

11 CLIMATE CHANGE

Introduction

- 11.1 This Chapter assesses the effects of the Proposed Development on Climate Change. In particular it identifies and assesses the likely significant effects resulting from and upon the Proposed Development regarding Climate Change and Greenhouse Gases (GHGs).
- 11.2 The Chapter describes the methods used to assess the likely significant effects, the baseline conditions currently existing at the site and surroundings, the potential direct, indirect and cumulative effects of the Proposed Development, the mitigation measures required to prevent, reduce, or offset the identified significant effects and the residual effects. It has been written by Hoare Lea.
- 11.3 This Chapter is supported by the following figures and appendices:
- **Appendix 11.1** Embodied Carbon appraisal results.
 - **Appendix 11.2** Annual operational carbon estimate.

Legislative and Planning Policy Context

- 11.4 Legislation, including International Legislation, national and local policies relevant to the topic of this Chapter are summarised below.

Legislation

Climate Change Act 2008 (2050 Target Amendment Order) 2019

- 11.5 The Climate Change Act 2008 established the legal framework for the UK's long-term Greenhouse Gas (GHG) emission targets. The overall aim of the Act is to reduce GHG emissions by 80% by 2050, compared to the 1990 levels. The 2008 Act also introduced a carbon budgeting system which operates on a five-year basis to limit overall emissions within each period. The 2008 Act was later amended to increase the 80% GHG emission reduction target to 100%. This means that, as of 2019, the UK is legally bound to a target of net zero GHG emissions by 2050. The carbon budget system remains in effect, but with a modified aim of achieving net zero carbon by 2050.

UK Climate Change Risk Assessment 2022

- 11.6 The Climate Change Act 2008 requires the UK Government to conduct five-year assessments on the risks of Climate Change within the UK. The 2022 update is the third risk assessment and highlights eight priority risk areas for action over the next two years, listed below for reference:

1. Risks to the viability and diversity of terrestrial and freshwater habitats and species from multiple hazards;
2. Risks to soil health from increased flooding and drought;
3. Risks to natural carbon stores and sequestration from multiple hazards, leading to increased emissions;
4. Risks to crops, livestock and commercial trees from multiple climate hazards;
5. Risks to supply of food, goods and vital services due to climate-related collapse of supply chains and distribution networks;
6. Risks to people and the economy from climate-related collapse of supply chains and distribution networks;
7. Risks to human health, wellbeing and productivity from increased exposure to heat in homes and other buildings; and
8. Multiple risks to the UK from climate change impacts overseas.

The Sixth Carbon Budget

- 11.7 As stated above, the Climate Change Act 2008 introduced legally binding carbon budgets which restrict the total GHG emissions the UK can emit over a 5-year period. The sixth carbon budget has been set, following the advice from the Committee on Climate Change, at 965 MtCO_{2e} over the 2033-2037 period.

Part L 2021 of the Building Regulations (Conservation of fuel and power).

- 11.8 Part L of the Building Regulations is the mechanism by which government is driving reductions in the regulated CO₂ emissions from new buildings. The residential buildings will be required to comply with Part L1A and the commercial elements with Part L2A of Approved Document Part L 2021 (ADL 2021) which was enforced on 15th June 2022.

National Planning Policy

National Planning Policy Framework (NPPF) (updated December 2023)

- 11.9 The updated National Planning Policy Framework (NPPF) was updated in December 2023 and superseded all Planning Policy Statements (PPS) and Planning Policy Guidance (PPG) documents, with the exception of PPS10 (Waste). The NPPF sets out the Government's strategy on the delivery of sustainable development and the aspects most relevant to this Chapter are briefly summarised below.

11.10 The NPPF places responsibility for policy making with the Local Planning Authority, who set out their policies through Local Plans and facilitate the creation of Neighbourhood Plans. The NPPF states that there is a presumption in favour of sustainable development. Paragraph 20 of the NPPF states strategic policies should set out an overall strategy for the pattern, scale and design quality of places (to ensure outcomes support beauty and placemaking), and make sufficient provision.

11.11 In respect of policy contained within the NPPF relating to climate change, paragraph 159 states that;

“New development should be planned for in ways that:

- a) avoid increased vulnerability to the range of impacts arising from climate change. When new development is brought forward in areas which are vulnerable, care should be taken to ensure that risks can be managed through suitable adaptation measures, including through the planning of green infrastructure; and*
- b) can help to reduce greenhouse gas emissions, such as through its location, orientation and design. Any local requirements for the sustainability of buildings should reflect the Government’s policy for national technical standards.”*

11.12 In respect of energy policy contained within the NPPF, paragraph 160 sets out that;

“To help increase the use and supply of renewable and low carbon energy and heat, plans should:

- a) provide a positive strategy for energy from these sources, that maximises the potential for suitable development, while ensuring that adverse impacts are addressed satisfactorily (including cumulative landscape and visual impacts);*
- b) consider identifying suitable areas for renewable and low carbon energy sources, and supporting infrastructure, where this would help secure their development; and*
- c) identify opportunities for development to draw its energy supply from decentralised, renewable or low carbon energy supply systems and for co-locating potential heat customers and suppliers.”*

Local Planning Policy

Bury Unitary Development Plan 1997

11.13 The Bury Unitary Development Plan (UDP) was adopted by the Council on 29th August 1997. The UDP acts as a guide for future development or protection of land in the Borough

and its policies and proposals currently form the basis for the Council's decisions on planning applications. Policies relevant to climate change and greenhouse gas emissions are summarised below;

- **Policy EN 4 Energy Conservation:** The Council will encourage development which contributes to energy conservation in the Borough. The use of renewable energy resources and the incorporation of energy efficiency measures in built development and the transport system will be encouraged.
- **Policy EN 5 Flood Protection and Defence:** The Council will seek to control development in a manner consistent with flood protection and the maintenance of flood defence systems.
- **Policy EN 7 Pollution Control:** The Council will seek to control environmental nuisance and minimise pollution levels associated with development by limiting the environmental impact of pollution, wherever possible, in conformity with current legislation and prescribed standards.
- **Policy EN 8 Woodland and Trees:** The Council will support the retention of trees, woods, copses and hedgerows and encourage natural regeneration and new and replacement tree planting throughout the Borough.
- **Policy EN 10 Environmental Improvement:** The Council will seek to improve the environmental quality of the Borough, within which priority will be given to an on-going environmental improvement programme.

Emerging Bury Local Planⁱ

11.14 The Bury Local Plan is intended to replace the UDP and is expected to be adopted following the adoption of the emerging Places for Everyone Joint Development Plan. A number of Policy Directions have been prepared which will inform future policies. Those of relevance are set out below:

- **Policy OP3 Climate Change:** In line with the Greater Manchester target of achieving zero carbon by 2050, Policy OP3 establishes the Borough's proactive approach towards mitigating against and adapting to the cause and effects of climate change.
- **Policy IN1 Renewable and Low Carbon Energy Infrastructure:** Policy IN1 supports the development of renewable and low carbon energy infrastructure as a means of contributing towards the Greater Manchester's Net Zero targets.

