Runnymede Borough Council

Climate Change Study

Climate Change Adaptation

Final Report

Prepared by LUC

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Runnymede Borough Council

Climate Change Study

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Chapter 1
Introduction and context

This section provides the climatic background, context and projections in the RBC region. Understanding the likely future climatic conditions is vital to informing future policy options and guiding successful adaptation.

1.1 This first chapter sets out a high-level assessment of climate risks and opportunities for Runnymede Borough Council (RBC) both now and in the future.

1.2 Firstly, it draws on the latest Met Office UK climate change projections (UKCP18)[1] to gain an understanding of what the future climatic baseline in Runnymede could look like along with information on the current climate baseline and extreme events.

1.3 Secondly, the chapter explores, based on the UK Climate Change Risk Assessment[2], the key climate change opportunities and risks in the Runnymede area. This covers priority areas such as infrastructure, the natural environment, housing, societal health and wellbeing and the economy. We have also considered how climate impacts can compound social inequality, identifying those parts of Runnymede where communities are least able to prepare, respond or recover from climate events.

1.4 Having identified likely climate risks for RBC, we have considered the role of the Local Plan in planning for and supporting adaptation in response to these specific risks. This chapter covers the key themes below and is structured as such:

[1] Met Office (2023) – Available at: https://www.metoffice.gov.uk/research/approach/collaboration/ukcp

[2] UK Climate Change Risk Assessment (2022) – Available at: https://www.gov.uk/government/publications/uk-climate-change-risk-assessment-2022

- Policy context
- Climate baseline and projected future climate
- Key climate risks to the natural environment, built environment and health in RBC
- Policy options and considerations for adapting to climate change

1.5 The Climate Change Committee, in their 2023 report to parliament on Climate Change Adaptation progress, made three comments on the UK planning system.[3]

- Recent updates to guidance on floodplain planning is limiting the amount of new development at risk of flooding, although some development is still occurring against advice. New guidance for green infrastructure has also progressed, but overall, climate resilience is not embedded nor sufficiently enforceable within spatial planning policy.
- Climate resilience measures are largely considered as guidance, resulting in inconsistent implementation and delivery. There is potential for planning and environmental improvement policies to ensure that planning decisions consider adaptation, but clear mechanisms are currently lacking.
- Planning policy lacks standards and mechanisms for monitoring the inclusion and maintenance of climate resilience measures.

1.6 Within the national context, Paragraph 153 of the NPPF states that:

'*Plans should take a proactive approach to mitigating and adapting to climate change, taking into account the long-term implications for flood risk, coastal change, water supply, biodiversity and landscapes, and the risk of overheating from rising temperatures. Policies should support appropriate measures to ensure the future resilience of communities and infrastructure to climate change impacts, such as providing space for physical protection measures, or making provision for the possible future relocation of vulnerable development and infrastructure.*'

1.7 The following sections of this chapter will provide the evidence base to inform climate change adaptation policies in the Runnymede Local Plan review. Contextual information on the likely climatic changes and associated risks is provided.

1.8 Chapters two and three provide policy principles and recommendations for mitigating the impacts of these changes and potential risks.

Climate baseline

1.9 To understand the specific climate risks facing the Borough, it is important to set out the current climatic baseline and how it is likely to change in the near to long term. This will provide a context for the resulting threats (and rare opportunities) and inform sound policy choices that can help necessary adaptation within the Borough.

1.10 The UK is typified by an oceanic climate; as such, the UK experiences relatively narrow ranges of temperatures, with cool summers and mild winters and relatively evenly distributed precipitation. However, the UK's weather and climate is naturally variable within this range. Cycles of average conditions of the Jet Stream above the North Atlantic can drive significant variations in typical weather patterns over multi-year periods. The Climate Change Committee suggests that incorporating this variability into adaptation policies is important for the following reasons:

- Individual years could still see conditions opposing the long-term average trend.
- The frequency of damaging UK weather patterns may shift due to global climate change.
- Changes in extreme climates may look different to changes in the average climate conditions.

1.11 The table below summarises some key observed changes in England's climate.

Table 1.1: Existing changes in UK climate

Variable	Observed change in England
Average annual temperature	Increase of 0.9°C from mid-1970s to mid-2010s
Annual mean rainfall	Increase of 4.5% from mid-1970s to mid-2010s
Sunshine	Increase of 9.2% from mid-1970s to mid-2010s
Weather extremes	UK-wide increase in extreme heat events. Little evidence yet on changes in extreme rainfall.

Summary of recent extreme weather events in Runnymede

1.12 The recent track record of extreme events in the Borough allows us to examine what the likely impact will be if these extreme events increase in their frequency and duration due to

[3] Progress in adapting to climate change – 2023 Report to Parliament (CCC, 2023)

climate change. Over the last decade, Runnymede has experienced extreme weather events that have resulted in flooding, heatwaves and wildfires. Table 1.2 below summarises the most notable events to affect the Borough.[4] Understanding previous extreme events and their impacts in the area will provide context to inform appropriate adaptation policy.

Table 1.2: Runnymede previous extreme events

Date	Type	Description	Impacts
July 2022	Heatwave	The UK experienced a brief but unprecedented extreme heatwave from 16 to 19 July 2022.	On 19th July 2022, 40.3°C was recorded at Coningsby (Lincolnshire), setting a new UK and England temperature record by a margin of 1.6°C, and multiple stations across England (including Chertsey) also exceeded 40°C.
February 2022	Storm	Three named storms affected the UK within the space of a week, the first time this has occurred since storm naming was introduced in 2015/2016.	Major transport disruption, with trains cancelled, roads were blocked by fallen trees and there were a number of overturned lorries. Thousands of trees were felled – including large mature trees. Runnymede received a rare red warning for strong winds during storm Eunice. A maximum windspeed of 78mph was recorded at Charlwood in Surrey.
February 2021	Storm	The UK experienced a week of severe winter weather from 7 to 13 February, with easterly winds drawing a bitterly cold airflow from eastern Europe.	Snow and ice caused widespread travel disruption, with roads closed across many eastern coastal and central counties.
August 2020	Heatwave	Southern England experienced a significant heat-wave during early August 2020 as hot, humid air moved north from the near continent.	The hot weather made conditions difficult for the elderly and vulnerable and was likely responsible for a rise in registered deaths in England and Wales during the week. The heatwave led to a wildfire on Chobham Common. This destroyed 30 hectares of rare lowland heath habitat.
February 2020	Flooding	UK-wide flooding brought about by intense rainfall from Storm Ciara and Storm Dennis.	Travel delays and disruptions. Flooding of properties and agricultural land.
July 2019	Heatwave	Short, intense heatwave UK-wide, with temperatures exceeding 37C.	Health impacts from heat stress; Travel delays and disruptions Disruptions to energy supply; Vegetation fires.
Summer 2018	Heatwave	The UK's warmest summer since 2006 and driest since 2003.	Drying up of private water supplies; Health impacts from heat stress; Low water supply for drinking and hygiene; Health implications for livestock; Blue green algae growth in water bodies; Increased incidence of fly infestation; High incidence of wildfires.
December 2013	Flooding	Over 50 millimetres of rainfall fell in Surrey in 24 hours, resulting in rapid flooding along the River Wey and the River Mole catchments.	Over 400 properties flooded; Disruptions to energy supply; Travel delays and disruptions.

1.13 The extreme events seen in the Borough mirror events seen across the whole of the UK. As the UK's climate becomes warmer, certain trends have been predicted in weather phenomena in the UK. In general, the weather in Runnymede is likely to become warmer and wetter. Table 1.3 summarises these trends and if they can be linked to climate change.

[4] Adapted from Surrey Heath Climate Change Study (Aecom, 2020) and the Met Office database of extreme weather events.

Table 1.3: Past and future changes in weather phenomena in the UK[5]

Trend	Changes in intensity or frequency so far	Is this linked to climate change?	What is expected in the future?
UK warm spells	Increase	Yes	Increase
UK cold spells	Decrease	Yes	Decrease
UK heavy rain	Increase	Inconclusive	Increase
UK dry spells	No trend detected	Inconclusive	Increase (summer)
UK wind storms	No trend detected	Inconclusive	Increase

Climate projections for the Runnymede region

1.14 This section outlines the likely changes in climate anticipated in the region around RBC. We have drawn upon the Met Office's UK Climate Projections (UKPC), which represent the UK's most comprehensive picture of how the climate could change by the end of this century, using the most recent scientific evidence. These projections have modelled the impacts of climate change based on four main Representative Concentration Pathways (RCP)[6]:

- RCP2.6 – Compatible with aims to limit global warming since pre-industrial levels to below 2˚C
- RCP4.5
- RCP6.0
- RCP8.5 – Reasonable worst-case scenario

RCP	Change in temperature (˚C) by 2081-2100
RCP2.6	1.6
RCP4.5	2.4
RCP6.0	2.8
RCP8.5	4.3

1.15 The figures in Table 1.4 below represent probabilistic projections that indicate that under RCP4.5 & 8.5, Runnymede will have warmer winter and summer temperatures, with an increase in both winter and summer precipitation. The table indicates that under RCP8.5, between 2040-2059 there is a 95% chance that mean annual temperatures will rise by 3.2˚C, mean winter temperatures by 3.3˚C, mean summer temperatures by 4.4˚C, mean winter precipitation by 40% and mean summer precipitation by 14%. In the time period 2080-2099 these trends are continued to further extremes. RCP8.5 reflects a worst-case scenario, and this table intends to display the most extreme projections for future climatic changes in the Borough. RCP4.5 is considered a medium case scenario. Both these scenarios provide important context to inform the climate change risks that are specific to the area.

Table 1.4: Projected changes in the South East UK climate

Region name	Variable	Time Horizon (relative to 1981-2000)	Emissions Scenario	5th percentile change	50th percentile change	95th percentile change
South East England	mean annual temperature (°C)	2040-2059	RCP8.5	0.7	1.9	3.2
South East England	mean annual temperature (°C)	2040-2059	RCP4.5	0.4	1.4	2.5
South East England	mean annual temperature (°C)	2080-2099	RCP8.5	2.1	4.3	6.9
South East England	mean annual temperature (°C)	2080-2099	RCP4.5	1	2.6	4.3

[5] Met Office (2023). Available at: https://www.metoffice.gov.uk/weather/climate-change/effects-of-climate-change

[6] The increase in global mean surface temperature averaged over 2081-2100 compared to the pre-industrial period (average between 1850-1900) for the RCP pathways (best estimate, 5-95% range). From IPCC AR5 WG1 Table 12.3

South East England	mean winter temperature (°C)	2040-2059	RCP8.5	0.2	1.7	3.3
South East England	mean winter temperature (°C)	2040-2059	RCP4.5	0	1.3	2.6
South East England	mean winter temperature (°C)	2080-2099	RCP8.5	1	3.6	6.4
South East England	mean winter temperature (°C)	2080-2099	RCP4.5	0.3	2.1	4
South East England	mean summer temperature (°C)	2040-2059	RCP8.5	0.8	2.5	4.4
South East England	mean summer temperature (°C)	2040-2059	RCP4.5	0.4	1.9	3.5
South East England	mean summer temperature (°C)	2080-2099	RCP8.5	2.2	5.8	9.5
South East England	mean summer temperature (°C)	2080-2099	RCP4.5	1	3.5	6.2
South East England	mean winter precipitation (%)	2040-2059	RCP8.5	-10	13	40
South East England	mean winter precipitation (%)	2040-2059	RCP4.5	-11	9	32
South East England	mean winter precipitation (%)	2080-2099	RCP8.5	-10	27	75
South East England	mean winter precipitation (%)	2080-2099	RCP4.5	-12	16	46
South East England	mean summer precipitation (%)	2040-2059	RCP8.5	-55	-22	14
South East England	mean summer precipitation (%)	2040-2059	RCP4.5	-47	-18	14
South East England	mean summer precipitation (%)	2080-2099	RCP8.5	-85	-41	7
South East England	mean summer precipitation (%)	2080-2099	RCP4.5	-59	-26	7

1.16 RCP8.5 is often referred to as the "business as usual" emission pathway and is the likely outcome if society does not make concerted efforts to reduce GHG emissions. RCP8.5 represents a "very high baseline emission scenario", consistent with the highest emission scenarios in the academic literature. This pathway includes assumptions of high population growth and slow technological progress, depicting a worst case scenario.

1.17 As RCP8.5 represents that worst case scenario, this is an inherently conservative approach. This provides RBC with the context of what 'could' happen to the climate in the region, given the uncertainties involved in modelling future climatic conditions. This will allow the Borough to prepare for worst case situations, with extreme changes factored into decision-making.

1.18 This approach aligns with guidance from the Town and County Planning Association and Royal Town Planning Institute which recommends that “local planning authorities should consider using ‘credible maximum climate change scenarios such as ‘High++’ when considering particularly vulnerable locations or sensitive development.”[7]

1.19 RCP4.5 has also been presented to provide an indication of the medium case scenario, where some GHG mitigation measures are implemented. Although 'likeliness' is not given as part of each scenario, RCP4.5 might be a more probable indicator of the future climatic conditions in RBC.

