline for the Site, as set out in **Table 10.17** below.

Table 10.17 Climate Baseline for Rothamsted (1991 – 2020)

Climate Variable	Description
Temperature	Mean daily minimum temperatures can range from 1.5°C to 2.0°C in winter, whilst summer mean daily maximum temperatures are in the region of 19.6°C to 22.1°C.
Rainfall	The region received an average of 715mm of rainfall annually across the study period.
Wind	The annual mean wind speed across the study period was 4.74 knots, with the lowest mean wind speeds recorded in August (3.1 knots), and the highest in March (6.2 knots)
Sunshine	Across the study period, an average of 1,621 annual sunshine hours were received.
Air Frost	On average, air frost was recorded on 42.6 days of the year across the study period.

Receptors

- 10.92 A list of existing and future receptors is included in **Table 10.18**.

Table 10.18 Existing and Future Sensitive Receptors

Receptor	Sensitivity
GHG Emissions: Existing and Future Receptors	
Global Climate	High

Climate Change Resilience: Existing Receptors	
All receptors identified within Chapters 6 to 9, and 11 to 16:	Very Low to High
Chapter 3: Utilities and Construction	
Existing Electricity Infrastructure	-
Existing Gas Infrastructure	-
Existing Water Infrastructure	-
Existing Telecoms Infrastructure	-
Chapter 6: Air Quality	
R1: 2 Warrensgreen Lane, Weston	High
R2: Dane End Cottage, Weston,	High
R3: 37 Quantock Close, Great Ashby,	High
R4: 11 Ryders Hill, Great Ashby,	High
R5: 41 Cleveland Way, Stevenage	High
R6: 66 Grampian Place, Stevenage	High
R7: 10 Fairfield Cresnet, Stevenage	High
R8: 2 Merrick Close, Stevenage	High
R9: 50 Snowdonia Way, Stevenage	High
R10: 15 Finbracks, Stevenage	High
R11: Newbury Barn, Weston, Hitchin	High
Chapter 7: Archaeology	
Prehistoric Remains	Medium
Roman Remains	Medium/High
Medieval Remains	Medium/High
Post-medieval Remains	Low
Chapter 8: Built Heritage	
Farm Buildings Next the Road at Friends Green Farm, Friends Green Farmhouse, & East Barn and Attached Outbuildings at Friends Green Farm	Medium
Dane End Cottage	Medium
Dane End Farmhouse & Granary at Dane End Farm, 4 meters to west of House	Medium
Tilekiln Farm House & Barn to the East of Farmhouse to Tilekiln Farm & Barn Group around Courtyard at Tilekiln Farm	Medium
The Thatched Cottage	Medium
Bart at Warrensgreen	Medium
Historic Hedgerows	Very Low
Chapter 9: Ecology	
New Spring Wood LWS	Medium

Brooches Wood LWS	Medium
Tilekiln Wood & Parsonsgreen Wood LWS	Medium
Claypithills Spring Wood LWS	Medium
Other LWSs (Off-Site)	Medium
Lowland mixed deciduous woodland (priority habitat); ancient	Medium
Native hedgerows, Mature trees & Lines of Trees	Medium
Bats	Medium
Badger	Low
Birds	Medium
Invertebrates	Low
Chapter 11: Landscape and Visual Impact Assessment	
Hedgerows, trees and woodland on the Site	Medium to High
Arable and grassland fields of the Site	Medium
Public Rights of Way (PRoWs)	Medium to High
Landscape Character of the Site	Low to High
North Hertfordshire Landscape Character Areas (LCAs)	Low to High
Residents	Low to High
Users of the PRoW Network	Medium to High
Users of the Road Network	Medium
Chapter 12: Noise & Vibration	
Tile Kiln Farm, residential	High
Merrick Close, residential area	High
Dane End Farm, residential	High
Cleveland Way / Ryders Hill residential areas	High
Mendip Way, residential area	High
Chapter 13: Socio Economics and Health	
Local Labour Market and Local Economy	Medium
The local housing market and people requiring housing	High
The health of the existing and future residents	Medium
Education Facilities in the school catchment area	Medium
Primary Healthcare Facilities	High
Open Space, Play Space and Sports Facilities	Low
Community Facilities	Low
Chapter 14: Soils and Agricultural Land	
Agricultural land quality (ALC Grades 2, 3a and 3b)	High and Medium
Soils susceptible to damage	Medium

Farm businesses (full-time arable)	Low
Chapter 15: Transport	
Existing Residents	High
Local Car, HGV and Bus Drivers	High
Pedestrians and Cyclists	Medium
All Road Users	Medium
Chapter 16: Water Environment and Flood Risk	
On-Site Users	Low to Medium
Ground Water and Surface Water Bodies	Medium to High
Climate Change Resilience: Future Receptors	
Proposed Development	High
Construction employees and future occupants	High
Construction operations	Medium
Site infrastructure	Medium
Site habitats and species	High
All receptors identified within Chapters 6 to 9, and 11 to 16:	Very Low to High
Chapter 3: Utilities and Construction	
Proposed Electricity Infrastructure	-
Proposed Water Infrastructure	-
Proposed Telecoms Infrastructure	-
Chapter 6: Air Quality	
P1: North-west of the Site	High
P2: North of the Site	High
P3: West of the Site	High
P4: North-east of the Site	High
P5: East of the Site	High
P6: South-east of the Site	High
P7: South of the Site	High
Chapter 7: Archaeology	
-	-
Chapter 8: Built Heritage	
Farm Buildings Next the Road at Friends Green Farm, Friends Green Farmhouse, & East Barn and Attached Outbuildings at Friends Green Farm	Medium
Dane End Cottage	Medium
Dane End Farmhouse & Granary at Dane End Farm, 4 meters to west of House	Medium

Tilekiln Farm House & Barn to the East of Farmhouse to Tilekiln Farm & Barn Group around Courtyard at Tilekiln Farm	Medium
The Thatched Cottage	Medium
Bart at Warrensgreen	Medium
Historic Hedgerows	Very Low
Chapter 9: Ecology	
New Spring Wood LWS	Medium
Brooches Wood LWS	Medium
Tilekiln Wood & Parsonsgreen Wood LWS	Medium
Claypithills Spring Wood LWS	Medium
Other LWSs (Off-Site)	Medium
Lowland mixed deciduous woodland (priority habitat); ancient	Medium
Native hedgerows, Mature trees & Lines of Trees	Medium
Bats	Medium
Badger	Low
Birds	Medium
Invertebrates	Low
Chapter 11: Landscape and Visual Impact Assessment	
Landscape Character of the Site	Low to High
North Hertfordshire Landscape Character Areas (LCAs)	Low to High
Residents	Low to High
Users of the PRow Network	Medium to High
Users of the Road Network	Medium
Chapter 12: Noise & Vibration	
Development residential	High
Development school(s)	High
Chapter 13: Socio Economics and Health	
Future Residents	N/A
Future Employees	Medium
Future School Age Children	Medium
Chapter 14: Soils and Agricultural Land	
-	-
Chapter 15: Transport	
Existing Residents	High
Local Car, HGV and Bus Drivers	High
Chapter 16: Water Environment and Flood Risk	