- **Policy AC1 Connectivity and Accessibility:** Policy AC1 looks to ensure new significant developments are located in areas which encourage sustainable transport choices by reducing the length and number of journeys and overall improving connectivity and accessibility.
- **Policy AC2 Transport Requirements in New Development:** Policy AC2 encourages new developments coordinate with transport planning to optimise the use of public transport, cycling and walking over the use of motorised vehicles as well as improve accessibility. The policy also establishes the requirement for all proposals to set out the generated travel demand created by the development.
- **Policy NE9 Waste Development:** Policy NE9 seeks to ensure that all developments proposals will look to manage waste disposal in line with the policy framework established through the Greater Manchester Joint Waste Development Plan Document which sets out Greater Manchester's future waste management requirements.
- **Policy IN3 Digital and Communications Infrastructure:** Policy IN3 sets out the provisions for enhanced electronic communications infrastructure and establishes the key considerations when dealing with proposals for communications infrastructure.
- **Policy OP4 Air Quality and Pollution Control:** Policy OP4 has been established to ensure any new or existing developments do not contribute towards unacceptable levels of pollution and in turn are not affected by unacceptable levels of pollution. The policy also sets out what factors should be considered when assessing the pollution associated with a development and any mitigation measures.
- **Policy OP5 Flood Risk Management:** Policy OP5 looks to manage flood risk by ensuring any proposals for new developments comply with the flood risk management hierarchy. New developments should not increase flood risk and where possible reduce overall risk.
- **Policy OP6 Efficient Use of Land:** Policy OP6 is in place to ensure all new developments make efficient use of the land.
- **Policy NE1 Green Infrastructure:** Policy NE1 looks to protect and enhance multi-functional green infrastructure and ensure any new developments or changes to existing buildings that could negatively impact green infrastructure networks are avoided, where possible.

- **Policy NE 2 Biodiversity:** Policy NE2 is for the maintenance and enhancement of the Borough's biodiversity assets. The policy seeks to ensure that any adverse biodiversity impacts are minimised and a net gain is achieved where possible.

Emerging Places for Everyone Joint Development Planⁱⁱ

11.15 Nine of the ten councils in Greater Manchester, including Bury, have submitted the Places for Everyone Joint Development Plan to the Secretary of State for Levelling Up, Housing and Communities for independent review. Examinations in public have been held. Assuming the plan is approved in its current form, it sets out a framework for sustainable, inclusive growth across the nine districts. Of particular reference to the proposed development, the emerging plan sets out the following strategic objectives/ policies:

- **Objective 7:** Promote carbon neutrality of new development by 2028, reduce car dependency, facilitate provision of infrastructure for cleaner vehicles and improve energy efficiency and generation of renewable and low carbon energy.
- **Policy JP-S 2 Carbon and Energy:** includes an expectation that, up to 2028, new development will follow the energy hierarchy to achieve operational net zero carbon. From 2028 onwards, the development will seek to achieve net zero carbon 'in construction' too.

Other Relevant Policy, Standards and Guidance

11.16 Policies, standards and guidance relevant to the Proposed Development are summarised below.

- IEMA 2022 Guide for Assessing Greenhouse Gas Emissions and Evaluating their Significance (2nd Edition)ⁱⁱⁱ;
- Department for Energy Security and Net Zero (DESNZ) (2023) Powering Up Britain: Net Zero Growth Plan^{iv};
- The Royal Institution of Chartered Surveyors (RICS) Methodology to calculate embodied carbon (1st Edition)^v;
- RICS Whole life carbon assessment for the built environment (1st Edition)^{vi};
- Committee on Climate Change The Sixth Carbon Budget. The UK's path to Net Zero^{vii};
- Department for Levelling Up, Housing and Communities Conservation of fuel and power: Approved Document L. Statutory guidance^{viii}; and
- CIBSE Guide F – Energy Efficiency in Buildings^{ix}.

Assessment Methodology and Significance Criteria

- 11.17 This Chapter is supported by further detailed information contained within standalone Sustainability and Energy Strategies submitted as part of the planning application.
- 11.18 The assessment follows the IEMA 2022 Guide for Assessing Greenhouse Gas Emissions and Evaluating their Significance (2nd Edition). This document provides the key guidance to assist practitioners with addressing greenhouse gas emissions assessment in EIA. The guidance sets out key principles including that climate change is a cumulative issue, all greenhouse gas emissions may be considered significant in the context that global greenhouse gases are reaching a scientifically defined environmental limit of 1.5 – 2°C, and that greenhouse emissions are considered and reported at varying scales and degrees of detail depending on the project.
- 11.19 Given the hybrid nature of the application (refer to **Chapter 4: The Proposed Development and Alternatives** for a description of the development), estimations of embodied and operational carbon emissions have been calculated based on the available information at the time of writing. For example, quantitative assessment of the residential elements is based on best available fixed parameters (e.g. building height, schedule of accommodation, land use etc.) and example domestic energy assessments from other similar projects as opposed to site-specific modelling.
- 11.20 Where mitigation can reasonably be applied, the effect is most likely to be felt at the project scale, but there is no single preferred method for evaluating effect significance. The IEMA guidance recommends a proportionate approach, which will be adopted, where boundaries to the assessment are set, and effects are contextualised on a case-by-case basis using the professional judgement of the practitioner.
- 11.21 Given the embedded mitigation measures described in this Chapter, the Proposed Development is not expected to increase the risk of climate change effects and so the assessment of climate change adaptation measures has been scoped out of this assessment.

Identification of the Study Area

- 11.22 The site boundary marks the study area; however, due to the nature of the assessment, emissions from outside this boundary have also been captured. This includes emissions associated with the extraction of raw materials, the manufacturing of building materials and transportation of supplies and personnel to the site.

Desk-based Data

- 11.23 In line with the methodology adopted, no surveys have been deemed necessary for the purposes of the assessment.
- 11.24 Local (Bury) and regional (North West) and national (UK) carbon budgets have been reviewed to appraise the relative impact of the Proposed Development.
- 11.25 Electricity emissions projections have been accounted for in relation to the future baseline.
- 11.26 The data available from RICS 2014 provides an indicative carbon rate (kgCO_2/m^2) for building use types, which was used alongside project specific Gross Internal Areas (GIA) for different building use types to estimate the associated embodied carbon for the outline elements.
- 11.27 For the detailed elements, a lifecycle assessment exercise has been undertaken to calculate embodied carbon emissions for each stage based on material quantities from the design team.

Identification of Sensitive Receptors

- 11.28 In this Chapter, the receptor identified for effects likely to be considered significant is 'the atmosphere' (global climate), as referenced in the IEMA GHG assessment Guide (2022). In light of the extreme importance of limiting global warming to below 1.5°C and in the absence of published standard definition of receptor sensitivity of carbon emissions, this assessment asserts that the sensitivity of the atmosphere (global climate) to increases in CO_2 emissions is always considered to be 'high'.

Methodology

- 11.29 CO_2e emissions refers to carbon dioxide equivalent emissions, which is a measure used to compare the emissions from various greenhouse gases based upon their global warming potential, in order to standardise the climate effects of greenhouse gases. This analysis has been undertaken using the general guidance and benchmark estimates of embodied carbon associated with construction materials for various building types provided by RICS set out in the RICS 2014 Methodology to calculate embodied carbon (1st Edition).