Implications for climate change adaptation policy

1.20 It is conclusive that the UK’s climate is changing and that continued change should be expected in the near and long term. Under all RCP pathways, there will be significant changes to the UK’s climate. Therefore, adaptation policies need to consider the future climate and the implications this will have on future development as well as transport delivery and infrastructure amongst other concerns. The decisions made in the planning process now will have implications for hundreds of years, as new building developments, energy and transport infrastructure will still be in place and operational over long time periods.

1.21 However, the UK’s climate is relatively insensitive to global trends of GHG emission reductions. This means that we have relative certainty on the likely climate changes that we will

[7] The Climate Crisis – a guide for local authorities on planning for climate change (TCPA/RTPI, 2023). https://tcpa.org.uk/resources/the-climate-crisis-a-guide-for-local-authorities-on-planning-for-climate-change/

see up to 2050. When designing adaptation policy, it is suggested that a 100 year horizon is used, with the TCPA/RTPI guidance stating *"Building resilience requires thinking about the very long term – and at least 100-year planning horizons. For some critical infrastructure longer periods will be appropriate."*

Specific Climate Change risks and impacts for RBC

1.22 When considering policy for the upcoming local plan review, it is important to consider the key climate risks and impacts that will affect the RBC area. Therefore, we have provided a summary and prioritisation of the key climate risks and opportunities affecting Runnymede now and in the future.

1.23 The Climate Change Committee's assessment of UK climate risk was used as a starting point, tailored to reflect the characteristics of Runnymede and the projected scale and spatial distribution of climate impacts. The key risks facing the Borough, to be considered in RBC policy-making, are summarised in Tables 1.5-1.8, with a table for each key climatic trend predicted to occur. These include increased risk of flooding affecting homes, businesses, infrastructure and farmland, drought and water shortages, changing land management requirements and ecological changes.

Table 1.5: Summary of the risks and impacts of UK warm spells

Asset	Priority for RBC	Description
Natural Environment and Assets		Increased invasive species and invasive species range. Warmer temperatures could lead to species shift and create conditions where non-native species can exist. Pests and pathogens have the potential to severely damage key ecosystem functions in Runnymede. This may damage or alter current ecosystem services in Runnymede, such as carbon sequestration and storage. Extreme heat events could lead to localised species die off due to the heat intolerance of certain species native to the UK. For example, heatwaves can cause rivers and streams to de-oxygenise, leading to fish die offs. Higher water temperatures and altered hydrology. UK rivers, especially the Thames, are under a multitude of pressures, such as sewage run-off, nutrient leaching, invasive species and physical modification. Increased temperatures will alter the temperature of river and lake waters, which may have an effect on biological growth and activity in these ecosystems. There is also an increased risk of algal blooms, which severely impact water ecosystems by restricting oxygen access to other organisms. Water scarcity and reduction in water quality due to higher evapotranspiration. Loss of carbon storage in both soils and vegetation. Increased temperatures may increase vegetation mortality in certain vegetation species, leading to a loss of carbon storage. It will also accelerate soil desiccation, which could lead to carbon losses in soils.
Infrastructure		Higher temperatures could lead to transport infrastructure overheating and disruption to IT and communication services. For example, steel rails used in train tracks expand in the heat and can buckle in extreme cases. Furthermore, overhead wires on electrified train routes can expand and sag in extreme heat. This could cause an increase in travel and freight delays and transport infrastructure damage and is a trend that has been increasing in recent years. Increased electric storms. Higher temperatures could increase the frequency of electric storms affecting Runnymede. In combination with increased dry periods, this could amplify the risk of lightening induced wildfires. This was seen across the South region of England during the summer heatwave of 2022, with a significant

		wildfire event declared at Hankley Common in Surrey.
Health, Communities and the Built Environment		Higher temperatures lead to an increase in heat related health issues, particularly in the elderly. This could lead to an increase in mortalities during summer heatwaves. Heatwaves cause disruption to health, social care, schools and emergency provision due to impacts on productivity and heat induced health risks to the general population. Productivity loss. Building overheating from an increase in warm days could lead to productivity losses.
Business and Industry		Impact on farming and crops. Increased temperatures could make certain crops no longer viable and increase the rate of crop failure. This will impact the local economy and also threaten food security. Increased temperatures also could accelerate the process of evapotranspiration, further compounding drought conditions and low water tables. Productivity loss. Building overheating from an increase in warm days could lead to productivity losses.

Table 1.6: Summary of risks and impacts of UK cold spells

Trend	Asset	Priority for RBC	Description
UK cold spells	Natural Environment and Assets		Extreme cold spells, especially those at unseasonable periods, have the potential to disrupt natural seasonality in Runnymede. This could have an impact on natural carbon storage and sequestration in the area, alongside biodiversity.
	Infrastructure		Cold spells, including snow and ice, could cause disruption to key infrastructure, particularly transport.
	Health, Communities and the Built Environment		Risks facing cyclists and pedestrians during extreme events. For example, cold spells could increase ice on active travel infrastructure, leading to more accidents to users. Vulnerable members of the community could be at health risk due to extreme cold.
	Business and Industry		Extreme cold events could impact agricultural yields and disrupt supply chains within the Borough.

Table 1.7: Summary of the risks and impacts of UK heavy rain

Trend	Asset	Priority for RBC	Description
UK heavy rain	Natural Environment and Assets		Flooding could lead to an increase in sewage discharge into waterways and nutrient leaching from agricultural land, degrading these habitats. Extreme weather and rainfall causes soil compaction, especially on agricultural land on clay soils. This will increase water run-off, leading to an increased flood and drought risk. Flooding and heavy rain can also increase topsoil degradation, reducing soil quality, which in turn will impact agricultural outputs. An increase in surface water run-off in impermeable areas could decrease water quality as this will reduce groundwater recharge, lowering the water table and making areas more prone to drought.
	Infrastructure		Increase in flooding events. This could damage water infrastructure, such as sewerage infrastructure. Energy infrastructure, such as hydro-electric installations, could be damaged or unable to produce energy during high rainfall events. There is also the possibility that transport

			infrastructure could be damaged by flooding, along with delays associated with damage and maintenance. Higher river flows could damage infrastructure situated close to banks that are prone to flooding. Increased saturation of soil may lead to slope and embankment failure. When situated next to transport infrastructure, this can cause damage and delays to services.
	Health, Communities and the Built Environment		Flooding will damage the built environment. This will lead to building productivity loss and damages. Water and sewerage infrastructure could be flooded more often, reducing water quality and supply.
	Business and Industry		Physical assets could be damaged by flooding, reducing productivity.

Table 1.8: Summary of the risks and impacts of UK dry spells

Trend	Asset	Priority for RBC	Description
UK dry spells	Natural Environment and Assets		Increased invasive species and invasive species range. Dryer conditions could lead to species shift and create conditions where non-native species can exist. This may damage or alter current ecosystems in Runnymede. Low water flows could encourage algal blooms in bodies of water. Blooms severely impact water ecosystems by restricting oxygen access to other organisms. Furthermore, when water levels drop, the concentration of pollutants increases, temperatures rise and the ecosystem is negatively affected. Loss of carbon storage in both soils and vegetation. Prolonged droughts may increase vegetation mortality in certain non-drought tolerant vegetation species, leading to a loss of carbon storage. It will also accelerate soil desiccation, which could lead to carbon losses in soils. Large amounts of carbon are released during wildfire events. High risk of wildfires due to lack of moisture in vegetation and soils alongside increase fire loads due to vegetation mortality. Increased sewage outflow into rivers after heavy rain following drought periods. This reduces water quality in the local environment.
	Infrastructure		Drought conditions could lead to soil instability. This could cause subsistence in areas surrounding infrastructure, such as rail and road banks. Increased risk of flash flooding due to compacted soils that cannot absorb moisture quickly.
	Health, Communities and the Built Environment		Poor water quality and water supply due to changes in precipitation and groundwater flow. Loss of amenity value due to habitat degradation in urban and semi-urban areas. Risk to homes due to wildfire events.
	Business and Industry		Water scarcity could affect the productivity of workers. Crop failure due to restrictions on the amount of groundwater farmers will be able to draw to water plants. This could lead to crop failure and increased food prices due to a shortage of supply. Crop damage due to wildfires. Risk of infrastructure disruption and damage due to wildfires.

Summary of key climate risks to RBC

Flooding

1.24 Climate change has the potential to increase the frequency and severity of flood events in the Borough. Higher rainfall averages, increased storm events and altered soil compaction and permeability due to droughts will all interact to make damaging flood events more likely. These events have the potential to damage homes, businesses and transport and service infrastructure. They could also negatively impact the natural environment by increasing sewage discharge and nitrate leaching into natural waterways. This is a priority risk in Runnymede due to its proximity to the Thames, along with the fact that the South East of England is likely to face some of the most extreme impacts of climate change in the UK. Therefore, ensuring that new developments in the area are able to withstand flooding events and are located in suitable areas based on future flood risk is crucial to enable adaptation.

Overheating

1.25 Climate change has the potential to increase the frequency and severity of heatwave events in Runnymede. Heatwaves have a range of negative impacts on transport infrastructure, human health and the natural environment. Due to its position in the South East of England, Runnymede will encounter some of the most extreme effects of increased heat as the climate changes. In particular, overheating in the built environment will affect both the health, comfort and productivity of the population of the Borough. Ensuring that this risk is mitigated in Local Plan adaptation policy is of increasing importance for the Borough.

Wildfires

1.26 The combination of dryer and warmer summers is likely to increase the risk of wildfires in the Borough. This has a severe impact on the natural environment and can seriously impact housing infrastructure and human health. The UK does not have a natural wildfire cycle and large fires, particularly on the rare habitat of lowland heath, can be extremely damaging to wildlife. Furthermore, uncontrolled fires pose a large risk to property and people. Adapting to climate change by implementing robust Local Plan policies could reduce the potential risks and impacts of wildfires by ensuring such risks are considered in scheme design, for example by retaining more water in soils and vegetation (through SuDS) and creating a more diverse habitat mosaic in the Borough.

Water shortages

1.27 As with wildfires, the combination of less precipitation and warmer temperatures will put pressure on the water system in the Borough. Lower water tables present issues to water infrastructure, water availability and the natural environment. Ensuring that the population of Runnymede and the natural environment has access to a consistent water supply will be crucial for adapting to the effects of climate change in the Borough.

Chapter 2
Adapting to climate change

This chapter will provide an overview of the key principles that should underpin effective climate change adaptation and how these relate to Runnymede.

2.1 "Business as Usual" planning based on existing standards and regulations that fail to take in to account climate change will lead to sub optimal outcomes.

2.2 For example, planting traditionally native tree species based on the current or historic climate could lead to higher tree mortality in the future as these species may not be suitable for the future climate of the area. Predictive adaptation should therefore be integrated into any planning policy focusing on climate change adaptation to ensure that the likely future climate is considered in any new development in the Borough.

Table 2.1: Business as usual planning

Asset	'Business as Usual' planning	Consequences
Natural Environment	Outdated habitat designations based on historical standards that have not kept up with change. Reactive approach to invasive species. Once species have established, it is very difficult to manage.	Cultural norms prevent transformations needed to improve resilience. Hard engineering prevents landscapes from adjusting to new climatic conditions. For example, hard flood defences on rivers will prevent rivers

	Planting of unsuitable tree species for future climatic conditions.	from adjusting to higher flow rates.
Infrastructure	Increasing the reliance on electrification for energy supply without increasing the climate resilience of the system is a key risk.	Energy supply disruption in the instance of future extreme weather events.
Health, Communities and Built Environment	Building new public infrastructure without passive cooling for current/future high temperature and protection against extreme events. Inappropriate development in floodplains. Water intensive production methods chosen. Lack of consideration of the number of vulnerable elderly people at risk from extreme heat in care settings.	Building new homes and other vulnerable infrastructure in locations at high risk of flooding, putting assets and lives at risk. Increased risk of extreme heat events negatively impacting public health and infrastructure.
Business	Risk of stranded assets due to the lack of consideration of climatic changes.	Lack of visibility and understanding of risks in the supply chain, leading to increased financial and reputational risk.

Net Zero and climate change adaptation interdependencies

2.3 To achieve Net Zero, a whole system approach to decarbonisation is required given the interdependencies between almost all areas of the UK's society, infrastructure, natural environment and wider economy. Without consideration of these interdependencies, initiatives to improve a single sector's resilience will flounder. The Climate Change Committee identify three main factors to consider regarding Net Zero interdependencies[8]:

1. **Increasing long-term carbon storage** – there are both opportunities and risks facing the UK's land based carbon storage. In Runnymede, tree and hedgerow planting and catchment sensitive farming can have benefits for increasing climate resilience, sequestering carbon and biodiversity improvement. Carefully considering species that will be suitable to the future climate of the area is essential to ensure that long-term benefits are secured. This is critical to any future planning policy on increasing carbon sequestration in the Borough.
2. **Maintaining a resilient power system** – changes in the supply, use and management of energy are required for the UK to reach Net Zero. This will include a higher dependency on electricity – which will need a vast expansion of infrastructure. Ensuring that this infrastructure is resilient to future climatic conditions is extremely important in safeguarding the UK's transition to Net Zero.
3. **Decarbonising the UK's building stock** – improving the energy efficiency of the UK's building stock can also make it more resilient to future climatic conditions. Improving insulation, ventilation and cooling will ensure that buildings are cooler in summer and warmer in winter whilst also reducing their energy consumption. Future climatic conditions must be considered in new developments and retrofit projects to ensure that climate change risks are not exacerbated.