Surface Water Bodies	Medium to High
Public Mains Water Network	Medium to High
Public Sewer Network	Medium to High
On-Site and Off-Site Users	Low to Medium

Future Baseline: GHG Emissions

- 10.93 When considering the trends in GHG emissions presented in **Table 10.15** above, as well as the legal GHG emissions limits set for the UK outlined in **Table 10.8**, the requirements of the UK Climate Change Act to achieve net zero by 2050 and the policy support for reducing GHG emissions, it is considered that future GHG emissions reductions would occur. It is anticipated that these reductions would occur as a result of, for example, the replacement of petrol and diesel as the primary fuel for vehicles with electricity, the uptake of smart technology to reduce energy demand, and the projected decarbonisation of the National Grid.
- 10.94 When accounting for the projected decarbonisation of the National Grid, it can be expected that future GHG emissions would reduce such that the future baseline would align with the carbon budgets set out within **Tables 10.8, 10.9** and **10.10**, above.

Future Baseline: Climate Change Resilience

- 10.95 The UKCP18 project includes four RCPs: RCP2.6, RCP4.5, RCP6.0 and RCP8.5. For the purposes of this assessment, RCP8.5 has been used as this represents the most conservative and highest-impact scenario. As detailed within the ISEP 'Guide to Climate Change Resilience and Adaption Guidance', the choice of RCP and the time period for which climate projections selected are an important step in establishing the future baseline considered as part of the assessment.
- 10.96 The future baseline established for this assessment, and as set out within the 'UKCP18 Factsheet: Derived Projections', is as follows, assuming a 2°C increase in global mean temperature:
- For temperature:
 - the largest warming in the UK will be in the South East where summer temperatures may increase another 3 to 4°C relative to the present day (1981 – 2000);
 - median warming will be at least 1 to 2°C throughout the year across the whole of the UK;
 - winter cool days will warm by 1 to 1.5°C across the country, whilst temperatures on warmer winter days will increase by less than 1°C; and
 - in summer, both hot and cool days will warm by 1 to 1.5°C across Scotland, and 1.5 to 2°C across England.
 - For precipitation:

- changes are uncertain, but suggest slightly wetter winters and drier summers, with summer drying more in the South; and
- dry days in summer will have 30% less precipitation in parts of the South West.

10.97 Future baseline climate conditions for the Site have been established using the Met Office's most up to date climate projections UKCP18 for the 25km OS grid square within which the Site is located (537500, 237500). These projections detail forecast changes relative to the 1991 – 2020 baseline conditions for annual and seasonal temperatures and rainfall, whilst also considering sea level rise and changes to wind speeds. In line with the ISEP 'Guide to Climate Change Resilience and Adaption Guidance', projections are taken from the 'high' emissions scenario (RCP8.5), 50th percentile (median) scenario for the 2050s and 2080s. The projected changes are set out in **Table 10.19** below:

Table 10.19 Future Climate Baseline

Description	Baseline	2050s		2080s	
		Change to Baseline	Future Baseline	Change to Baseline	Future Baseline
Maximum summer temperature (°C)	21.12	+2.34	23.46	+4.96	26.08
Minimum winter temperature (°C)	1.70	+2.00	3.70	+2.81	4.51
Summer rainfall (mm per month)	57.79	-10.59%	51.67	-40.53%	34.37
Winter rainfall (mm per month)	61.89	+6.93%	66.18	+16.93%	72.37

10.98 Over this period, and as demonstrated in **Table 10.20** below, the general projected trends are to be a move towards warmer, wetter winters, and hotter, drier summers. However, natural variations in climate will continue to result in some cold winters, some dry winters, some cool summers and some wet summers. The table below displays trends relative to the present day, which for the purposes of this assessment falls within the reference period of 1991 – 2020. Whilst the table below presents the general trends across the UK as a whole, with the Site located within North Hertfordshire, Eastern England has been selected as the most appropriate geographical location for consideration within the future assessment.

Table 10.20 Projected Trends in Climatic Variables

Variable	Projected change in trend at		
	10 th percentile	50 th percentile	90 th percentile
Temperature			
Mean minimum winter temperature (°C)			
Mean winter temperature (°C)	↑	↑	↑
Mean summer temperature (°C)			
Mean maximum summer temperature (°C)			
Warmest day of summer (°C)	↓		
Precipitation			
Annual mean precipitation (%)	↓	↕	
Mean winter precipitation (%)	↕	↑	
Mean summer precipitation (%)	↓	↓	↑
Wettest day in winter (%)	↕	↑	
Wettest day in summer (%)	↓	↕	
Snow			
Snow fall – winter		↓	
Snow fall – spring		↕	
Sea Level			
Sea level rise (cm)		↑	

Key: ↑ - projected increase in variable; ↓ - projected decrease in variable; ↕ - projected increases and decreases in variable. Note: The above demonstrates only the projected direction of change in a variable, and does not consider the potential magnitude of change.

Assessment of Effects (Construction and Operational): GHG Emissions

- 10.99 During the construction works, there is potential for GHG emissions to arise from the sourcing, transportation, fabrication and construction of all materials and products to the Site. The construction works also have the potential to generate GHG emissions through the transportation of waste and materials from the Site, and through embodied carbon within the fabric of building materials. In

addition, the GHG emissions embedded in materials used for construction, GHG emissions will be emitted when transporting materials to the Site.

- 10.100 During the operation of the Proposed Development, there is potential for GHG emissions to arise from traffic and transport movements within, to and from the Site. GHG emissions will also arise as a result of operational energy use within the Proposed Development, as well as during the maintenance and repair of the buildings.

Environmental Design and Management

Construction Phase

- 10.101 As detailed within **Chapter 4: Description of Development**, circular economy principles have been embedded within the design of the Proposed Development and materials will be procured in consideration of sustainability credentials and embodied carbon emissions. This, in addition to the implementation of lean design principles and the preferential use of recycled and reused materials, where appropriate, will aid in ensuring materials with low embodied carbon emissions are employed within the construction of the Proposed Development.
- 10.102 The land use change⁵ resulting from the Proposed Development would not cause an increase in land use related GHG emissions owing to the Proposed Development including extensive landscaping and habitats, such as woodland, wildlife ponds and long grass / meadow planting.
- 10.103 The management of construction traffic emissions will aid in reducing associated GHG emissions, as would the sourcing of products within the local area to reduce transportation distances. As detailed within **Chapter 4: Description of Development**, locally sourced materials will be employed where appropriate, which will further aid in mitigating the generation of GHG emissions associated with the transportation of materials to the Site.

