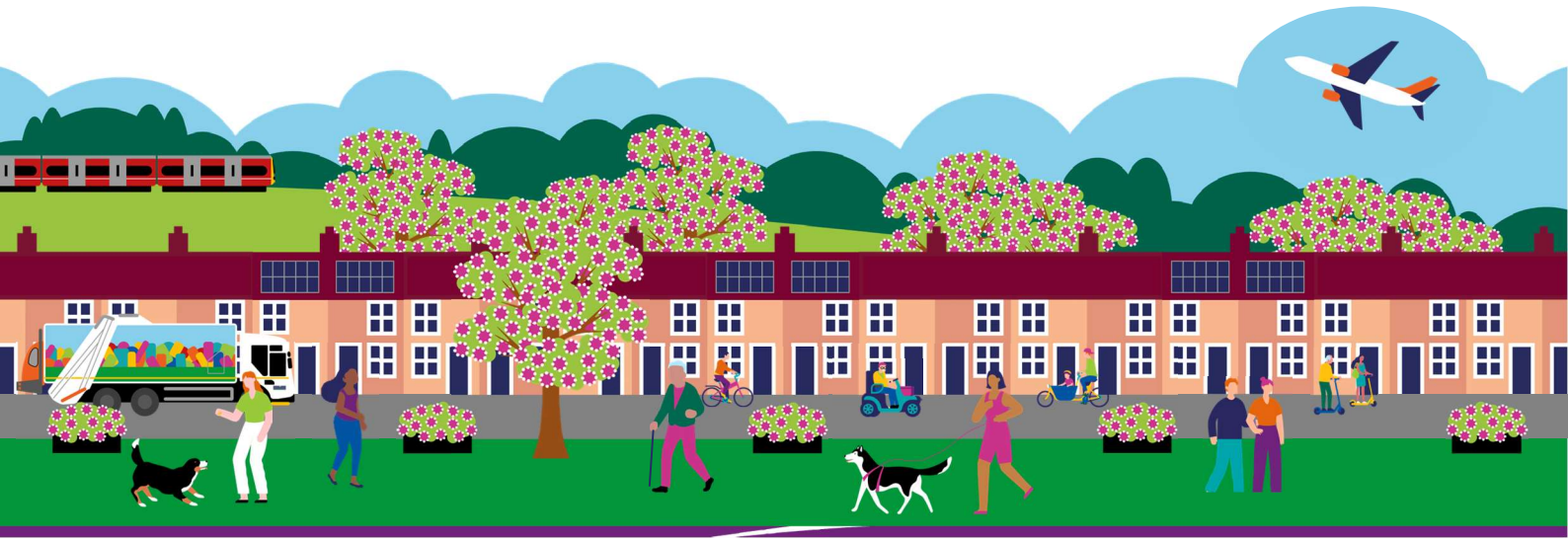
R&B Local Plan

Climate Change, Mitigation and Adaptation Study

Evidence Document

Reigate & Banstead Borough Council

September 2025



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New Local Plan Climate Change, Mitigation and Adaptation Study

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1. Introduction

1.1 Climate change has been identified as one of the single biggest challenges of our time. Mitigating and adapting to climate change and designing for low carbon infrastructure are vitally important to future local plans. The council as a Local Planning Authority has a legal duty to help meet the requirements of the Climate Change Act 2008 by ensuring that the Local Plan includes policies designed to mitigate and adapt to climate change.

1.2 The built environment is responsible for almost 40% of global carbon emissions, including buildings and infrastructure assets, and embodied and operational carbon (UNEP, 2022). In the UK, the UK Green Building Council (UKGBC) considers the built environment to be directly responsible for some 25% of the UK's consumption-based greenhouse gas (GHG) emissions (Arup & UKGBC, 2021). Professionals working in the development industry have a responsibility to work together to reduce this figure and identify where reductions in carbon emissions can be made. A consistent approach to measuring and reporting on carbon throughout the lifecycle of a built asset is key to achieving this.

1.3 The metric for assessing the climate change impacts of GHG emissions is global warming potential (GWP). GHGs include several gases that cause global warming, including carbon dioxide (CO_2), methane (CH4), nitrous oxide (N2O) and gases commonly used as refrigerants and insulation blowing agents. These gases each produce different levels of damage to the atmosphere, but are all expressed, for ease of use, in units of CO_2 equivalent over a 100-year timescale (CO_2e), often referred to as 'carbon impacts' or 'carbon'.

1.4 One of the recurring themes in this study is the aspiration by the UK and other governments to achieve net zero by 2050. Net zero means that the total greenhouse gas (GHG) emissions would be equal to or less than the emissions removed from the environment. This can be achieved by a combination of emission reduction and emission removal' (Office of National Statistics). Within net zero, the approach is always to maximize emissions reduction first before offsetting the remainder.

1.5 This document has been prepared to inform the emerging Reigate & Banstead local plan and builds on work being undertaken by the council as part of its Environmental Sustainability Strategy and Action Plan (2024), policies in the current local plan Core Strategy (2012) and Development Management Plan (2019) and the guidance included in the Climate Change and Sustainable Construction Supplementary Planning Document (2021).

Climate Change

1.6 Climate change is a global problem. Scientists the world over agree that the Earth's surface temperature is rising faster now than ever before. Most of this global warming has occurred in the past 40 years and is driven largely by CO_2 emissions caused by human activities.

1.7 According to the World Meteorological Organisation, the past ten years 2015-2024 are the ten warmest years on record. In 2024 average global temperatures exceeded 1.55°C above its pre-industrial level. This is the warmest year on record globally, and the first calendar year that the average global temperature exceeded 1.5°C.

1.8 In 2024, the annual average sea surface temperature (SST) over the extra-polar ocean reached a record high of 20.87°C, 0.51°C above the 1991–2020 average.

1.9 It is likely that everyone on the planet will be affected by climate change. Extreme weather events are becoming more frequent. Some places will see more droughts, while others may experience more storms or flooding.

1.10 Rising sea levels, lost habitats and failing crops would impact some places more than others but would change how we all live our lives in the future.

1.11 In the South East of England we can expect hotter summers and heatwaves to become more intense and lasting longer. Summer drought conditions will occur more frequently whilst winters will become wetter and milder. Heavy rainfall events that can lead to flash flooding are expected to become more frequent and intense across the country.

1.12 Such change will impact both our natural and built environments. As a result the government has directed all organisations to adapt to 2°C of change and plan for 4°C of change particularly for longer lived infrastructure, which will necessitate the use of adaptation pathways for planning.

Mitigation

1.13 Climate change mitigation (also known as decarbonisation) is the action to limit greenhouse gases in the atmosphere that cause climate change and to prevent further climate change. Such mitigation includes energy conservation and the move to renewable energy. Such actions, whilst fundamental, will only reduce global greenhouse gas emissions by 55%. The other 45% comes from embodied carbon and relates to how materials are used and managed through their whole lifecycle.

1.14 Whole Life-Cycle Carbon (WLC) emissions are the carbon emissions resulting from materials, construction and use over a building's entire life, including demolition and disposal. As operational carbon is reduced, embodied carbon will continue to grow in importance as a proportion of total emissions. According to the World Green Building Council, ‘Net zero embodied carbon should be pursued as part of a whole lifecycle approach to carbon reduction that includes net zero operational carbon. A net zero embodied carbon building (new or renovated) or infrastructure asset is highly resource efficient with upfront carbon minimised to the greatest extent possible and all remaining embodied carbon reduced or, as a last resort, offset to achieve net zero across the lifecycle’.

1.15 Reducing greenhouse gas emissions is vital to sustainable development. However, not all development must be net zero from construction to operation but there should be effective emission reduction pathways to contribute to the borough reaching net-zero.

Adaptation

1.16 Climate adaptation refers to the ability of a system to resist, recover from, and continue to develop despite climate-related shocks. Climate change itself refers to a change in the state of the climate that can be identified by changes in the mean and/or the variability of its properties and that persists for an extended period, typically decades or longer.

1.17 Due to climate change, the borough is likely to experience more frequent and extreme severe weather in addition to warmer and wetter winters, as well as hotter, drier summers. Resilience to these changes can be improved by avoiding adverse events, limiting their impact, or enhancing recovery.

1.18 Building climate resilience into local plans is key to adjusting to climate change. This does not mean that all new developments must be constructed to withstand all future climate variables, such as increased temperatures or decreased precipitation, but there should be effective mechanisms to build resilience to the impact of climate change in the design, management or operation of the development.

Purpose of this study

1.19 The purpose of this study is to assist the Council to help tackle climate change and its impact in the borough through the new local plan. The first part of this paper considers the international treaties and protocols, national legislation and local guidance relevant to climate change. The second part includes an assessment of the borough's greenhouse gas emissions. The third part considers the greenhouse gas emissions generated in Reigate and Banstead whilst the fourth section considers how the climate has been changing and what to expect as the climate changes during the 21st century and the different environmental risks. The fifth section considers ways to reduce emissions and adaptation to climate change, whilst the final section provides several policy options for the emerging local plan using the information included in this report.

2. Legislation and Policy Context

Introduction

2.1 Over the past 30 years significant legislation and policy has been introduced to limit and reduce greenhouse gas emissions. This has evolved as new evidence and longitudanal studies have been prepared and assessed with the result that more ambitious reduction targets have been set at the international level which have fed down to the national level. This legislation feeds down to the local level along with a range of required actions. This section reviews the different levels of legislation and policy.

International

The UN Framework Convention on Climate Change (UNFCCC) (1994)

2.2 This document provides the basis for international co-operation for action on climate change' Its overarching aim is to stabilise greenhouse gas emissions at a level which minimises the risks and impacts of a changing climate. This amounts to minimising the rise in average global temperatures to well below 2 degrees Celsius and ideally no higher than 1.5 degrees.

Cancun Adaptation Framework (2010)

2.3 This was the first formal agreement to establish principles and guidelines for decreasing the vulnerability of communities and ecosystems. Among the key agreements are the establishment of the Green Climate Fund, establishment of a new Technology Mechanism and Agreement on a Framework to Reduce Deforestation.

2.4 Signed by 195 nations and ratified by 170 including the UK, the agreement applies to the period beyond 2020 and has three key objectives:

(a) Holding the increase in the global average temperature to well below 2°C above pre-industrial levels and to pursue efforts to limit the temperature increase to 1.5 °C above pre-industrial levels, recognising that this would significantly reduce the risks and impacts of climate change.

(b) Increasing the ability to adapt to the adverse impacts of climate change and foster climate resilience and low greenhouse gas emissions development, in a manner that does not threaten food production; and

(c) Making finance flows consistent with a pathway towards low greenhouse gas emissions and climate-resilient development.

Glasgow Climate Pact (2021)

2.5 Strengthened efforts to build resilience to climate change, further curb greenhouse gas emissions and to provide the necessary finance for both initiatives. Included was a commitment to halt and reverse forest and land degradation; phase down coal power; and decarbonise shared shipping routes.

Kyoto Protocol (2005, updated in 2020)

2.6 The protocol commits 192 industrialised countries and economies in transition to limit and reduce greenhouse gas (GHG) emissions in accordance with agreed individual targets. The Convention asks those countries to adopt policies and measures on mitigation and to report on them periodically.

National Legislation

2.7 National planning legislation has been introduced to enable both plan-making and decision-making to support reaching the UK's national commitments.

Climate Change Act 2008

2.8 The Climate Change Act 2008 includes in section 5 a statutory target to reduce UK carbon emissions by at least 100% by 2050, compared to 1990 levels. To help achieve this, the government has set five-yearly 'carbon budgets' for the UK (See below).

2.9 The Act also requires UK Climate Change Risk Assessments which set out the latest evidence on the risks posed by climate change. The most recent of these was published in May 2024. Outputs from the Climate Change Act provide an evidence base that can help to identify priorities for action at the local level. The carbon budget directly relates to local plans.

Planning Act 2008

2.10 Section 182 of the Planning Act 2008, which amended the Planning and Compulsory Purchase Act (2004), places a legal duty on local authorities to include policies on climate change mitigation and adaptation in their local plans.

Planning and Energy Act 2008

2.11 This Act introduced powers for local authorities to require a proportion of the energy used in relation to new development to be sourced from renewable and low carbon sources local to the development area. It also enabled local authorities to require building energy efficiency standards that exceed those required by Building Regulations.

Levelling-up and Regeneration Act (LURA) 2023

2.12 Schedule 7 (15C) of the Levelling-up and Regeneration Act (LURA) 2023 further amended Section 19 of the Planning and Compulsory Purchase Act 2004 requiring that: 'The local plan must be designed to secure that the use and development of land in the local planning authority's area contribute to the mitigation of, and adaptation to, climate change.' This obligation makes clear that local plans must contribute towards meeting the carbon reduction target set by the national carbon budget of 78% by 2035 and the net zero by 2050 target.

Environment Act 2021

2.13 This introduced many of the ambitions set out in the 25 Year Environment Plan into law, including the requirement for development to achieve a 10% net gain in biodiversity. The Act also introduced Local Nature Recovery Strategies, which are spatial strategies for protecting and enhancing the natural environment and introducing(?) nature-based solutions for helping to address climate change.

Flood and Water Management Act 2010

2.14 This Act addresses both flood risk and water scarcity. It aims to minimise the impact of flood events and established the role of Lead Local Flood Authorities, which are local authorities responsible for managing local sources of flood risk in their regions, including surface water runoff, groundwater and ordinary watercourses.

Neighbourhood Planning Act 2017

2.15 While strengthening the powers of neighbourhood plans, this Act requires local authorities to set out the strategic priorities for their area. This approach is important

for tackling climate change as it supports longer-term planning on issues such as renewable energy and adaptation to its impacts.

National Policy

National Planning Policy Framework (NPPF) Dec 2024

2.16 The National Planning Policy Framework (NPPF) sets out the key national planning priorities for England. The most recent update was in December 2024 and is an important consideration for local planning authorities when producing local development plans and making planning decisions. Paragraph 161 of the NPPF states that "the planning system should support the transition to a low carbon future in a changing climate…It should help to: shape places in ways that contribute to radical reductions in greenhouse emissions, minimise vulnerability and improve resilience; encourage the reuse of existing resources, including the conversion of existing buildings; and support renewable and low carbon energy and associated infrastructure."

2.17 Paragraph 163 continues by underlining the responsibility of local authorities to take a proactive approach to mitigating and adapting to climate change impacts.

2.18 In relation to tackling climate change the NPPF includes policy on:

- achieving sustainable development.
- climate change mitigation, renewable energy generation and sustainable energy use.
- mitigation and transport emissions; and
- adaptation to climate change.

2.19 Paragraph 168 states that: "When determining planning applications, local planning authorities should:

a) not require applicants to demonstrate the overall need for renewable or low carbon energy, and give significant weight to the benefits associated with renewable and low carbon energy generation and the proposal's contribution to a net zero future;

b) recognise that small-scale and community-led projects provide a valuable contribution to cutting greenhouse gas emissions;

c) in the case of applications for the repowering and life-extension of existing renewable sites, give significant weight to the benefits of utilising an established site.

Planning Practice Guidance

2.20 The Planning Practice Guidance provides additional guidance on aspects of the NPPF. In relation to tackling climate change, relevant sections include those titled: climate change; air quality; renewable and low carbon energy; flood risk and coastal change; waste; and water supply, wastewater and water quality.

UK Clean Growth Strategy 2017

2.21 Under the Climate Change Act 2008, the UK Government is required to publish a set of policies and proposals to ensure that the UK meets its legally binding carbon budgets on the way to net zero by 2050. The Clean Growth Strategy sets out the Government's plans. The strategy presents a comprehensive set of policies and proposals to help accelerate the pace of 'clean growth'. These include policies to improve business and industry efficiency, improve energy consumption in homes, accelerate the shift to low carbon transport, deliver clean, smart and flexible power, enhance the benefits and value of the UK's natural resources, reduce carbon emissions in the public sector, and demonstrate Government leadership in driving clean growth.

25 Year Environment Plan 2023

2.22 First published in 2018 and updated in 2023, the 25 Year Environment Plan is the Government's plan to improve England's natural environment, setting out their approach over a 25 year period. It sets a range of targets to improve the quality of the natural environment, including on improving air and water quality, supporting the thriving of plants and wildlife, reducing the risks of harm from environmental hazards, using resources from nature more sustainably and efficiently, enhancing beauty, heritage and engagement with the natural environment, mitigating and adapting to climate change, minimising waste, managing exposure to chemicals and enhancing biosecurity.

