

# Appendix C2: Climate Change, Energy and Sustainable Design and Construction Topic Paper

## Introduction

Development at North East Cambridge provides an opportunity to design for a new community that has responding to the climate emergency at its heart. NEC will deliver a low environmental impact urban district where:

- Development forms will support the transition to zero carbon and embed the challenge of climate change resilience
- It will be a new model for low car dependency by maximising the use of and integration with walking, cycling and public transport infrastructure
- It will be inherently 'walkable' and allow easy transitions between sustainable transport modes (walking, cycling & public transport) with density linked to accessibility
- Green infrastructure will enable everyone to lead healthy lifestyles, and will protect and enhance biodiversity.
- Low-tech green solutions will couple with high tech smart city technology in achieving future-proofed and climate adaptable buildings and spaces.

In October 2018, the Intergovernmental Panel on Climate Change (IPCC) released a report highlighting the significance of limiting global warming to just 1.5°C in line with the Paris Agreement<sup>1</sup> and the potential climatic implications of exceeding this. In order to prevent further global warming beyond this level, the IPCC concluded that global net human-caused emissions of carbon dioxide (CO<sub>2</sub>) need to fall by about 45% from 2010 levels by 2030, reaching 'net zero' around 2050. Even by limiting emissions, we will still see some global warming, with the UK Climate Projections 2018 study noting that even under a lower emissions scenario, the UK will still see higher average yearly temperatures and an increase in extreme weather events. However, under a scenario

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<sup>1</sup> [Intergovernmental Panel on Climate Change: Global Warming Report](#)

with the highest emissions, summer temperatures could be up to around 5°C hotter by 2070 with an increase in the frequency and magnitude of extreme weather events.

The IPCC's report has led to local governments across 16 countries declaring climate emergencies, and in May 2019, the UK Government declared a climate emergency, amending the 2008 Climate Change Act to set a target for emissions in the UK to become net zero by 2050. Both Cambridge City Council and South Cambridgeshire District Council have pledged to support net zero through the development of planning policy, as well as other areas over which the Councils have influence.

Net zero means the complete decarbonisation of the economy: emissions cannot exceed zero. The work of the IPCC and other organisations such as the Committee on Climate Change, recognises that it won't be possible to phase out all carbon emitting activities, for example in agriculture. Instead, net zero proposes that in addition to phasing out fossil fuels and the role of renewable energy and energy reduction measures, there is also a role for balancing a certain measured amount of carbon released with negative emission carbon offsets, for example, tree planting or carbon capture and storage.

Planning is not just concerned with buildings themselves but place making and as such has the potential to be a powerful tool in the response to the climate emergency. Achieving net zero status cuts across all elements of place making; not just through how homes and buildings are designed and constructed, but also by ensuring new development is in places where it is or can be well served by low carbon transport links like public transport, cycling and walking as well as renewable and low carbon energy. The proximity of North East Cambridge to the Cambridge North Railway Station, Guided Bus route, Waterbeach Greenway and Public Transport Corridor, the Cambridgeshire Autonomous Metro (CAM) and the Chisholm Cycle Trail, combined with the mixed use nature of the site, present an exciting opportunity to deal with transport related emissions, designing places around active travel and minimising the need to travel for homes, work and leisure. Green infrastructure also has a role to play, supporting fauna and flora to enhance biodiversity and offering opportunities to capture any remaining emissions as well as helping our communities adapt to our changing climate through flood storage and helping to cool our cities, towns and villages. Planning can also help ensure we make the best use of the many natural assets the area has to offer, as well

as considering issues such as efficient use of resources including water. Development at North East Cambridge should, therefore, help to support the transition to a zero carbon society.

The World Green Building Council's Advancing Net Zero campaign calls on all new buildings to be net zero carbon in operation by 2030. The UK Green Building Council, as part of its work to develop a framework definition for Net Zero Carbon Buildings, have developed two definitions for net zero carbon buildings, focussing separately on the operation and construction of the building.

## Definitions

Net zero carbon – operational energy is defined as: “When the amount of carbon emissions associated with the building’s operational energy on an annual basis is zero or negative. A net zero carbon building is highly energy efficient and powered from on-site and/or off-site renewable energy sources, with any remaining carbon balance offset”.

Net zero carbon – construction is defined as: “When the amount of carbon emissions associated with a building’s product and construction stages up to practical completion is zero or negative, through the use of offsets or the net export of on-site renewable energy”.