Operational Phase

- 10.104 The Proposed Development has been designed to reduce the need to travel beyond the immediate local area by providing amenities and services such as community uses in accessible locations with active travel modes. During the operation of the Proposed Development, transport emissions will be minimised through the delivery of active travel corridors, including pedestrian and cycle network throughout the Site, as set out within the Developable Areas parameter plan, together with the provision of dedicated cycling facilities. This will aid in promoting the preferential use of sustainable and active modes of transport to move away from the use of private, combustion-engine vehicles.

⁵ Land use change can result in GHG emissions through, for example, the removal of habitats such as trees that act as carbon sinks.

Further to this, as within the Transport Assessment (**Appendix 15.1**), electric vehicle charging facilities will be delivered throughout the Proposed Development, encouraging the uptake of electric vehicles which, when accounting for the anticipated decarbonisation of the national electricity grid, will result in zero associated GHG emissions by 2050.

10.105 As set out within **Chapter 4: Description of Development**, the Proposed Development will target an Energy Usage Intensity (EUI) of no more than 60 kWh/m²/year, which will reduce the energy demand and associated GHG emissions of the Proposed Development during its operation. This will be achieved through the employment of a ‘fabric first’ approach, with energy demand minimised through the specification of low u-values, high levels of air tightness, the minimisation of thermal bridging, and the employment of highly efficient systems and equipment. Further to this, the Proposed Development will be gas-free. All-electric systems would be employed to deliver space and water heating and, where required, space cooling, throughout. Renewable and low carbon technology shall also be integrated to deliver efficient space and water heating, as well as carbon-free electricity, on-Site. The incorporation of the measures set out within **Chapter 4: Description of Development** will result in significant GHG emissions reductions over the Part L^{xxxii} of the Building Regulations^{xxxiii} baseline for both the domestic and non-domestic components of the Proposed Development.

10.106 Further to this, due to the intended employment of electric-only systems, the Proposed Development will benefit from the anticipated decarbonisation of the national grid, with the intention that, subject to this continued decarbonisation of the grid, net-zero CO₂ emissions in operation be achieved by 2035.

Effects During Construction

10.107 The calculation of the embedded GHG emissions associated with the Proposed Development is shown in **Table 10.21**.

Table 10.21 Calculation of Embedded GHG Emissions from Construction

Use Class	Use	Proposed Development - Maximum Floorspace GIA (m ²)	RICS GHG Factor (kg/CO ₂ e/m ²)	Embedded GHG Emissions from Construction (tonnes CO ₂ e)
C3	Dwelling Houses	62,616*	550	34,439
F2	Community	1,900**	940	1,786
Total				36,225

* For the purposes of this assessment, it has been assumed that the average GIA of the dwellings, including the self-build provision, will be 97.8 m². This is based on the indicative mix of dwellings.

** The community hub would extend up to 2,000m². For the purposes of this EIA, it has been assumed that this is equivalent to the GEA of the community hub, and that the GIA is 95% of this GEA.

10.108 The total embedded GHG emissions from the Proposed Development from construction to practical completion are 36,225 tonnes. Based on the indicative construction programme in **Chapter 3: Utilities and Construction**, this equates to 7,245 tonnes CO₂e per year.

10.109 The calculation of construction transport-related GHG emissions are presented in **Table 10.22**.

Table 10.22 Calculation of GHG Emissions from Transport in 2027

Mode	2027 Emission Factor per km or passenger.km (kgCO ₂ e)	Distance Travelled (km)*, **	GHG Emissions from Construction Transport (tonnes CO ₂ e)
LDV	0.256	44,083	11
HGV	0.891	1,135,464	1,012
Total			1,023

* Assumes an average of 66 vehicle movements per day, of which 20% are LDVs and 80% are HGVs.

** Assumes 253 working days.

10.110 The total construction transport GHG emissions from the Proposed Development from the first year of construction are 1,023 tonnes. Based on the indicative build period to practical completion, this equates to 5,115 tonnes CO₂e.

10.111 The total GHG emissions during the construction of the Proposed Development, including the embodied GHG emissions of the materials used and the construction traffic, as described above, and a comparison with the 4th and 5th UK carbon budgets are presented in **Table 10.23** below.

Table 10.23 GHG Emissions during Construction and Comparisons to the National Carbon Budget

Construction Impact	GHG Emissions (tonnes CO ₂ e) for Construction Period	Percentage of 4 th UK carbon budget (%)	Percentage of 5 th UK carbon budget (%)
Embodied Carbon of Materials and Plant (Modules A1 – A5)	36,225	0.0004%	0.0017%
Construction Traffic	5,115	0.0001%	0.0002%
Total	41,340	0.0004%	0.0034%

- 10.112 The total anticipated GHG emissions associated with the construction of the Proposed Development are 41,340 tonnes CO₂e. This is considered to be **negligible (not significant)** at a higher spatial (UK) level, equating to 0.0004% of the 4th carbon budget and 0.0034% of the 5th carbon budget.

Effects Once the Proposed Development is Operational

- 10.113 The assessment of transport-related GHG emissions for the Proposed Development within the opening year of the first occupation (2028) is presented in **Table 10.24** below.

Table 10.24 Calculation of GHG Emissions from Transport in 2028

Mode	2028 Emission Factor per km or passenger.km Factor (kgCO ₂ e)	Distance Travelled (km)	GHG Emissions from Operational Transport (tonnes CO ₂ e)
Car	0.163	39,825,588	6,492
Motorcycle	0.114	2,034	0
Taxi*	0.208	48,805	10
Bus/coach	0.104	70,219	7
Rail	0.035	1,051,789	37
Cycle	-	8,466	0
Walk	-	128,859	0
Total			6,546

* For the purposes of this assessment, average cars have been assumed to be used as taxis.

- 10.114 The total operational transport GHG emissions from the Proposed Development during the opening year are 6,546 tonnes CO₂e. Based on an assumed 60-year operational lifespan, this equates to 392,764 tonnes CO₂e across the lifetime of the Proposed Development.

- 10.115 The assessment of operational energy consumption-related GHG emissions for the Proposed Development within the opening year (2028) is presented in **Table 10.25** below.

Table 10.25 Calculation of Annual GHG Emissions from Operational Energy Consumption

Use Class	Use	Proposed Development - GIA (m ²)	RIBA Operational Energy Benchmark (kWh/m ² /year)	Relevant Carbon Factor (tonnes CO ₂ e/kWh)	GHG Emissions from Operational Energy Consumption (tonnes CO ₂ e)
C3	Dwelling Houses	62,616*	60	0.000136	511
F2	Community	1,900**	75	0.000136	19
Total					530

* For the purposes of this assessment, it has been assumed that the average GIA of the dwellings, including the self-build provision, will be 97.8 m². This is based on the indicative mix of dwellings.

** The community hub would extend up to 2,000m². For the purposes of this EIA, it has been assumed that this is equivalent to the GEA of the community hub, and that the GIA is 95% of this GEA.

10.116 The total operational energy consumption-related GHG emissions from the Proposed Development are 530 tonnes CO₂e per year. Based on an assumed 60-year operational lifespan, this equates to 31,820 tonnes CO₂e across the assumed 60-year lifetime of the Proposed Development.