Powering Up Britain (2023)

2.23 An updated series of government commitments were published on 30 March 2023. This followed the independent review of net zero (see paragraph 1.4) and a High Court judgment which required the government to outline how its policies would meet the 2050 net zero target.

2.24 The overarching strategy document, Powering Up Britain, includes the government's policy response to the Climate Change Committee progress report, the Skidmore independent review, the net zero growth plan, energy security plan and carbon budget delivery plan. This suite of documents acted as an update to the broader net zero strategy. Wider publications included:

- The Green finance strategy,
- The 2030 strategic framework for international climate and nature action,
- UK international climate finance strategy, and
- The Net Zero Research and Innovation Delivery Plan for 2022-2025

Future Homes and Future Buildings Standards 2025

2.25 The government have been consulting on the Future Homes and Future Buildings Standards 2025. These proposals would update Part L and Part F of Building Regulations for new residential dwellings, and would require all new-build homes to produce 75-80% less carbon emissions than homes built under previous Building Regulations. The proposed standard aims to decarbonise new homes by focussing on improving heating and hot water systems and reducing waste heat.

Written Ministerial Statement Planning- Local Energy Efficiency Standards Update (13 December 2023)

2.26 The Written Ministerial Statement (WMS) Planning – Local Energy Efficiency Standards Update replaced the 2015 WMS which was found unlawful through a successful legal challenge. The 2023 WMS represents current national policy, and seeks to constrain local authorities in setting energy efficiency standards that go beyond current Building Regulations, and by directing local authorities, where they do set higher standards, to express these 'as a percentage uplift of a dwelling's Target Emissions Rate (TER) calculated using a specified version of the Standard Assessment Procedure (SAP).'

2.27 To date the WMS has been unsuccesfully challenged in the courts though open legal advice from Essex County Council prepared by Estell Dehon KC dated 28 April 2023 and updated in February 2024. This establishes the legal justification through the Planning and Energy Act 2008 for requiring higher targets for energy performance

standards for development than the national baseline and can be relied upon by local planning authorities in open fora, such as public inquiries and local plan examinations.

2.28 Since the WMS was published in 2023, a number of local plans have been independently examined and have been permittted to retain higher targets, including the London Borough of Merton Local Plan adopted December 2024.

Carbon Budgets

2.29 The UK has committed to a 68% reduction in GCG by 2030. The Climate Change Committee (CCC) prepare five-yearly carbon budgets which currently run until 2037. These budgets place a limit on the amount of greenhouse gases the UK can legally emit during each of the five-year time periods. The UK is currently in the fourth carbon budget period (2023-2027), which requires a 52% reduction in emissions from 1990 levels. This was agreed by the government in June 2011. The fifth carbon budget will cover the period from 2028-2032 and will set at a 57% reduction on 1990 emission levels. This builds naturally on the 4th carbon budget. A seventh carbon budget was published by the CCC in February 2025 and seeks an 87% reduction or 90% lower where emissions from international aviation and shipping are excluded. See Table 4.1.

Table 2.1 Carbon Budget Reductions against 1990 levels

Budget	Period	Carbon Budget Level	Reduction below 1990 levels
First Carbon Budget	2008-2012	3,018 $MtCO_2e$	25%
Second Carbon Budget	2013-2017	2,782 $MtCO_2e$	31%
Third Carbon Budget	2018-2022	2,544 $MtCO_2e$	37%
Fourth Carbon Budget	2023-2027	1,950 $MtCO_2e$	51% by 2025
Fifth Carbon Budget	2028-2032	1,725 $MtCO_2e$	57% by 2030
Sixth Carbon Budget	2033-2037	965 $MtCO_2e$	78% by 2035
Seventh Carbon Budget	2038-2042	535 $MtCO_2e$	87% by 2040

Net Zero Strategy: Build back Greener 2021

2.30 Sets out the Government's vision for transitioning to a net zero economy, building on the sectoral plans published in 2020/21. Policies for achieving net zero by 2050, include:

- Ending the sale of new petrol and diesel cars and vans by 2030,
- Powering the UK entirely with clean electricity by 2035,
- Providing grants to upgrade home heating systems from gas boilers to heat pumps and other low-carbon heating systems, and
- Tripling the rate of woodland creation in England, planting at least 30,000 hectares of new woodland per year.

National Guidance

2.31 In 2019, the UK Climate Change Committee (CCC) released two reports of relevance: 'UK Housing: Fit for the future?' and 'Net Zero – The UK's contribution to stopping global warming'. In 2020, the CCC followed up with three further key publications: 'The Sixth Carbon Budget - The UK's path to Net Zero' (2020), 'Local Authorities and the Sixth Carbon Budget' (2020) and 'Land use: Policies for a Net Zero UK' (2020).

2.32 The CCC Housing Report 2019 notes that the UK housing stock is not contributing sufficiently to emissions reductions and that without the near-complete elimination of greenhouse gas emissions from buildings, national climate targets will not be met. Progress to date in reducing building emissions has been slow; and energy use in homes - which accounts for 14% of total UK emissions - increased between 2016 and 2017. The report also found that measures to adapt the UK housing stock to climate risks are not being implemented fast enough or at the required level.

2.33 The critical need for local authority-level action is reinforced in the CCC's 'Local Authorities and the Sixth Carbon Budget' report (2020). It identifies that while emissions reduction progress to date has largely been driven through central policy to phase out coal for electricity production, more than half of the emissions cuts needed to comply with the Sixth Carbon Budget rely on people and businesses taking up low-carbon solutions. These decisions - such as installing low-carbon heating or switching

to an electric vehicle - are made at a local and individual level, and often depend on having supporting infrastructure and systems in place. Local authorities have a key enabling and encouraging role in this behaviour change. Moreover, through their duties and powers, the report finds that local authorities have power or influence over roughly one third of emissions within their local area.

Planning Practice Guidance

2.34 The Planning Practice Guidance (PPG) provides additional guidance to support the understanding and implementation of the NPPF. The section on climate change states: 'Addressing climate change is one of the core land use planning principles which the National Planning Policy Framework expects to underpin both plan-making and decision-taking'. The PPG provides advice on how to identify suitable mitigation and adaptation measures in the planning process to address the impacts and causes of climate change. The PPG provides examples of how local plans can mitigate climate change by promoting a reduction in emissions, as well as adapting to climate risks including:

- Reducing the need to travel and providing for sustainable transport.
- Providing opportunities for renewable and low carbon energy technologies e.g. through district heating networks that include tri-generation (combined cooling, heating and power).
- Providing opportunities for decentralised energy and heating e.g. maximising summer cooling through natural ventilation in buildings.
- Promoting low carbon design approaches to reduce energy consumption in buildings, such as passive solar design.
- The provision of multi-functional green infrastructure; and
- Considering future climate risks when allocating development sites to ensure risks are understood over the development's lifetime.

2.35 The Renewable and Low Carbon Energy guidance expands upon paragraph 165 of the NPPF, which states that plans should maximise the potential for renewable

energy generation. The guidance sets out how local plans should account for renewable and low carbon energy and heat, including through the provision of a positive strategy on such matters, and consider the identification of suitable areas for energy generation and supporting infrastructure. The guidance acknowledges that community led renewable energy initiatives are likely to play an increasingly important role and that these should be encouraged as a way of providing positive local benefit from renewable energy development. It follows on to suggest that local planning authorities may wish to establish policies which give positive weight to renewable and low carbon energy initiatives which have clear evidence of local community involvement.

Building Regulations

Electric Vehicle Charge-points

2.36 Measures, introduced in June 2022, form Part S of the Building Regulations and now require:

- Every new home, including those created from a change of use, with associated parking within the site boundary to have an electric vehicle charge-point
- Residential buildings undergoing major renovation, which will have more than 10 parking spaces within the site boundary after the renovation is complete, to have at least one electric vehicle charge point for each dwelling with associated parking within the site boundary and cable routes in all spaces without charge points
- All new non-residential buildings, with more than 10 parking spaces within the site boundary of the building, to have a minimum of one charge point and in addition to this, cable routes for one in five of the total number of spaces
- All non-residential buildings undergoing a major renovation, which will have more than 10 parking spaces within the site boundary after the renovation is complete, to have a minimum of one charge point and, in addition to this, cable routes for one in five spaces.

Local Policy and Guidance

Surrey's Greener Future Delivery Plan 2020-2050 (2019)

2.34 This document sets out the joint ambition and collective commitment across Surrey to reduce GHG emissions across organisations, transport, energy generation, housing, and planning, building and infrastructure, waste, resources and circular economy, land use and food systems, industry, and green economy. It is designed to enable councils to meet net zero by 2050 in accordance with the Climate Change Act. It provides a framework from which boroughs' and districts' climate action plans are delivered.

Surrey Climate Change Strategy 2020

2.36 The Surrey Climate Change Strategy is a shared ambition by Surrey's 12 local authorities. It sets a number of ambitions and targets that seek to achieve net zero by 2050. See Table 2.2. The targets are predominantly set in this strategy to be achieved by 2035 with future updates planned.

Table 2.2 Surrey Climate Change Strategy Ambitions and Targets (2020)

Ambitions	Targets
Organisation Emissions: Achieve net zero carbon local authorities that lead by example in promoting sustainable practices across their operations, estate, and vehicles.	Net Zero Carbon For Surrey's organisational emissions by 2030 or sooner.
Transport: Deliver and promote an integrated, accessible, affordable and reliable public and active (walking or cycling) transport system across the County, thereby reducing journeys and improving local air quality for improved health and wellbeing of our residents.	60% Emissions reduction in the Transport sector by 2035 against BAU as a minimum.

Ambitions	Targets
Energy Generation: To support the national decarbonisation ambition by leading renewable energy generation expansion and bringing low carbon heating into Surrey homes through smart, decentralised systems.	15% Of energy from solar PV by 2032.
Housing and Planning: To create low carbon, healthy homes for our residents that reduce emissions, have lower running costs and improve the wellbeing of our community.	66% Emissions reduction across commercial and public buildings sector by 2035 against BAU as a minimum.
Buildings and Infrastructure: To drive forward the transition to a zero carbon built environment, through the pursuit of lower operational energy use, increased supply of renewable energy to Surrey's buildings and reduced embodied carbon – the GHG emissions associated with non-operational phases e.g. construction.	61% Emissions reduction across commercial and public buildings sector by 2035 against BAU as a minimum.
Waste, Resources and Circular Economy	70% Of all local authority collected waste reused, composted or recycled by 2030.

Ambitions	Targets
Land Use and Food Systems: Develop a land use framework for Surrey focused on increasing accessible green spaces, woodland cover in appropriate locations in line with national targets and sustainable farming practices.	1.2 million Trees planted by 2030.
Industry and Green Economy: Pursue the transition to clean growth, through the decarbonisation of all major sectors and investment in the development of clean technologies and industries that create jobs and improve the quality of life for our residents.	56% Emissions reduction across industry by 2035 against BAU as a minimum.

Surrey Climate Change Adaptation and Resilience Strategy 2023

2.37 Also known as Surrey Adapt, this stategy builds on the Climate Change Strategy (2020). It seeks to move away from focusing on climate extremes as one-off events and instead treat them as the new normal developing infrastructure, services, ecosystems, communities and economies to co-exist with climate change.

2.38 The goal of this strategy is to adapt to a world 2°C warmer, and preparing for scenarios up to +4°C, for long lived infrastructure and long-term decision making. The goal is backed by climate science and reflects central government advice. It still means however, that the councils will continue to pursue Net Zero commitments, ambitions, goals and deadlines as stated in the broader Surrey Climate Change Strategy and Implementation Plans.

2.39 Surrey Adapt is based on 9 principles including:

- Leave no-one behind: Focusing climate resilience resources on the most vulnerable communities and people, so that climate impacts are not further entrenching inequalities, and undermining development gains.

- Enabling, Empowering and Working Together: Enabling communities, businesses, and government partners to understand climate change hazards, impacts and risks. To work collaboratively to reduce those risks and manage the immense change that lies ahead of us in our collective future.
- Complex Systems Thinking: Managing complex systems and risks that impact across systems requires both a central coordinating strategy as well as integration into other strategies.
- Adaptive Planning: Planning for both short- and long-term changes related to climate change will require Adaptation Pathways which allow us to sensitivity check how the climate is changing and if we need to change our response pathways over time.
- Science-Based: Ensuring we are utilising the latest climate science in risk registers. Supporting this with modelling and scenario planning as required.
- Embrace Innovation: Enabling innovation so that new adaptation actions can be tried and tested.

2.40 There are 9 Priority Programmes for delivery including:

- Climate resilient organisations
- Partnerships for resilience
- Climate resilient biodiversity and natural resource
- Climate resilient land use, agriculture and food system
- Climate resilient and healthy communities
- Climate resilient buildings and planning
- Climate resilient transport, energy and infrastructure
- Climate resilient water resources
- Climate resilient economy

Surrey 2050 Place Ambition 2019

2.41 This document is used to help shape projects and seek the support of wider sub-national partners and government, particularly in relation to accessing additional

funding and investment opportunities for infrastructure and to support a zero-carbon future.

Surrey County Council Local Transport Plan 4 (2022)

2.37 The Local Transport Plan (LTP4) sets out plans for transforming the transport network in Surrey from 2022 up to 2032 and beyond. LTP4 aims to significantly reduce carbon emissions from transport to achieve net zero emissions by 2050, in line with the national policy. There are 4 objectives including:

- Net zero carbon emissions
- Sustainable growth
- Well-connected communities
- Clean air and excellent quality of life.

2.38 To achieve these objectives, three principles will be followed including:

- **Avoid** unnecessary travel by reducing the number and length of trips needed.
- **Shift** travel choices to more sustainable modes of transport, including public transport, walking and cycling, away from car use.
- **Improve** the energy efficiency of vehicles and operational efficiency of roads through technology improvements.

Surrey Viability Toolkit May 2024

2.39 Concerns over current Building Regulations not being sufficiently stringent to achieve net zero resulted in the Surrey authorities undertaking a study to inform planning policies that deliver buildings which exceed minimum national standards and meaningfully address the effects of climate change.

2.40 The viability study quantified the impact on development viability of alternative net zero carbon, low energy pathways on residential and non-residential development using the preferred policy route – Absolute Energy Targets which will result in developments with lower energy consumption than those using the Target Emission Rate approach. Option A proposed setting the Energy Use Intensity (EUI) at a level sufficient to minimise energy use and to require PVs to match the EUI.

2.41 Proposed levels suggested include:

- **35kWh/m^2_{GIA} for domestic**
- **70 kWh/m^2_{GIA} for offices**
- **70 kWh/m^2_{GIA} for schools**
- **35 kWh/m^2_{GIA} for industrial buildings**
- **160 kWh/m^2_{GIA} for hotels**

2.42 By working out the difference between the energy used by the development and how much renewable energy it can generate, any shortfall of renewable energy generation could result in an offset payment.

2.43 For residential schemes the scheme modelled five development scenarios reflective of the Surrey built environment. Schemes from 6 to 260 dwellings were tested in a range of house and flatted schemes and modelled as greenfield and/ or brownfield developments.

2.44 Local and national policies were taken into account and three broad market areas were identified across the county.

2.45 The results of the residential viability modelling demonstrated good general viability and that most development in Surrey would be able to absorb the additional costs of achieving net zero. The one exception was very tall blocks of flats.

2.46 For non-residential development, the requirement for higher standard development was found not to have an impact on the delivery, except in the most marginal circumstances. However, there is a case for considering separate standards for industrial buildings in order to reduce the risk to delivery.

2.47 To adopt net zero policies local authorities will need to carry out their own area-wide viability assessment taking into account specific local costs, land values, variances in house prices and local policy objectives.

Reigate & Banstead's Local Plan: Core Strategy 2012

2.48 The Local Plan: Core Strategy includes several Strategic Objectives of which No.10 states; 'To require that developments conserve natural resources, minimise

greenhouse gas emissions and help to reduce waste, and are adaptable to climate change (including the risk from flooding)'.

2.49 This Strategic Objective is amplified in Policy CS10 and CS11. Policy CS10: Sustainable Development, section 9 states that development will 'Be designed reflecting the need to adapt to the impacts of climate change (for example higher temperatures, increased flooding, increased pressure on water resources, impacts on ecology and built heritage and impacts on ground conditions). Section 10 continues: 'Be located to minimise flood risk, through the application of the Sequential Test and where necessary the Exception Test, taking account of all sources of flooding including fluvial, surface water, sewer and pluvial flooding, and reservoir failure, and manage flood risk through the use of SuDS and flood resistant/resilient design features, and where necessary provide floodplain compensation.'