Construction Phase

- 11.30 An analysis of the anticipated GHG emissions associated with the raw material extraction and manufacturing of the building materials used on-site has been carried out for both the full and outline elements of the application.
- 11.31 For the detailed elements (excluding the Travel Hub - Plot G) the assessment has been undertaken using a Life Cycle Assessment (LCA) tool (OneClick LCA) to quantify embodied carbon at each stage.
- 11.32 For the outline elements (but also including the Travel Hub - Plot G), RICS benchmark values have been used to calculate the anticipated embodied carbon emissions including A1-A3 (construction materials) associated with the Proposed Development. These benchmark emissions factors are based on broad building use type / size and are provided on a per floor area basis.

Operational Phase

- 11.33 For the detailed elements, an evaluation of the anticipated CO₂ emissions resulting from the operation of the buildings has been carried out using energy use intensity (EUI) targets associated with the specific building type i.e. an operational energy target (kWh/m²/yr) has been set to encourage energy efficient design. These bespoke EUIs have been determined from preliminary operational energy estimates to reflect the mixed-use nature of the detailed element of the application (Community Hub - Plots A, Retail Hub - B and Markey Hall - Plot C).
- 11.34 For the residential plots associated with the outline element of the application (Plots D, E and F), benchmark EUI targets have been taken from the LETI Climate Emergency Design Guide^x for medium/ large scale residential.
- 11.35 The Travel Hub (Plot G) is excluded from the assessment of operational energy because its annual operational energy demand, resulting only from lighting and lifts, is expected to be relatively minor and have no material impact on this assessment.
- 11.36 In all cases, the targets are industry-leading and account for the embedded mitigation described below.
- 11.37 The following sections define the approach adopted within the assessment for the magnitude of change (or impact), determination of sensitivity (or value/importance) and the level of effect and significance.

Magnitude of impacts

- 11.38 To provide context and to assist with determining the magnitude, the CO₂ emissions generated by the Proposed Development have been assessed in the context of emissions at a local scale (Bury Council Local Authority Boundary), regional scale (North West), and national scale (the UK as a whole) reflecting the various levels where emissions may occur. CO₂ emissions observed at local and regional level have been sourced from UK national statistics collated by the Department for Energy Security and Net Zero (DESNZ) whereas the national-scale data is based on the five-year National Carbon Budgets produced by the Committee on Climate Change (CCC), which reflect the requirement to remain within agreed global emission limits. These carbon budgets are outlined in **Table 11.1**, **Table 11.2** and **Table 11.3** below and have been used in assessing the magnitude of the National/ Local / Regional impact of emissions.
- 11.39 The relevant national carbon budgets have effectively been used as a proxy for the level of effect caused by the Proposed Development on the global climate. The national-scale data is based on the five-year National Carbon Budgets produced by the Committee on Climate Change (CCC), which reflect the requirement to remain within agreed global emission limits. These are outlined in **Table 11.1**. The National Carbon Budgets have been apportioned to reflect the contribution of the built environment towards the UK total carbon footprint (estimated to be nearly 40%). This approach is in alignment with UK Green Building Council Guidance for assessing GHG emissions and evaluating their significance, which provides a steer on contextualising a project's carbon impacts.
- 11.40 At this stage, it is anticipated that the enabling works and construction of the Proposed Development will commence in 2024 with full site completion and occupation of both phases of the development by 2031.
- 11.41 Given the phasing of the Proposed Development noted above, the 4th national carbon budget is deemed applicable to the construction stage, and the 5th and 6th national carbon budgets (as detailed in **Table 11.1**) are deemed to be applicable to the operational stage. No data is currently available post-2037 so it is not possible to assess the anticipated operational emissions against UK carbon emissions beyond this date. However, in light of the ambitious sustainability target set by the UK government for the country, i.e. the legally binding 'net-zero' carbon target for 2050, it can be expected that the magnitude of operational emissions will only increase as a proportion of the total national carbon budget.

Table 11.1 UK National carbon budget levels

Budget	Carbon budget level	Reduction below 1990 levels
1 st carbon budget (2008 – 2012)	3,018 MtCO ₂ e	25%
2 nd carbon budget (2013 – 2017)	2,782 MtCO ₂ e	31%
3 rd carbon budget (2018 – 2022)	2,544 MtCO ₂ e	37% by 2020
4 th carbon budget (2023 - 2027)	1,950 MtCO ₂ e	51% by 2025
5 th carbon budget (2028 - 2032)	1,725 MtCO ₂ e	57% by 2030
6 th carbon budget (2033 – 2037)	965 MtCO ₂ e	78% by 2035

11.42 The 4th Bury and North West carbon budgets are deemed applicable to the construction stage of both phases of the Proposed Development, while the 5th, 6th and 7th carbon budgets are deemed to be applicable to the operational stage across the project's anticipated 60-year life.

Table 11.2 Carbon Budget Levels for Bury

Budget	Carbon budget level	Reduction beyond 2015 levels
1st carbon budget (2018 - 2022)	3.5 MtCO ₂	24.1% by 2020
2nd carbon budget (2023 - 2027)	1.8 MtCO ₂	62.3% by 2025
3rd carbon budget (2028 - 2032)	0.9 MtCO ₂	81.3% by 2030
4th carbon budget (2033 - 2037)	0.4 MtCO ₂	90.7% by 2035
5th carbon budget (2038 - 2042)	0.2 MtCO ₂	95.4% by 2040
6th carbon budget (2043 - 2047)	0.1 MtCO ₂	97.7% by 2045
7th carbon budget (2048- 2100)	0.1 MtCO ₂	98.9% by 2050

Table 11.3 North West Carbon Budget Levels

Budget	Carbon budget level	Reduction beyond 2015 levels
1st carbon budget (2018 - 2022)	160.6 MtCO ₂	23.1% by 2020
2nd carbon budget (2023 - 2027)	81.7 MtCO ₂	62.0% by 2025
3rd carbon budget (2028 - 2032)	40.3 MtCO ₂	81.2% by 2030
4th carbon budget (2033 - 2037)	19.9 MtCO ₂	90.7% by 2035
5th carbon budget (2038 - 2042)	9.8 MtCO ₂	95.4% by 2040
6th carbon budget (2043 - 2047)	4.9 MtCO ₂	97.7% by 2045
7th carbon budget (2048- 2100)	4.7 MtCO ₂	98.9% by 2050

Determining the Magnitude of Change

- 11.43 In GHG accounting, it is a widely accepted practice to exclude emission sources that do not have a material contribution to the overall carbon footprint on the basis of the 'De Minimis' rule^{xi}. International Organisation for Standardisation (ISO) guidance on GHG reporting (ISO 14064-1)^{xii} states that, *"the organisation may exclude from quantification direct or indirect GHG sources or sinks whose contribution to GHG emissions or removals is not material or whose quantification would not be technically feasible or cost effective"*. In this context, multiple sources have introduced a 'materiality threshold'. PAS 2050¹ for example, stipulates that in order to be considered 'material', the contribution from any one source of GHG emissions should be more than 1% of the anticipated total GHG emissions associated with the product being assessed.
- 11.44 The UK Emissions Trading System (UK ETS)^{xiii} replaced the EU Emissions Trading System (EU ETS) from 1st January 2021. It retains the provision for small installations, which states that small installations whose emissions do not exceed a threshold of 25,000 tCO₂e per annum and, where they carry out combustion activities, have a rated thermal input below 35 MW, excluding emissions from biomass, can opt out from the scheme. Additionally, as part of its public reporting under the Task Force on Climate-related Financial Disclosures framework (IFC Performance Standard 3: Resource Efficiency and Pollution Prevention the International Finance Corporation (IFC)) discloses emissions of projects with estimated annual emissions over 25,000 tCO₂e through the Environmental and Social Review Summary for each project.
- 11.45 In line with the above, a 1% materiality threshold has been implemented in this assessment when determining magnitude of the relevant change in carbon emissions. To ensure a robust approach, a second reference point has been included, i.e. 25,000 tCO₂e annual emission maximum level. It is therefore assumed that any annual carbon emissions quantum <1% of the (proportional value) of the relevant carbon budget(s) and < 25,000 tCO₂e would not be considered to have a 'material' contribution to the relevant UK GHG inventory (i.e. at the national scale). More details are provided in **Table 11.4** and **Table 11.5** below.