Ensuring a just transition

2.4 Fairness and justness should be at the heart of climate change adaptation and mitigation. Those most disadvantaged in society are more likely to be adversely impacted by the effects of climate change and often have fewer resources to react to any adverse events. Ensuring that local plan policies integrate and protect the most disadvantaged in society is crucial to any plan making/review process. Local authorities should consider the impact of their policies on disadvantaged groups and how these interplay with climate risks and opportunities. The RTPI's "Five Reasons for Climate Justice in Spatial Planning"[9] provides an overview of the most important reasons for considering climate justice within spatial planning. These include:

- Reinforcing the importance of diversity and equality in planning for climate change;
- Putting real engagement at the centre of planning for climate change;

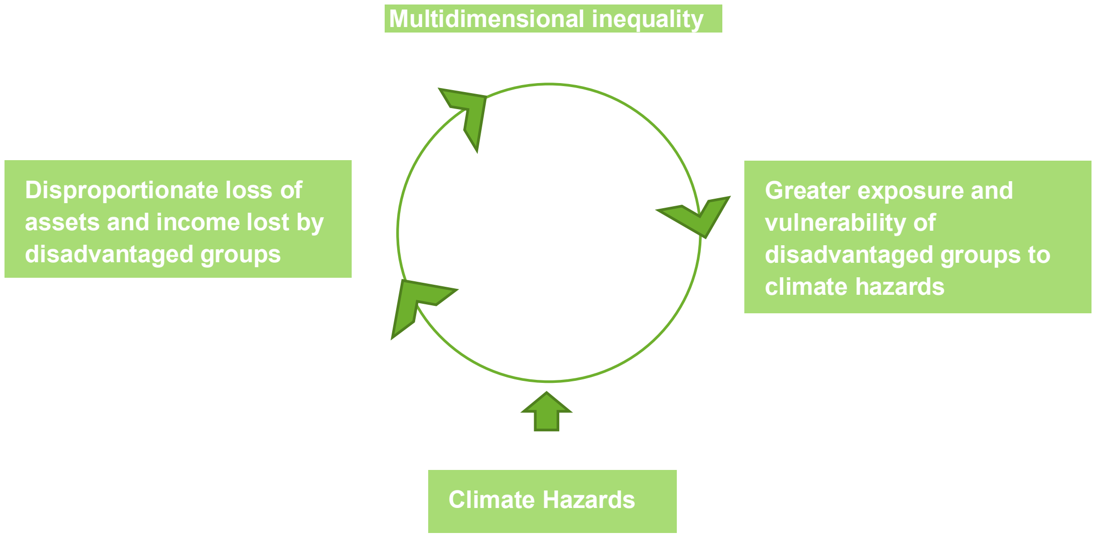
[8] Climate Change Committee (2023) Progress in adapting to climate change – Report to Parliament.

[9] RTPI (2020) Five reasons for climate justice in Spatial Planning

- Focusing attention on the wider social costs and benefits of adaptation and mitigation measures;
- Opening up crucial questions about governance, resourcing, and institutional capacity; and
- Helping planners to tell compelling stories that spur action and collaboration.

2.5 The UK Climate Assembly highlights the adoption of the principle of 'fairness, including for the most vulnerable'.[10] RBC should strive to not just avoid worsening inequality through adaptation planning, but look to reduce inequality. Certain groups are inherently more vulnerable to climate change impacts (for example, households with low incomes and limited savings). The IPCC states "Socially and economically disadvantaged and marginalised people are disproportionately affected by climate change."[11] Climate change exacerbates these inequalities. Figure 2.1[12] below displays the cyclical relationship of climate change and inequality.

Figure 2.1: Relationship between climate change and inequality



2.6 The following sub-section highlights how some of the key climate change risks for the Borough will potentially interact with inequalities in the area.

Runnymede socio-economic overview and key statistics

2.7 This section provides an overview of the key socio-economic statistics of Runnymede and how climate change interacts with these characteristics.

2.8 Runnymede has a younger population than the average in the south east region as well as the wider UK. Table 2.2 below shows the population breakdown of the district.[13] This means the area's population may be less vulnerable to the impacts of climate change than other regions because younger populations tend to be in better health and may not be vulnerable to extreme events, such as overheating and extreme cold spells. Younger populations also tend to have more capacity to react to extreme events, such as flooding, due to increased mobility and connectivity with wider society.

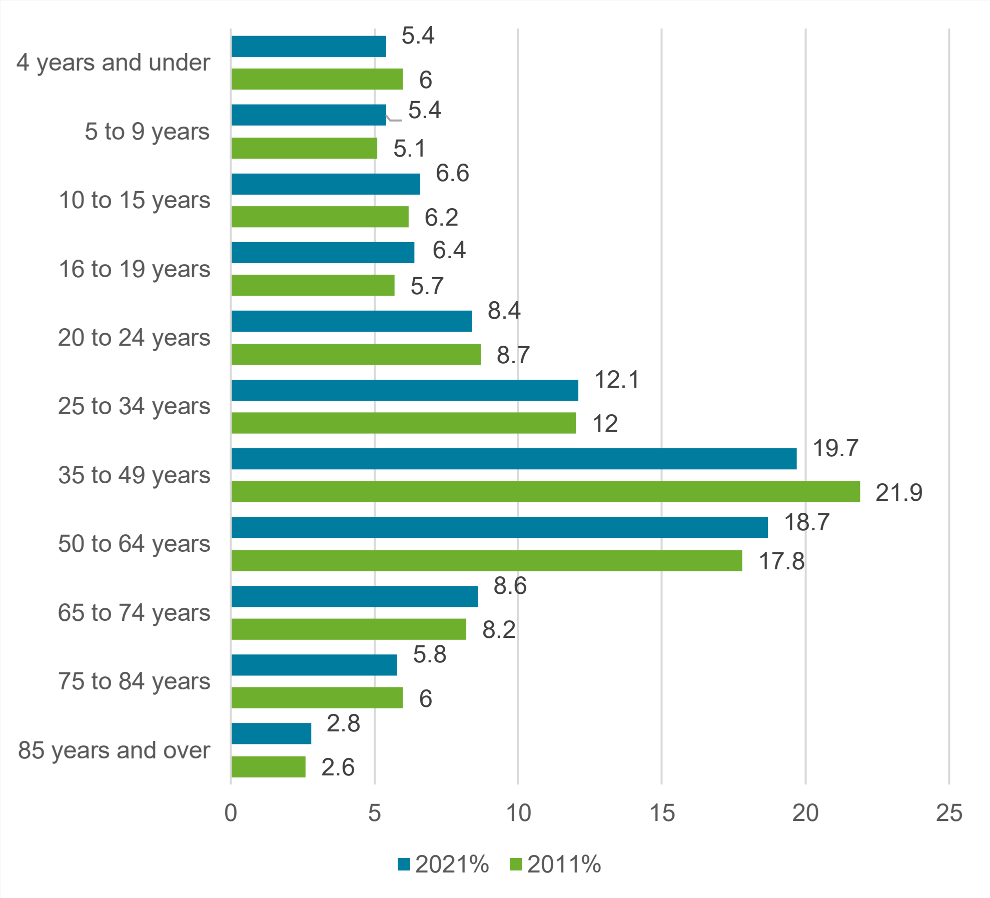
Table 2.2: Population age ranges in Runnymede

Age range	Runnymede	South east region	UK
0-19 years	22.7%	23.7%	23.3%
20-39 years	30.1%	24.1%	26.3%
40-59 years	25.3%	27%	26.2%
60+ years	21.9%	25.2%	25.2%

2.9 This is supported by the latest census data, showing that the median age remained at 39 years between 2011 and 2021. This is lower than the average median age in the South East of England (41 years) and slightly lower than England (40 years). Despite this, the number of people aged between 50 and 64 years rose by around 2,200 (an increase of 15.2%) as seen in Figure 2.2. This may be indicative of a trend towards an ageing population, something seen in many rural and semi-rural areas in the UK. However, without more definitive data is it difficult to determine if this is trend likely to be continue in Runnymede in the future. It should be noted that an ageing population increases the number of vulnerable people to climate risks and increases the pressure on support services.

[10] The Path to Net Zero – Climate Assembly final report (2020). Available at: https://www.climateassembly.uk/report/read/#top
[11] IPCC (2022): Summary for Policymakers.
[12] Islam, N. and J. Winkel, 2017.
[13] https://www.runnymede.gov.uk/downloads/file/752/rbc-profile

Figure 2.2: Runnymede demographic changes 2011-2021 (ONS, 2023)



2.10 Runnymede also scores highly on a wide range of socio economic indicators. Runnymede scores above the regional and national average for most health measures, however 7.9% of children in Reception (age 4/5) and 17.2% of children in Year 6 (age 10/11) are obese, and 10.6% of all children are living in poverty.[14] Runnymede residents record high earnings with the median gross weekly pay approximately £745 per week for full-time workers, compared to £636 in the South-East and £591 in England. Runnymede also has a slightly lower percentage of overall social housing, at 12.9%, than the rest of the South-East region, at 13.7%. This is also significantly lower than the UK average of 18.2%. Average weekly social housing rent stands at £108 in Runnymede, compared to £88 in the UK. Runnymede ranks as just the 61st least deprived out of 317 local authorities based on the latest ONS figures.[15]

2.11 Interestingly, of Runnymede households, 19.1% rented privately in 2021, up from 15.2% in 2011. This reflects wider trends in society towards an increase in private renting, with private renting increasing by 3.6% across England over this period. Tenants in the social and private rented sector are likely to have a lower ability to adapt to climate change and extreme weather events compared to homeowners.

2.12 As it has been shown however, Runnymede has, relative to the UK, a younger and wealthier population. The Borough's residents should, therefore, be more able to adapt and react to the impacts of climate change, be that overheating, flooding or wildfires.

2.13 Despite this, there are areas in the Borough that score highly on the Index of Multiple Deprivation (IMD). Figure 2.4 below displays these areas. We will explore, below, how those areas that score highly on the IMD interact with the main climate risks in the area.

[14] ONS (2021). Available at: https://www.ons.gov.uk/visualisations/areas/E07000212/
[15] ONS (2021). Available at: https://www.ons.gov.uk/visualisations/areas/E07000212/

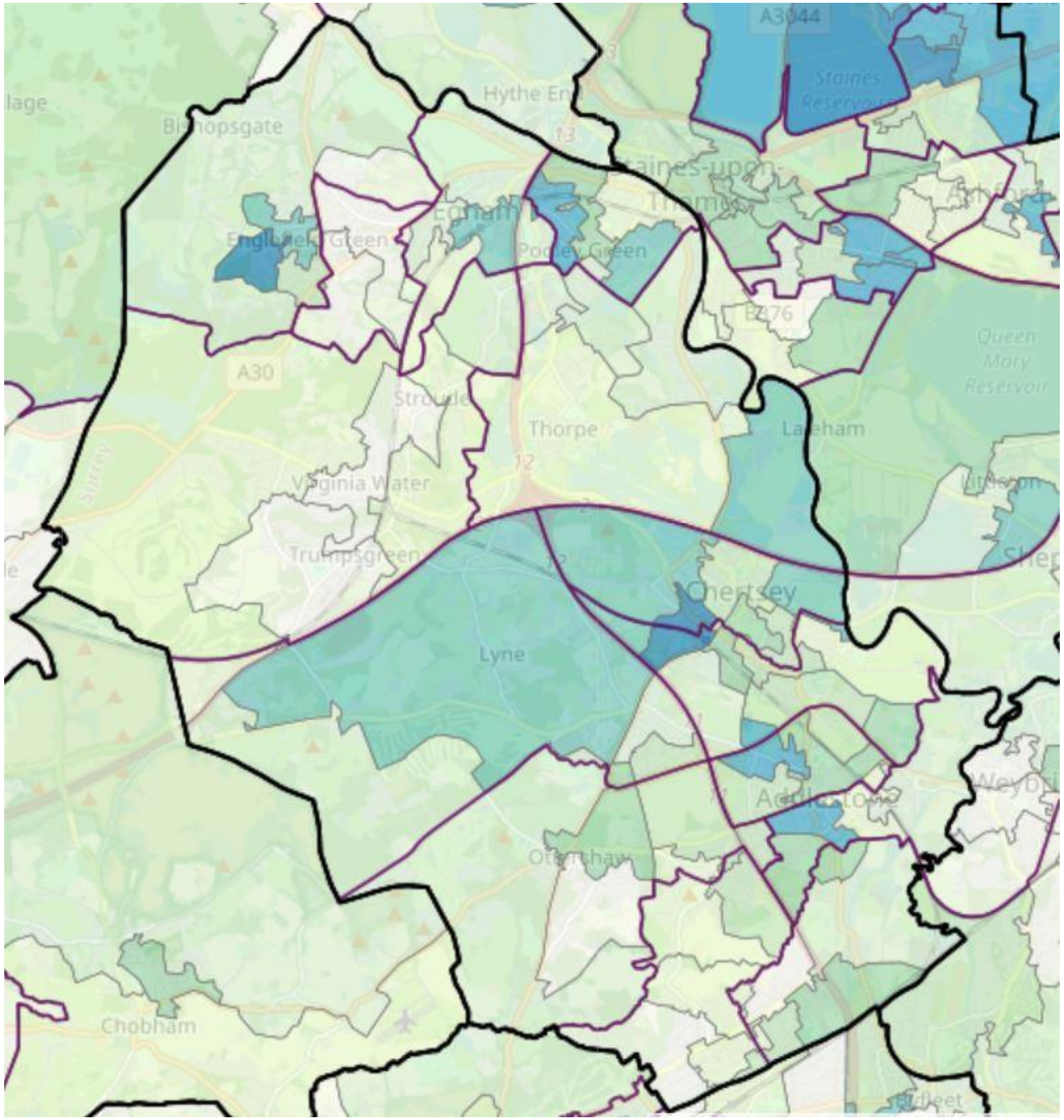


Figure 2.4: Index of Multiple Deprivation Map in Runnymede[16]