Reigate & Banstead Development Management Plan 2019

2.50 Section 4 of the Development Management Plan deals with climate change resilience and flooding. Policy CCF1: Climate change mitigation states:

1. New residential developments must:
    a. Meet the national water efficiency standard of 110 litres/person/day.
    b. Achieve not less than a 19% improvement in the Dwelling Emission Rate (DER) over the Target Emission Rate (TER) as defined in Part L1A of the 2013 Building Regulations.
2. New non-residential developments of 1,000 square metres or more of gross floorspace should include renewable or low-carbon energy generation to provide 10% of the expected energy usage of the development, unless it can be demonstrated not to be viable. This could be through renewable energy technologies (i.e. solar photovoltaics), implementation of or connection to a district heating network, or any other method that demonstrably reduces carbon emissions from energy usage.

3. The Council will support developments that make provision for on-site micro-generation.
4. The design of buildings should maximise opportunities for energy saving (e.g. orientation of the building to achieve solar gain), unless this conflicts with other policies.
5. The use of sustainable construction methods and materials will be encouraged.

2.51 The supporting text to Policy CCF1 emphasises that: 'The borough has a role to play in mitigating climate change, including by contributing to national targets to reduce carbon emissions. However, since the policy was adopted the Building Regulations have been updated and there are new considerations such as embedded carbon and tougher national requirements that would need to be reflected in an updated policy.

2.52 Development Management Plan Policy CCF 2 considers flood risk. It states:

1. Development proposals must avoid areas at risk of flooding where possible and prioritise development in areas with the lowest risk of flooding. The Sequential Test shall be undertaken for developments in Flood Zones 2 and 3 except where exempt in accordance with the requirements of the NPPF and Planning Practice Guidance. Development will not be permitted if there are reasonably available sites appropriate for the proposed development in areas with a lower probability of flooding. Where necessary the Exception Test must also be satisfied in line with national guidance.

2. Sites within Flood Zones 2 and 3, sites within Flood Zone 1 which are greater than 1 hectare in area, and sites with critical drainage problems or where a proposed development will result in a vulnerable development being subject to other sources of flooding, will be required to carry out a site-specific Flood Risk Assessment (appropriate to the scale of the development). Where a Flood Risk Assessment is required, it should:

a. take account of the impacts of climate change over the lifetime of the development
b. demonstrate that the development will be safe for its lifetime taking account of the vulnerability of the proposed use; and
c. take account of the advice and recommendations set out in the Council's Strategic Flood Risk Assessment.

3. Proposals must not increase the existing and future risk of flooding elsewhere. Where possible, proposals should seek to secure opportunities to reduce both the cause and impact of flooding for existing and proposed development.

4. Development should reduce surface water run-off rates using Sustainable Drainage systems where necessary, suitable to the scale and type of development. Where Sustainable Drainage Systems are proposed, schemes should include appropriate arrangements for the ongoing maintenance for the lifetime of the development.

2.53 The policy is designed to ensure that 'new development is designed safely and will not worsen the risk of flooding for others.' Reference is made to the 2017 Strategic Flood Risk Assessment and the advice it contains. This was superseded in the 2025 SFRA which includes the Environment Agency's 2025 revised mapping methodology and revised climate change allowances.

Reigate and Banstead Corporate Plan 2025

2.54 The council's five year corporate plan includes an objective to reduce its own environmental impact, support residents and businesses to do the same, and to make sure our activities increase the borough's resilience to the effects of climate change.

Reigate and Banstead Environmental Sustainability Strategy 2024

2.55 The strategy is an update to the 2020 strategy that supported the Corporate Plan above and explains how the council is committed to reducing its own environmental impact and reducing its carbon footprint, and providing support for residents and businesses to do likewise. The Strategy Action Plan includes five themes with associate objectives. The themes cover

1. Energy and Carbon
2. Low Impact Consumption (Considers waste reduction)
3. Natural Environment
4. Climate Change Adaptation and Resilience
5. Effective Implementation which includes capacity building and partnership working

Reigate and Banstead Climate Change and Sustainable Construction Supplementary Planning Guidance (2021)

2.56 This document provides advice on how to make different types of new development more resilient and adaptable to climate change and to reduce greenhouse gas emissions. The Guidance:

- Identifies design and energy-saving/efficiency measures that can result in a development minimising greenhouse gas emissions and energy use and waste and creating places that are amenable to biodiversity and adaptable to a changing climate (including through the integration of green infrastructure).

- Provides guidance on renewable and low-carbon energy solutions for reduced reliance on fossil fuels and finite energy sources, and for efficient use of national grid energy.
- Considers potential solutions to water shortages and efficiency requirements.
- Addresses the materials and methods used in construction; and

- Provides clear guidance for anyone applying for planning permission, or wishing to comment upon a planning application, as well as providing a consistent approach to assessing planning applications.

Summary

2.57 Policy at the international, national and local level is broadly aligned in terms of reducing carbon emissions by 2050 to net zero with a range of actions to be implemented at the local level. However, as they stand current policies will not fully deliver net zero buildings in line with national and regional climate net-zero targets. To this end local plans, when supported by robust evidence, have an important part to play to ensure that net zero developments are delivered. The Surrey Net Zero Development Viability Toolkit provides evidence in what circumstances this could be achieved. The current local plan Policy CCF1 needs to be updated to better reflect recent policy changes particularly with regard to local mitigation measures and how the borough will adapt to the impacts of climate change of up to +4^{O}Celsius.

3 Greenhouse gas emissions

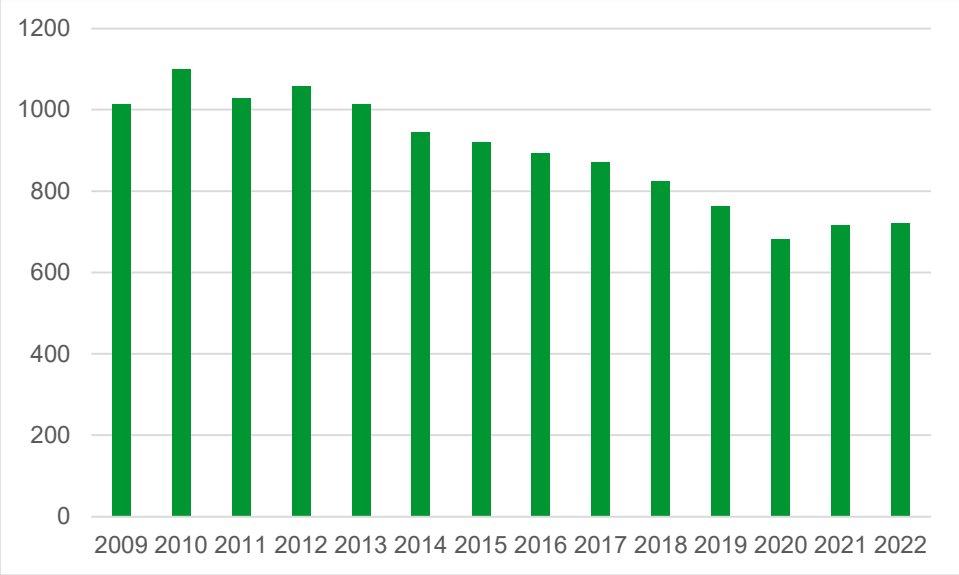
3.1 Built environment carbon impacts are mostly attributable to either operational or embodied carbon emissions. Operational carbon impacts result from energy and water consumption in the day-to-day running of a built asset, be it a building or infrastructure asset. Embodied carbon impacts arise from sourcing, manufacturing and installing the materials and components that make up a built asset, and include the lifetime emissions from maintenance, repair, replacement and ultimately their demolition or deconstruction, waste treatment and disposal. In addition, there are also user carbon impacts from the activities of the users of a built asset, outside of the use of energy and water used to operate the asset, for example the impact of commuting to an office building or the impact of vehicles using a road, which produce further user-related emissions.

3.2 Together, operational, embodied and user carbon are known as whole life carbon (WLC). The UN Environment Programme estimated that in 2021, embodied carbon was responsible for some 12% and operational carbon approximately 28% of global CO_2 emissions.

Greenhouse Gas Emissions in Reigate & Banstead

3.3 This section considers the greenhouse gas emissions (GHG) in Reigate & Banstead. The local data on this issue comes from a study prepared by the Department for Energy and Net Zero (formerly known as the Department for Business, Energy and Industrial Strategy (BEIS)). The study uses 2022 as a base year as this is the most recent year for which data is available from government. However, because of the Covid pandemic and associated lockdowns in 2020 and 2021, there are some data anomalies during that period and even in 2022 activity levels were still returning to a new norm. See Figure 3.1 below.

Figure 3.1 Reigate & Banstead Emission Changes ($ktCO_2e$) 2009 to 2022



Source: https://www.gov.uk/government/statistics/uk-local-authority-and-regional-greenhouse-gas-emissions-statistics-2005-to-2022

3.4 In 2022 there were 719.8 Kt of greenhouse gas emissions in the borough, equivalent to 4.7 tCO_2e per capita. Between 2012 and 2022 during the life of the current local plan, emissions reduced by 31.9%.

Emissions by Sector

3.5 Reigate & Banstead emissions are broken down by sector as shown below in Table 3.1.

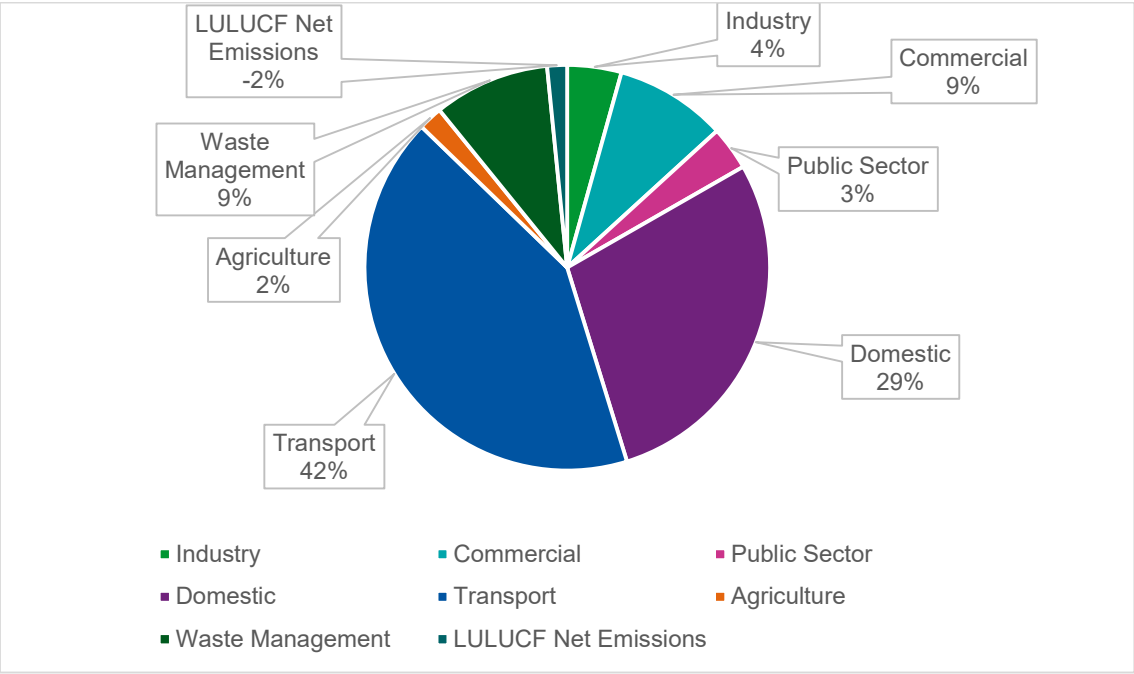
Table 3.1 Reigate & Banstead Emissions by Sector 2022

Sector	Emissions ($ktCO_2e$)
Industry	32.1
Commercial	66.2

Sector	Emissions ($ktCO_2e$)
Public Sector	26
Domestic	212.2
Transport	312.4
Agriculture	14.2
Waste Management	68.8
LULUCF Net Emissions	-11.9
TOTAL	**719.8**

Source: https://www.gov.uk/government/statistics/uk-local-authority-and-regional-greenhouse-gas-emissions-statistics-2005-to-2022

Figure 3.2 Reigate & Banstead Sector Emissions ($ktCO_2e$) 2022



Source: https://www.gov.uk/government/statistics/uk-local-authority-and-regional-greenhouse-gas-emissions-statistics-2005-to-2022

3.6 Figure 3.2 above identifies the share of emissions by different sectors. The most significant contributor to total borough emissions is the transport sector, which contributed 42%, the equivalent to 312.4 $ktCO_2e$, in the baseline year. Emissions from the domestic sector account for 29% (212.2 $ktCO_2e$). When combined these two sectors are responsible for over 76% of total emissions in the borough.

3.7 Emissions from the commercial, industry and public sectors make contributions of 9%, 4% and 3% respectively, while waste management and agriculture account for 9% and 2%. Cumulatively, these non-domestic sectors account for 207.3 $ktCO_2e$ (27%) of emissions in the borough. However, the land use, land use change and forestry (LULUCF) sector helped to reduce emissions by -11.9 $ktCO_2e$ (-2%).

Priority Areas

Heat and Power

3.8 Gas used to heat the domestic, commercial, industrial and public sectors accounted for 191.6 $ktCO_2e$, equivalent to 26.2% of the borough's total emissions in 2022. 80% of these emissions, or 153.6 $ktCO_2e$, were generated through domestic gas use to heat people's homes. This is the equivalent of 21.3% of the borough's total emissions.

3.9 Electricity use in the domestic, commercial, industrial and public sectors accounted for 116.1 $ktCO_2e$, equivalent to 16.1% of the borough's total emissions in 2022. The domestic sector electricity consumption accounted for 50.2 $ktCO_2e$ or 6.9% of the borough's total emissions, with the commercial sector accounting for 48.1 $ktCO^2e$ or 6.7% of the borough's emissions.

3.10 When gas and electricity consumption are combined in the borough, they are the source of 307.7 $ktCO_2e$ of carbon emissions or 42.7% of GHG emissions.

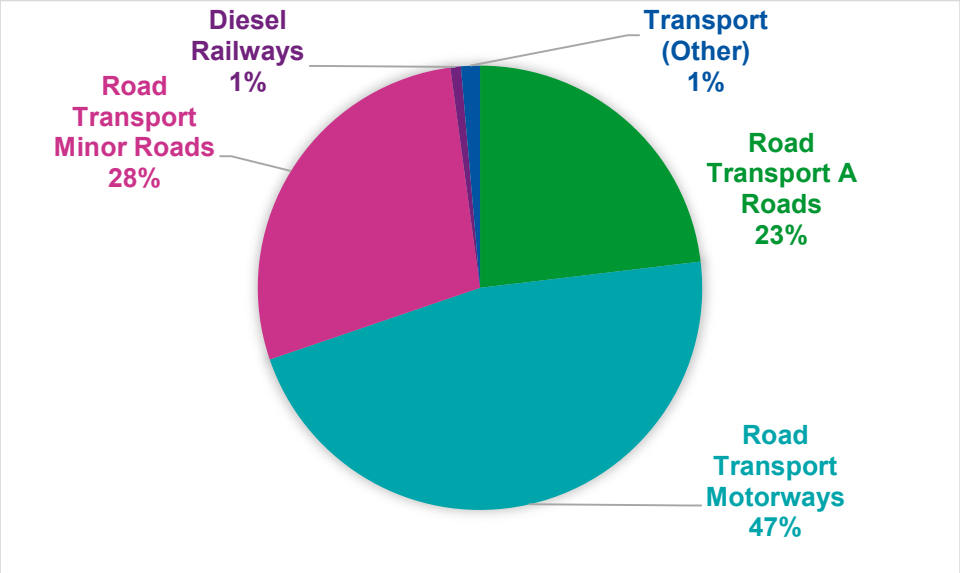
3.11 Reducing carbon from heating and powering buildings is key for Reigate & Banstead to achieve net zero by 2050.