¹ internationally applicable standard to calculate carbon foot

Table 11.4: Criteria for determining magnitude of impact – national scale

Magnitude of impact	Criteria
Large	Annual carbon emissions represent a contribution equal to or higher than 1% of the national baseline emissions and / or annual proportion of the relevant UK National Carbon Budget's share attributable to the built environment sector; AND Annual carbon emissions are higher than 25,000 tCO₂e in any year.
Medium	Annual carbon emissions represent a contribution lower than 1% of the national baseline emissions and / or annual proportion of the relevant UK National Carbon Budget's share attributable to the built environment sector; AND Annual carbon emissions are higher than 25,000 tCO₂e in any year.
Small	Annual carbon emissions represent a contribution lower than 1% of the national baseline emissions and / or annual proportion of the relevant UK National Carbon Budget's share attributable to the built environment sector; AND Annual carbon emissions are lower than 25,000 tCO₂e in any year.
Negligible	Annual carbon emissions represent a contribution lower than 0.1% of the national baseline emissions and / or annual proportion of the relevant UK National Carbon Budget's share attributable to the built environment sector; AND Annual carbon emissions are lower than 25,000 tCO₂e in any year.

Table 11.5: Criteria for determining magnitude of impact – local/ regional scale

Magnitude of impact	Criteria
Large	Annual difference in carbon emissions represents a contribution higher than 1% of the local / regional baseline emissions share attributable to the built environment sector; AND Annual difference in carbon emissions represents a contribution higher than 1% of the relevant local / regional carbon budget's share attributable to the built environment sector.
Medium	Annual difference in carbon emissions represents a contribution lower than 1% of the local / regional baseline emissions share attributable to the built environment sector; AND Annual difference in carbon emissions represents a contribution higher than 1% of the relevant local / regional carbon Budget's share attributable to the built environment sector.
Small	Additional annual carbon emissions represent a contribution lower than 1% of the local / regional baseline emissions share attributable to the built environment sector; AND Additional annual carbon emissions represent a contribution lower than 1% of the relevant local / regional carbon Budget's share attributable to the built environment sector.

Magnitude of impact	Criteria
Negligible	Additional annual carbon emissions represent a contribution lower than 0.1% of the local / regional baseline emissions share attributable to the built environment sector; AND Additional annual carbon emissions represent a contribution lower than 0.1% of the relevant local / regional carbon Budget's share attributable to the built environment sector.

11.46 While the emission thresholds outlined above have been used to provide context, it is important to recognise that the application of professional judgement is a critical additional component, as recognised by the IEMA guidance and as outlined in the Impact Assessment Methodology section, which may result in a different overall conclusion than the one suggested by a quantitative criteria alone based on a percentage increase/decrease relative to the baseline.

11.47 The magnitude of impact or change from the baseline conditions has been considered as the change experienced from the baseline conditions at the sensitive receptor and has been considered on a scale of large, medium, low, or negligible. The assessment of magnitude is carried out taking account of any primary (i.e. embedded) mitigation that forms part of the Proposed Development.

Determining the Sensitivity of the Receptor

11.48 In this Chapter, the receptor identified for effects likely to be considered significant is 'the atmosphere (global climate)', which is highlighted in the IEMA GHG assessment guideline (2022). In light of the extreme importance of limiting global warming to below 1.5°C and in the absence of published standard definition of receptor sensitivity of carbon emissions, this assessment asserts that the sensitivity of the atmosphere (global climate) to increases in CO₂ emissions is always considered to be 'high'.

Significance Criteria

11.49 The significance considers the following variables:

- The magnitude of effect experienced by the receptor – i.e. the degree of alteration from the baseline;
- The sensitivity of the receptors – i.e. their value and susceptibility to change;
- The scale at which any effect will be felt - i.e. site level, at the immediate setting of the site, at the scale of the study area;

- The duration of any effect (short-term, long-term, permanent etc.);
- The changes that will occur over time with the Proposed Development in place.

Significance Criteria

- 11.50 The assessment of likely significant environmental effects as a result of the Proposed Development has taken into account the enabling, demolition and construction and operational stages of both phases of the development.
- 11.51 The level of effect is confirmed as a single level, informed by professional judgement, as summarised in **Table 11.6** below.

Table 11.6: Matrix to Support Determining the Significance of Effect

		Sensitivity (or value / importance)			
		High	Medium	Low	Negligible
Magnitude of Change	Large	Major	Moderate to Major	Minor to Moderate	Negligible
	Medium	Moderate to Major	Moderate	Minor	Negligible
	Small	Minor to Moderate	Minor	Negligible to Minor	Negligible
	Negligible	Negligible	Negligible	Negligible	Negligible

Characterisation of Effect

- 11.52 Effects that are identified as being moderate or major adverse/beneficial are more likely to be classified as significant effects, with minor effects being subject to the impact of magnitude and professional judgement. However, as stated earlier in the Chapter, a blended quantitative-qualitative approach relying on standard GHG accounting and reporting principles has been applied so the effect categorisation will also be subject to professional judgment. **Table 11.7** provides some examples of significance criteria as outlined in the IEMA guidance.

Table 11.7: Significance Criteria - characterisation of effect

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

Assumptions/Limitations

11.53 Due to the nature of the development, a phased assessment has not been undertaken; instead the assessment considers the construction and operational phases of the entire development.

11.54 The following limitations and assumptions have been identified:

- As stated in IEMA (2022) guidance, activities that do not significantly change the result of the assessment can be excluded where expected emissions are less than 1% of total emissions, and where all such exclusions total a maximum of 5% of total emissions. These thresholds have been applied in the assessment.
- The area schedule used to calculate embodied carbon, operational carbon and demolition impact is based on the final design parameters.

- RICS benchmark values have been used to calculate the anticipated embodied carbon emissions including A1-A3 (construction materials) associated with the Proposed Development. These benchmark emissions factors are based on broad building use type / size and are provided on a per floor area basis. As such, they may not be wholly representative of the Proposed Scheme at detailed design but is a recognised industry-standard approach.
- Where more than one use type could be attributed to a plot, the type with the higher embodied carbon emissions was selected to ensure a 'worst-case' assessment.
- The carbon impact of demolishing the existing buildings onsite was calculated using the average rate of 3.4 kgCO₂/m², as provided by the RISC 2017 paper. This is a standardised figure based on monitored demolition case studies in London.
- For the Community Hub, Retail Hub and Market Hall (Plot A, B and C) bespoke operational energy emissions have been used based on project specific calculation. However, the operational emissions for the residential elements (Plot D, E and F) have estimated using benchmark targets from the LETI Climate Emergency Design Guide^{xiv} which provides energy use intensity targets specifically for residential development. This is due to the full and outline applications.
- The assessment of baseline operational carbon emissions is based on approximate floor areas provided by the project architects and assumed use classes to align with the CIBSE Guide F benchmarks.