Map legend

Deciles of deprivation

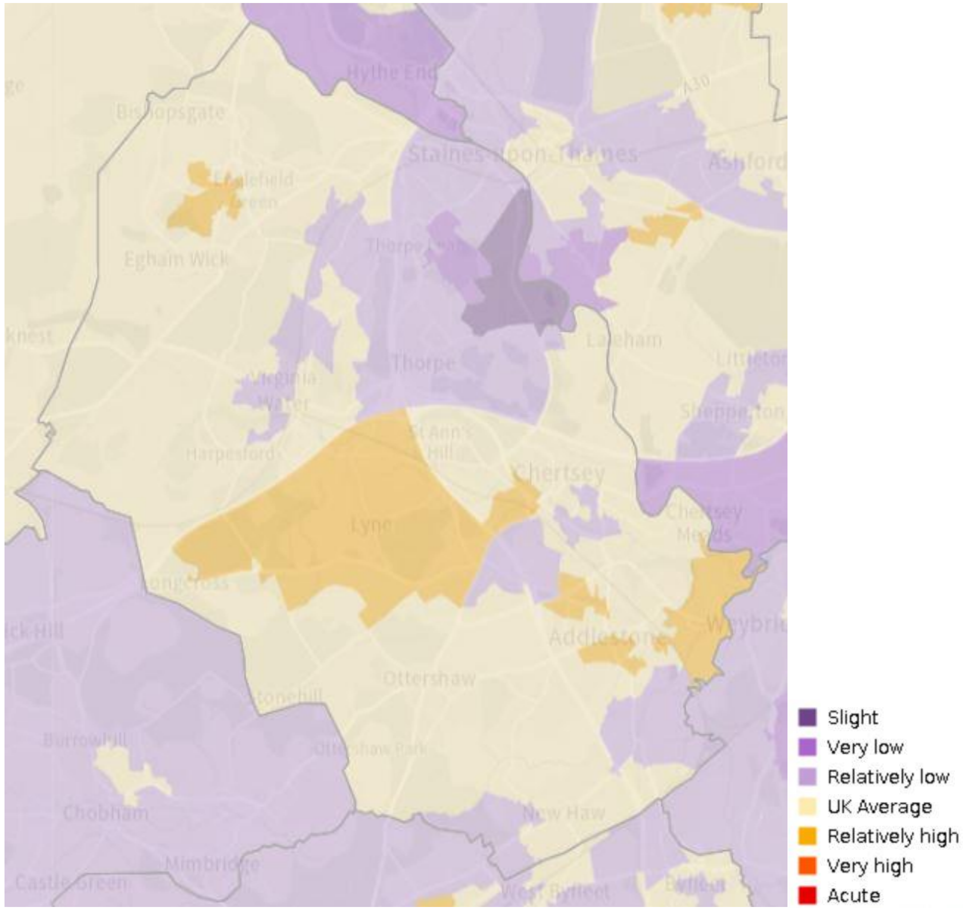
- 10% most deprived
- 10% least deprived

2.14 Figure 2.4 shows that there are pockets of high IMD in urban areas in Englefield Green, Chertsey, Addlestone and Pooley Green. For example, an area in Chertsey (Runnymede 006D) is ranked 9,605 out of 32,844 neighbourhood areas in England; where 1 is the most deprived. This is amongst the 30% most deprived neighbourhoods in the country. Similarly, Runnymede 002F in Englefield Green is ranked 7,886 and is also within the 30% most deprived neighbourhoods. In more rural areas, Lyne (Runnymede 008A) is the only neighbourhood (LSOA) that scores relatively poorly on the IMD and ranks 14,776, sitting within the 50% most deprived neighbourhoods in the country.

2.15 In comparison to 2015 IMD data, there has been a slight increase in IMD in the Borough. Although this still remains relatively small compared to national figures, it is an important aspect to consider as climate change could accelerate inequalities in the Borough. For example, the neighbourhood of Lyne (Runnymede 008A) was ranked 17,837 in 2015, amongst the 50% least deprived neighbourhoods in the country. This has increased, as mentioned in 2.14, to 14,776 in 2019. Despite this, IMD is still concentrated in small pockets within the Borough – suggesting that these areas will need consideration when implementing new Local Plan policies.

2.16 Although some parts of the UK show a trend towards an ageing population, we have not found significant evidence that this is occurring in Runnymede. However, as this is not a certainty, it is important to note that ageing populations increase the number of people in the area vulnerable to climate hazards and reduces their ability to adapt. We would suggest that the Council should refer to wider Local Plan review evidence such as the Housing and Economic Development Needs Assessment to understand trends in more detail.

Figure 2.5: Neighbourhood Flood Vulnerability Index mapping in Runnymede



2.17 Figure 2.5, above, shows Neighbourhood Flood Vulnerability Index (NFVI) mapping from Climate Just organisation for the Runnymede area. The NFVI provides insight into the social vulnerability of a neighbourhood should a flood occur. This is made up of five characteristics of vulnerability as outlined by Climate Just:[17]

1. **Susceptibility** – predisposition of an individual to experience a loss of well-being when exposed to a flood. The elderly and very young are generally more susceptible to flooding.
2. **Ability to prepare** – an individual's ability to prepare is influenced by their income, capacity to act, local knowledge and property tenure.
3. **Ability to respond** – the degree to which an individual can respond to a flooding event. An individual's ability to respond can be influenced by their income, capacity to access and use formal and informal information, local knowledge and physical mobility.
4. **Ability to recover** – the extent to which an individual can recover from a flood event. This is influenced by income, capacity to use information, and physical mobility.
5. **Community support** – the capacity of the emergency services in the region along with broader care and social services. The following characteristics are considered to gauge the nature of this support: housing characteristics; the collective experience of past floods; the likely availability of community services in a flood (including emergency service provides, schools, GPs, care homes); and the social networks that exist.

2.18 The analysis approach taken by Sayers et al. (2017) also includes an assessment of flood hazard (probability and extent), flood exposure (given a flood) and flood vulnerability (of those exposed).

2.19 From Figure 2.5, above, we can see that areas of high vulnerability in the NFVI match closely with areas of IMD from Figure 2.4. In particular, the rural region surrounding Lyne scores highly on both metrics, as do the urban regions in Englefield Green and Addlestone. This suggests that communities in these two areas are particularly vulnerable to flooding, and future planning policy (and wider action on flood risk management) should look to address the risks faced by these two areas in particular. The rest of the Borough either sits at the UK average for susceptibility or lower than average.

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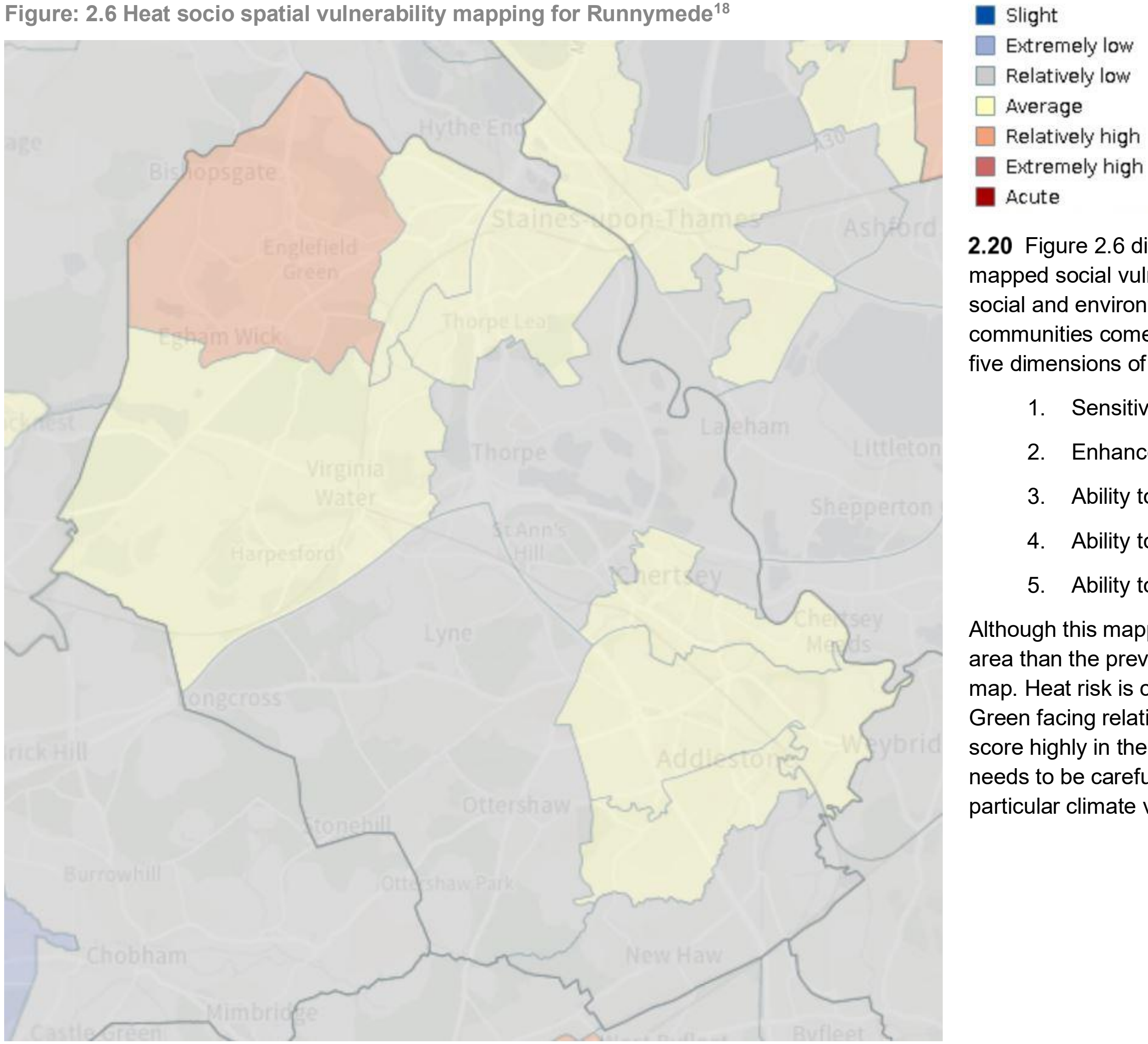
[16] UK Government (2019): Available at: https://dclgapps.communities.gov.uk/imd/iod_index.html

[17] Sayers, P.B., Horritt, M., Penning Rowsell, E., and Fieth, J. (2017). Present and future flood vulnerability, risk and disadvantage: A UK scale assessment. A report for the Joseph Rowntree Foundation published by Sayers and Partners LLP.

Figure: 2.6 Heat socio spatial vulnerability mapping for Runnymede[18]



2.20 Figure 2.6 displays the Heat socio-spatial vulnerability for Runnymede. This refers to mapped social vulnerability with respect to heat related hazard. It shows how the personal, social and environmental factors which help to explain uneven impacts on people and communities come together in particular neighbourhoods. The map is derived from the following five dimensions of socio-spatial vulnerability:

1. Sensitivity
2. Enhanced Exposure
3. Ability to Prepare
4. Ability to Respond
5. Ability to Recover

Although this mapping uses Middle Super Output Areas (MSOAs) that are of a larger spatial area than the previous two mapping Figures, we can still draw some important insights from this map. Heat risk is concentrated in the north of the Borough, with the area around Englefield Green facing relatively high heat socio-spatial vulnerability. When considering the areas that score highly in the previous two maps, this would suggest that the area within Englefield Green needs to be carefully considered in future climate adaptation policy in an attempt to alleviate the particular climate vulnerabilities that occur in this location.