10.117 Further to this, GHG emissions will be generated during the maintenance and repair of the buildings. The assessment of maintenance and repair-related GHG emissions for the Proposed Development is presented in **Table 10.26** below.

Table 10.26 Calculation of Embedded GHG Emissions from Maintenance and Repair

Use Class	Use	Embedded GHG Emissions from Construction (tonnes CO ₂ e)	RICS Uplift Factor (%)	GHG Emissions from Maintenance and Repair (tonnes CO ₂ e)
C3	Dwelling Houses	34,439	26	8,954
F2	Community	1,786	48	857
Total				9,811

10.118 The total GHG emissions associated with the maintenance and repair of the Proposed Development during its lifetime are 9,811 tonnes. Based on an assumed 60-year operational lifespan, this equates to 164 tonnes CO₂e per year.

10.119 The total GHG emissions during the operation of the Proposed Development, including those arising from operational energy use, transport and maintenance and repair, as described above, and a comparison with the 5th, 6th and proposed 7th UK carbon budgets are presented in **Table 10.27** below.

Table 10.27 GHG Emissions during the Operation and Comparisons to the National Carbon Budget

Operational Impact	GHG Emissions (tonnes CO ₂ e) from Operation	Percentage of 5 th UK carbon budget (%)	Percentage of 6 th UK carbon budget (%)	Percentage of proposed 7 th UK carbon budget (%)
Operational Energy	31,820	0.0002%	0.0003%	0.0050%
Operational Traffic	392,764	0.0019%	0.0034%	0.0612%
Maintenance and Repair	9,811	0.0000%	0.0001%	0.0015%
Total	434,395	0.0021%	0.0038%	0.0677%

- 10.120 The total anticipated GHG emissions during the operation of the Proposed Development are 434,395 tonnes CO₂e. This is considered to be **negligible (not significant)** at a higher spatial (UK) level, equating to 0.0021% of the 5th carbon budget, 0.0038% of the 6th carbon budget and 0.0677% of the proposed 7th carbon budget.

Effects of the Future Primary School (Construction and Operational)

- 10.121 The calculation of the embedded GHG emissions associated with the primary school to be brought forward on land within the Site is shown in **Table 10.28**.

Table 10.28 Calculation of Embedded GHG Emissions from Construction of the Future Primary School

Use Class	Use	Proposed Development - Maximum Floorspace GIA (m ²)	RICS GHG Factor (kg/CO ₂ e/m ²)	Embedded GHG Emissions from Construction (tonnes CO ₂ e)
F1	Primary School	2,375*	690	1,639

* For the purposes of this assessment, it has been assumed that a fully occupied 2-form entry school would have 420 students. Based on the guidance provided by the Department for Education and Skills (2014)^{xxxiv}, this would require a net internal area (NIA) of 2,000m². For the purposes of this EIA, it has been assumed that the NIA of non-residential spaces is 80% of the Gross External Area (GEA), and that the GIA is 95% of the GEA.

- 10.122 Assuming the relevant area of land will be remediated as part of the Proposed Development, and employing the 2027 emission factors in line with the assessment above, the calculation of construction transport-related GHG emissions is presented associated with the primary school to be brought forward on land within the Site is shown in **Table 10.29**.

Table 10.29 Calculation of GHG Emissions from Transport associated with the Construction of the Future Primary School

Mode	2027 Emission Factor per km or passenger.km (kgCO ₂ e)	Distance Travelled (km)*, **	GHG Emissions from Construction Transport (tonnes CO ₂ e)
LDV	0.256	22,041	6
HGV	0.891	567,732	506
Total			511

* Assumes an average of 33 vehicle movements per day, of which 20% are LDVs and 80% are HGVs.

** Assumes 253 working days.

10.123 The total construction transport GHG emissions associated with the construction of the primary school to come forward on land contained within the Site from the first year of construction are 511 tonnes. Based on the indicative build period to practical completion of two years, which is considered to represent a worst-case scenario, this equates to 1,022 tonnes CO₂e.

10.124 Based on the above, the total anticipated GHG emissions associated with the construction of the primary school to come forward on land contained within the Site are 2,661 tonnes CO₂e. Taking a worst-case approach and assuming that the primary school comes forward in or after 2038, this equates to 0.0005% of the proposed 7th UK carbon budget. With the Proposed Development itself contributing no GHG emissions to the global atmosphere during the proposed 7th UK carbon budget period, it is considered that the effect of the construction of the primary school to come forward on land contained within the Site is **negligible (not significant)** at a higher spatial (UK) level, both in isolation, and in combination with the Proposed Development itself. There will be no impact, therefore, on the conclusions drawn above with respect to the Proposed Development itself.

10.125 With respect to operational transport-related GHG emissions associated with the primary school to come forward on land contained within the Site, for the purposes of this assessment, it is assumed that there would be no change in the number of trips projected for the Proposed Development itself, nor the split of modes. It is highlighted that, through the provision of a primary school on the Site, there is potential for more trips to be internalised. This means that the number of vehicular trips associated with the Proposed Development could be reduced following the delivery of the primary school, with more trips associated with travel to school being made by foot, cycle or other non-vehicular means. For the purposes of this assessment, however, the total operational transport GHG emissions of 392,764 tonnes CO₂e calculated for the assumed 60-year operational lifespan of the Proposed Development will remain unchanged once the primary school to come forward on land contained within the Site becomes operational.

10.126 The assessment of operational energy consumption-related GHG emissions for the primary school to be brought forward on land within the Site within the opening year is presented in **Table 10.30** below.

Table 10.30 Calculation of Annual GHG Emissions from Operational Energy Consumption

Use Class	Use	Proposed Development - GIA (m ²)	RIBA Operational Energy Benchmark (kWh/m ² /year)	Relevant Carbon Factor (tonnes CO ₂ e/kWh)	GHG Emissions from Operational Energy Consumption (tonnes CO ₂ e)
F1	Primary School	2,375*	70	0.000136	23

* For the purposes of this assessment, it has been assumed that a fully occupied 2-form entry school would have 420 students. Based on the guidance provided by the Department for Education and Skills (2014), this would require a net internal area (NIA) of 2,000m². For the purposes of this EIA, it has been assumed that the NIA of non-residential spaces is 80% of the Gross External Area (GEA), and that the GIA is 95% of the GEA.

10.127 The total operational energy consumption-related GHG emissions from primary school to be brought forward on land within the Site are 23 tonnes CO₂e per year. Based on an assumed 60-year operational lifespan, this equates to 1,380 tonnes CO₂e across the assumed 60-year lifetime of the Proposed Development.

10.128 The assessment of maintenance and repair-related GHG emissions for the primary school to be brought forward on land within the Site is presented in **Table 10.31** below.