Consultation and Scoping

- 11.55 No formal consultation has taken place in the preparation of this Chapter. However, the approach and methodology has been agreed through the EIA Scoping process and receipt of the Council's EIA Scoping Opinion (refer to **Chapter 2: Assessment Scope and Methodology**).

Baseline Conditions

- 11.56 This section sets out the baseline conditions of relevance to this Chapter. The description contextualise any emissions generated by the Proposed Development and implement a proportional approach to the assessment.

Site

- 11.57 The Site Location Plan (refer to **Figure 1.1, Chapter 1: Introduction**) identifies existing buildings on site, which are summarised in **Table 11.8** below. A suggested use class has

been identified as a close match for each building based on those available in CIBSE Guide F.

Table 11.8 Baseline conditions – building types

Plot Description	Use	Area (m ²)
Health Centre	Primary health care (GP surgeries)	1,313
Longfield Centre	Retail - clothes shop	1,985
Longfield North West		741
Longfield South West		1,192
Iceland	Retail - frozen food	841
Library	Public buildings - libraries	1,012
Total floor area		7,084

11.58 All of these buildings will be demolished to enable the Proposed Development.

Existing operational carbon emissions

11.59 An estimate of existing operational carbon emissions has been calculated using the approximate floor areas scheduled above and applying a 'typical practice' benchmark for operational energy use from CIBSE Guide F, as shown in **Table 11.9** below.

Table 11.9: Baseline conditions – operational carbon emissions

Plot Description	Use Class	Operational carbon (tCO ₂ e/m ²)
Health Centre	Primary health care (GP surgeries)	81.65
Longfield Centre	Retail - clothes shop	167.34
Longfield North West		62.47
Longfield South West		100.49
Iceland	Retail - frozen food	179.20
Library	Public buildings - libraries	58.59
Total carbon emissions		649.74

11.60 Using the DESNZ UK GHG Conversion Factors for Company Reporting^{xv} for electricity (0.20707 kgCO₂e/kWh) and mains gas (0.23032 kgCO₂e/kWh) respectively, this results in an indicative carbon baseline of 649.74 tCO₂e/yr. The estimated emissions do not exceed 25,000 tCO₂e per year.

11.61 The annual baseline operational emissions are lower than 25,000 tCO₂e and account proportionally for:

- 0.0804% of local (Bury) baseline emissions / 0.0018% of regional (NW England) baseline emissions;
- 0.000417% annual proportion of the 4th national carbon budget (2023 - 2027) (40% share attributable to the built environment sector);

- 0.000471% annual proportion of the 5th national carbon budget (2028 - 2032) (40% share attributable to the built environment sector); and,
- 0.000842% annual proportion of the 6th national carbon budget (2033 - 2037) (40% share attributable to the built environment sector).

Local scale (Bury)

11.62 The latest CO₂ emissions for the Local Authority of Bury are from 2021 and total 808.1 ktCO₂e, as shown in **Table 11.10** below. The data shows emissions allocated on an 'end-user' basis where emissions are distributed according to the point of energy consumption (or point of emission if not energy related).

Table 11.10 CO₂ emissions data for Bury

Year	Industry & Commercial	Public Sector	Domestic	Transport	Land use, land-use change & forestry (LULUCF)	Agricultural	Waste Management	Grand Total	Population	Per Capita Emissions
	ktCO ₂	kt C O ₂	ktCO ₂	ktCO ₂	ktCO ₂	ktCO ₂	ktCO ₂	ktCO ₂	'000s, mid-yr estimate	(t)
2005	8.8	3.1	16.0	3.2	0.5	13.1	5.5	50.3	181.0	0.3
2006	8.3	2.9	15.3	3.0	0.5	14.8	6.4	51.3	181.8	0.3
2007	7.8	2.7	14.4	3.0	0.5	14.2	59.6	102.1	182.7	0.6
2008	7.2	2.2	13.7	2.6	0.5	15.2	102.8	144.2	183.0	0.8
2009	6.4	2.1	13.2	2.7	0.5	12.0	112.6	149.6	183.9	0.8
2010	6.4	2.1	13.5	2.4	0.5	11.3	107.2	143.4	184.8	0.8
2011	6.0	1.9	12.7	2.6	0.5	11.2	89.8	124.8	185.4	0.7
2012	6.0	2.2	13.7	2.2	0.5	11.1	64.5	100.3	186.4	0.5
2013	4.8	1.9	12.1	2.2	0.5	10.4	45.5	77.4	187.0	0.4
2014	4.6	1.6	11.2	2.1	0.5	10.6	26.3	56.9	188.2	0.3
2015	4.4	1.6	11.1	2.0	0.5	10.5	25.5	55.6	189.5	0.3
2016	3.9	1.2	9.6	2.0	0.5	10.3	17.4	45.0	191.2	0.2

2017	3.7	0.9	9.0	2.1	0.5	9.9	29.8	56.1	192.9	0.3
2018	3.5	1.1	8.9	2.3	0.5	9.5	83.6	109.3	193.8	0.6
2019	3.4	1.0	8.8	2.2	0.5	9.4	49.6	74.7	194.9	0.4
2020	2.8	0.9	8.2	1.9	0.5	9.2	49.7	73.1	195.0	0.4
2021	3.0	1.0	7.9	1.6	0.5	8.9	35.0	57.9	193.8	0.3

Regional scale (North West)

- 11.63 The latest available CO₂ emissions data for the North West of England is from 2021 and recorded at 36,471.2 ktCO₂e.
- 11.64 In order to help understand the trends in carbon emissions at a regional level, a breakdown of total carbon emissions from the main sources has been provided for the North West. The DESNZ regional statistics data from the UK government, shown by **Table 11.11**, are available for the period 2005 – 2021

Table 11.11 Carbon emissions with the North West of England 2005-2021

Year	Industry & Commercial	Public Sector	Domestic	Transport	Land use, land-use change & forestry (LULUCF)	Agricultural	Waste Management	Grand Total	Population	Per Capita Emissions
	ktCO ₂	ktCO ₂	ktCO ₂	ktCO ₂	ktCO ₂	ktCO ₂	ktCO ₂	ktCO ₂	'000s, mid-yr estimate	(t)
2005	23969.1	2731.8	17491.4	15011.5	193	755.5	190.3	60342.6	6870	8.8
2006	23380.6	2636.4	17432.9	14818.8	162.4	755.1	126.2	59312.3	6901.6	8.6
2007	22752.9	2486.2	16862.1	14832.5	118.1	747.8	165	57964.6	6929.3	8.4
2008	22051.8	2411.1	16805.4	14361.2	67.3	817.5	140.9	56655.2	6958.5	8.1
2009	19033.9	2079.8	15228.7	14005.8	45.3	738.1	134.5	51266	6986.2	7.3
2010	20255.1	2269.7	16241.4	13919.3	34.4	725	135.9	53580.8	7019.9	7.6
2011	18095.4	1977.6	14161.7	13728.1	-4.1	639	127.1	48724.8	7056	6.9
2012	19467.6	2185.4	15139.6	13464.3	31	744.9	117.2	51150	7076.6	7.2
2013	18175.8	2101.8	14729.1	13366.7	-8.1	653.1	104.5	49122.9	7091.9	6.9
2014	15977.8	1847.3	12391.5	13530.2	-29.6	632.5	109.4	44459.1	7124.3	6.2
2015	14799.9	1700.3	12134.9	13795.6	-55.1	655.9	102.1	43133.6	7175.5	6.0