[18] Sayers, P.B., Horritt, M., Penning Rowsell, E., and Fieth, J. (2017). Present and future flood vulnerability, risk and disadvantage: A UK scale assessment.

Chapter 3
Planning for climate resilience

This chapter will provide an overview of the policy options available to RBC and an assessment of their suitability within the local context.

Context

3.1 Planning for continued climate change is about managing risks and increasing our resilience to them. New buildings and places need to be designed to withstand the impacts of climate change over the next 80 years to ensure that they are fit for purpose over their lifetimes. Early action will not only manage current and future risks but save money and create jobs.

3.2 The National Planning Policy Framework (NPPF) sets out the Government's planning policies and how these should be applied. This includes designing and shaping sustainable places that are resilient to, and appropriate for, current and future climate change impacts. This was strengthened through the July 2021 update, which added reference to climate change adaptation to the wording of the presumption in favour of sustainable development; and emphasised the importance of considering the impacts of all sources of flooding (below).:

> *"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."*

3.3 The previous Chapter 2 showed that the Borough faces a wide range of climatic risks and opportunities. As the climate changes, Runnymede is at risk of increased frequency of flooding, heatwaves and wildfire events. These extreme events will have an impact on local infrastructure, housing, businesses and the natural environment. Local planning policies have an important role to play in adapting to these impacts, and ambitious yet realistic wording in the upcoming Local Plan review has the potential to prepare new developments for the future climatic conditions likely to be seen in the Borough. Furthermore, well thought out policies can help reduce inequalities in the Borough by ensuring that those who are most vulnerable to extreme events are considered.

3.4 This section will outline some of the key policy options available to RBC along with consideration of their suitability to the local context, drawing on good practice case studies.

3.5 The Town and Country Planning Association (TCPA) and Royal Town Planning Institute (RTPI) have together identified[19] four main overarching themes that should be considered when delivering new climate change adaptation policy. These are as follows:

Place: Climate change impacts will take different forms and impacts depending on location. Considering and understanding the local elements and impacts of climate risk is crucial in enabling successful adaptation policy.

People: Climate change impacts will affect different people to varying degrees based on their adaptive capacity, as indicated in the previous chapter. Including the community in adaptation planning will increase the chances of interventions being successful in the long term.

Space: Building resilience requires coordination across a multitude of systems and landscapes. These interdependencies influence climate change adaptation to a large degree.

Time: Building resilience requires thinking about the very long term – and at least 100-year planning horizons.

3.6 With this in mind, we have identified key policy options across the following types of risk/adaptation challenge:

- Flood risk
- Overheating risk
- Water shortages
- Woodland expansion and protection
- Biodiversity Net Gain

3.7 For each area of adaption challenge, we provide important background and contextual information along with viable policy options and recommendations, case studies of these approaches and the positives and negatives of Runnymede deploying each approach. The aim is to provide RBC with a range of potential options to explore when implementing the Local Plan review.

Flood risk reduction

Context

3.8 The Council's Strategic Flood Risk Assessment (currently being updated) and the latest EA flood data make clear that flooding from the River Thames and its main tributaries; the Chertsey Bourne, the Addlestone Bourne and River Wey, are the primary sources of flooding in Runnymede. It also highlights that the floodplain of the River Thames is fairly extensive on its eastern side within Runnymede, due to the flat, low lying nature of the land, and presents significant fluvial flood risk for the Borough.

3.9 The latest Environment Agency flood risk data[20] suggests similar themes to the above, with Runnymede and Chertsey Meads appearing particularly prone to flooding. In general, areas to the east of the Borough that are in close proximity to the Thames are prone to flooding, especially in comparison to those areas in the west of the Borough.

3.10 The NPPF (paragraph 159) states that:

> *"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.*
>
> *…Strategic policies should be informed by a strategic flood risk assessment, and should manage flood risk from all sources. They should consider cumulative impacts in, or affecting, local areas susceptible to flooding, and take account of advice from the Environment Agency and other relevant flood risk management authorities, such as lead local flood authorities and internal drainage boards.*
>
> *…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."*

[19] TCPA, RTPI (2021): The Climate Crisis – A Guide for Local Authorities on Planning for Climate Change.

[20] https://check-long-term-flood-risk.service.gov.uk/map?easting=499999&northing=167054&map=SurfaceWater

3.11 Managing flood risk involves a range of approaches to minimise flood risk from all sources including rivers and surface water, such as steering new development away from current and future flood risk areas, implementing flood resistance and resilience design measures in new and existing buildings/developments, implementing sustainable drainage techniques and ensuring best practice guidance has been adhered to (e.g. the Code of Practice for Property Flood Resilience, 2021).

3.12 RBC should have regard to the significantly revised and updated flood risk and coastal change sections of the Planning Practice Guidance published by MHCLG in August 2022, which provides a rich source of guidance.

River Thames Scheme

3.13 The River Thames Scheme is an important scheme that is attempting to alleviate the effects of flooding in the Thames valley, including in Runnymede, whilst also achieving co-benefits such as sustainable travel, biodiversity enhancement and economic growth. The scheme will create two new flood channels, running close to the main river, that will reduce the peak flow of water through the Thames. One of the new channels, the 'Runnymede Channel Section', will be located within the Borough; nearly 3 miles (4.8 km) long, it will run from Egham Hythe to Chertsey. The channel will flow through lakes, intersecting existing watercourses and under transport infrastructure. The channel will be flanked by new areas of public green space, active travel infrastructure and improved habitat for wildlife and nature recovery.

3.14 The scheme is still under development with the intention to secure a Development Consent Order (DCO) for this scheme in summer 2026, following statutory consultation in winter 2023.

Runnymede Local Plan: Policy EE13: Managing Flood Risk

This existing policy, which provides a strong foundation for flood risk management, states that:

> *"Any development proposed in either flood zone 2, flood zone 3, on sites over 1ha in flood zone 1, or in a dry island (all types of development excluding minor development in a dry island), must be accompanied by a site specific Flood Risk Assessment, proportionate to the scale of development that demonstrates that all forms of flooding have been taken into account (as detailed in the Council's Strategic Flood Risk Assessment). Managing flood risk over the lifetime of the development must be addressed, taking into account the following:*

- *The impacts of climate change, and*
- *Where practical to do so, it will be expected that developments will be constructed with adequate flood resilience and resistance measures suitable for the lifetime of the development, in line with Environment Agency advice and advice contained in the Runnymede Strategic Flood Risk Assessment."*

And:

> *"For new development where at least 1 net additional residential unit is proposed or for all other types of development, where a net additional floorspace of 250sqm is proposed, development must not materially:*

- *Impede the flow of flood water;*
- *Reduce the capacity of the floodplain to store water;*
- *Cause new, or exacerbate existing flooding problems, either on the proposed development site or elsewhere."*

Policy option 1 – Strengthen policy and design guidance on sustainable drainage systems (SuDS)

3.15 Sustainable drainage systems (SuDS) use nature-based approaches to slow, store or infiltrate rainwater that would otherwise risk overwhelming sewers, causing flooding and sewage pollution. SuDS try to mimic natural drainage systems and retain water on or near the site, reducing the rate of surface water run-off even at times of peak rainfall. Unlike a pipe, SuDS can provide a raft of benefits locally such as, managing flood risk, filtering and cleaning contaminated water, increasing nature habitat in urban areas (note the link to mandatory biodiversity net gain here), providing shading from heatwaves (e.g. where trees form part of the scheme), helping recharge water resources, and improving local air quality. Sustainable drainage and natural flood management measures (e.g. swales, balancing ponds, rain gardens etc.) thus reduce local flood risk but also provide wider benefits for amenity and biodiversity.

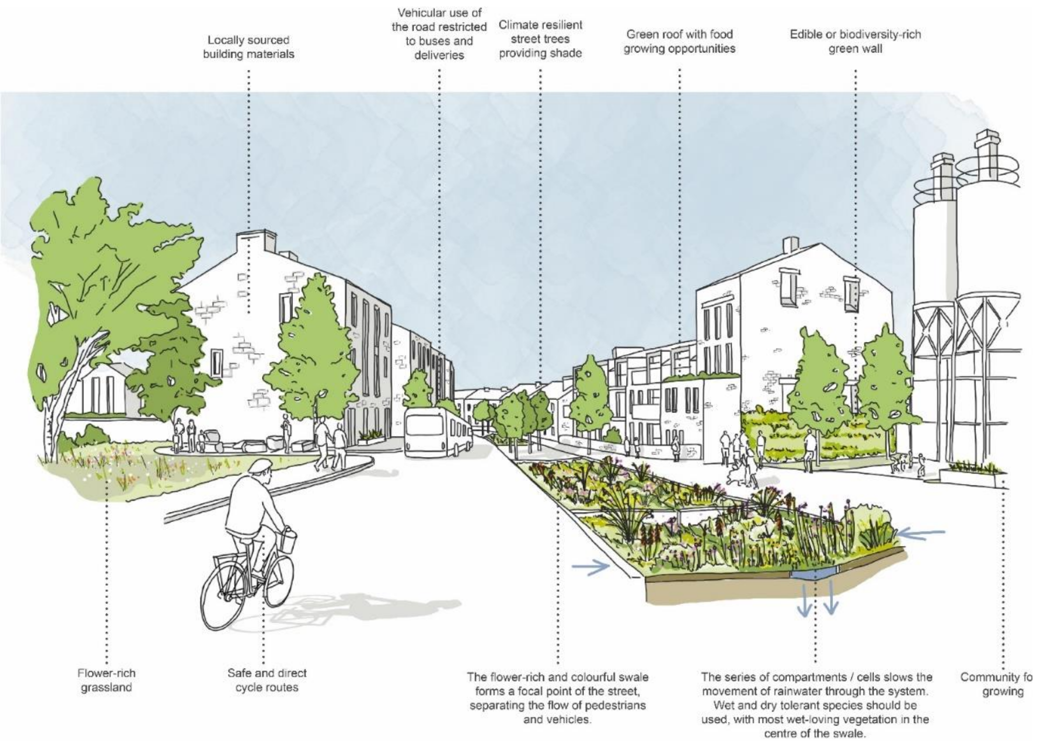
3.16 Policy EE13 of the RBC Local Plan states that

3.17 "All new development is required to ensure that sustainable drainage systems are used for the management of surface water unless demonstrated to be inappropriate. All new developments in areas at risk of flooding must give priority to the use of sustainable drainage systems."

3.18 The Government has announced it will implement Schedule 3 of the Flood and Water Management Act 2010 which will mandate SuDs in new developments, but this will not come into effect until at least 2024.[21]

3.19 The variety of SuDS techniques available means that virtually any development can make use of them, as seen in Figure 3.1.

Figure 3.1: Example of Sustainable drainage systems and green infrastructure working in tandem



3.20 Cardiff Council, Welsh Water and Natural Resources Wales partnered to prepare the Greener Grangetown project[22] which uses the latest sustainable drainage techniques to catch, clean and divert rainwater directly into the River Taff instead of collecting and pumping it into a treatment works and then discharging it to sea. In addition, it has delivered a host of other benefits for the local community, including 1600 square metres of new green space, the creation of Wales' first 'bicycle street', increased biodiversity, and a community orchard. The project was set in motion by the 2018 update to Planning Policy Wales, but the collaborative approach between the local planning authority, Welsh Water, an engineering firm and the local community helped to progress and shape the final design.

3.21 Therefore, Runnymede already has a strong SuDS policy in place. This is complemented by the work of Surrey County Council, the lead local flood authority and the River Thames scheme.

3.22 It is recommended that this policy wording is reviewed in light of any forthcoming Government consultation on the implementation of Schedule 3 of the Flood and Water Management Act 2010.

3.23 The council could also consider expanding the policy to introduce a 'drainage hierarchy' to encourage use of multi-functional green solutions to reduce the rate and volume of surface water runoff. This could make reference to Surrey County Council guidance on the discharge hierarchy.[23] Alternatively, RBC could make reference to the drainage hierarchy following a similar approach to the London Plan. Policy SI13 Sustainable drainage of the London Plan states that developments should aim to achieve greenfield run-off rates and that there should be a preference for green over grey features, in line with the following drainage hierarchy:

- Rainwater use as a resource (for example rainwater harvesting, blue roofs for irrigation)
- Rainwater infiltration to ground at or close to source
- Rainwater attenuation in green infrastructure features for gradual release (e.g. green roofs, rain gardens)
- Rainwater discharge direct to a watercourse
- Controlled rainwater discharge to a surface water sewer or drain
- Controlled rainwater discharge to a combined sewer

3.24 This policy is also complemented by the London Sustainable Drainage Action Plan which contains a series of actions to make the drainage system work in a more natural way with a particular emphasis on retrofitting.