Table 10.31 Calculation of Embedded GHG Emissions from Maintenance and Repair of the Future Primary School

Use Class	Use	Embedded GHG Emissions from Construction (tonnes CO ₂ e)	RICS Uplift Factor (%)	GHG Emissions from Maintenance and Repair (tonnes CO ₂ e)
F1	Primary School	1,639	48	787

10.129 Based on the above, the total anticipated additional GHG emissions associated with the operation of the primary school to come forward on land contained within the Site are 2,167 tonnes CO₂e. Taking a worst-case approach and assuming that the primary school becomes operational in or after 2033, this equates to 0.0004% of the proposed 7th UK carbon budget. With the Proposed Development itself contributing 361,996 tonnes CO₂e to the global atmosphere during the proposed 7th UK carbon budget period, equivalent to 0.0677% of the proposed 7th UK carbon budget, it is considered that the effect of the operation of the primary school to come forward on land contained within the Site is **negligible (not significant)** at a higher spatial (UK) level, both in isolation, and in combination with

the Proposed Development itself. There will be no impact, therefore, on the conclusions drawn above with respect to the Proposed Development itself.

Assessment of Effects (Construction and Operational): Climate Change Resilience

10.130 Changes to climatic conditions, combined with the occurrence of more extreme weather events, can lead to a number of effects. These can be considered in terms of the risk that they pose to the Proposed Development and its occupiers directly, or they have the potential to have an in-combination effect with other impacts that are anticipated, as identified within the other chapters of this ES.

10.131 Based on the above UKCP data, the key climate change hazards for the East of England are as follows:

- Construction phase:
 - Increase in the number of extremely hot days; and
 - Climate changes in 2020 – 2044 time period and increased probability of extreme weather events.
- Operational phase:
 - Increased number of extremely hot days;
 - Extremely cold weather;
 - Increased frequency of flooding from river, surface and ground sources;
 - Increased risk of drought;
 - Extreme wind speeds; and
 - Increased risk of lightning strikes.

Environmental Design and Management

Construction Phase

10.132 The following measures have been embedded within the design and construction of the Proposed Development to ensure the risk to sensitive receptors present at the Site during the construction phase is reduced as far as possible:

- Robust materials will be employed in the construction of roads and pavements.
- Foundations will be constructed in line with the requirements of the Building Regulations.
- Where required, earthworks will be undertaken in line with the guidance and requirements set out in the relevant British Standard(s).

Operational Phase

10.133 The following measures have been embedded within the design of the Proposed Development to ensure the risk to sensitive receptors present at the Site during the operation of the scheme is reduced as far as possible:

- Robust materials will be employed in the construction of roads and pavements.
- A site-wide surface water management system will be integrated within the Proposed Development to manage surface water runoff. The surface water management strategy has been designed to account for flood risk and climate change.
- Projected heat and rainfall stresses across the next 60 years will be incorporated within the detailed structural design of all domestic and non-domestic buildings, in line with the requirements of the Building Regulations.
- The Proposed Development would include a diversity of habitats and species, and plants would be drought-resistant, where feasible.
- The Proposed Development would include a diversity of habitats and species. Plants would be drought-resistant, where feasible.
- Facilities for rainwater harvesting will be provided, to reduce demand on potable water supplies by enabling the collection of rainwater for landscape irrigation purposes.
- The Proposed Development would include the provision of green and blue infrastructure and the incorporate trees to provide shade.
- Whilst a detailed design matter, buildings would include passive cooling measures, supported by mechanical ventilation or cooling where required.

Effects During Construction

10.134 The Climate Change Resilience assessment undertaken for the construction of the Proposed Development is set out in **Table 10.32** below.

Table 10.32 Climate Change Resilience Assessment for the Construction of the Proposed Development

Receptor	Aspect	Potential Effect to Proposed Development (Impact)	Embedded Design Measures	Likelihood Category	Consequence of Impact	Significance
Pavements and Road Infrastructure	Laying of surface dressing, micro-surfacing and other temperature susceptible materials	During extended periods of hot, sunny conditions, asphalt can remain workable for a considerable time, making it difficult to maintain profile during compaction.	Employment of robust materials for the construction of roads and pavements.	Very High	Negligible	Not Significant
Geotechnical Conditions	Workforce	An increase in mean temperature and a decrease in summer precipitation has the potential to lead to health risks associated with overheating and dehydration.	Climatic conditions will be assessed on a day-to-day basis, while identification of physical risks constantly observed and mitigated. Provision of potable water supplies, shaded refuge and sufficient ventilation for temporary Site accommodation will be delivered in compliance with the Construction (Design and Management) Regulations 2015 (CDM Regulations) ^{xxxv} .	Very High	Negligible	Not Significant
Buildings	Wind actions	An increase in wind speed has the potential to increase the risk of disruption to construction works, with the potential that the Site would be unable to operate during times of high winds.	Whilst there is no specific projection of the effects of climate change with respect to high wind speeds or the intensity of storms at the Site, working conditions will be assessed each day, in compliance with the CDM Regulations.	Medium	Negligible	Not Significant
	Increased thermal range giving rise to increased earth pressures for buildings	Increases in mean temperatures, as well as extreme temperatures, have the potential to result in stronger fill materials being required within the foundations of buildings, which could increase the quantities of excavated materials becoming waste.	Foundations will be constructed in line with the requirements of the Building Regulations, accounting for the British Standard BS 8004:2015+A1:2020: Code of practice for foundations ^{xxxvi} .	Very High	Negligible	Not Significant
	Stability of earthworks	Increased volumes of precipitation could increase the risk of earthworks instability, due to the potential susceptibility of fill materials to moisture.	Earthworks will be undertaken in line with the guidance and recommendations set out within British Standard BS EN 16907-1:2018 Earthworks - Principles and general rules ^{xxxvii} .	Very High	Negligible	Not Significant
	Earthworks compaction	Increases in extreme temperatures and decreases in summer precipitation may lead to reduced levels of soil moisture, which in turn may lead to a requirement for increased levels of ground compaction.	Climatic conditions will be assessed on day-to-day basis, with soils to be observed prior to the commencement of construction works that may be affected, in compliance with the CDM Regulations.	Very High	Negligible	Not Significant

10.135 On the basis of the inclusion of the embedded measures set out above in accordance with the relevant regulations, the effects of climate change on sensitive receptors during the construction of the Proposed Development are anticipated to be **negligible (not significant)**.

Completed Development: Climate Change Resilience

10.136 The Climate Change Resilience assessment undertaken for the operational Proposed Development is set out in **Table 10.33** below.