Transport

3.12 The emissions from the transport sector account for 312.4 $ktCO_2e$ or 42% of the borough's total emissions. Reducing these emissions is a high priority in achieving net zero. Figure 3.3 illustrates the emissions from different elements of the transport sector. The most significant contributor is the traffic on the motorways which accounts for 145.7 $ktCO_2e$ or 20.2% of the borough's total emissions or 47% of transport emissions. This is not surprising given the presence of the M25 cutting across the borough.

3.13 The minor roads and A roads account for 160 $ktCO_2e$ or 72.2% and 87.8% respectively, whilst diesel trains and other transport emissions generate 2.4 $ktCO^2e$ and 4.3 $ktCO_2e$ respectively or 6.7% of transport related emissions.

Figure 3.3 Reigate & Banstead Transport GHG Emissions (%s)



Source: https://www.gov.uk/government/statistics/uk-local-authority-and-regional-greenhouse-gas-emissions-statistics-2005-to-2022

3.14 Transitioning transport away from using the internal combustion engine (ICE) to electric and hydrogen non carbon solutions and sustainable transport modes will be fundamental to reducing GHG emissions. This will come from a combination of national policy such as the ban from sale of new ICE vehicles (due in 2030), increasing the vehicle licence fee on remaining ICE vehicles based on their exhaust emissions and local planning policies that support electric vehicle infrastructure, active travel and public transport.

Challenges

Domestic

3.15 Accelerating the move away from mains gas to heat people's homes will be a significant challenge. Government are incentivising schemes for residents to switch away from natural gas to heat pumps and other renewable systems. The 2025 Future Homes Standard is proposing to ban the connection to gas mains for new build properties relying instead on better insulation, heat pumps and renewables. There is also a desire to use the existing mains gas network to switch to hydrogen and many

modern gas boilers are being designed be capable of switching to hydrogen should that opportunity come. However, to switch to hydrogen, network providers will need to upgrade their network infrastructure which will be extremely costly, but it is something that government continues to support.

3.16 The Climate Change Committee and its Adaptation Committee noted in their publication UK housing: Fit for the future? (2019), that almost all the UK's 29 million homes would need to be retrofitted to be made low carbon, low energy and made resilient to climate change.

Table 3.2 Percentage of dwellings by primary fuel type and heating 2022

Community Heating Scheme	Electricity	Mains Gas	Oil	Other	Renewables
2.81	10.21	85.61	0.33	0.36	0.02

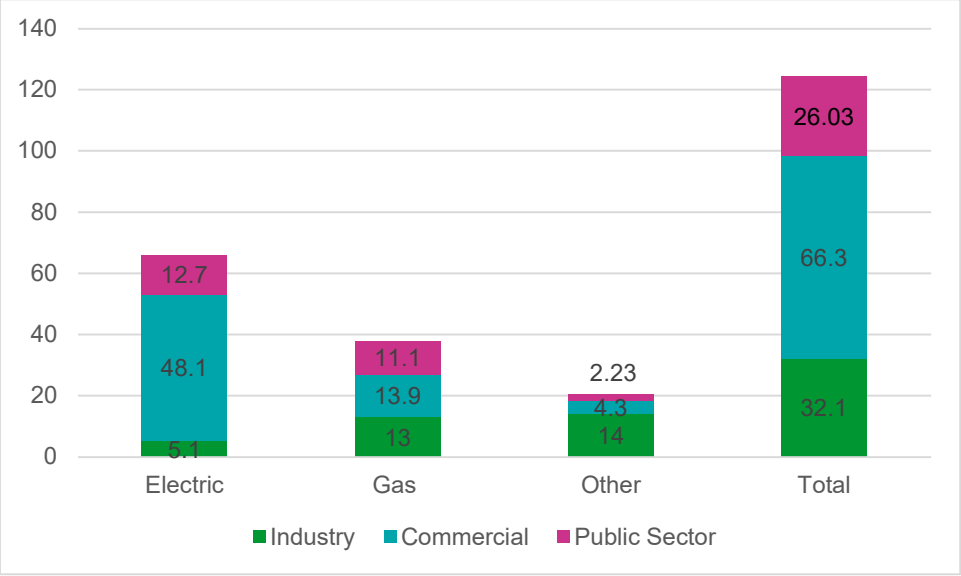
3.17 From Table 3.2 above it is evident that in 2022, 85.6% of dwellings in Reigate & Banstead use gas but only 0.02% of homes are heated using renewable technologies.

3.18 As of June 2024 there were approximately 63,200 homes in the borough of which, based on 2021 Census data, 71% were owned, 12% were social rented, 16% private rented and 1% other. In policy terms this means that the council has limited powers to encourage a reduction in carbon-based heating system use. A new local plan policy could specify requirements above Building Regulation standards where justified, such as using the Surrey Net Zero Viability Toolkit or similar, which could apply to future housing delivery in the borough, or it can make changes to its own very limited building stock. For existing properties using gas and oil, the council can advise owners of the need for change, including the use of SMART appliances and where possible provide grants to support the transition away from gas and oil use.

Non-domestic

3.19 In terms of non-domestic users, for carbon emissions from energy consumption, total emissions from electricity are 55.9 $ktCO_2e$, gas use is equivalent to 38 $ktCO_2e$, and other uses 20.53 $ktCO_2e$, equating to 114.43 $ktCO_2e$ from the non-domestic sector. Combined, this is still below the 153.6 $ktC_{O2}e$ of gas used to heat homes in the borough. See Figure 3.4 below.

Figure 3.4 Non-Domestic Carbon from energy use $ktCO_2e$



Source: https://www.gov.uk/government/statistics/uk-local-authority-and-regional-greenhouse-gas-emissions-statistics-2005-to-2022

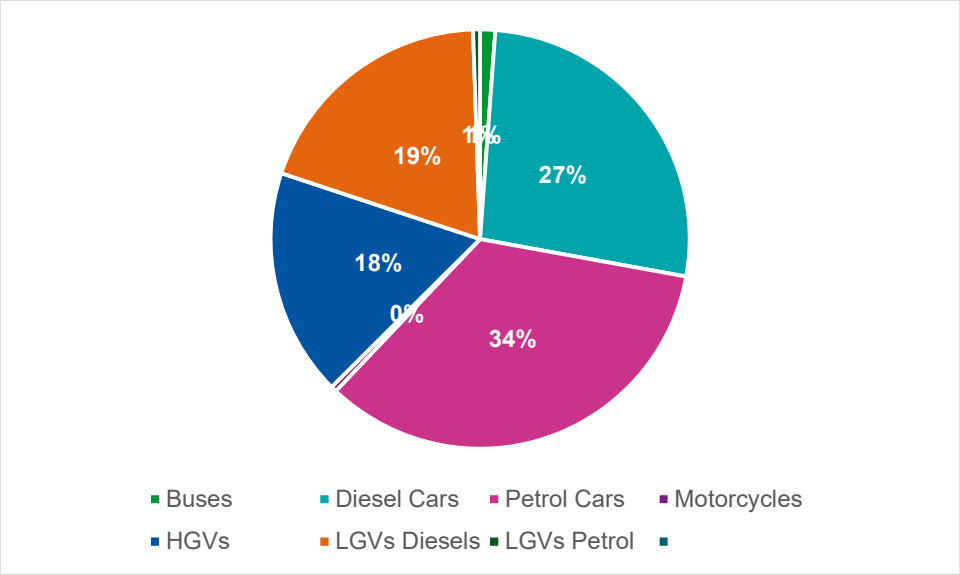
3.20 National de-carbonisation measures will reduce heat and power emissions. The Council could update its own systems and consider a renewable energy credit backed power purchase scheme.

3.21 Retrofitting existing non-domestic buildings will need to focus on the fabric efficiency and minimising the need for heating and air conditioning/ powered ventilation.

Transport

3.22 Road vehicle emissions in 2022 produced 110.5 $ktCO_2e$ of which 69.1 $ktCO_2e$ were attributed to personal transport (cars, buses, motorbikes) and for freight (HGVs and LGVs) 41.4 $ktCO_2e$. Petrol cars accounted for 34% of these emissions, diesel cars 27% of the emissions and 18% HGVs. See Figure 3.5 below.

Figure 3.5 Percentage of types of vehicle carbon emissions in Reigate and Banstead 2022



Source: UK road transport energy consumption at regional and local authority level, 2005 to 2022 - GOV.UK

3.23 Car ownership is high in Reigate & Banstead. As of February 2025, there were 87,900 registered vehicles in Reigate and Banstead. According to the Census 2021 86.5% of homes had access to a car which is above the UK average of 73.2% of homes.

3.24 The number of battery electric vehicles (BEVs) continues to grow nationally with 1,411,680 registered by February 2025 and a further 777,651 Plug in Hybrid electric vehicles (PHEVs) nationally. Together this equates to 6.44% of all vehicles at end of

February 2025. At end of February 2025 BEVs made up 21% of new vehicle sales. BEVs do not emit carbon emissions. Replacing petrol and diesel vehicles would reduce the borough's transport-related emissions but would come at an additional cost to the purchaser.

Embodied emissions

3.25 Embodied emissions in a whole life-cycle carbon (WLC) assessment include the emissions arising from the extraction, manufacture and assembly of materials plus maintenance and end of life disposal. According to the Climate Change Committee's report UK Housing: Fit for the Future? (2019), embodied emissions account for 25% to 50% of the overall carbon footprint of new buildings. Where the current lifetime footprint of a residential building is 3.5 $tCO_2e/m2$, and the average UK home size is $96m^2$, then the embodied emissions of one home could be up to 168 tCO_2e over 60 years. While this calculation is indicative only, it suggests that for the 19,545 homes which the government requires the council to provide over the 15-year time horizon of the new local plan, total embodied emissions could be as much as 3.3 $MtCO_2e$. However, by using more timber in the construction process instead of concrete, these emissions could be reduced to 15%-28% of traditionally built concrete structures to between 0.5 $MtCO_2e$ to 0.924 $MtCO_2e$.

3.26 However by locating new homes within towns and cities, the demand for travel can be reduced, as employment opportunities, retail and leisure activities, and public services are already located nearby, and therefore the need for additional infrastructure is reduced. This principle can be extended to include planned strategic developments, where infrastructure and active travel opportunities can be planned in at the outset, reducing the need to travel by private car.

4 How Climate Change is affecting Reigate & Banstead and future risks

Climate Change and Risk

4.1 This section considers the way Reigate & Banstead's climate has been changing in recent times. It then looks at future climate projects and assesses the risks as far as they apply to local plan preparation. By bringing these elements together it will be possible to identify areas for potential inclusion in the borough's emerging local plan.

Changing Climate

4.2 The recent weather for Reigate & Banstead has been collected from the Met Office stations at Kenley Airfield c3.4km to the east of the north of the borough and Charlwood 2km to the south-west of Horley. This will help to see if there are changes from the different topographies between the north (The North Downs) and south (Low Weald) of the borough. The data is displayed in Table 4.1 below.

4.3 The borough has a temperate, maritime climate with warm summers and cold winters. A comparison of the data collected between the 1981-2010 and 1991-2020 periods indicate that the climate has become warmer and wetter particularly in the north of the borough. Similarly there has been a decrease in the number of days with frost in both the north and south of the borough. Maximum annual temperatures have increased slightly in the north of the borough but have remained similar to the higher regional picture to the south of the borough.

Table 4.1 Climate data for Reigate & Banstead

	Kenley Airfield		Charlwood		Regional: England SE & SC	
	1981 2010	1991 2020	1981 2010	1991 2020	1981 2010	1991 2020
Monthly average rainfall (mm)	68.46	70.57	68.23	69.47	65.41	67.167

	Kenley Airfield		Charlwood		Regional: England SE & SC	
	1981 2010	1991 2020	1981 2010	1991 2020	1981 2010	1991 2020
Days of rainfall >1mm (days per annum)	127.64	129.53	123.59	126.21	121.64	133.01
Min annual average temperature °C	6.74	6.97	5.8	6.58	6.31	6.58
Max annual average temperature °C	13.69	14	14.7	14.7	14.32	14.7
Max summer average temperature °C	21.60	21.77	21.96	21.44	22.03	22.28
Mean wind speed at 10m (knots)	7.56	7.72	5.76	5.55	8.44	8.33
Air frost (days)	45.53	35.3	55.73	41.89	47.19	42.97

Source: Kenley Airfield Location-specific long-term averages and Charlwood Location-specific long-term averages

Precipitation

4.4 Between 1981-2020 most of the precipitation in the borough occurred between October and February in both the north and south. Between 1981 and 2020 both the north and south of the borough saw an increase in precipitation. The monthly level of rain increase in the borough was larger than at the regional level.

Temperature

4.5 The maximum annual average temperature for the borough is c14^{o}C in the north and 14.7^{o}C in the south. July and August are the hottest months both in the north and south of the borough. The coolest months are December and January. The number of days of frost fell between 1981 and 2020 and remain below the regional average for the period 1991-2021.

Wind speed

4.6 The mean wind speed at 10m is c7.6 knots for the north of the borough but lower in the south at 6.77 knots whereas the mean regional windspeed is 8.44 knots.

Flood Risk

4.7 Following the introduction of new national flood risk modelling in March 2025, the Council has prepared a new Strategic Flood Risk Assessment. The new modelling is more accurate than its predecessor and takes account of the impact of carbon emissions on climate change. The main risks of flooding in Reigate & Banstead is surface water flooding throughout the borough and some risk of fluvial flooding south of the M25 and particuarly around Horley and Reigate/ Redhill.

Future climate in the borough

4.8 The UK Climate Change Projections, prepared by the Met Office, provides probability-based projections of changing climate based on emissions scenarios, known as Representative Concentration Pathways (RCP). These scenarios model climate on a range of mitigation policies and consider changes in concentrations of greenhouse gases and pollutants from human activities. Each pathway leads to different temperature increases through the 21st century and consider elements of uncertainty such as the rates of ocean heat absorption.

4.9 According to this work summers will continue to become dryer, but this will be accompanied by future increases in the intensity of heavy summer rainfall events. For urban areas particularly, this will impact on the frequency and severity of surface water flooding.

4.10 Future climate change is projected to bring about a change in the seasonality of extremes. Summers will extend into autumn, with significant increases in heavy hourly rainfall intensity in the autumn. This will impact how we manage water.

4.11 The UKCP18 highlights change in average winter precipitation with an increase in very large winter precipitation events being more likely.

4.12 By the end of the 21st century, all areas of the UK are projected to be warmer, more so in summer than in winter. This projected temperature rise in the UK is consistent with future warming globally.

4.13 Hot summers are expected to become more frequent. The temperature of hot summer days, by the 2070s, could increase by between 3.8 °C to 6.8 °C, along with an increase in the frequency of hot spells.

4.14 Future climate change is projected to bring about a change in the seasonality of extremes. For example, rainfall associated with an event that occurs typically once every 2 years increases by 29% (central estimate). This has several implications for how we manage water. It is worth noting that whilst the intensity of hourly rainfall is projected to increase in the future, overall summers are projected to become drier.

4.15 There will be a decrease in soil moisture during summers in the future, consistent with the reduction in summer rainfall. Locally this could lead to an exacerbation of the severity of hot spells, although large-scale warming and circulation changes are expected to be the primary driver of increases in the occurrence of hot spells. This could impact biodiversity and affect rainfall runoff rates and surface water flooding.

Risk Assessment

4.16 The third Climate Change Risk Assessment (CCRA3) identifies 61 climate risks cutting across multiple sectors of our society (See Table 4.2). It identifies a wide range of potential costly impacts of climate change including on health and productivity, affecting many of our households, businesses and public services. Impacts range from a deterioration in soil health and agricultural productivity to impacts on water availability and thereby our alternative energy supply. For example, unless we take further action, under a 2°C by 2100 warming scenario, annual damages from flooding for non-residential properties across the UK is expected to increase by 27% by 2050 and 40% by 2080. At 4°C this increases to 44% and 75% respectively.