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[21] The review for implementation of Schedule 3 to The Flood and Water Management Act 2010 (publishing.service.gov.uk)
[22] https://greenergrangetown.wordpress.com/
[23] Surrey County Council Sustainable Drainage System Design Guidance. Available at: https://www.surreycc.gov.uk/community/emergency-planning-and-community-safety/flooding-advice/more-about-flooding/suds-drainage/drainage-guidance#53

3.25 It is also recommended that as part of preparing local design codes or guides LPAs should provide clarity about design expectations at an early stage – as recommended by paragraph 128 of the NPPF and in accordance with the National Model Design Code – RBC should explicitly consider flood risk management. This should include providing guidance within these documents advising on the use and integration of SuDS into developments and key design considerations, linking to the strategic design advice in SCC's Sustainable Drainage System Design Guidance and the National Model Design Code and to mandatory biodiversity net gain requirements (which SuDS can help to meet).

3.26 The layout and function of SuDS needs to be considered at the start of the design process for new development, as integration with roads and other infrastructure can maximise the availability of developable land. Particular types of sustainable drainage features may not be practicable or appropriate in some locations, such as the use of infiltration techniques from potentially polluting development in areas where groundwater provides a potable supply of water. Design guidance could highlight such locations constraints and could also encourage the incorporation of rainwater harvesting in sustainable drainage systems to help manage potable water demand from new development.

3.27 A relevant example of a good SUDS design guide is the Sustainable Drainage: Cambridge Design and Adoption Guide which can be accessed at: https://www.cambridge.gov.uk/media/5457/suds-design-and-adoption-guide.pdf

Policy option 2 – Address flood risk in site specific policies

3.28 Flood risk management should be explicitly addressed in site specific policies as well as strategic policies. This should make reference to SCC's Sustainable Drainage System Design Guidance (Section 5. Design Criteria) that sets out the design principles to be adhered to with any submitted drainage strategy.

3.29 In the early stages of plan making, flood risk should be included as a key criteria when reviewing potential site allocations for housing and other development, so that sites that are at significant risk, now or over their lifetime, are avoided where possible. In allocating sites for development in the new Local Plan the 'sequential test' should be applied, and if needed, the 'exception test', in order to avoid flood risk to new development where possible. Given the levels of flood risk from the Thames and other rivers highlighted in the Strategic Flood Risk Assessment (SFRA, 2018)[24] it is clear that this issue will need to be considered carefully in liaison with the Environment Agency (EA). For example, it is noted that the Level 2 SFRA completed in 2018[25] identified one proposed site allocation where more work would be needed to ensure that flood risk could be appropriately managed.

3.30 The new SFRA, currently under development, should take into account the latest climate allowances and any other new data. RBC should work with the EA to incorporate any identified mitigation measures as key criteria into site allocation policies.

3.31 The need to safeguard specific sites for new traditional flood defences or natural flood management schemes should also be considered as part of the local plan process, taking into account who is anticipated to be most vulnerable to flood risk in the existing community (see earlier analysis). Whilst the River Thames Scheme, highlighted above, is being brought forward via the DCO route and will therefore be determined separately from the local plan, RBC will need to consider the implications of this large scale infrastructure scheme for wider planning across the district, including the opportunity to maximise the delivery of complementary natural flood risk measures[26] (e.g. river restoration measures such removal of culverts or reintroducing meanders on tributaries of the Thames, which can also contribute to biodiversity net gain) and make links into wider green infrastructure networks (boosting benefits for both people and nature).

Mitigating overheating risk in buildings and the urban environment

Context

3.32 There are approximately 2,000 heat-related deaths each year in the UK. As outlined in the future climatic conditions in Runnymede (Chapter 2) - summer temperatures in urban areas are predicted to rise between 2 and 4 degrees by 2050, increasing the existing risk posed to the elderly, the young and the sick (those who typically spend most of their time indoors during the day) of suffering from severe heat stress.

3.33 Overheating risk is particularly pertinent to the South-East of England, where heatwaves are becoming more frequent and intense in both their duration and temperatures. Overheating risks are real and present for Runnymede.

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[24] https://www.runnymede.gov.uk/downloads/file/995/level2-sfra
[25] https://www.runnymede.gov.uk/downloads/file/995/level2-sfra
[26] The Working with Natural Processes evidence base and online mapping provided a wealth of information on natural flood management – see: https://www.gov.uk/flood-and-coastal-erosion-risk-management-research-reports/working-with-natural-processes-to-reduce-flood-risk and https://www.arcgis.com/apps/mapviewer/index.html?webmap=7315f943998847e2b3797a85665f5438

3.34 The NPPF states that plans should take a proactive approach to mitigating and adapting to climate change, taking into account the long-term implications for the risk of overheating from rising temperatures.

3.35 The key options for this policy type relate to different approaches to ensuring that buildings do not overheat in summer, taking into account increasing temperatures due to climate change. This could include a requirement to undertake an overheating assessment and/or requirements regarding maximising passive design measures such as orientation, solar shading and careful design of fenestration. RBC should also consider the role of tree planting and green infrastructure for mitigating the urban heat island effect, cooling air temperatures and providing shade – as well as wider benefits for physical and mental wellbeing.

3.36 The Government recently introduced Approved Document O: Overheating of the Building Regulations to prevent homes overheating in the summer. This applies to both residential dwellings and dwellings, such as care homes and student accommodation.

3.37 Through Part O, designers have two routes to demonstrate compliance.

1. A simplified method, limiting solar gains and maximising natural ventilation potential through window sizing or window design, and
2. A dynamic thermal modelling route, based on CIBSE's TM59 Design methodology for the assessment of over-heating document.

3.38 The simplified method sets limits on the amount of glazing on different aspects. There are two main parameters that must be met in this method.

- That the total glazed area within the dwelling does not exceed a limit based on the floor area and orientation of the most glazed facade.
- And that the total area in the most glazed room does not exceed a percentage limit, based on the floor area of that room.

3.39 The dynamic thermal modelling route is based on the methodology developed by CIBSE in TM59. Based on data inputs from TM59 and using climate modelling from CIBSE 2020s Design Summer Year (representative of 2010-2040), the model can be used to show whether a scheme is compliant.

3.40 Most developers will utilise the simplified method as this is the most straightforward route to take. This is as the simplified method prescribes measures that are the least costly, such as ventilation and limiting solar gains and does not require any modelling. However, this approach is very prescriptive and does not offer the same level of design flexibility as dynamic modelling. Early feedback from the industry has also suggested that the simplified method is quite burdensome on developers. Therefore, it appears that Part O has not found the right balance in addressing overheating, suggesting that there is scope for RBC to set additional targets/requirements to ensure that this is addressed.

Option 1 – Expand Nature Based Solutions and Green and Blue Infrastructure

3.41 Nature-based solutions (NBS) can drastically reduce ambient temperatures in towns and cities. Trees, vegetation, water bodies, green roofs and green surfaces can mitigate the Urban Heat Island Effect (UHI), improve thermal comfort in and around buildings, reducing the need for mechanical cooling, while bringing countless quality of life and health benefits to urban communities. Green Infrastructure can be designed to support ecological resilience to climate change.

3.42 Runnymede's Green and Blue Infrastructure Supplementary Planning Document (2021) provides more information for householders and developers on how they can meet the requirements of SD7, EE11 and EE12. In local plans, well developed GI policies go as far as planning to contribute to the wider GI network as well as identifying, mapping and providing safeguarding measures to key habitats, ecological networks and priority species. GI should be considered at the earliest stages of design to identify opportunities to expand and improve the GI network.

3.43 Policy GI1 of Salford City Council's adopted Local Plan (2023) sets out how development will protect and enhance the GI network in Salford to maximise its extent, interconnectedness, multi-functionality and quality. RBC could improve its current policy by introducing requirements for green roofs and walls where possible, which can play an important role in flood reduction and urban cooling when supported through planning policy.

Option 2 – Design buildings to mitigate overheating risk

3.44 Buildings should be consciously designed to mitigate the risk of overheating, avoiding the need for energy/carbon intensive air conditioning as far as possible. This can be achieved by maximising passive design measures such as orientation, solar shading and careful design of fenestration to minimise heat entering a building and then using thermal mass and passive ventilation to manage heat within a building. A good example of a planning policy encouraging this approach comes from the London Plan, which sets out a cooling hierarchy.

Case study – London Plan

Policy SI 4 Managing Heat Risk - of the London Plan states that development should minimise adverse impacts of the urban heat island effect through design, layout, orientation, materials and the incorporation of green infrastructure. Additionally, major developments must prepare an energy strategy demonstrating how it will reduce internal overheating through the following cooling hierarchy:

-reduce the amount of heat entering a building through orientation, shading, high albedo materials, fenestration, insulation and the provision of green infrastructure

-minimise internal heat generation through energy efficient design

-manage the heat within the building through exposed internal thermal mass and high ceilings

-provide passive ventilation

-provide mechanical ventilation

-provide active cooling systems.

Case study – Camden Council

Policy CC2: Adapting to climate change - states that all new developments must adopt measures such as: "incorporating bio-diverse roofs, combination green and blue roofs and green walls where appropriate"

This policy is part of a wider high-level policy to promote climate change adaptation, including green and blue infrastructure, sustainable design and energy use efficiency.

Option 3 – Early overheating risk assessment

3.45 RBC could also require a relatively simple overheating scorecard/tool or more detailed dynamic overheating modelling to be completed for major developments to demonstrate that they have mitigated the risk of overheating. This simpler approach could be developed in-house by the Council, potentially making use of off the shelf screening tools, such as BRE's temperature screening tool (used in HQM) or Good Homes Alliance's 'Early Stage Overheating Risk Tool'[27] (as used by Greater London Authority). If this assessment flags any potential issues, a further detailed appraisal could be requested.

3.46 The Chartered Institution of Building Services Engineers (CIBSE) has produced detailed guidance on assessing and mitigating overheating risk in new developments, which can also be applied to refurbishment projects. CIBSE's TM59 should be used for domestic developments and TM 52 should be used for non-domestic developments. In addition, TM49 guidance and datasets should also be used to ensure that all new development is designed for the climate it will experience over its design life. The Greater London Authority seeks such detailed overheating modelling for schemes of 150 units or more, at reserved matters stage.

3.47 This sort of policy would incentivise early and rigorous consideration of overheating risks in buildings, going further than the limited requirements set in Building Regulations, leading to a more climate resilient development. RBC could also consider including a further stretch target, as seen in the Milton Keynes Local Plan, to impose a monitoring scheme on a small proportion of new dwellings to ensure that overheating mitigation has been achieved.

Case study - Milton Keynes Local Plan (Adopted 2019)

Plan MK, Policy SC1: Sustainable Construction - Development proposals for 11 or more dwellings are required to:

- calculate Indoor Air Quality and Overheating Risk performance;

- implement a recognised quality regime that ensures the 'as built' performance (energy use, carbon emissions, indoor air quality, and overheating risk) matches the calculated design performance of dwellings;

- put in place a recognised monitoring regime to allow the assessment of energy use, indoor air quality and overheating risk for 10% of the proposed dwellings for the first five years of their occupancy, and ensure that the information recovered is provided to the applicable occupiers and the planning authority

Summary

Table 3.1: Overheating policy summary

Options	Pros	Cons
NBS and GI	RBC's Green and Blue Infrastructure plan (2021) SPD provides a strong evidence base for any future policy. Expansion of green infrastructure is a well proven way to reduce ambient temperatures in urban areas and can be integrated with measures to achieve biodiversity net gain and wider goals	Policies already well developed in this area. Green infrastructure requirements can add costs for developers, both in terms of capital cost and ongoing maintenance costs; though this

[27] https://goodhomes.org.uk/wp-content/uploads/2019/07/GHA-Overheating-in-New-Homes-Tool-and-Guidance-Tool-only.pdf

	(e.g. increase access to greenspace and carbon sequestration).	may be overset by higher resulting sales values.
Design buildings to mitigate overheating	Ensures that developers take a logical approach to mitigating overheating risk by working through a hierarchy of measures.	Requires planning officers to have sufficient knowledge to interrogate/challenge the reasons provided by developers not to apply any measures earlier in the hierarchy.
Overheating modelling	Ensures that overheating in buildings is considered at the earliest stage possible. Once policy is established it is easy to maintain and implement. If implemented with a monitoring scheme, the impacts of overheating will almost certainly be mitigated in new developments.	Requires upfront resources and costs to set up; and sufficient skills to assess/interrogate information provided.

Water resource management

Context

3.48 As identified in the climate change risk section of this section (Chapter 1), climate change is likely to impact water quality and water availability in Runnymede through increased instances of flooding and drought. To facilitate new development, clean water is required to be taken from natural sources, further exacerbating this issue. As of the latest Environment Agency classification, Runnymede is in a 'Water Stressed' area.[28] For this reason, water efficiency in new developments should be maximised.