Table 10.33 Climate Change Resilience Assessment for the Proposed Development once Completed

Receptor	Aspect	Potential Effect to Proposed Development (Impact)	Embedded Design Measures	Likelihood Category	Consequence of Impact	Significance
Pavements and Road Infrastructure	Design of foundations	An increase in winter precipitation, or a decrease in summer precipitation, may result in a change in groundwater levels and soil moisture, which has the potential to generate increased ground movements, and soil settlement.	Employment of robust materials for the construction of roads and pavements.	Very High	Negligible	Not Significant
	Materials specifications and construction details	An increase in extreme temperatures, both during the summer and winter, has the potential to put the Proposed Development at risk of an increased degree of surface failure or deterioration. This may include, for example, the creation of uneven internal stresses within concrete paving blocks that can give rise to curling or warping, and which may be compounded by passing traffic. Large changes in temperature also have the potential to generate thermal contraction and expansion within paving slabs that may generate large longitudinal internal stresses and excessive movement at joints, leading to surface degradation.		Very High	Negligible	Not Significant
	Roads	An increase in the frequency and/or intensity of storm events may discourage the use of non-motorised forms of transport, such as walking or cycling, to complete journey, which may result in increased numbers of road users.	Sustainable urban drainage systems (SuDS) have been integrated into the Proposed Development to manage surface water drainage. The drainage system would be designed to capture rain falling as close to source as possible, up to and including a 1 in 100 year return period event including an allowance for climate change.	Very High	Negligible	Not Significant
	Pavements	An increase in heavy rain could potentially lead to flooding and closures and diversions of footpaths.		Very High	Negligible	Not Significant
		Large changes in temperatures may result in thermal contraction and expansion of paving slabs, leading to cracking of pavement surfaces, as well as large longitudinal internal stress, and excessive movements at joints.	Employment of robust materials for the construction of roads and pavements.	Very High	Negligible	Not Significant

		Newly laid pavement surfaces may maintain temperatures that are high enough to result in excessive rutting, as well as the embedding of chipping, which may cause a reduction of texture depth.		Very High	Negligible	Not Significant
Geotechnical Conditions	Surface water drainage systems, road-edge drainage, attenuation, outfalls, and drainage ditches	An increase in winter precipitation and a decrease in summer precipitation has the potential to change groundwater levels at the Site, which may increase the risk of flooding from this source, in addition to associated increases in the risk of surface water and fluvial flooding. This could result in a need for additional drainage and the use of stronger materials.	SuDS have been integrated into the Proposed Development to manage surface water drainage and takes into account the groundwater conditions identified on the Site. The drainage system would be designed to capture rain falling as close to source as possible, up to and including a 1 in 100 year return period event including an allowance for climate change.	Very High	Negligible	Not Significant
Buildings	Domestic and non-domestic buildings	An increase in extreme temperatures may require the use of more robust, and potentially, therefore, more expensive materials, such as joints, bearings and paint systems. There is also potential for increased movement of building elements as a result of increased temperatures, which would require greater consideration when setting gaps. Some buildings have the potential to fail to operate within original design parameters. This could induce failures meaning additional works would then be required to strengthen them.	Projected heat and rainfall stresses across the next 60 years would be incorporated within the detailed structural design of all domestic and non-domestic buildings, in line with the requirements of the Building Regulations.	Very High	Negligible	Not Significant
		Increases in precipitation rates, as well as the frequency and intensity of storm events, could lead to premature deterioration rates for joints, bearings, surfaces and external fabric of buildings, which may lead to an increased risk of building collapse.		Very High	Negligible	Not Significant
		An increase in mean temperatures and increased humidity levels has the potential to lead to an increased need for maintenances for the building fabric and discomfort for the resident (overheating and reduced ventilation).		Very High	Negligible	Not Significant

		Increased precipitation has the potential to lead to isolated flooding (flood damage, damp, mould).		Very High	Negligible	Not Significant
		Increased drought could lead to the subsidence in the buildings.		Very High	Negligible	Not Significant
	Earth pressures and foundation design affected by changes in groundwater levels	An increase in winter precipitation and a decrease in summer precipitation has the potential to change groundwater levels at the Site, which may result in impacts on the foundations of the domestic and non-domestic buildings to be delivered as part of the Proposed Development.	All parcels of development would be located outside of Flood Zone 2 and Flood Zone 3.	Very High	Negligible	Not Significant
Landscape	Landscape design	A decrease in mean rainfall may lead to drought tolerant trees becoming more prevalent. This may cause a change in the landscape character of the area.	The Proposed Development would include a diversity of habitats and species. Plants would be drought-resistant, where feasible.	Very High	Negligible	Not Significant
		An increase in mean temperature and changes in precipitation patterns may alter the growing characteristics such as soil properties and length of growing season. This may impact the species identified as part of the landscape strategy and thus alter the character of the landscape.		Very High	Negligible	Not Significant
		An increase in precipitation and, as a consequence, a potentially increased risk of flooding, has the potential to adversely impact plants in higher flood risk areas.		Very High	Negligible	Not Significant

		An increase in frequency and intensity of heavy rainfall and flooding events could cause temporary flooding of public open spaces and public realm areas.	The SuDS have been designed to account for flood risk and climate change.	Very High	Negligible	Not Significant
Water	Continuity of water supplies to domestic and non-domestic buildings	Increased risk of household and business water supply interruptions during droughts and from burst pipes in cold weather.	Water efficient appliances and systems would be installed throughout the Proposed Development, with internal water consumption limited to 105 litres per person per day within the dwellings. Facilities for rainwater harvesting would also be provided, to reduce demand on potable water supplies by enabling the collection of rainwater for landscape irrigation purposes.	Very High	Negligible	Not Significant
Ecology	Habitats, flora and fauna	An increase in mean temperatures may exceed thresholds for certain habitats and species identified for enhancement as part of the Proposed Development.	The Proposed Development would include a diversity of habitats and species. Plants would be drought-resistant, where feasible.	Very High	Negligible	Not Significant
Human Health	Increased temperatures	An increase in summer average temperatures and the number of days above 30°C could cause overheating in living spaces and could discourage the use of active transport modes.	The Proposed Development would include the provision of green and blue infrastructure and the incorporate trees to provide shade. Whilst a detailed design matter, buildings would include passive cooling measures, supported by mechanical ventilation or cooling where required.	Very High	Negligible	Not Significant
	Changes to precipitation	Eastern England is expected to experience changes in overall precipitation and the intensity of rainy days. This is expected to impact on the likelihood of surface flooding events.	All parcels of development would be located outside of Flood Zone 2 and Flood Zone 3.	Very High	Negligible	Not Significant

10.137 It is considered that the consequences of each of the above effects is **negligible**. This is derived from the ISEP definition of negligible included in the ISEP 'Guide to Climate Change Resilience and Adaption Guidance', as follows:

"It is expected that there will be only localised disruption or loss of service. No permanent damage, minor restoration work required: disruption lasting less than one day. Small financial losses and/or slight adverse health or environmental effects".

10.138 On the basis of the above, the likely effects of climate change on the Proposed Development itself during its operation are anticipated to be **negligible (not significant)**.

In-Combination Climate Change Assessment

10.139 In considering the in-combination climate change effects, the assessment has taken account of both the construction works and the operation of the Proposed Development. It is considered that the Proposed Development would not result in significant in-combination climate change related effects on the receptors in **Table 10.18** above covered within the following chapters of the ES:

- **Chapter 3: Utilities and Construction;**
- **Chapter 6: Air Quality;**
- **Chapter 7: Archaeology;**
- **Chapter 8: Built Heritage;**
- **Chapter 12: Noise & Vibration;** and
- **Chapter 14: Soils and Agricultural Land.**

10.140 Likely significant in-combination climate change related effects have been considered further below.

Ecology

10.141 The Proposed Development would include a diversity of species and would be drought-resistant, where feasible, as stated in **Chapter 4: Description of Development**.