2016	13666	1412.7	11427	13977.9	-26.1	600.1	103.7	41161.3	7262.9	5.7
2017	12919.3	1587	10938.3	13810	-65.7	630.4	93.8	39913.2	7308.2	5.5
2018	12372.3	1766.1	10773.7	13694.3	-71	685.2	84.1	39304.5	7343.1	5.4
2019	11864.9	1682.6	10442	13702	-82.9	623.4	87.9	38320	7402.5	5.2
2020	10696.6	1531.6	10091.4	11367	-50	599	91.9	34327.4	7425.5	4.6
2021	11593.3	1748.9	10530.5	11906.5	-88.5	675.1	105.5	36471.2	7422.3	4.9

- 11.65 In line with the trend shown in **Table 11.11**, the statistics for the North West of England demonstrate a continuing downward trend over the overlapping 2005 – 2021 period, whereby the per capita CO₂ emissions have decreased by approximately 44%. Total emissions have also been reduced by 40% over the studied period despite the observed population growth.
- 11.66 The main reductions are observed in industry and commercial emissions followed by domestic emissions in line with an overall downward trend for the whole of the UK. In comparison, the reduction observed in the transport sector for the region is considerably smaller amounting to approximately 21%.

National Scale

- 11.67 The latest DESNZ data available for the UK was published in 2023 and relates to the year 2021. The total CO₂ emissions generated in the UK in 2021 amount to 339,540 kt CO₂. The UK demonstrates one of the largest declines in CO₂ emissions, with a 48% reduction in the period 1990 - 2021. This is one of the biggest percentage reductions in CO₂ emissions of all large economies.
- 11.68 A study conducted by analysts Carbon Brief reveals that the decline in industry, commercial and domestic emissions is driven by a combination of the introduction of a low- and zero-carbon electricity mix based on gas and renewables instead of coal and reduced non-electric energy consumption in the industrial and residential sectors. The latter is explained mainly by improvements in energy efficiency and switching to lower-carbon fuels. A structural movement towards a less carbon-intensive mix of industrial output, with some energy-intensive industry moving to other countries and UK industry increasingly focusing on higher-value manufacturing with lower energy intensity is also considered to have been a significant factor in the case of industry-related emissions.

Embedded Mitigation

- 11.69 The following embedded mitigation measures have been evaluated as part of the assessment of each phase of the development.

Demolition, Enabling and Construction Phase

- 11.70 Prior to the demolition of the existing buildings onsite, a pre-demolition audit (which is likely to form part of the Construction Environmental Management Plan (CEMP)) will be conducted to identify any materials that could be re-used on site. Salvaging and re-using existing building materials reduces the embodied carbon emissions produced by the Proposed Development. Virgin materials have high embodied energy, and potentially need

transporting long distances to reach the site which further increases embodied carbon through transportation related emissions.

- 11.71 A circular economy approach has also encouraged the reuse and recycling of building materials. In addition, circular economy work ensures materials are carefully selected with consideration for the building's whole lifespan. The flexibility, adaptability, longevity and disassembly of building components are assessed to ensure appropriate material choices are made which minimise the whole life carbon impact.

The Completed and Operational Development

- 11.72 The following measures have been considered in the Sustainability and Energy Strategy for the buildings which are applied for in full detail (Phase 1), to further reduce the CO₂ emissions during operation:

- Careful design of buildings with enhanced U-values and air tightness, beyond those required for Building Regulations (summarised below in **Table 11.12**) to reduce operational carbon emissions.

Table 11.12: Summary of building fabric energy efficiency

Element	Target	Building Regulations
Roof	0.11 W/m ² K	0.15 W/m ² K
External wall	0.15 W/m ² K	0.18 W/m ² K
Ground floor	0.12 W/m ² K	0.15 W/m ² K
Opaque spandrel panel	0.12 W/m ² K	0.18 W/m ² K
External solid personnel doors	1.00 W/m ² K	1.9 W/m ² K
Air permeability	1.00 m ³ /h.m ²	8 m ³ /h.m ²

- Inclusion of low carbon and renewable energy sources to reduce the CO₂ emissions produced during the operation of the Proposed Development. Air Source Heat Pumps will be used for heating and domestic hot water generation and Photovoltaics on the pitched roof of Plot B (PV) will generate electricity.
- Green roofs above the single storey retail units in Community Hub (Plot A) and the Market Hall (Plot C) will further insulate the buildings to reduce unwanted heat loss and promote biodiversity net gain allowing any biodiversity loss associated with the construction of the Proposed Development to be re-established.
- The green roof will operate as a nature-based Sustainable Drainage System (SuDS), working to restrict surface water runoff and reduce flood risk. Alongside this, below ground attenuation tanks and rain gardens have been proposed to further reduce surface water runoff by storing rainwater and releasing in a controlled way.

- The façade of the Travel Hub has been designed to reduce noise and light pollution as well as preventing overlooking into the surrounding residential buildings and gardens.
- The onsite cycle stores will provide safe and secure bicycle storage, encouraging low carbon, sustainable travel alternatives. Providing these cycle facilities will work to reduce operational emissions by decreasing the CO₂ emissions associated with traveling to and from the site. Further, the design of the public realm will improve pedestrian routes across the site and to local public transport nodes such as the Prestwich Metrolink tram stop.

Assessment of Likely Significant Effects

11.73 Significance has been assessed below firstly for the demolition, enabling works and construction phase combined for both phases combined, and then the complete and operational development for both phases combined.

Demolition, Enabling and Demolition Works

11.74 The Proposed Development includes the demolition of the existing buildings on site. The embodied carbon 'lost' due to the demolition of existing buildings has been assessed by multiplying the GIA of the existing buildings by an assumed demolition impact of 3.4 kgCO₂e/m² which is the average demolition impact rate stated in the RISC 2017 paper^{xvi}, based on monitored demolition case studies in London. Emissions calculated using this figure can be taken as a proxy for typical demolition practice. The total demolition impact is estimated to be 24.09 tCO₂e. as shown in **Table 11.13** below.

Table 11.13: The embodied carbon impact of demolishing the existing buildings onsite

Floor Area	Average demolition impact rate	Total demolition impact
m ²	kgCO ₂ e/m ²	tCO ₂ e
7,084	3.4	24.09

Construction Works

11.75 A full lifecycle assessment has been completed for the detailed elements of the application (Phase 1)², with the total embodied carbon for lifecycle stages A1-A5 calculated to be 4,879tCO₂e as shown in **Table 11.14** below.

Table 11.14: Summary of upfront carbon for the detailed elements

Lifecycle Stage	A1-A3	A4	A5	Upfront carbon
				tCO ₂ e

² This excludes Plot G as set out in the methodology section of this Chapter

Plot A	1,933	240	167	2,340
Plot B	1,329	164	118	1,611
Plot C	769	86	73	928
Total	4,031	490	358	4,879

- 11.76 An appraisal of the anticipated CO₂e emissions associated with the raw material extraction and manufacturing of the building materials used on-site has been carried out using the general guidance and benchmark estimates of embodied carbon associated with construction materials for various building types provided by RICS set out in the RICS 2014 paper and the project specific GIA values.
- 11.77 For the outline elements (Phase 2) and including the Travel Hub (Plot G), A1 – A3 embodied carbon emissions (i.e. product stage of building life stages considered) have been estimated to be approximately 19,750.38 tCO₂e. The RICS carbon factors represent the embodied carbon in the construction materials (as per lifecycle stages A1 – A3 (EN 15978)) the resulting embodied carbon has been calculated by multiplying the derived GIA per land use type by the most relevant RICS carbon factor.