4.17 The CCRA assesses 61 different risks, and 8 priority risks are identified that require action. These are included in Fig 4.2 below. The economic magnitude of each risk has been assessed for both a 2°C and 4°C warming scenario. The following are the UK-wide magnitude categories where the cost of damage (economic) or forgone opportunities are represented in ranges to reflect the uncertainty in the evidence base:

- Very High (VH) is over £1 billion per annum
- High (H) is over £ hundreds of millions per annum
- Medium (M) is over £ tens of millions per annum
- Low (L) is less than £ ten million per annum

Table 4.2 Climate change risk areas

Priority Risk Area	Magnitude of Risk Key	Key policy areas
1. **Risks to the viability and diversity of terrestrial and freshwater habitats and species from multiple hazards.**	High	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.**	Medium but will increase to high by 2050.	Biodiversity Soil and water protection and restoration Environmental land management Sustainable farming and forestry Net Zero Green finance
3. **Risks to natural carbon stores and sequestration from multiple hazards leading to increased emissions.**	Medium but will increase to high by 2050	Biodiversity Soil and water protection and restoration Environmental land management Sustainable farming and forestry Net Zero Green finance
4. **Risks to crops, livestock and commercial trees from multiple hazards.**	Medium but will increase to high by 2050.	Public procurement Business resilience Environmental land management Trade

Priority Risk Area	Magnitude of Risk Key	Key policy areas
5. Risks to supply of food, goods and vital services due to climate-related collapse of supply chains and distribution networks	Medium but will increase to high by 2050.	Public procurement Business resilience Environmental land management Trade
6. Risks to people and the economy from climate-related failure of the power system	High	Infrastructure Energy Net Zero
7. Risks to human health, wellbeing and productivity from increased exposure to heat in homes and other buildings	High	Building Regulations and strategies Planning reform
8. Multiple risks to the UK from climate change impacts overseas	High	National resilience Overseas aid Research and capacity building

Source: https://www.gov.uk/government/publications/uk-climate-change-risk-assessment-2022

4.18 In development plan terms there are several areas where local plans can support attempts to adapt to climate change. These are identified in Table 4.3 below.

Table 4.3 Risks where planning can intervene

Risk ID	Risk or opportunity	2050s, 2/4°C	2080s, 2°C	2080s, 4°C
I1	Risks to infrastructure networks (water, energy, transport, ICT) from cascading failures	-VH	-VH	-VH
I2	Risks to infrastructure services from river, surface water and groundwater flooding	**-H to -VH**	**-H to -VH**	**-VH**
I4	Risks to bridges and pipelines from flooding and erosion	**- M**	**- M**	**- M**
I5	Risks to transport networks from slope and embankment failure	**-M to -H**	**-M to -H**	**-H**
I8	Risks to public water supplies from reduced water availability	**- H**	**- H**	**- H**
I9	Risks to energy generation from reduced water availability	**Not known**	**Not known**	**Not known**
I10	Risks to energy from high and low temperatures, high winds, lightening	**- H to - VH + H to + H**	**- H to - VH + H to + H**	**- H to - VH + H to + H**
I12	Risks to transport from high and low temperatures, high winds, lightning	**- H to - VH**	**- H to - VH**	**- VH**
I13	Risks to digital from high and low temperatures, high winds, lightening	**- M**	**- M**	**- H**

Risk ID	Risk or opportunity	2050s, 2/4°C	2080s, 2°C	2080s, 4°C
H1	Risks to health and wellbeing from high temperatures	**- VH**	**- VH**	**- VH**
H3a	Risks to people, communities and buildings from river and surface flooding	**- VH**	**- VH**	**- VH**
H5	Risks to building fabric	**Not known**	**Not known**	**Not known**
H6a	Risks and opportunities from winter household energy demand	**+ VH**	**+ VH**	**+ VH**
H6b	Risks and opportunities from summer household energy demand	**- H**	**- VH**	**- VH**
H7a	Risks to health and wellbeing from changes in air pollution	**-L**	**-L**	**-L**
H8	Risks to health from vector-borne diseases	**- L to - M**	**- M**	**- M**
H10a	Risks to health from water quality	**-H**	**-H**	**-H**
H10b	Risks to health from household water supply	**Not known**	**Not known**	**Not known**
H11	Risks to cultural heritage	**Not known**	**Not known**	**Not known**
B1	Risks to business sites from flooding	**- VH**	**- VH**	**- VH**
B3	B3 Risks to businesses from water scarcity	**- H**	**- H**	**- H**

Risk ID	Risk or opportunity	2050s, 2/4°C	2080s, 2°C	2080s, 4°C
B5	Risks to business from reduced employee productivity due to infrastructure disruption and higher temperatures in working environments	**- M**	**- M**	**- H to - VH**
B7	Opportunities for business from changes in demand for goods and services	**+ VH**	**+ VH**	**+ VH**

Source: https://www.gov.uk/government/publications/uk-climate-change-risk-assessment-2022

4.19 The table in Figure 4.3 is based on national risks but these specific risks do apply to the borough and its plan making. There are additional risks such as coastal impacts and other sector risks such as agriculture that have not been included. The potential economic magnitude of each risk has been assessed at the national level for both a 2°C and 4°C warming scenario where sufficient information exists. The following are the UK-wide magnitude categories where the cost of damage (economic) or forgone opportunities are represented in ranges to reflect the uncertainty in the evidence base:

- Very High (VH) is over £1 billion per annum.
- High (H) is over £ hundreds of millions per annum
- Medium (M) is over £ tens of millions per annum
- Low (L) is less than £ ten million per annum

4.20 The key areas which could have the greatest financial impact resulting from climate change are risks to infrastructure networks (water, energy, transport, ICT) from cascading failures (I1), risks to health and wellbeing from high temperatures (H1), risks to people, communities and buildings from river and surface flooding (H3A), risks to business sites from flooding (B1) and future household energy demand in the summer months (H6b). Such insight helps to inform the future local plan and how future policies can focus on adaptation and mitigation.

4.21 The very highest risks up to 2050 for Reigate & Banstead from climate change will be risks to human health from overheating, risks to infrastructure, and fluvial and surface water flooding risks to communities, buildings and businesses. In the increasingly high to very high-risk category – impacts on the energy and transport networks are seen as an increasing risk to the borough through to 2050. As temperatures increase in the summer months there will be an increase in energy demand for cooling systems especially in people's homes. There will be some opportunities in supplying decarbonised energy systems and changes in demand for some good and services.

4.22 However further work is needed to understand more about the risks associated with climate change including the effects of reduced water supplies in drought periods to energy supplies and reduced water in dry periods, the fabric of buildings mainly related to subsidence, effects on cultural heritage including buildings and other structures and maintaining household water supplies.

Summary and Next Steps

4.23 Section 4 has demonstrated how the climate is changing and how the risks are increasing in Reigate & Banstead and the effect this could have on businesses and communities. By understanding the risks associated with climate change locally there will be opportunities and adaption and mitigation measures that can be used to inform future local plan policy, council corporate policy, infrastructure providers' investment and the behaviour of individuals and businesses.

5. Reducing emissions and adaptation to climate change

5.1 For the council to achieve net zero by 2050 and for the local plan to ensure that new development makes an effective contribution, enhanced policy is needed that builds on the current local plan.

Existing Policy Critique

5.2 DMP Policy CCF1: Climate change mitigation was introduced in 2019. This is set out in full in paragraph 2.50 above.

5.3 Paragraph 1a on water efficiency in residential properties is currently consistent with Part G of the Building Regulations 2016 but a more ambitious target will be needed as Reigate & Banstead is located in a 'Serious Water Stressed' area and with the scale of growth required by government, a lower water usage target per person will be required for development. The challenge with this is that not only would existing water efficiencies be needed but dual systems that collect and use greywater will be required which will add to development costs and could require additional space for storage tanks.

5.4 Point 1b seeks a 19% improvement in the Dwelling Emission Rate (DER) over the Target Emission Rate (TER) as defined in Part L1A of the 2013 Building Regulations. However this requirement was increased in the 2021 Building Regulations and was further enhanced in the 2025 amendments. The drawback with updating the policy wording to match the Building Regulations is that the TER methodology only includes regulated carbon and would mean that new development will not meet net zero by 2050. The limitation of the TER methodology using 'regulated carbon' is that it ignores scope 3 emissions with the result that the 19% TER improvement is less than 19% of the development's real life emissions.

5.5 Paragraph 2 on renewables needs to be refined as more properties can meet 10% of their energy needs through renewable technologies. Indeed, most forms of development can generate enough energy to meet a building's needs if it is sufficiently energy efficient. The one exception according to the Surrey County County Council led research is high rise flats as they would struggle to find the space to locate the technology on site. However there are additional mechanisms and policies that Local Planning Authorities can introduce in order to ensure that new development is net zero before 2050.

5.6 Paragraph 3 on encouraging micro energy generation remains pertinent but needs to be considered in the context of stand alone units including community battery banks.

5.7 Paragraph 4 on maximising design opportunites for energy saving such as orientation and building fabric remains appropriate but could be extended to include access to the building to reduce pedestrians becoming overheated when walking to a building on hot sunny days.

5.8 The use of sustainable construction methods and materials in section 5 remains pertinent but needs to be considered in the context of reuse, recycling and decarbonisation of buildings.

5.9 Whilst DMP policy CCF1 was appropriate in 2019 it would be prudent to adopt a more methodical and focused approach that seeks to reduce greenhouse gas emissions and adapt to climate change in a future local plan. Such an approach would include:

- Reuse and refurbuishment of buildings
- Sustainable design
- Renewable energy
- Electrification of heat
- Heat networks
- Carbon sequestration
- Avoiding areas at risk of flooding
- Natural flood managment
- Low carbon transport
- Climate change resilient infrastructure

5.10 DMP Policy CCF2 Flood Risk remains broadly consistent with the NPPF 2024 in terms of the different types of flood risk that need to be considered. Reference to the borough's Strategic Flood Risk Assessment 2017 will need to be updated to reflect the latest Strategic Flood Risk Assessment (currently 2025). Whilst the policy does take account of climate change there is no mention of the flood mapping to be used. In March 2025 updated National Flood Risks maps were made available by the Environment Agency which replaced the previous 2005 maps. The new mapping was developed using a new methodology that included LiDAR mapping and the latest Met Office climate change predictions.

5.11 One area on which DMP Policy CCF2 is relatively silent is supporting improvements to water systems that take a more natural approach to flood risk, a theme that could be considered in future policy. However the Council is aware that national development management policies are currently being prepared by Government which could negate the need for the inclusion of a flood risk policy in the new local plan in pure planning terms. However there may be some areas where a local policy may be required with regard to local schemes to return some systems their natural course.

The Circular Economy

5.12 The Ellen MacArthur Foundation define the circular economy as: ‘a system where materials never become waste and nature is regenerated. In a circular economy, products and materials are kept in circulation through processes like maintenance, reuse, refurbishment, remanufacture, recycling, and composting. The circular economy tackles climate change and other global challenges, like biodiversity loss, waste, and pollution, by decoupling economic activity from the consumption of finite resources.’

5.13 The circular economy (See Figure 5.1 below) is based on three priciples. These include:

1. Eliminate waste and poluution
2. Circulate products and materials at their highest value, and
3. Regenerate nature

Figure 5.1 Circular Economy Diagram

Source: Circular Economy | Resource Recovery | Future Recycling

5.14 In development terms building materials are treated as a resource rather than waste. It requires new buildings to be easier to dismantle and adaptable over their lifetime. It relies on reducing carbon emissions through reuse, improved building fabric renewable energy, and an enhanced natural environment. As such this approach can play an important role in reaching Net Zero by 2050.

Reuse and Refurbishment of buildings Embodied Emissions

5.15 Re-use and refurbishing of existing buildings on a site to make them more energy efficient rather than demolishing them reduces Ggeenhouse gas emissions. All existing buildings have embodied carbon within them (carbon dioxide (CO_2) or greenhouse gas emissions associated with the manufacture, construction and use of a building). If buildings are demolished and new buildings are constructed on a site this will require carbon to build them. However, there may be good place making reasons as to why

buildings cannot be retained and/ or refurbished on site. This needs to be balanced against the fact that planning permission is not generally required to carry out most demolitions apart when a building is listed or is located in a conservation area.

5.16 Local Plans can encourage developers to consider the role of embodied carbon as part of the design process and whether the buildings could be reused/refurbished and how the energy performance of the building can be improved as part of the design and layout of a development. This can be demonstrated through an Energy and Carbon Reduction report to accompany the planning application.

5.17 Between 30-70% of emissions associated with buildings are associated with pre-occupation, maintenance, repair, demolition and eventual material disposal. The Climate Change Committee has recommended that Government should work towards introducing a mandatory minimum whole-life carbon standard for both buildings and infrastructure.

Building whole life-cycle approach

5.18 However to fully capture a development's carbon impact, a whole life-cycle approach to building design is required. This would capture the pre-occupancy stages, the building's unregulated emissions (i.e. those associated with cooking and small appliances), its embodied emissions and emissions associated with maintenance, repair and replacement as well as dismantling, demolition and eventual material disposal. The Climate Change Committee recommends that "Government should work towards introducing a mandatory minimum whole-life carbon standard for both buildings and infrastructure."

5.19 The London Plan (2021) considers embodied carbon through Policy Strategic Infrastructure 2 : Minimising Greenhouse Gas Emissions, where Part F states: 'Development proposals referable to the Mayor should calculate whole lifecycle carbon emissions through a nationally recognised Whole Life-Cycle Carbon Assessment guidance and demonstrate actions taken to reduce life-cycle carbon emissions.'

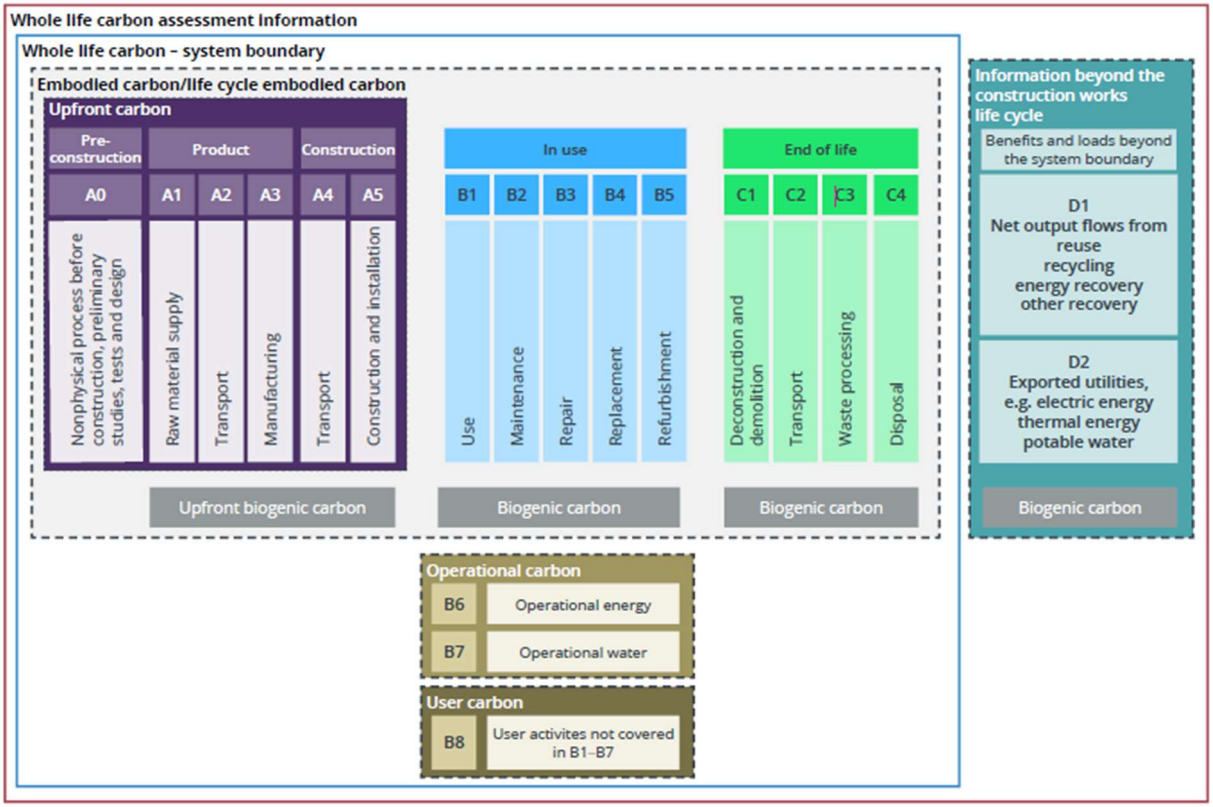
5.20 In 2022, the Mayor of London published Whole Life-Cycle (WLC) Carbon Assessments guidance, with the objective of minimising a development's WLC carbon emissions. The principles set out in the guidance document include:

- the re-use of existing materials and the retrofit and retention of existing structures and fabric over new construction;
- the use of repurposed or recycled materials and designing for future reuse and recycling, so reducing waste and supporting the circular economy;

- a ‘fabric first’ approach to promote natural ventilation;
- considering operational and embodied emissions simultaneously;
- sourcing materials locally and through short supply chains; and
- designing for durability and flexibility, increasing building lifespan?