Option 1 – Review water efficiency targets

3.49 This context led to the inclusion of Policy SD7e in RBC's current local plan stating:

> *"In residential development, including replacements, conversions and subdivisions achieve water efficiency of 110 litres per person per day through compliance with the Building Regulations and where feasible provide rainwater harvesting techniques".*

3.50 This is a positive step in addressing water efficiency in new residential developments. It is in line with current Building Regulations which specify a mandatory water efficiency requirement through Building Regulations of 125 litres/person/day, but the Government has indicated that

> *"Where there is a clear local need, local planning authorities can set out Local Plan policies requiring new dwellings to meet the tighter Building Regulations optional requirement of 110 litres/person/day."*[29]

3.51 Whilst setting a higher target (e.g. 85 litres per person per day) might be beneficial, this might run the risk of being challenged at examination unless the council had a strong supporting evidence base.

3.52 This standard of water efficiency has the benefit of being achievable with cost-effective water efficient fixtures and fittings, without having to resort to rainwater harvesting (which could still be encouraged) and grey water recycling, which is more complex (e.g. requires energy use and maintenance). Compliance can be demonstrated through use of the Building Regulations Part G calculator tool.

3.53 With regard to non-residential development, there is no government guidance on setting water efficiency standards. As with residential development, we need to consider how to drive water efficiency whilst avoiding perverse outcomes. Setting a high target would be more likely to require the installation of greywater recycling systems which could lead to the installation of measures that are complex, energy-intensive and/or hard to maintain. This report recommends specifying a minimum BREEAM score on BREEAM category Wat 01, such as 3 credits, particularly if BREEAM is being used to secure wider performance across other policy areas. The BREEAM manual indicated that this credit score would require 25% of WC flushing to be met by using recycled potable water from greywater or rainwater system, which is deemed to be an appropriately stretching performance requirement.

3.54 The use of SuDS, as covered above, will also help to improve water quality and release water more slowly, potentially helping to sustain river flows in dry periods and/or recharge aquifers. The SuDS Manual and the National Standards for Sustainable Drainage Systems provide further details.

[28] EA (2021) Water stressed areas – final classification 2021.

[29] https://www.gov.uk/guidance/housing-optional-technical-standards

Case Study: Sustainable Design, Energy Efficiency and Renewable Energy Generation (SPD)

The draft SPD, which supports the implementation of proposed Policy DM30a of the Lancaster Sustainable Design, Energy Efficiency and Renewable Energy Generation SPD (still awaiting decision) states that:

"All major non-residential development should incorporate water conservation measures so that predicted per capita consumption does not exceed the appropriate levels set out in the applicable BREEAM 'Excellent' standard. Where the 'Excellent' Standard cannot be achieved, evidence must be submitted with an application to the satisfaction of the City Council. The BREEAM 'Very Good' standard must be met as a minimum. The design of new developments should optimise the inclusion of water efficiency and consumption measures, such as rainwater/ or greywater recycling, low flow taps and showers, low flush toilets, rain gardens and water butts in the construction of new buildings."

Option 2: Water neutrality

3.55 Water neutrality is a relatively new concept for managing the demand for water. It is defined as development that takes place which does not increase the rate of water abstraction for drinking water supplies above existing levels. The primary aim of the concept is to reduce demand for water from households and other buildings in new and existing development. Water neutrality encompasses water use efficiency targets, rainwater harvesting and water reuse.

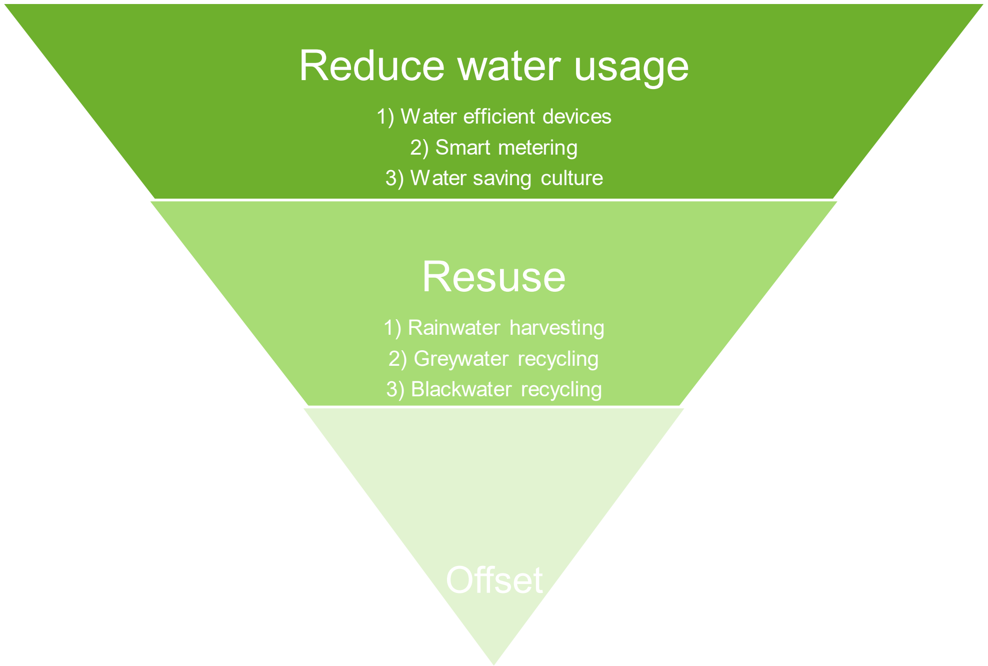
3.56 Natural England state that achieving 100% water neutrality is an aspiration, and that it may not be possible to set such a stretch target for all new development. Setting a locally specific neutrality target between 0%-100% will be dependent on local drivers and constraints surrounding water neutrality. Natural England identify key drivers to include environmental factors, political or social will, climate change mitigation and adaptation and cost effectiveness. Constraints include the size of development, consumption rates in existing surrounding developments and predicted consumption in new developments.

3.57 Requiring new developments to achieve 100% water neutrality may not be realistic in the Runnymede context, unless requirements are imposed by Natural England. However, RBC could require developers to provide a water neutrality statement with applications. Water neutrality typically entails the following standards:

- Limiting water usage to 90 litres per person per day
- Incorporating low water usage WCs, showers etc.
- Incorporating rainwater harvesting
- Incorporating grey water recycling
- Off-set the remainder of any budget

3.58 A water neutrality statement will display how the principles of the sustainable water hierarchy (see diagram below) have been adhered to in new developments and ensure that developers consider water efficiency from an early stage of project development.

Figure 3.2: Water hierarchy



3.59 A recent study from Waterwise[30] (2021) outlined some of the benefits of achieving water neutrality in new developments. The study estimated that around 112,000 litres of water could be saved every year for every water neutral home built. This would also equate to around 43.8 $kgCO_2e$ per year per household in carbon savings. Water neutrality is also estimated to provide annual savings on water and energy bills of £44 per home per year by reducing water demand to 85 litres per person per day. The additional benefits include reducing the environmental impact of new developments, improving resilience to future climate change and reducing the amount of water entering the sewage network.

Case Study - Horsham Council

On 14 September 2021, Horsham Council received a Position Statement from Natural England. Information collected by Natural England for the statement showed that water abstraction for drinking water supplies is having a negative impact on the wildlife sites in the Arun Valley. They have advised that any new development that takes place must not add to this negative impact.

In the case of all other development, where an increase in water consumption is likely, the Council requires the application to be accompanied by a water neutrality statement setting out the strategy for achieving water neutrality within the development. Water neutrality can be achieved by developers building significant water efficiency measures into new development and by providing offsetting measures to reduce water consumption from existing development. If an application cannot demonstrate water neutrality is reasonably achievable, this will mean the development will not meet the requirements of section 63 of the Habitats Regulations, and the application could not be determined positively.

The Council advise that consideration should be given to water neutrality ahead of the submission of any new planning application. The requirement for a Water Neutrality Statement to support planning applications will likely become a requirement for the Council's emerging Local Plan.

Summary

Table 3.2: Water resource management policy summary

Option	Pros	Cons
Water use efficiency target	Tried and tested approach that has been adopted in many Local Plans. Easy to understand metric that is cross compatible with national metrics that will allow benchmarking. Developers already familiar with reporting on this metric.	The water efficiency targets proposed fall well short of water neutrality.
Water neutrality	Most comprehensive measure to prevent new development from having an impact on water resources. Scalable water neutrality target, such as 50%, could be implemented to reflect local conditions. Easy to understand concept.	Has only been implemented in one area due to a position statement from Natural England and is therefore relatively untested. Might be challenged by developers at examination. 100% water neutrality is not realistic in many areas. Water neutrality statements are an additional burden to developers.

Woodland expansion and carbon sequestration

Background

3.60 The NPPF states:

> *"Trees make an important contribution to the character and quality of urban environments and can also help mitigate and adapt to climate change. Planning policies and decisions should ensure that new streets are tree-lined, that opportunities are taken to incorporate trees elsewhere in developments (such as parks and community orchards), that appropriate measures are in place to secure the long-term*

[30] Waterwise, UK Water Efficiency Strategy to 2023 (2021).

maintenance of newly planted trees, and that existing trees are retained wherever possible."

3.61 Woodland expansion will reduce carbon dioxide levels, improve air quality, reduce flooding, increase urban cooling, support and enhance biodiversity, and improve the population's physical and mental health and wellbeing. All of these factors will help RBC adapt to a changing climate and mitigate the key risks identified in this chapter by addressing urban overheating and reducing flood risk. Therefore, tree, woodland and hedgerow expansion is an important climate change adaptation measures available to RBC.

3.62 Key adaptation benefits of increased tree cover in the Borough are the regulation of movement of water through ecosystems, reducing flooding and cooling the local climate and through providing shading to the local environment through increased canopy cover. Both benefits will increase the adaptive capacity of the area and increase the climate resilience of both the natural environment and wider society through co-benefits.

Option 1 – Updated Tree, Woodlands and Hedgerows SPD

3.63 Runnymede currently boasts an existing tree canopy cover of 31.8%[31], compared to the average of 16% in England in urban areas. Protecting existing tree cover should be the Council's priority, ensuring that new developments integrate existing trees and hedgerows and where these have to be cut down that they are replaced in the locality.

3.64 We note that Runnymede's Trees, Woodlands and Hedgerows SPD is dated from 2003 and was revoked in March 2023 and is no longer a material consideration in decision-making. Updating this document with a new Tree and Woodland strategy, expanding on the content in the Green Infrastructure Strategy and Surrey's Tree Strategy, would allow the Council to provide greater clarity on how to protect existing woodlands and encourage expansion, making use of the right tree species (taking into account climate change) in the right place.

Option 2 – Woodland creation/carbon sequestration opportunities assessment

3.65 Besides supporting adaptation to climate change, tree planting has significant potential to boost carbon sequestration within Runnymede. The Committee on Climate Change has indicated that the UK needs to achieve an average of 30,000ha of new woodland planting per year up to 2050 to help sequester and store atmospheric carbon and mitigate the effects of climate change. RBC could complete a carbon sequestration opportunities assessment of Council owned land holdings. This will allow RBC to identify sites where woodland creation could contribute to carbon sequestration in the area whilst also contributing to wider biodiversity and public amenity benefits. Concentrating on sites, such as derelict land, where the largest net carbon sequestration and wider benefits can be achieved could help contribute towards the Council's residual carbon footprint. Such sites could then be allocated for tree planting within the local plan.

3.66 As discussed in Chapter 1 of this section, ensuring that species that are resilient to the future climatic conditions of Runnymede is critical to the success of any policy in this area.

Case Study – Canterbury District Tree and Woodland Strategy

This strategy outlines how Canterbury District Council intends to protect and enhance woodlands across the district. The ambition for the strategy is for the long term – until 2045 – with reviews every five years to update the strategy based on the latest scientific knowledge and learnings. The strategy will be delivered by five core principles:

-Protecting existing trees and woodland

-Expanding trees and woodlands

-Capturing more carbon

-Enabling nature recovery

-Involving and benefitting everyone

This strategy also includes a wide range of advice on how expanding and protecting trees can bolster climate change adaptation in the area, including by:

-Supporting biodiversity

-Cleaning the air, soil and water

-Provide cooling and shading

-Prevent and mitigate flooding

Case Study: Staffordshire Moorlands Local Plan

Policy NE 2 sets out the Council's vision to protect existing trees, woodland and hedgerows. The key policies include:

[31] Forest Research (2021) UK Urban Canopy Cover. Available at: https://www.forestresearch.gov.uk/research/i-tree-eco/uk-urban-canopy-cover/

- Requiring that existing woodlands, healthy trees and hedgerows are retained and integrated within a proposed development unless the need for, and benefits of, the development clearly outweigh their loss;
- Requiring new developments to provide tree cover that secures a good level of sustainability through tree retention, planting and soft landscaping, including where possible the on-site replacement of any trees that are removed with sufficient tree planting to replace or increase the canopy cover on-site as appropriate.

To ensure compliance, in accordance with Staffordshire Moorland's Tree Strategy, the following information will normally be required with planning applications:

-Tree survey and plan (as per Section 2.2);

-Details of tree protection including plan showing RPAs;

-An arboricultural implication assessment – an evaluation of the impact of development on the trees and any intended mitigation including details of any tree works required;

-Permanent/temporary access arrangements;

-Full levels survey (which should include existing and proposed spot levels at tree bases and around crown extremities. Cross-sectional diagrams may be required in certain cases);

-Drainage and service details;

-Soft and hard landscaping treatments.