Table 11.15: Embodied carbon break down A1-A3 for the outline elements and Travel Hub

Plot Ref.	RICS Carbon Factor by closest match	GIA	A1 – A3 embodied carbon
	kgCO ₂ /m ²	m ²	tCO ₂ e
Plot D	Residential/ retail	6,484	5,592.29
Plot E	Residential/ retail	5,544	4,794.92
Plot F	Residential/ retail	6,740	65,820.78
Plot G	Depot/ open storage	8,640	3,542.4
Total		28,491	19,750.38

- 11.78 Emissions for lifecycle stage A4 (transport) cannot be based on floor areas so an LCA practitioner recommended taking a proxy of 10% of lifecycle stages A1-A3 as an estimate.
- 11.79 Finally, for the outline elements and including the Travel Hub, an estimate of A5 emissions has been calculated using an average carbon factor of 30.34 kgCO₂e/m² for the total floor area of the remaining plots. As shown in **Table 11.16**, the total emissions for lifecycle stage A5 are estimated to be 831.56 tCO₂e.

Table 11.16: Embodied carbon break down A5 for the outline elements

Floor Area	One Click carbon factor	A5 embodied carbon
m ²	kgCO ₂ e/m ²	tCO ₂ e
27,408	30.34	831.56

- 11.80 The total estimated emissions for the enabling and construction phase is estimated below at 27,460.06 tCO₂e as shown in **Table 11.17**.

Table 11.17 Total embodied carbon emissions from enabling and construction

Lifecycle stage	Full Element (Phase 1)	Outline Element (Phase 2) inc. Travel Hub	Total impact
m ²			tCO ₂ e
Demolition	-	-	24.09
A1-A3	4,031	19,750.37	23,781.38
A4	490	1,975.04	2,465.04
A5	358	831.56	1,189.56
Total	4,879	22,556.98	27,460.06

11.81 The annual carbon emissions account proportionally for:

- 0.06282% of local (Bury) baseline emissions;
- 0.00139% of regional (North West) baseline emissions;
- 0.00033% annual proportion of the 4th national carbon budget (2023 – 2027) attributable to the built environment sector (assumed 40% attributed to built environment);
- 0.00037% annual proportion of the 5th national carbon budget (2028 – 2032) attributable to the built environment sector (assumed 40% attributed to built environment);
- 0.00066% annual proportion of the 6th national carbon budget (2033 – 2037) attributable to the built environment sector (assumed 40% attributed to the built environment).

11.82 The sensitivity of the global atmosphere is considered to be high.

11.83 At a local and regional scale, the annual carbon emissions represent a contribution lower than 0.1% of the local / regional baseline emissions and carbon budget share attributable to the built environment sector. Therefore, the magnitude of impact at local scale is negligible. In summary, on a local scale there likely to be a permanent, long-term, adverse effect which is considered to be Negligible.

11.84 At a national scale, the annual carbon emissions are less than 25,000 tCO₂e and contribute less than 0.1% of the relevant UK National Carbon Budget's share attributable to the built environment. As such, the magnitude of impact is considered to be negligible. In summary, across these scales there is likely to be a permanent, long-term, adverse effect which is considered to be Minor Adverse.

- 11.85 In accordance with the stated IEMA methodology, the project is evaluated to have a **Minor Adverse** effect that is Not Significant; it is in compliance with up-to-date policy and good practice guidance reduction measures, so is deemed to be compatible with the budgeted, science-based 1.5°C trajectory (in terms of rate of emissions reduction) i.e. the UK's net zero trajectory.

The Complete and Operational Development Phase

- 11.86 The total anticipated emissions associated with the completed and operational stage of the Proposed Development (combining Phases 1 and 2), relating to the operation of the buildings, have been calculated to be 355.75 tCO₂e (refer **Table 11.18** below).
- 11.87 As stated above, the Travel Hub (Plot G) is excluded from the assessment of operational energy because its annual operational energy demand, resulting only from lighting and lifts, is expected to be relatively minor and have no material impact on this assessment.
- 11.88 The upper levels of Plot A have been designed to accommodate either a business hub, NHS or office-type function. Similarly, Plot B could be utilised as a gym or office space. Bespoke EUIs have been developed for Plots A-C which account for the proposed function with the higher anticipated energy use intensity.
- 11.89 Whilst a purely residential function is suggested below for Plots D-F, it is likely that the detailed design will include for some commercial and/or retail space on the ground floor levels. A purely residential EUI has been utilised here given the outline application for this phase and the relatively small impact that an area-weighted estimate of commercial space is expected to have.

Table 11.18: Operational carbon emissions

Plot Ref.	Use type	EUI	GIA	B6 Operational carbon
		kWh/m ²	m ²	tCO ₂ e
Plot A	Retail/ Community/ Leisure	76	3,423	53.87
Plot B	Retail/ Leisure	143	2,266	67.10
Plot C	Retail/ Food & Beverage	131	935	25.36
Plot D	Residential/ Retail	50/ 131	6,484	70.72
Plot E	Residential/ Retail	50/ 131	5,544	63.46
Plot F	Residential/ Retail	50/ 131	6,740	75.24
Total			25,392	355.75

- 11.90 Therefore, the estimated emissions do not exceed 25,000 tCO₂e per year (the threshold set by the UK ETS as not having a 'material' contribution to the national GHG inventory).
- 11.91 The annual operational carbon emissions account proportionally for:

- 0.0440% of local (Bury) baseline emissions;
- 0.0010% of regional (North West) baseline emissions;
- 0.00023% annual proportion of the 4th national carbon budget (2023 – 2027) attributable to the built environment sector (assumed 40% attributed to built environment);
- 0.00026% annual proportion of the 5th national carbon budget (2028 – 2032) attributable to the built environment sector (assumed 40% attributed to built environment);
- 0.00046% annual proportion of the 6th national carbon budget (2033 – 2037) attributable to the built environment sector (assumed 40% attributed to built environment).

11.92 The sensitivity of the global atmosphere is considered to be high.

11.93 At a local and regional scale, the annual carbon emissions represent a contribution lower than 0.1% of the local / regional baseline emissions and carbon budget share attributable to the built environment sector.

11.94 At a national scale, the annual carbon emissions are less than 25,000tCO₂e and contribute less than 0.1% of the relevant UK National Carbon Budget's share attributable to the built environment.

11.95 Across local, regional and national scales the magnitude of effect is considered to be negligible. Therefore, the operational CO₂ emissions are likely to have a direct, permanent, long-term, adverse effect which is considered to be **Negligible**, which is Not Significant.