5.21 More recently the Royal Institute of Chartered Surveyors (RICS) has developed, in collaboration with other development professionals, a modular lifecycle approach methodology to consider whole life carbon emissions from development (See Figure 5.2). This lifecycle approach has split the different elements of biogenic carbon assessments into the development stages starting with upfront (including preconstruction, products used and construction), followed by the inuse and end of life stages.

Figure 5.2 Building and infrastructure life cycle stages and information modules RICS 2024



Source:https://www.rics.org/content/dam/ricsglobal/documents/standards/Whole_life_carbon_assessment_PS_Sept23.pdf

5.22 With regards to future local plan policy, the inclusion of a such a whole lifecycle approach to development would facilitate a reduction in the borough's CO_2 emissions. In terms of which approach to use, both the RICS and London Plan approaches are effective tools but given that the RICS represents a professional body and its approach can be widely applied, the more recent RICS Wholelife Carbon Assessment Tool appears more suitable for the borough to use.

Sustainable design – operational emissions

5.23 Operational or in use emissions are those emissions which result from all activities related to the use of a building over its lifespan, Building Regulations set minimum standards for the performance of buildings, with Part L specifically regulating the conservation of fuel and power. The designed carbon emission rate of a new build must not exceed the Target Emission Rate (TER) for a notional building of a similar type, size and shape. Through the Future Homes and Future Buildings Standards 2025, the focus centres on improving energy efficiency and moving away from fossil fuels. As a result of these updates, TER can be decreased by approximately 70-80%. However there remain serious concerns that just focusing on operational emission reductions based on TER rather than a whole building approach still falls short of ensuring that the borough reaches net zero by 2050.

5.24 A number of local plans require specific percentage reductions against the TER. The percentage is typically lower for minor developments compared to major developments. The London Plan (2021), which is based on the 2021 Building Regulations standard, requires through Policy Sustainable Infrastructure 2 - Minimising Greenhouse Gas Emissions that: "Major development should be net-zero carbon…" "A minimum on-site reduction of at least 35 per cent beyond Building Regulations… for major development. Residential development should achieve 10 per cent, and non-residential development should achieve 15 per cent through energy efficiency measures."

5.25 The London Plan 2021 also seeks: 'For major developments to be net zero carbon, this policy means that they must achieve a minimum on-site carbon reduction of a 35% improvement over Part L Building Regulations 2021 (e.g. through fabric efficiencies and renewable energy generation), after which point developers can utilise offsetting measures to reach 'net zero'.

5.26 The carbon emission rate of a building is typically reduced through energy efficiency measures, such as triple glazing or a waste-water heat recovery system. Other sustainable design practices that reduce building energy use include:

- maximisation of passive features (daylighting, heating, cooling and ventilation),

- building orientation,
- thermal mass and shape, and
- landscaping.

Renewable Energy

5.27 The Planning and Energy Act 2008 allows local authorities to introduce their own standards on the use of renewable energy and low carbon systems in development. As with the 2019 DMP Policy CCF1, a number of local plans include a renewable energy policy requirement for new development. Milton Keynes City Council's Plan:MK local plan (2019) policy goes further and encourages community-led renewable energy schemes whilst the Oxford City Local Plan 2019 seeks seeks a 40% reduction in carbon emissions, of which 25% must be achieved through on-site renewable energy and other low carbon technologies.

5.28 Other local plans are less prescriptive and are more likely to be supportive. Rather than mandating renewable energy for certain scales of development, this type of policy would be less specific and require development to have some regard to meeting part of the predicted energy demand through on-site renewable energy generation. Other policy options include:

- Reducing initial energy demand;
- Including energy efficiency measures within the development;
- Using renewable energy sources to meet demand;
- Using low carbon energy sources; and
- Meeting energy demand through conventional energy resources.

5.29 Some local plans incorporate a requirement for proposals to provide an Energy Statement, demonstrating compliance with an energy hierarchy that typically follows the structure below:

- Reduce initial energy demand;
- Employ energy efficiency measures within development;
- Utilise renewable energy sources to meet demand;
- Utilise low carbon energy sources; and

- Meet energy demand through conventional energy resources.

This has been effective in London especially on the larger schemes.

5.31 However there are several areas where these policies are silent. These include supplying surplus renewable energy back to the grid, battery charging including that for electric and plug in hybrid vehicles, and the use of SMART appliances (including EV chargers) which avoid using energy at peak times. Combined, these would further support a reduction in greenhouse gas emissions and reduce fuel poverty and dependency on imported fossil fuels.

Electrification of heat

5.30 The electrification of heat has the potential to play a major role in decarbonising heating systems. It also helps to inprove air quality. Currently carbon emissions from heating in the borough account for 21.6% of its total carbon emissions.

5.31 There are several technologies that can help reduce those emissions by converting electricity into heat including direct electric heating systems and heat pumps. Proposals using direct electric heat should only be deemed acceptable where it can be demonstrated, through Passivhaus certification or equivalent, that energy use has been significantly reduced by achieving ultra-high fabric efficiency. This will ensure that direct electric heating systems do not result in high energy bills for future residents, and to mitigate the risk of fuel poverty.

5.32 Heat pumps will play a growing role in the delivery of low carbon heat, as part of both low carbon heat networks and individual building heating systems. Well designed, installed and maintained heat pumps can be very energy efficient and a way of harnessing waste heat. Modern heat can achieve efficencies of up to more than 100%, often reaching 300% or even 600% in some cases, whereas direct electric systems and gas boilers typically operate between 80 and 100% efficiency. In addition, heat pumps use low flow temperature and large emitters to spread heating throughout the day, resulting in reduced peak heating demand compared to gas boilers and direct electric systems which operate when heat is desired. Heat pumps also have the benefit of being smart grid ready which could enable demand-side response. Heat pumps can be used to supply both space heating and hot water provided there is sufficient space for hot water storage and pipework.

5.33 Heat pumps are a lower carbon system than gas boilers, and the carbon factor for grid electricity is expected to decrease further as more renewable energy is produced, while the carbon content of gas is likely to remain the same unless low carbon gases

are introduced to the gas grid. Heat pumps also provide air quality benefits given that they do not produce any direct emissions on site.

5.34 Low-carbon heat using a heat pump is cost effective when built into new homes and will not increase running costs where the system is well designed, installed and operated, particularly in well-insulated buildings. Heat pump deployment in new build properties will also play an important role in helping develop the heat pump markets and supply chains required to electrify heat in our existing building stock. Heat pumps use electricity to increase the temperature of a low temperature heat source (e.g. air, water or ground).

5.35 However, inappropriate design, installation or operation of heat pumps can result in high energy costs and increased peak electricity demand. In order to mitigate impacts on the electricity grid and operating costs, electrical heating systems must be highly efficient and paired with high fabric efficiency; high performance building fabric is critical to enable the electrification of heat while keeping costs low for future residents.

5.36 To be effective, new development should also be designed to harness heat at low temperatures given that heat pumps tend to operate significantly more efficiently at lower temperatures and waste heat sources are also typically at lower temperatures. It is important that where heat pumps are proposed, it can be demonstrated that efficiencies have been maximised through the proposed technology and heating system. A high specification of energy efficiency (coefficient of performance) will be expected to ensure the system works efficiently and reduces running costs and peak electricity demand.

5.37 However heat pumps can be obtrusive and create noise and vibration and therefore it is important that where heat pumps are proposed that living conditions of existing and future occupiers of the proposed development and neighbouring properties are not materially harmed in terms of outlook, noise or vibrations.

Heat Networks

5.38 Heat networks, also known as ‘district heating’ schemes, supply heat from a central source to consumers, via a network of underground pipes carrying hot water and are considered the most efficient way of heating large developments when compared against individual sytems. Heat networks can cover a large geographical area or be fairly local supplying a group of buildings. Networks can be supplied by a diverse range of sources, including energy from waste facilities, industrial processes, biomass boilers, heat pumps, geothermal sources and gas-fired combined heat and power units. However they should not be gas powered only. Heat networks are one of the most cost-effective ways to reduce carbon emissions from heating. Their efficiency

and carbon-saving potential increases as they expand and connect to other heat networks particularly across towns and cities. This forms an important part of the Government's heat decarbonisation plan. The Future Homes Standard 2025 requires newbuilds to be heated by heat pumps or low carbon heat networks.

5.39 Local plans can effectively support heat networks through:

- Site selection: locating development in proximity to an existing heat network, to a strategic heat source or to a source of heat demand, enables development to connect to or contribute to existing and new heat networks.
- Spatial strategy: co-locating growth to achieve densities of heat demand to sufficiently allow the delivery of commercially viable heat networks.
- Specific policy: requiring development to connect to an existing network or be built to be 'connection ready' for new/expanded heat networks.

5.40 In several local plans reviewed, policy requires development that met a certain threshold to include decentralised energy provision, unless it could be demonstrated that this was not suitable, feasible or viable. In Reading's Local Plan, this threshold was set at any development of more than 20 dwellings and/or non-residential development of over 1,000 sq m. Where an existing network was in place, the number of dwellings was reduced to 10 to consider the feasibility of connecting to the network.

5.41 Alternatively, Heat Network Priority Areas have been mapped by the Mayor of London and included in the London Plan. These areas identify where in London the heat density is sufficient for heat networks to provide a competitive solution for supplying heat to buildings and consumers. The London Plan 2021 Policy SI4 Managing heat risk part B states; 'Major development proposals should demonstrate through an energy strategy how they will reduce the potential for internal overheating and reliance on air conditioning systems in accordance with the following cooling hierarchy:

1. reduce the amount of heat entering a building through orientation, shading, high albedo materials, fenestration, insulation and the provision of green infrastructure
2. minimise internal heat generation through energy efficient design
3. manage the heat within the building through exposed internal thermal mass and high ceilings

4. provide passive ventilation

5. provide mechanical ventilation

6. provide active cooling systems.

5.42 This provides a comprehensive hierachy although passive ventilation requirements have been required in the Building Regulations since 2021. However the challenge of introducing a similar policy in the borough is the absence of heat networks at present but they could be considered for inclusion in very large developments of 500 to 1000 homes where economies of scale exist to support the inclusion of such infrastructure.

5.43 It should be noted that the Department for Energy Security and Net Zero will soon launch Heat Zones mapping and that Surrey County Council are preparing a Local Area Energy Strategy.

Carbon Sequestration

5.44 Carbon sequestration is the capturing, removal and permanent storage of CO_2 from the earth's atmosphere. It's recognised as a key method for removing carbon from the earth's atmosphere. This is important, as around 45% of the CO_2 emitted by humans remains in the atmosphere, which is a significant factor behind global warming. Carbon sequestration can prevent further emissions from contributing to the heating of the planet.

5.45 Carbon sequestration can happen in two basic forms: biologically or geologically. Also, while it's being encouraged artificially through various biological and geological methods, it also happens naturally in the environment on the biggest scale.

5.46 Biological carbon sequestration happens when CO_2 is stored in the natural environment. This includes what are known as 'carbon sinks', such as forests, grasslands, soil, oceans and other bodies of water. This is also known as an 'indirect' or passive form of sequestration.

5.47 Geological carbon sequestration happens when CO_2 is stored in places such as underground geological formations or rocks. This process is largely artificial or 'direct', representing an effective way of neutralising emissions put into human practices, such as manufacturing or construction.

5.48 It's also largely technological as a result, with recent innovations showing CO_2 being sequestered more effectively on larger scales. They include:

Graphene production

The production of graphene requires CO_2 as a raw material. Although limited to certain industries, it's used heavily in the production of the tech devices we use on a day-to-day basis, such as smartphones or computer processors.

Engineered molecules

A fairly new science, scientists can change the shape of molecules to form new compounds by capturing CO_2 from the air. In practice, this could present an efficient way of creating raw materials while reducing atmospheric carbon.

Carbon Capture and Storage

5.49 Carbon Capture or Storage (CCS) involves capturing CO_2 that's been produced by power generation or industrial activity, such as cement or steel making. This CO_2 is then compressed and transported to deep underground facilities, where it's injected into rock formations for permanent storage.

5.50 Local plans can incorporate policies related to carbon sequestration by requiring developments to include green infrastructure, promoting renewable energy, and reducing emissions from construction and transport. These policies aim to minimize the impact of development on the environment and contribute to climate change mitigation efforts.

5.51 One way local plans can encourage carbon sequestration is the incorporation of green and blue infrastructure into development schemes. This can include elements like:

- **Urban forests and parks:** These can help absorb carbon dioxide from the atmosphere.
- **Green roofs and walls:** These can also contribute to carbon sequestration and provide other benefits like reducing the urban heat island effect; however, their effect is relatively limited.
- **Wetlands and other natural habitats:** These can store carbon and provide other environmental benefits. By promoting green and blue infrastructure, Local Plans can help to increase the capacity of urban areas to sequester carbon.

Carbon offsetting

5.52 In cases where development impacts on carbon sinks or stores are unavoidable, Local Plans may consider incorporating carbon offsetting policies. This can involve:

- **On-site mitigation:** Finding ways to compensate for the impact of the development on carbon sinks or stores by implementing additional measures to sequester carbon.
- **Off-site carbon offsetting:** Investing in projects that sequester carbon elsewhere to compensate for the development's impact.

5.53 Carbon offsetting can help ensure that the development does not significantly increase the overall level of carbon in the atmosphere.

5.54 The London Plan 2021 seeks compensation where carbon cannot be offset on site. The carbon offset price has been set at £95 per tonne of carbon - a level considered sufficiently high to encourage a greater level of on-site carbon reduction (beyond the 35% minimum required), as opposed to widespread use of offsetting. This is something to consider in the future plan subject to a development viability assessment.

5.55 The Surrey Net Zero Development Viability Study 2024 uses an alternative approach. By following policy route 2 option A (identified in the study) where the Energy Use Intensity (EUI) is set to minimise energy use and require PVs to match the EUI, the following levels could be specific for each typology including:

- 35kWh/m^2_{GIA} for domestic
- 70 kWh/m^2_{GIA} for offices
- 70 kWh/m^2_{GIA} for schools
- 35 kWh/m^2_{GIA} for industrial buildings
- 160 kWh/m^2_{GIA} for hotels

5.56 Any shortfall in renewable energy regeneration could lead to an offset payment. This would most likely apply to mid and high-rise residential development.

Avoiding areas at risk of flooding

5.57 According to paragraph 170 of the NPPF 2024, 'Inappropriate development in areas at risk of flooding should be avoided by directing development away from areas at highest risk (whether existing or future). Where development is necessary in such areas, the development should be made safe for its lifetime without increasing flood risk elsewhere'.

5.58 Flood risk will continue to increase in future due to climate change. Development will therefore need to be located away from areas that either are currently impacted by flood risk or will be over the course of its lifetime (100+ years). To assist the national flood risk assessment methodology has been updated and new maps published in March 2024 which take account of surface water flooding and the latest climate change modelling.

5.59 Paragraph 172 of the NPPF 2024 states that; 'All plans should apply a sequential, risk-based approach to the location of development – taking into account all sources of flood risk and the current and future impacts of climate change – so as to avoid, where possible, flood risk to people and property.' Paragraph 173 of the NPPF states that; 'A sequential risk-based approach should also be taken to individual applications in areas known to be at risk now or in future from any form of flooding.'

Natural flood management

5.60 Incorporating natural flood management features, such as Sustainable Drainage Systems (SuDS), into its design to reduce surface water runoff. SuDS should be designed to provide amenity value and natural habitats for wildlife and considered at the earliest stage of development. (See Para 182 NPPF 2024).

5.61 The effects of climate change will cause periods of drought to become more frequent and therefore water efficiency measures should be incorporated into the design of every new development to minimise consumption. By maximising opportunities to recycle water, the impact on water quality can be minimised.

Low carbon transport

5.62 Moving into an era of low carbon transport is vital both in reducing carbon emissions but can also encourage healthier lifestyles. The key area where a local authority can help is by supporting improvements in public transport services and their coverage which would help reduce emissions and congestion.

5.63 Whilst national government is the lead body in reducing carbon based vehicles through national legislation, local authorities can help ensure that there is a public charging network to support electric vehicles. However as Building Regulations now include a requirement for a vehicle charging point in new development there is no requirement for such a local plan policy.