10.142 Further to this, the SWDS, which has been designed in consideration of climate change, will include pollution control measures, such as swales, to separate and filter pollutants before surface water is discharged off the Site.

10.143 It is considered that, when accounting for the projected effects of climate change, the conclusions drawn within **Chapter 9: Ecology** will remain unchanged.

Landscape and Visual Impact Assessment

10.144 As detailed within **Chapter 11: Landscape and Visual Impact Assessment**, new green infrastructure will be incorporated within the Proposed Development, as per the Green Infrastructure parameter plan (**Appendix 4.1**), and will serve to provide publicly accessible space accommodating active travel, sustainable drainage systems and play areas, as well as providing areas for wildlife. As detailed in **Chapter 4: Description of Development**, species will be selected in consideration of long-term resilience to climate change. This will include a diversity of plant species and landscape areas.

10.145 It is considered that the conclusions drawn within **Chapter 11: Landscape and Visual Impact Assessment** will remain unchanged when accounting for the projected effects of climate change.

Socio Economics and Health

10.146 There are several weather and climate aspects that have the potential to vary in the future as a result of climate change:

- The mean average air temperature is expected to increase; and
- The annual volume of precipitation is expected to increase.

10.147 The local economy, levels of employment and the attainment of skills may be impacted as a result of any economic downturn associated with extreme weather-related worker illness and disruption to travel. However, through the incorporation of the measures detailed in **Tables 10.32** and **10.33** above, this risk is not anticipated to change the sensitivity of relevant receptors, nor magnitude of impacts expected to be experienced, when considering the community and educational opportunities to be delivered as part of the Proposed Development in the context of climate change. It is therefore not anticipated that the beneficial effects of the Proposed Development on the local labour market and the local economy, during both construction and operation, will be altered as a result of climate change. Similarly, the expected beneficial effects of the Proposed Development on the local housing market, existing and new open space, and deprivation experienced by new and existing residents are considered to be unchanged in the context of climate change when accounting for the measures detailed within **Tables 10.32** and **10.33** above.

10.148 Further to this, the Proposed Development will be designed to comply with the Building Regulations, including the regulations pertinent to internal overheating, and the Surface Water Drainage Strategy (SWDS) (**Appendix 16.1**) has been designed to account for climate change. Measures to mitigate the risk of overheating and flooding within the Proposed Development have therefore been embedded within its design. This will ensure that the potential impacts of increased temperatures and volumes of precipitation on the health and wellbeing of existing and future residents will be mitigated.

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- 10.149 It is considered that, when accounting for the projected effects of climate change, the conclusions drawn within **Chapter 13: Socio Economics and Health** will remain unchanged.

Transport

- 10.150 The construction of the Proposed Development, as well as its operation, will result in an increased level of traffic. This, in combination with an increased risk of rainfall and extended periods of increased temperatures associated with future climate change, may cause increased stress on the road network within and surrounding the Site. However, it is expected that through the incorporation of the measures detailed in **Tables 10.32** and **10.33** above, this risk is not anticipated to change the sensitivity of relevant receptors, nor magnitude of impacts expected to be experienced, when considering the effects of the Proposed Development on existing residents, road users, cyclists and pedestrians in the context of climate change:
- 10.151 It is considered that, when accounting for the projected effects of climate change, the conclusions drawn within **Chapter 15: Transport** will remain unchanged.

Water Environment and Flood Risk

- 10.152 The Site is located wholly within Flood Zone 1, and all parcels of development will therefore be located outside of Flood Zones 2 and 3. It is also confirmed within the Interim Flood Risk Assessment and Drainage Strategy Rev A (**Appendix 16.1**) that the Site is not at risk of flooding from groundwater, sewer or reservoir sources.
- 10.153 The SuDS within the Proposed Development have been designed to account for a 40% increase in rainfall intensity as a result of climate change.
- 10.154 It is considered that, when accounting for the projected effects of climate change, the conclusions drawn within **Chapter 16: Water Environment and Flood Risk** will remain unchanged.

Mitigation Measures

Construction: GHG Emissions

- 10.155 In advance of the commencement of enabling and construction works for each phase, a Construction Environmental Management Plan (CEMP) would be submitted to, and approved by, North Hertfordshire District Council.
- 10.156 Prior to the commencement of the construction of the Proposed Development and at the detailed design stage, consideration should be given to materials with lower associated embodied carbon emissions, for example the sourcing of materials with a high recycled content, or the use of cement with a higher content of fly-ash.

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- 10.157 Consideration should be given to overall quantities of materials used, for example through the inclusion of thinner floor slabs or piles with reduced widths or depths. Care must be taken, however, to consider the need to adapt to climate change and balance this with the opportunities to reduce GHG emissions that are associated with the operation of the Proposed Development, as well as the opportunities to further embed circular economy principles with respect to the safeguarding of opportunities to reuse or better recycle building materials or components. Whilst it is not possible to quantify the effectiveness of applying this mitigation measure at this stage, it is noted that there will be opportunities to reduce the embodied GHG emissions associated with the Proposed Development throughout the continued detailed design process, and that potential measures may be considered as part of future reserved matters applications.
- 10.158 GHG emissions may be further reduced during the construction of the Proposed Development through the preferential use of construction plant with low operational emissions that has been purchased since the Non-Road Mobile Machinery (NRMM) Directive (97/68/EC)^{xxxviii}, including subsequent amendments. Additional measures to mitigate the effects associated with construction plant may be implemented through a CEMP.
- 10.159 Additional measures may also be set out within a CEMP to mitigate GHG emissions associated with construction transport, such as details on the levels of on-Site parking that would be present for construction staff, and measures to encourage the use of public transport for staff travelling to and from the Site. Additional measures to mitigate the effects associated with construction traffic will be implemented through the detailed Construction Traffic Management Plan (CTMP), submitted on appointment of a contractor.
- 10.160 Measures to mitigate GHG emissions arising as a result of the generation of waste during construction should be set out within the CEMP, in addition to a Site Waste Management Plan (SWMP) and a Materials Management Plan (MMP), both of which would similarly be secured via a suitably worded planning condition. These documents should set out measures related to environmental control and monitoring, as well as those related to the smart procurement of construction materials, such as the local sourcing of materials, the procurement of sustainable products, and the use of off-site manufacturing or pre-fabricated techniques. Targets may also be set to track and monitor against key performance indicators for energy usage and waste production throughout the construction of the Proposed Development. A SWMP may also specifically identify the types of waste generated during construction, and how this waste will be reduced, reused and recycled.