11.96 As noted in **Table 11.9** above, the baseline operational carbon emissions were estimated to be 649.74 tCO₂e, therefore the completed and operational development is anticipated to significantly reduce operational carbon emissions for the site (at 355.75 tCO₂e) resulting in a net reduction in operational carbon emissions (-293.99 tCO₂e). As the Proposed Development's net operational GHG impacts are below zero and it causes a reduction in atmospheric GHG concentration, compared to the without-project baseline, the operational development is deemed to have a beneficial effect and a positive climate impact.

Future baseline

11.97 Any future changes to the baseline are expected to be minor. The baseline figures have used industry benchmarks and bespoke project specific calculations to produce an

estimate for operational energy. Without a significant change of use it is unlikely these figures will change. However, the emissions may experience a small decrease as a result of external actions to reduce the emissions associated with the energy consumption arising from the uses on-site. Further, electricity emissions are projected to reduce over time and this assessment is based on the carbon emissions factor published in 2023. DESNZ projections for electricity emissions suggest that they will decrease over time and so the operational carbon impact of the scheme is expected to reduce in line with the decarbonisation of the Grid.

- 11.98 The present assessment has not identified any CO₂ emissions expected to be generated throughout the lifecycle of the Proposed Development that are likely to result in effects which are considered adverse to the degree of either 'moderate' or 'major'.
- 11.99 The effects assessed are not considered significant for the global climate. Following a blended quantitative-qualitative approach based on widely accepted GHG accounting and reporting principles and professional judgement, all likely effects associated with the CO₂ emissions reviewed as part of this assessment have been classified as being 'minor adverse' therefore no requirement for secondary measures are required at this stage. On this basis, the assessment concludes that no likely significant effects are expected to be produced during the enabling, demolition and construction phase or the completed and operational phase.

Further Mitigation, Enhancement Measures and Residual Effects

- 11.100 This section describes mitigation or enhancement measures with regards to Climate Change.

Enabling, Demolition and Construction Phase

- 11.101 Whilst this assessment demonstrates there are no likely significant GHG effects (only minor adverse effects), further mitigation will include a detailed assessment of regulated and unregulated loads, as well as consumption sources, to identify opportunities for energy consumption reduction through operational and management strategies.
- 11.102 The following example measures are included in the Construction Environmental Management Plan (CEMP) to further reduce CO₂ emissions during demolition and construction stages:
- Main contractor to set energy, water and waste reduction targets and waste reuse/recycling targets for the construction activities from the outset to encourage transparency and accountability;

- Main contractor to monitor energy, water and waste data during the construction stages;

- 11.103 An assessment of embodied carbon has been completed for Plots A, B and C to inform design development. This assessment process will continue through to RIBA Stage 4 Technical Design (post planning) to reduce embodied carbon as far as practicable.
- 11.104 Phase 2 forms part of the outline element and so further mitigation will be secured through design development e.g. developing proposals that support a net zero carbon trajectory through compliance with the latest building regulations and seeking to target improved levels of performance where possible.
- 11.105 Taking account of the embedded mitigation measures and the further mitigation / enhancement measures set out above, the residual effects remain as previously identified and are Not Significant.

The Completed and Operational Development Phase

- 11.106 As the operational effects are Negligible across all the scales considered, no further mitigation or enhancement measures have been identified. Therefore, taking account of the embedded mitigation measures, the residual effects remain as previously identified and are Not Significant.

Residual Effects Summary

- 11.107 The table below summarises the residual effects assessed as part of this assessment.

Table 11.19: Residual Effects Summary

Description of Effect	Embedded Mitigation	Potential Effect	Additional Mitigation / Enhancement Measures	How are Mitigation / Enhancement Measures Secured?	Residual Effect
Enabling, Demolition and Construction					
Demolition of existing buildings, fuel use in construction plant & associated facilities and construction of new buildings (embodied carbon)	Pre-demolition audit Circular Economy strategy to form part of the CEMP	Direct, permanent, long-term, Minor Adverse effect. Not Significant	CEMP monitoring targets. Assessment of Embodied Carbon and Circular Economy Strategy, pre-commencement	Condition	Direct, permanent, long-term, Minor Adverse effect Not Significant
Completed and Operational					
Regulated and unregulated emissions from buildings	Bespoke EUI targets. Enhanced u-values and air permeability, Green Roofs, inclusion of low carbon and renewable energy sources, Sustainable Urban Drainage systems and inclusion of cycle storage and enhanced public realm	Direct, permanent, long-term, Negligible effect. Not Significant.	N/A	Design measures secured by Condition	Negligible Not Significant

Summary of Residual Effects and Mitigation Measures

- 11.108 The release of GHG emissions from the enabling, demolition and construction of the Proposed Development (for both Phase 1 and 2) is assessed as Minor Adverse which is Not Significant. This takes account of the embedded mitigation and further mitigation / enhancement measures identified. These measures shall be secured by a CEMP.
- 11.109 The release of GHG emissions from the operation of the Proposed Development (for both Phases 1 and 2) is assessed as Negligible which is Not Significant. This takes account of the embedded mitigation measures identified which form part of the design of the proposals.

Assessment of Cumulative Effects

- 11.110 An assessment of cumulative effects has been scoped out as agreed at the Scoping stage.

Assessment of Significance Summary and Conclusions

- 11.111 This Chapter assesses the effects of the Proposed Development on Climate Change. In particular it identifies and assesses the likely significant effects resulting from and upon the Proposed Development regarding Climate Change and Greenhouse Gases (GHGs).

Summary of Baseline Conditions

- 11.112 The baseline operational emissions have been estimated as 649.74 tCO₂e/yr, which is considered to have a negligible impact locally and nationally.

Summary of Likely Significant Effects

- 11.113 For the Construction Phase, in accordance with the stated IEMA methodology, the project is evaluated to have a Minor Adverse effect that is Not Significant; it is in compliance with up-to-date policy and good practice guidance reduction measures, so is deemed to be compatible with the budgeted, science-based 1.5°C trajectory (in terms of rate of emissions reduction) i.e. the UK's net zero trajectory.
- 11.114 For the Operational Phase, the Proposed development is expected to have reduced operational emissions, compared to the baseline, of 355.75 tCO₂e/yr, thus having a similarly Negligible impact locally and nationally.

Summary of Mitigation and Enhancement Measures

- 11.115 Beyond the mitigation measures embedded into the design, additional mitigation and enhancement measures will be implemented through a Construction Environmental Management (CEMP) and through detailed design of Phase 2.

Conclusion

- 11.116 During Construction, in accordance with the stated IEMA methodology, the project is evaluated to have a Minor Adverse effect that is not significant; it is in compliance with up-to-date policy and good practice guidance reduction measures, so is deemed to be compatible with the budgeted, science-based 1.5°C trajectory (in terms of rate of emissions reduction) i.e. the UK's net zero trajectory.
- 11.117 As the Proposed Development's operational net GHG impacts are below zero and it causes a reduction in atmospheric GHG concentration, compared to the without-project baseline, the operational development is deemed to have a beneficial effect and a positive climate impact.

References

- ⁱ Bury Council (2018) Bury Local plan, Policy Directions. (last accessed 23/10/2023)
<https://www.bury.gov.uk/asset-library/bury-local-plan-policy-directions.pdf>
- ⁱⁱ Places for Everyone Joint Development Plan Document – Bolton, Bury, Manchester, Oldham, Rochdale, Salford, Tameside, Trafford, Wigan (August 2021) (last accessed 23/10/2023)
<https://www.greatermanchester-ca.gov.uk/media/4838/places-for-everyone.pdf>
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