5.64 Local authorities working with the bus operators can enable the move to hydrogen buses reducing diesel bus numbers and carbon emissions. Moreover by working with the operators and passenger groups, improvement to the bus infrastructure and service frequencies and routes can be achieved locally.

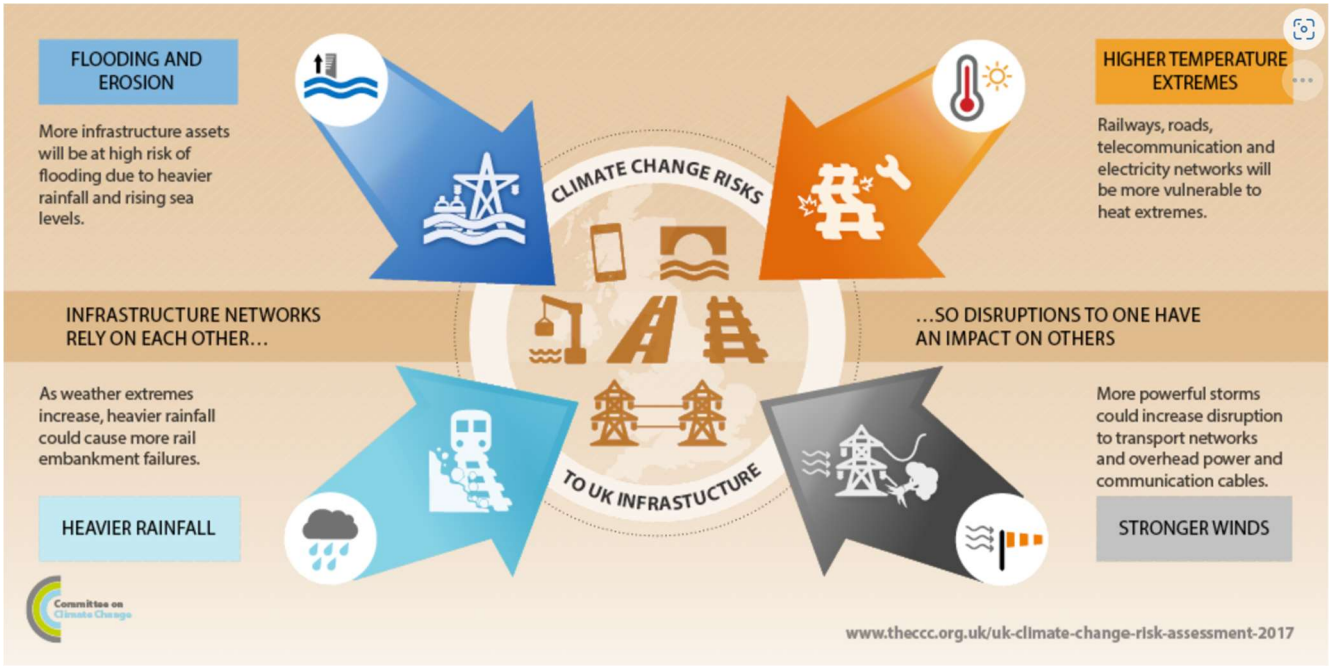
5.65 Most of the rail network running through the borough on the Brighton to London mainline is electric but the North Downs Line provides an opportunity to replace diesel locomotives with electric battery powered vehicles, tests of which are currently being undertaken with a view to introduce such units in the 2030s.

5.66 One area where local authorities have a role is preparing Local Cycling and Walking Infrastructure Plans (LCWIPs) which identify locations for improvements to the cycling and walking networks and then delivering the upgrades. Walking and cycling help improve wellbeing and can reduce road congestion. The current LCWIP was adopted in 2022 and has identified routes for improvement. Moreover as new developments come forward there will be opportunities to support walking and cycling routes and network linkages through larger schemes.

Climate change resilient infrastructure

5.67 According to the Climate Change Committee Risk Assessment 2017 Evidence Report; ‘Extreme events, such as the winter storms of 2013/14 and 2015/16, are associated with disruption to or even the complete loss of essential services such as water and energy supplies, and transportation and communication networks. As well as being costly to recover, the loss of infrastructure services can have significant impacts on people’s health and wellbeing, and local economic activity.’ Figure 5.3 Climate Change risks and Infrastructure below highlights how climate change effects different infrastructure.

Figure 5.3 Climate change risks and infrastructure



Source: Climate Change Committee UK Climate Change Risk Assessment 2017

Rainfall and flooding

5.68 Much of the borough's infrastructure was built before there was an awareness of climate change. Most domestic water systems can only cope with a 1 in 30-year rainfall event. More regular extreme events that more regularly occur because of the climate changing, could affect both water supply and sanitation. Parts of the transport network including railway lines and stations and parts of the road network are liable to flooding.

Extreme temperatures

5.69 Changes in temperature will place additional pressures on infrastructure. Very hot weather can cause overhead power cables to sag and will soften and damage tarmac surfaces slowing journeys. On the railways, sections of track risk becoming buckled and signalling systems could become too hot, resulting in failure and disrupting journeys. Some changes in use of materials and running a hot weather timetable could help.

Droughts

5.70 Droughts and reduced water availability will limit the availability of water for consumption, as well as freshwater abstractions to cool energy plants and some data centres. Additional water storage capacity is needed in South East England to meet growing needs along with more efficient systems.

Storm damage and disruption

5.71 Storms including high winds and lightning are the most likely risk for disruption to overhead cables, which are vulnerable to tree and debris-related damage, especially energy distribution infrastructure, some telecommunication and data networks and railway networks. Furthermore, higher rates of vegetation growth associated with the changing climate could result in more tree failures for electricity and transport networks. Future tree planting and tree management would be needed to reduce the risks to infrastructure. Some of this work may need to be undertaken to protect the borough's infrastructure.

Geohazards

5.72 Extended periods of rainfall increase the risk of slope and embankment instability. These risks are most significant for road and rail infrastructure, where nearly 2% of the UK's network is at high risk of landslide disruption, with a further 6% at medium risk. To address this challenge slopes will need to be improved to reduce the risk from slippage. A further geohazard are sinkhole appearances such as at nearby Godstone on the A25 in 2025 which closed the road for months as the sinkhole was stabilised, filled in and the road replaced.

Interdependencies

5.73 Infrastructures are increasingly reliant on each other – for power, control (via ICT) and access for deliveries or servicing. Risk understanding for such interdependencies is still being developed but there is a role for local authorities to help bring infrastructure providers together to help deliver effective solutions.

Challenges

5.74 The biggest challenge to making infrastructure resilient to climate change is the significant cost of any upgrades. Furthermore, the fragmentation of infrastructure partners into multiple organisations can itself be a challenge due to the wide range of priorities of the different companies and bodies together with commercial confidentiality. However, bringing infrastructure providers together is one area where local authorities can assist, coupled with any Community Infrastructure Levy funding it could bring to the table to assist in making infrastructure climate change resilient.

Summary

5.75 This section has outlined the ways new development can adapt and mitigate to climate change including the use of the curcular economy, the reuse and refurbuishment of buildings, how sustainable design and renewable energy can play their roles. It then discussed the advantages of heat networks, carbon sequestration and carbon offsetting, avoiding areas at risk of flooding and the benefits of natural flood management as a means to mitigate the effects of climate change. It then discussed ways the council can support infrastructure improvements that take account of climate change.

6. Policy Options

Progressing towards a net zero Reigate & Banstead

6.1 The evidence presented in this document highlights a need for updating the Development Management Plan climate change policy CCF1 in order to tackle the effects of climate change and the impacts it will have during the new local plan period as the borough works towards achieving net zero by 2050 whilst adapting to warmer winters and hotter summers. The development undertaken during the plan period will for the most part still exist in 2050.

6.2 This section of this report details the justification for the council's preferred policy direction for tackling climate change through the Local Plan and sets out a suite of draft policies to be included in it.

CC1 Proposed Policy Mitigating and Adapting to Climate Change

6.3 To ensure that the borough becomes more sustainable and achieves net zero carbon by 2050, the council will reduce greenhouse gas emissions and improve local resilience to climate change. This will be achieved by:

1. Requiring all development to:

- **I. Be of a sustainable high quality design.**
- **II. Maximise energy efficiency through the orientation of the building and the types of materials being used during construction.**
- **III. Incorporate low carbon heating and local renewable energy generation**
- **IV. Include measures such as shading and effective ventilation to reduce overheating**
- **V. Adopt the principles of the circular economy and promote more effective resource use, to ensure that buildings are re-purposed, and resources are kept in use for as long as possible and to minimise waste.**
- **VI. Ensure that new development mitigates the effects from flooding and overheating over their full lifetime.**

2. The Council will:

- **i. Work with infrastructure providers, first responders and partners to adapt and mitigate the effects of a changing climate.**

ii. **Maximise opportunities to enhance green infrastructure and tree planting to deliver multifunctional benefits including reducing overheating in urban areas, enhancing natural carbon sinks and improving air quality.**

iii. **Promote active travel by working with developers and partners to improve local walking and cycling infrastructure and securing improvements to local public transport services.**

iv. **Explore opportunities to introduce carbon offsetting measures.**

Reason

6.4 The policy provides the basis upon which the borough will become more sustainable and achieve net zero carbon by 2050. High quality design can integrate elements that will make the building more energy efficient. Effective orientation will reduce overheating whilst optimising opportunities for solar gain. A well insulated fabric and building layout, with effective ventilation and shading, will make buildings more pleasant for occupiers all year round. When linked to local carbon heating systems and renewable energy generation, these factors will combine to reduce carbon emissions from heating, whilst alo reducing energy bills and reducing fuel poverty. Reusing buildings and materials will reduce waste which will furthwer reduce carbon emissions. Enhancing green infrastructure and trees will assist in providing local carbon sequestration. In cases where carbon cannot be offset on site, measures will be considered to offset carbon emissions in the borough eincluding the use of contributions to green infrastructure or other larger renewable schemes.

CC2 Proposed policy minimising waste

6.5 Reducing waste in the construction sector facilitates a reduction in carbon emissions.

1. All development proposals will be required to follow a circular economy approach to building design and construction. Each scheme should be designed for durability, flexibility and easy disassembly, to reduce waste, to keep materials and products in use for as long as possible, and to minimise embodied carbon.

2. To achieve this, all development will be required to:

a. Reuse and retrofit existing buildings wherever possible before considering the design of new buildings.

b. Ensure resource efficiency and reduce embodied carbon emissions by sourcing and prioritising materials, and designing building shapes and

forms that can easily be maintained, repaired and renewed across the scheme's lifetime.

c. Minimise the environmental impact of materials by utilising sustainably-sourced, low impact and re-used or recycled materials and should where possible include the retention and reuse of existing on site materials (e.g. re-use of on site demolition materials). Materials should be locally-sourced wherever possible to minimise transport emissions.

Reason

6.6 Adopting a circular economy approach makes a significant contribution to reducing the borough's carbon emiossions. To minimise carbon emissions, the reuse and refurbishment of new buildings is preferred over a new build unless it can be demonstrated that carbon emission reductions could be better achieved through a new build or that the older structure would be holding back a larger scale redevelopment or would be beyond economic repair or would provide public open space, sports, community or similar facility(ies).

CC3 Proposed Policy Embodied Carbon

6.7 As new buildings become more efficient, operational emissions start to increasingly reduce, with the result that embodied carbon emissions make up a greater proportion of the total building's whole life carbon. Therefore in order to achieve net zero by 2050, the focus now needs to be on embodied carbon emissions, and the impact should be reduced as far as possible through good design and planning.

6.8 Embodied carbon assessments and targets are not yet defined in terms of Building Regulations, however several local authorities have started mandating embodied carbon assessments in their local plans. Furthermore, several industry organisations have have been considering embodied carbon. The RIBA 2030 Climate Challenge sets targets for 2025 and 2030. LETI have also set design targets for 2020 and 2030, in addition to producing guidance and a reporting tool for embodied carbon assessments. Furthermore, LETI have worked with RIBA, the GLA, IStructE and the UKGBC to produce guidance on alignment in Embodied Carbon measurement and comparisons, as an interim step towards developing net zero carbon targets that reflect the UK's carbon budget.

Proposed policy option 1 : Major residential and non-residential developments are required to include an embodied carbon assessment, using the RICS Whole Life Carbon Assessment for the Built Environment methodology, as part of the planning application.

Advantages

- Mandates that assessments are carried out.
- Increased embodied carbon assessments and results, leading to more evidence, which can promote stronger targets in the near future.
- Data gathered can be used for benchmarking embodied carbon targets in future plan-making.

Disadvantages

- Without a maximum embodied carbon limit, applicants may not reduce embodied carbon.

Proposed policy option 2 : Meeting an upfront embodied carbon limit

Major residential and non-residential developments are required to undertake an embodied carbon assessment, following the RICS Whole Life Carbon Assessment for the Built Environment methodology, and should comply with an upfront embodied carbon limit.

Advantages

- Mandates that assessments are carried out; supports the industry in developing in this specialism.
- Applicants will have to comply with an embodied carbon limit, which will encourage embodied carbon to be factored into design decisions.

Disadvantages

- A bespoke evidence base will need to be developed to provide limits. It is important that a limit is set that is stretching, but achievable.
- Industry is currently developing information on benchmarking of embodied carbon; it will be simpler to set limits once this has been developed. Once these have been set, the policy could be updated.
- Setting a target that is too large a number is unhelpful, as it might lead to applications that show higher embodied carbon than in reality, which will skew benchmarking.

Proposed policy option 3 : Meeting a lifecycle embodied carbon limit

6.9 Major residential and non-residential developments are required to undertake an embodied carbon assessment, following the RICS Whole Life Carbon Assessment for the Built Environment methodology, and should comply with a lifecycle embodied carbon limit by 2030.

Advantages

- Mandates that assessments are carried out; supports the industry in developing in this specialism.
- Applicants will have to comply with an embodied carbon limit, which will encourage embodied carbon to be factored into design decisions.

Disadvantages

- Same as Option 2 plus
- The use and the end-of-life stages are not typically in the 'control' of the developer, and consequently the outcomes of the assessment are less likely to be implemented.
- Carrying out upfront embodied carbon assessments is gaining much more traction but still not common place. Lifecyle embodied carbon, that includes the embodied carbon of the use and end-of-life stages, is additional work, and this has a much higher level of uncertainty.

Proposed Policy Embodied carbon

Proposed Policy Wording: Major residential and non-residential developments are required to undertake an embodied carbon assessment, following the 'RICS Whole Life Carbon Assessment for the Built Environment' methodology, and this should be included in the Energy and Carbon Statement submitted with the planning application.

Reason

6.10 Embodied carbon emissions are the emissions emitted producing a building's materials, their transport and installation on site, as well as their disposal at end of life. As new buildings become more efficient, operational emissions start to increasingly reduce, with embodied carbon emissions making up a greater proportion of the total building whole life carbon. Subsequetly the focus needs to be

directed towards embodied carbon emissions, with the impacts reduced through good design and planning. The RICS guidance is an industry standard and has been developed by a wide range of experts in the development industry.

Energy efficiency

6.11 Making development more energy efficient will help reduce emissions particularly in new development where most heating systems are electric.

CC4 Proposed policy Low carbon energy

6.12 Reducing carbon emissions emitted through heating and energy consumption has a major part to play in reducing the borough's carbon emissions. This needs to be considered in terms of energy for heating and energy for other needs, including cooling systems in the summer months. Low carbon heating and energy systems not only reduce carbon emissions but can help reduce fuel poverty and improve local air quality

Proposed policy Energy Efficiency

1. New development must demonstrate that its energy supply will be efficient and clean, and maximises the use of renewable and low carbon energy generation and storage.