Summary

Table 3.3: Woodland expansion and protection policy summary

Option	Pros	Cons
Updated SPD	Will ensure that the exiting high percentage tree cover in the Borough is further protected and further vegetation cover encouraged.	Drafting an updated SPD in this area may not be the most efficient use of staff time considering the G&BI SPD..
Carbon sequestration study	Identify areas where RBC could expand carbon sequestration and vegetation and increasing the climate resilience of the Borough.	Difficult to imbed into planning policy.

Supporting nature recovery and resilience

Background

3.67 Runnymede has a rich ecology including a range of habit types such as woodland (including ancient woodland), grassland and lowland heathland and sites of national and international biodiversity value.

3.68 Protecting and expanding important wildlife habitats increases the resilience of the natural environment to climate change. The Government's National Adaptation Programme sets out three main themes for adaptation in the natural environment.

1. Building ecological resilience to the impacts of climate change

Building resilience is about reducing the adverse impacts of climate change and enabling species, habitats and landscape features to persist in the face of climate change.

2. Preparing for and accommodating inevitable change

Some change will be inevitable, and where possible the co-benefits of these changes should be realised. A crucial element of this will be connecting fragmented habitats to allow the free movement of species responding to the changing climate.

3. Valuing the wider adaptation benefits the natural environment can deliver

Climate adaptation in the natural environment will also have a wide range of co-benefits that will also help society adapt to climate change, such as increased water resilience.

3.69 Furthermore, Natural England's Climate Change Adaptation Manual[32] highlights four factors that contribute to a habitat's vulnerability to climate change:

a. The changes in climate, both type and magnitude, that are likely to occur in the local area;

[32] Natural England (2015): Available at: https://publications.naturalengland.org.uk/publication/5679197848862720

b. The intrinsic sensitivity of the species, ecosystem or other feature of the site to those climatic changes;

c. The site-specific conditions that could make things better or worse;

d. The capacity to manage those conditions.

3.70 The need to adhere to the principles mentioned above is highlighted by the RSPB's State of Nature report[33], that cites an average 13% decline in the average abundance of wildlife in the UK since the 1970s. Expanding areas of biodiversity value and protecting existing areas is crucial in allowing RBC to address the biodiversity crises affecting the UK.

3.71 Paragraph 174 of the NPPF states that planning policies and decisions should contribute to and enhance the natural and local environment by:

> *"minimising impacts on and providing net gains for biodiversity, including by establishing coherent ecological networks that are more resilient to current and future pressures"*

3.72 Biodiversity net gain (BNG) will apply from November 2023 for developments in the Town and Country Planning Act 1990. The key components to mandatory BNG will include the following:

- Minimum 10% gain required calculated using Biodiversity Metric & approval of net gain plan
- Habitat secured for at least 30 years via obligations/ conservation covenant
- Habitat can be delivered on-site, off-site or via statutory biodiversity credits
- There will be a national register for net gain delivery sites
- The mitigation hierarchy of avoidance, mitigation and compensation for biodiversity loss still applies
- Will also apply to Nationally Significant Infrastructure Projects (NSIPs)
- Does not apply to marine development
- Does not change existing legal environmental and wildlife protections

3.73 BNG has the potential to significantly contribute to RBC's climate change adaptation policies if habitat creation is strategically planned. For example, by connecting habitat fragments and thus helping wildlife adapt to climate change; or investing in woodland and wetland creation in locations where it can also contribute to reduce flood risk and provide wider benefits for society (e.g. water filtration, recreation opportunities, carbon sequestration).

3.74 Key considerations for RBC when planning for the upcoming regulations regarding BNG are summarised below:

- Conduct a joined up approach to strategic planning of BNG across council services, making the links to green infrastructure planning and SUDS requirements and ensuring that opportunities to deliver multiple benefits are fully realised.
- Link up with early work on the Local Nature Recovery Strategy with neighbouring Boroughs to coordinate approaches to nature recovery across borders.
- RBC should consider what additional skills/staffing they will need to implement BNG effectively and seek to get staff in place early.

Option 1 – set a local BNG target and strategically plan for BNG delivery

3.75 Although 10% BNG will become mandatory in November 2023 for developments in the Town and Country Planning Act, and for small sites from April 2024, there are significant benefits to adopting more ambitious BNG targets within Local Plan policy. Any such policy should link to existing strategies and policies within the Borough, such as the 2021 Green and Blue Infrastructure SPD, priority habitats, Biodiversity Opportunity Areas (BOAs) and the upcoming Surrey Local Nature Recovery Strategy (noting that sites identified in the latter receive a favourable weighting in BNG calculations).

3.76 Where possible the local plan should identify what land is to be safeguarded for offsite BNG/habitat restoration, seeking to ensure such projects contribute to the resilience of wider habitat networks (e.g. woodland, grassland and lowland heathland networks). This would be in addition to guidance for developers about how to first follow the mitigation hierarchy and maximise BNG onsite (in accordance with the council's preference for BNG to be met onsite where feasible).

3.77 This policy approach will allow a locally-specific BNG policy to contribute towards wider Borough-wide nature recovery plans, ensuring gains are of the right type in the right place. It could also ensure that BNG delivers maximum benefits to the local community. Examples of wider targets that this approach could contribute towards include recreation and health (if tensions between biodiversity and recreation can be managed), flood risk alleviation, active travel and wider climate change and net zero ambitions. It is also recommended that Runnymede operates "drop in" sessions where developers can ask questions about BNG and

[33] RSPB (2019): Available at: https://nbn.org.uk/stateofnature2019/

how it applies to their site. This would allow RBC to remain resource efficient despite having to implement new legislation on BNG.

Case Studies

Cornwall Council

Cornwall Council's Local Plan (2016) refers to the need for development to 'enable net gains by designing in landscape and biodiversity features and enhancements' – in line with wording from the NPPF. However, there was a desire within the LPA to bring in mandatory BNG ahead of the mandatory instigation in 2023. This was integrated into the Council's Climate Emergency Development Plan Document (DPD). The DPD states that:

"All development proposals will be required to provide a measurable increase in biodiversity' including minor developments which will use a 'simplified net gain process based on a Cornwall Council approved Small Sites Biodiversity Metric"

Following an independent examination in November 2021 and publication of the inspector's report, the DPD was adopted in February 2023.

Guildford Borough Council

Guildford Borough Council, within their Development Management Policies, have set a minimum BNG target of 20% after the national scheme comes into effect. This has been future proofed by stating that this 20% must be met or the advised minimum amount. Therefore, if central policy develops beyond Guildford's minimum standards, developers will still be obliged to meet the highest BNG requirement.

Qualifying development proposals submitted after the national scheme comes into effect are required to achieve a biodiversity net gain of at least 20%, or the advised national minimum amount, whichever is greater, measured using the national biodiversity net gain calculation methodology.

13) Where previously developed land is exempted from biodiversity net gain under the relevant regulations, a minimum net gain will not be required unless the site supports at least one protected or priority species population or habitat, or an assemblage of species with an otherwise demonstrably high biodiversity value58. Where these are present, a measurable 20% net gain for relevant habitats will be required.

14) Biodiversity gains are required to be delivered in a manner that is consistent with the biodiversity policies in this plan and LPSS 2019 Policy ID4: Green and Blue Infrastructure so that measures are focused on local priorities and will provide the best biodiversity value.

15) New habitats and habitat improvements that contribute towards the achievement of biodiversity net gain are required to be secured and maintained for at least 30 years, or a period of time set out in national policy or legislation if this is greater.

16) Where the applicant is unable to provide the gains on-site, provide the gains off-site or fund gains off-site on third-party sites, a justified and proportionate financial contribution to fund off-site measures will be secured.

17) Development proposals for the creation of biodiversity sites will be supported where these are well located and will be appropriately managed in order to align with local, regional and national strategies and provide best biodiversity value.

As part of this, Guildford Council commissioned an Evidence Base for Policy Development on Biodiversity Net Gain. This study found that setting a minimum standard of 20% BNG would not affect the viability of new developments in the Borough.[34]

Buckinghamshire Council

Buckinghamshire Council are developing a SPD ahead of their Local Plan implementation to support applicants on the local BNG process and information they will need to supply with planning applications made ahead of the mandatory BNG implementation in November 2023. The Council has followed the following steps in implementing this policy:

- Internal officer restructuring and training – the Council funded 1.6 FTE BNG officers to implement new policy and produced training and guidance support for planners dealing with BNG applications.

- Policy development – the Council developed a SPD to support the delivery of BNG. The SPD provided additional guidance to both the National Planning Policy Framework and the four legacy local plans on the introduction of BNG requirements.

[34] Stantec (2021) Available at: https://www.guildford.gov.uk/media/35024/ED-GBC-LPDMP-003f-BNG-Sites-Study-Main-Report/pdf/ED-GBC-LPDMP-003f_-_BNG_Sites_Study_-_Main_Report.pdf?m=638023018116070000#:~:text=1.2.,or%20enhancement%20of%20existing%20habitats.

- Research – the Council undertook a feasibility study in 2019 which took a sample of recent planning applications at the time and looked at how BNG and offsetting could work for the county.

Greater Cambridge

The Greater Cambridge Biodiversity Supplementary Planning Document, adopted in February 2022[35], states that they expect to require developers to deliver 20% BNG. Under the new scheme, developers who are unable to meet BNG requirements on sites in the South Cambridgeshire area will be able to secure biodiversity units from the council's Lower Valley Farm BNG scheme in Fulbourn, located within the Cambridge Nature Network and adjacent to a Site of Special Scientific Interest.

Viability

3.78 Kent Nature Partnership (KNP) have undertaken a strategic level viability assessment for both 15% and 20% BNG requirements[36]. The findings are as follows:

- A shift from 10% to 15% or 20% BNG will not materially affect viability in the majority of instances whether delivered onsite or offsite.
- The biggest cost in most cases is to get to mandatory, minimum 10% BNG. The increase to 15% or 20% BNG in most cases costs much less and is generally negligible.
- Because the BNG costs are low when compared to other policy costs, in no cases are they likely to be what renders development unviable.
- Local Authorities that wish to pursue BNG in excess of 10% will need a local viability assessment to support it. However, this study shows that an assessment is likely to demonstrate that viability will not be negatively impacted (to a material extent) for BNG increases of up to 20%. As the costs of delivering on this policy are small, BNG is unlikely to impact the viability threshold significantly.
- If onsite provision is how the majority of BNG is delivered, this could have implications on land take by lowering of average housing densities. However, as the majority of this burden relates to the mandatory 10% BNG, and the increase to get to 15% and 20% BNG are comparably small, this should not be seen as a reason for not aiming beyond the 10% but may still be a consideration for LPAs.

Conclusion and next steps

3.79 As a local planning authority, RBC has an opportunity to influence the degree to which new development contributes towards climate change adaptation in the local area. As the region's climate changes towards warmer and wetter conditions, RBC is facing a wide range of climate risks. The main threats include flooding, overheating, wildfires and overheating. The impacts of these threats can be seen from previous extreme weather events, where flooding and droughts have caused severe disruption and damage to the local community.

3.80 Mitigating these risks in the present and future through proactive climate change adaptation is important. This will allow the protection of the natural environment, buildings infrastructure and community health. Stronger planning policies can play a significant role in preparing the local community for the impacts of climate change by encouraging flood impact reduction measures, overheating management, water management and encouragement of green infrastructure and habitat restoration.

3.81 They also have the potential to improve the socio-economic status of the Borough by ensuring a 'just transition'. As climate change impacts are likely to affect those who are least likely to be able to adapt to its consequences, proactive climate change adaptation planning can protect these vulnerable groups by giving consideration to their needs and improving the minimum standard of developments in the Borough.

3.82 As with any change to planning policies, the impact on development viability is important to consider to ensure housing delivery is not undermined. By increasing the standards that new developments need to meet, developers will most likely incur increased costs.

3.83 However, the costs and impacts of many measures proposed here are limited. In finalising their proposed policy approach RBC will need to test the financial viability and deliverability of the plan as a whole (viability assessment can also inform CIL charging rates). By making new policy requirements clear in the Local Plan, developers should be able to estimate the associated costs and factor those into the price they pay for land. Landowners should also take these requirements in to account when applying for planning permission or selling sites.

[35] https://www.greatercambridgeplanning.org/media/2504/gcsp-biodiversity-spd-final-copy-march-2022-1.pdf

[36] https://kentnature.org.uk/wp-content/uploads/2022/07/Viability-Assessment-of-Biodiversity-Net-Gain-in-Kent-June-2022.pdf

3.84 This report has identified a variety of opportunities to strengthen Local Plan policies that directly or indirectly relate to climate change adaptation. Some of the key points include:

- Suggestions for further enhancing RBC's existing flood management policies.
- Better mitigating overheating risks
- Improving water use efficiency
- Encouraging tree planting and woodland creation
- Encouraging strategic planning for nature recovery and resilience.