Completed Development: GHG Emissions

- 10.161 To reduce the effects of operational traffic related to servicing, smart procurement strategies could be employed during the operation of the Proposed Development. This could include the consideration of the employment of smart logistics techniques, and the provision of a centralised delivery location to minimise the number of associated vehicles.

10.162 As a primary objective, it is intended that waste be prevented at source. Waste management will be considered as part of reserved matters applications, ensuring that suitable spaces are provided within the Proposed Development to reduce the generation of waste, and to encourage higher rates of material recycling and reuse.

10.163 Energy monitoring should be undertaken within a sample of the dwellings to be delivered as part of the Proposed Development, for at least five years from practical completion. This will aid in understanding how the buildings perform in operation, which in turn will contribute to the minimisation of performance gaps, as well as the continued development of knowledge, skills and innovation within the design and construction industry.

Construction: Climate Change Resilience

10.164 No additional mitigation measures are proposed to mitigate the likely effects of climate change during the construction of the Proposed Development, beyond those that will be embedded within the design, and which are outlined in **Table 10.32** above.

Completed Development: Climate Change Resilience

10.165 As outlined above, no significant in-combination climate change related effects have been identified and no mitigation is considered necessary. However, climate change adaptation and resilience should be considered in detail at the reserved matters application stages.

Residual Effects and Monitoring

10.166 The residual effects arising from the Proposed Development are summarised in **Table 10.34** below.

Table 10.34 Summary of Residual Effects

Effect	Receptor (Sensitivity)	Nature of Effect and Geographic Scale	Magnitude of Impact*	Classification of Effect (Statement of Significance BEFORE mitigation)	Mitigation and Monitoring	Residual Effect
Construction Effects						
GHG Emissions						
Production of GHG emissions	Global Climate (High)	Short and Long Term Local and Global	High	Negligible	Adherence to the CEMP, SWMP and MMP	Negligible (not significant)
Climate Change Resilience						
Increased temperatures	Pavement and Road Infrastructure (High)	Short Term Local	Very High	Negligible	N/A	Negligible (not significant)
Increased temperatures and decreased precipitation	Geotechnical Conditions (High)	Short Term Local	Very High	Negligible	Adherence to the CEMP	Negligible (not significant)
Increased mean and extreme temperatures, increased wind speeds, and variation (both increased and decreased) in precipitation	Buildings (High)	Short Term Local	Very High	Negligible	Adherence to the CEMP and SWMP	Negligible (not significant)
Operational Effects						

GHG Emissions						
Production of GHG emissions	Global Climate (High)	Short and Long Term Local and Global	High	Negligible	Monitoring of operational energy usage	Negligible (not significant)
Climate Change Resilience						
Increased extreme temperatures, greater variation in temperatures, and changes to the frequency and magnitude of rainfall and storm events	Pavement and Road Infrastructure (High)	Short and Long Term Local	Very High	Negligible	N/A	Negligible (not significant)
Increased temperatures and changes to the frequency and magnitude of rainfall events	Geotechnical Conditions (High)	Short and Long Term Local	Very High	Negligible	N/A	Negligible (not significant)
Increased mean and extreme temperatures, increased humidity, increased precipitation and increased drought	Buildings (High)	Short and Long Term Local	Very High	Negligible	N/A	Negligible (not significant)

Increased temperatures, variations (both increased and decreased) in precipitation, and increased wind speeds	Landscape (High)	Short and Long Term Local	Very High	Negligible	N/A	Negligible (not significant)
Increased drought and decreased temperatures during the winter	Water (High)	Short and Long Term Local	Very High	Negligible	N/A	Negligible (not significant)
Increased mean temperatures	Ecology (High)	Short and Long Term Local	Very High	Negligible	N/A	Negligible (not significant)
Increased temperatures and variations (both increased and decreased) in precipitation	Human Health (High)	Short and Long Term Local	Very High	Negligible	N/A	Negligible (not significant)

Notes: * incorporating environmental design and management, ** incorporating mitigation and monitoring measures

Likely Significant Environmental Effects

- 10.167 Whilst the Proposed Development will result in the production of GHG emissions during both the construction works and once the Proposed Development is completed and operational, it is considered that the GHG emissions associated with the Proposed Development will have a **negligible effect**, and therefore **not significant** effect on the global climate.
- 10.168 With respect to the adaptation of the Proposed Development to the effects of projected climate change, it is considered that there will be **no significant effects** on the sensitive receptors identified within **Chapters 6 to 9, and 11 to 16** of this ES.

Summary and Conclusions

- 10.169 This chapter has considered both how the Proposed Development will mitigate its potential impact on the global climate by reducing GHG emissions throughout its lifetime, as well as how it may be affected by, and in turn adapt to, a changing climate over time.

GHG Emissions

- 10.170 Due to the lack of data available with respect to the existing energy and transport use of the Site, a zero-emission baseline has been assumed to assess a worst-case scenario.
- 10.171 In line with relevant guidance, a life cycle assessment methodology has been applied in the undertaking of the GHG emissions assessment, which includes an assessment of the emissions arising from materials, transportation, operational energy, and repairs and refurbishments.
- 10.172 A range of embedded mitigation measures, which are appropriate to the scale and available opportunities present, are included within the design of the Proposed Development that will aid in minimising GHG emissions. These include, but are not limited to, the employment of low and zero carbon technologies to serve the heating and cooling demands of the Proposed Development, the provision of active and sustainable access, and the employment of robust materials that have low associated embodied carbon emissions within the construction of the buildings.
- 10.173 The residual effects, following the incorporation of mitigation measures, are considered to be negligible (not significant) in the context of the UK Carbon Budgets during both the construction, and the operational, phases even in the absence of projected grid decarbonisation.
- 10.174 Additional mitigation measures may be implemented during the construction and the operational phases to further reduce GHG emissions. These measures may include, but are not limited to, the consideration of employing materials with lower associated embodied carbon emissions and the undertaking of energy monitoring during the operation of the Proposed Development.

Climate Change Resilience

- 10.175 The existing baseline for the Proposed Development has been set according to the weather patterns observed within the East of England over the last 30 years. Using a future assessment timeframe covering the years 2081 to 2100, which represents a period over which the Proposed Development is expected to still be in operation, it is anticipated that the general trends of climate change will result in warmer, wetter winters, and hotter, drier summers. It is noted, however, that natural variations will mean that some cold and some dry winters, and some cool and some wet summers will continue to occur.
- 10.176 The risk associated with climate hazards, and therefore the significance of the associated effect, has been determined based on a combination of likelihood and consequence. The assessment is qualitative, and uses professional judgement based on knowledge of similar schemes, engagement with the wider technical team, and a review of relevant literature.
- 10.177 A number of embedded mitigation measures, outlined within the technical studies carried out in support of the planning application, have been included for within the design of the Proposed Development.
- 10.178 Based on the assessment, it is considered that the conclusions drawn within **Chapters 6 to 9, and 11 to 16** of the ES will be unchanged from the existing scenario when assessed against future projected climate change.
- 10.179 It is considered that there will be no significant effects with respect to climate change resilience and adaptation.

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