2. This will be achieved by requiring:

a. All new development to use low carbon heat and cooling.

b. All development proposals to demonstrate in the energy statement:

i. How demand-side response has been incorporated, specifically through the installation of smart meters, minimising peak energy demand and promoting short term energy storage.

ii. How the proposal has ensured efficient generation of low carbon energy on site; any developments proposing to use heat pumps to demonstrate that these are of good quality and achieve a minimum standard of efficiency.

iii. How appropriate roof spaces have been utilised to maximise the delivery of multi-functional benefits (e.g. co-location of renewable energy and green, brown or blue infrastructure).

iv. **How the proposal has made the best potential use of roof space to maximise local renewable and low carbon electricity and/or heat generation – 100% of energy demand should be met by renewable energy generation on site wherever possible including the use of batteries where feesable.**

v. **How Major Development schemes (500 plus units) incorporate decentralised energy and heat systems including linkages to existing heat networks or made ready to connect to future decentralised heat/ energy networks unless it is robustly demonstrated that it is not technically feasible.**

3. **Total energy use for developments must have a predicted energy use intensity of no more than:**

   - **35kWh/m^2_{GIA} for domestic**
   - **70 kWh/m^2_{GIA} for offices**
   - **70 kWh/m^2_{GIA} for schools**
   - **35 kWh/m^2_{GIA} for industrial buildings**
   - **160 kWh/m^2_{GIA} for hotels**

   Of which, the maximum space heating demand must be a predicted maximum energy use intensity of:

   New build major 15 Kwh/m^2/year
   New build minor 20 Kwh/m^2/year

   Or:

   Developments can use the following or equivalent sustainability certification to demonstrate high levels of energy efficiency:

   For residential and non-residential Passivhaus
   For non-residential BREEAM "excellent"

Reason

6.13 In 2022 the borough's carbon emissions from heating accounted for 21.6% of the borough's total carbon emissions. To reach Net Zero by 2050 it is crucial that heating systems are electrified.

Direct electric heating systems are relatively inefficient and should only be used where it can be demonstrated that energy use has been significantly reduced by achieving ultra-high fabric efficiency such as through Passivhaus certification or equivalent. This will both reduce carbon emissions and ensure that the system does not result in high energy bills for future residents, and to reduce the risk of fuel poverty.

Well designed, installed and maintained heat pumps can be very energy efficient and a way of harnessing waste heat. Heat pumps typically achieve efficiencies between 260 and 320% efficiency, whereas direct electric systems and gas boilers typically operate between 80 and 100% efficiency. Furthermore, heat pumps use low flow temperature and large emitters to spread heating throughout the day, resulting in reduced peak heating demand compared to gas boilers and direct electric systems which operate when heat is desired. Heat pumps also have the benefit of being smart grid ready which could enable demand-side response.

Heat pumps are a lower carbon system than gas boilers. Whilst the carbon factor for grid electricity is expected to decrease further as more renewable energy is produced, the carbon content of gas will remain the same unless low carbon gases such as hydrogen are introduced to the gas grid. Heat pumps also provide air quality benefits given that they do not produce any direct emissions on site.

Low-carbon heat using a heat pump is cost effective when built into new homes and will not increase running costs where the system is well designed, installed and operated, particularly in well-insulated buildings.

To be effective new development should be designed to harness heat at low temperatures given that heat pumps tend to operate significantly more efficiently at lower temperatures and waste heat sources are typically at lower temperatures. Where heat pumps are proposed, it should be demonstrated that efficiencies have been maximised through the proposed technology and heating system. A high specification of energy efficiency (coefficient of performance) will be expected to ensure the system works efficiently and reduces running costs and peak electricity demand.

However, heat pumps can be obtrusive and create noise and vibration and therefore it is important that where heat pumps are proposed that living conditions of existing and future occupiers of the proposed development and neighbouring properties are not materially harmed in terms of outlook, noise or vibrations.

The incorporation of renewable energy systems including solar panels and battery systems would support a development in reducing its dependency on carbon based energy and reduce peak demand and the risk of fuel poverty. These systems will also play a role in producing low carbon cooling systems which will be needed increasingly as summer temperatures increase in the borough.

BREEAM and Passivhaus are two recognised accreditation schemes which will support moves towards net zero by 2050.

For information: GIA means Gross Internal Area

CC5 Proposed Policy Electric Vehicle Charging Infrastructure

6.14 In 2022 road transport accounted for the largest contribution to greenhouse gas emissions when compared with other sources. From 2030 the government requires all new cars to be electric in order to reduce transport carbon emissions. Currently electric car use remains limited in the borough. One way to support the transition to electric vehicles is the availability of electric charging infrastructure. This will require significant private and commercial investment, most significant of all being the energy companies which will have to update electric generation capability, network grid capacity and cabling in many neighbourhoods. It should be noted that since the introduction of Part S of the Building Regulations in 2022, there is a requirement for new development to include EV infrastructure and charge points.

6.15 The council is seeing more planning applications for charging stations and these with their rapid charging capability will both support EV users and the decarbonisation of the transport sector. However ensuring that there is sufficent local grid capacity and that the stations comply with other plan policies is vital for a successful roll out.

Proposed Policy: Electric Vehicle Charging Infrastructure

1. **Electric vehicle (EV) charging points must be installed in car parks with more than 9 spaces which form part of a village hall, community facility or similar either as part of a new development or as part of an extension of more than 100 sqm.**

2. **Commercial electric vehicle charging stations will be supported where a suitable energy supply can be supplied to the site which does not compromise electricity supplies in nearby neighbourhoods and where the proposed scheme complies with other local plan policies, highway and other safety considerations.**

Reason

6.16 Transport generated carbon emissions account for 42% of the borough's total emissions. For the borough to achieve net zero carbon by 2050 the transition to electric and other low carbon vehicles will require significant new infrastructure. The Building Regulations Part S sets out the requirements for EV Charging points in new development and some larger commercial extensions. However long distance travellers and others without appropriate private parking space or electric network capacity will need commercial standard and high speed charging stations.These will need to be located along major arterial routes, on streets where there is on street parking where properties lack space for cars and outside community facilities and in public car parks. This will require new energy infrastructure and cabling so as to not inconvenience nearby neighbourhoods resulting from power outages. New charging stations will be required; some of these will be on existing petrol station sites but other new locations will come through promoters. It is important to ensure that highway safety is not compromised and that such schemes are located in approprate locations, are of a suitable scale to fit in with the surrounding area and are respectful of local amenities. This will be in accordance with the Surrey Local Transport Plan 4.

CC6 Proposed Policy Avoiding areas at risk of flooding

6.17 New development needs to be both carefully designed and built to be resilient to both current and future impacts of climate change. The risk of flooding will continue to increase as a result of climate change with increasingly frequent and more intensive storms.

Recommended Policy: Minimising risk from flooding

1. **Development proposals must avoid areas at risk of flooding where possible and prioritise development in areas with the lowest risk of flooding. The Sequential Test shall be undertaken for developments in Flood Zones 2 and 3 except where exempt in accordance with the requirements of the NPPF and Planning Practice Guidance. Development will not be permitted if there are reasonably available sites appropriate for the proposed development in areas with a lower probability of flooding. Where necessary the Exception Test must also be satisfied in line with national guidance.**

2. **Sites within Flood Zones 2 and 3, sites within Flood Zone 1 which are greater than 1 hectare in area, and sites with critical drainage problems or where a proposed development will result in a vulnerable development being subject to other sources of flooding, will be required to carry out a site-specific Flood Risk Assessment (appropriate to the scale of the development). Where a Flood Risk Assessment is required, it should:**

a. take account of the impacts of climate change over the lifetime of the development

b. demonstrate that the development will be safe for its lifetime taking account of the vulnerability of the proposed use; and

c. take account of the advice and recommendations set out in the Council's Strategic Flood Risk Assessment.

3. Proposals must not increase the existing and future risk of flooding elsewhere. Where possible, proposals should seek to secure opportunities to reduce both the cause and impact of flooding for existing and proposed development.

4. Development should reduce surface water run-off rates using permeable surfaces and sustainable drainage systems where necessary, suitable to the scale and type of development. Where sustainable drainage systems are proposed, schemes should include appropriate arrangements for its ongoing maintenance for the lifetime of the development.

Reason

6.18 Flood risk (whether fluvial, surface water, groundwater, sewer, pluvial, or from reservoir failure), affects a number of areas within the borough, including key regeneration areas, and in these areas is a key consideration for new developments. Whilst there is a need to make best use of land in the borough, a policy is required to ensure that this is balanced with the need to ensure new development is designed safely and will not worsen the risk of flooding for others.

6.19 The Council has undertaken a Strategic Flood Risk Assessment using the latest national flood risk data to understand the flood risk in the borough from all sources, now and in the future, taking account of the impacts of climate change, and to assess the impact that land use changes and development in the area will have on flood risk. This document should be taken into account when preparing applications for sites within Flood Zones 2 and 3, sites within flood zone 1 which are greater than 1 hectare in area, sites with critical drainage problems or where a proposed development will result in a vulnerable development being subject to other sources of flooding, which require preparation of a Flood Risk Assessment.

6.20 In particular, climate change allowances should be factored into the design of a scheme and information on these measures should be submitted with an application, including consideration of national sensitivity ranges for rainfall intensity, peak river

flows as appropriate and whether emergency egress and access to the site will be required.

For site-specific Flood Risk Assessments, advice on the scope of the Flood Risk Assessment required should be sought from the Environment Agency, and from Surrey County Council as the Lead Local Flood Authority for the area.

Water efficiency

6.21 According to the Environment Agency in 2021, Reigate and Banstead is in a 'Serious water stressed area'. However SES water have observed that residents in Reigate & Banstead use approximately 150 LPPPD (Litres per person per day), 7 litres more than the national average. Part G of the Building Regulations 2016 has set the daily limit to 125 LPPPD and a 110 LPPPD limit where the 'fittings approach' is used. The current local plan seeks to limit water consumption to 110 LPPPD in accordance with the Building Regulations 2013, which remain current.

6.22 The Future Homes Hub's report "Water Ready: A report to inform HM Government's roadmap for water efficient new homes" pulls together evidence and suggests the steps that could be taken under Part G of the Building Regulations to increase water efficiency requirements for new homes over the next 10 years.

Table 6.1 Framework to reduce water consumption per person per day

2025	2030	2035
105 LPPPD achieved through fittings approach	**100 LPPPD** achieved through fittings approach and innovation	**90 LPPPD** achieved through fittings approach and further innovation

2025	2030	2035
100 LPPPD in water stressed areas	**90 LPPPD** in water stressed areas To be determined in seriously water stressed areas to enable sustainable growth	**80 LPPPD** in water stressed areas To be determined in seriously water stressed areas to enable sustainable growth
90 LPPPD In seriously water stressed areas to enable sustainable growth		

Source: https://www.futurehomes.org.uk/future-homes-hub-water-efficiency-report

6.23 **Policy option 1: Retain the existing policy requirement of 110 LPPPD**

Advantages

- Established practice
- Would not add to the cost of a development above what is agreed nationally.

Disadvantages

- Fails to reflect that the borough is in a seriously water stressed area and that new development should be seeking to reduce water consumption.

- The scale of new development being proposed in the new local plan would critically increase the demand for water in an already seriously water stressed area.

6.24 **Policy option 2: Reduce water consumption in new development to 90 LPPPD**

Advantage

- According to Future Homes 90 LPPPD would be a sustainable level of water consumpton in seriously water stressed areas
- Lower water use would reduce network carbon emissions associated with pumps and water treatment works.
- Reduce water bills in real terms

Disadvantages

- This would represent a significant reduction to water consumption in new development which would require the use of dual water systems.
- There would be an additial cost of installing dual systems
- Development would need to include space for dual system collection/ storage tanks
- Consumers could be resistant to use of grey water
- The 90 LPPPD per day limit, whilst sustainable up to 2035, could be further reduced to 80 LPPPD from 2035 as a result of climate change.

6.25 **Policy option 3: Reduce water consumption in new development to 90 LPPPD with further reduction to 80 LPPPD from 2035**

Advantage

- According to Future Homes 90 LPPPD would be a sustainable level of water consumpton in seriously water stressed areas but as a result of climate change this would need to be reduced to 80 LPPPD from 2035
- Lower water use would reduce network carbon emissions associated with pumps and water treatment works.

- Reduce water bills in real terms

Disadvantages

- This would represent a significant reduction to water consumption in new development which would require the use of dual water systems.
- There would be an additional cost of installing dual systems
- Development would need to include space for dual system larger collection/ storage tanks
- Consumers could be resistant to use of grey water

CC7 Proposed Policy: Water Efficiency in new residential development

6.26 The borough is located in a very stressed water area with limted water resources. New development will place additional pressure on existing water supplies. It will also increase demand for additional water to be treated. Making more efficient use of water will reduce the impact on supply and treatment which will further reduce water network carbon emissions. It will also reduce occupiers' future water bills. As a result reducing water usage and reusing greywater in new development will provide a more sustainable solution.

Proposed policy: Water Efficiency in new residential development

New residential development must achieve a water efficiency standard of 90 litres per person per day reducing to 80 litres per person per day from 1 January 2035.

Reason

6.27 The requirement to meet the higher water efficiency standard is based on the Future Homes recommendation and is based on Environment Agency findings that Reigate & Banstead is in an area of very seriously stressed water.

Glossary

Term	Meaning
Biogenic Carbon	Carbon removals associated with carbon sequestration into biomass as well as any emissions associated with this sequestered carbon. Biogenic carbon must be reported separately if reporting only upfront carbon but should be included in the total if reporting embodied carbon or whole life carbon.
Biomass	Material of biological origin excluding material embedded in geological and/or fossilised formations.
BREEAM	BREEAM (Building Research Establishment Environmental Assessment Methodology) is a globally recognised sustainability assessment method used to evaluate the environmental performance of buildings across their lifecycle.
Carbon Sequestration	The process by which carbon dioxide is removed from the atmosphere and stored within a material – e.g. stored as Biogenic Carbon in 'Biomass' by plants/trees through photosynthesis and other processes.
Circular Economy	An economy that is restorative and regenerative by design, and that aims to keep products, components and materials at their highest utility and value always, distinguishing between technical and biological cycles.

Term	Meaning
Embodied Carbon or Life Cycle Embodied Carbon	Embodied Carbon emissions of an asset are the total GHG emissions and removals associated with materials and construction processes throughout the whole life cycle of an asset.
Energy Use Intensity (EUI)	A measure of a building's energy performance, specifically how much energy it consumes per unit of area over a given period. It's calculated by dividing the total energy consumed by a building in a year by its total gross floor area. A lower EUI indicates better energy efficiency.
Greenhouse Gases (GHG)	GHG (Often referred to as ‘carbon emissions’): Greenhouse Gases are constituents of the atmosphere, both natural and anthropogenic, that absorb and emit radiation at specific wavelengths within the spectrum of infrared radiation emitted by the Earth’s surface, the atmosphere, and clouds.
GIA	Gross Internal Area
Net Zero Whole Life Carbon	A Net Zero Whole Life Carbon Asset is one where the total of all assets-related GHG emissions, both operational and embodied, over an asset ’s life cycle are minimized, which meets local carbon, energy and water targets or limits, and with residual ‘offsets’, equals zero.
Land use and land use change (LULUC)	A greenhouse gas inventory sector that covers emissions and removals of greenhouse gases resulting from direct human induced land use such as settlements and commercial uses, land use change, and forestry activities.

Term	Meaning
Litres per person per day (LPPPD)	The daily amount of water consumed per person in a household.
Local Cycling and Walking Infrastructure Plan (LCWIP)	Such plans are for a local area and are based on the Department for Transport Local Transport Note 1/20 Cycle Infrastructure Design
Operational Carbon – Energy, Buildings	Operational Carbon – Energy are the GHG emissions arising from all energy consumed by an asset in-use, over its life cycle.
Passivhaus	The Passivhaus standard is a set of criteria that focuses on achieving ultra-low energy consumption in buildings. It aims to minimise heating and cooling needs by creating a well-insulated, airtight building envelope, often with heat recovery ventilation. The standard sets specific requirements for energy performance, airtightness, and thermal comfort.
Target Emissions Rate (TER)	TER is a benchmark used in Building Regulations to assess the energy efficiency of new dwellings. It represents the maximum allowable level of carbon dioxide emissions for a notional building of the same type, size, and heating fuel as the proposed dwelling, ensuring a minimum standard for energy performance.

Term	Meaning
Upfront Carbon - Buildings	Upfront Carbon emissions are the GHG emissions associated with materials and construction processes up to practical completion. Upfront carbon excludes the biogenic carbon sequestered in the installed products at practical completion.
User Carbon	'User Carbon' are those GHG emissions associated with user's utilisation of the buildings or infrastructure during the use stage. These must be clearly identified as 'Operational Carbon' or 'User Carbon' within the scope if addressed.
Whole life Carbon	Whole Life Carbon emissions are the total of all assets-related GHG emissions and removals, both operational and embodied over the life cycle of an asset including its disposal.

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