## Key Evidence Documents

Evidence that we already have:

- Carbon Neutral Cambridge (2019). Zero Carbon Futures Symposium. Event Report. Available online at: <https://carbonneutralcambridge.org/wp-content/uploads/2019/08/Zero-Carbon-Futures.pdf>
- CUSPE (October 2019) Net Zero Cambridgeshire: What actions must Cambridgeshire County Council take to reach net zero carbon emissions by 2050. Available online at: [https://cambridgeshire.cmis.uk.com/CCC\\_live/Document.ashx?czJKcaeAi5tUFL1DTL2UE4zNRBcoShgo=n50fNihP782F1JKAFVjeBMwN1gceCgmEfBXigJISowUZl20hL9YDZA%3d%3d&rUzwRPf%2bZ3zd4E7lkn8Lyw%3d%3d=pwRE6AGJFLD](https://cambridgeshire.cmis.uk.com/CCC_live/Document.ashx?czJKcaeAi5tUFL1DTL2UE4zNRBcoShgo=n50fNihP782F1JKAFVjeBMwN1gceCgmEfBXigJISowUZl20hL9YDZA%3d%3d&rUzwRPf%2bZ3zd4E7lkn8Lyw%3d%3d=pwRE6AGJFLD)

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O=ctNJFf55vVA%3d](https://carbonbudget.manchester.ac.uk/reports/E07000008/print/)

- The University of Manchester and Tyndall Centre for Climate Change Research (October 2019). Setting Climate Commitments for Cambridge. Quantifying the implications of the United Nations Paris Agreement for Cambridge. Available online at: <https://carbonbudget.manchester.ac.uk/reports/E07000008/print/>
- The University of Manchester and Tyndall Centre for Climate Change Research (October 2019). Setting Climate Commitments for South Cambridgeshire. Quantifying the implications of the United Nations Paris Agreement for South Cambridgeshire. Available online at: <https://carbonbudget.manchester.ac.uk/reports/E07000012/print/>
- Element Energy and Terence O'Rourke Ltd (2010). Decarbonising Cambridge Study: A renewable and low carbon energy study for Cambridge. Available online at: <https://www.cambridge.gov.uk/media/2529/rd-cc-250.pdf>
- Cambridgeshire Horizons – Cambridgeshire Renewables Infrastructure Framework:
  - 1<sup>st</sup> Report: Baseline Data, Opportunities and Constraints (2012). Available online at: <https://files.cambridge.gov.uk/public/ldf/coredocs/RD-CC/RD-CC-050.pdf>
  - Final Report: Finance, Delivery and Engagement (2012). Available online at: <https://files.cambridge.gov.uk/public/ldf/coredocs/rd-cc-040.pdf>
- Cambridgeshire Horizons – Carbon Offset Fund for Cambridgeshire:
  - Scoping Report: Feasibility of a Carbon Offset Mechanism for Cambridgeshire (2010). Available online at: <https://files.cambridge.gov.uk/public/ldf/coredocs/Stage%201%20Carbon%20Offset%20Report.pdf>
  - Cambridgeshire Community Energy Fund. Stage 2 Final Report (2012). Available online at: <https://files.cambridge.gov.uk/public/ldf/coredocs/Stage%202%20Community%20Energy%20Fund%20Report.pdf>

- Asset Utilities. Greater Cambridge Partnerships – Local Network Analysis. Final Report – February 2019 (hard copy only).
- Local Energy East Strategy: An Energy Strategy for the Tri-Local Enterprise Partnership (LEP) area (2018). Available online at: <https://www.energyhub.org.uk/wp-content/uploads/2019/09/LEE-Energy-Strategy.pdf>
- UK Green Building Council (UK-GBC) Framework for Net Zero Built Environment and the Policy Playbook. Available online at: <https://www.ukgbc.org/ukgbc-work/advancing-net-zero/>
- Heat Network Delivery Unit (HNDU) work on heat mapping for Cambridge (2019).

#### New evidence that needs to be commissioned:

- Work to consider the ways in which development at North East Cambridge can support the transition to a net zero carbon society. An evidence base to support the Greater Cambridge Local Plan and NEC is currently under and will inform future policies related to carbon reduction and the transition to net zero carbon.
- District Wide Energy and Infrastructure Study and Energy Masterplan for the site to consider suitable options for renewable energy and associated supporting infrastructure (including smart energy options). This needs to consider how much grid capacity would be required to support the growth of the district, taking into account various policy scenarios for supporting the transition to net zero, the likely renewable energy mix, electric vehicle charging requirements, the type of energy infrastructure that could support this, including smart infrastructure, and giving specific considerations to renewable heat technology.

#### National Planning Policy Framework (NPPF) and other relevant national legislation

Addressing climate change is one of the core land use planning principles within the NPPF. Section 14 of the NPPF considers the role of planning in dealing with climate change and flood risk, noting the role of the planning system in supporting the transition to a low carbon future in a changing climate. Planning should help to shape places in ways that contribute to radical reductions in greenhouse gas emissions, minimise vulnerability and improve resilience, and support renewable and low carbon energy and

associated infrastructure. Footnote 48 of paragraph 149 goes on to note that planning policies should be in line with the objectives and provision of the Climate Change Act 2008. The Climate Change Act 2008 was amended in August 2019 to set a legally binding target for the UK to become net zero by 2050.

The NPPF is supported by the National Planning Practice Guidance (NPPG) which notes that in addition to the delivery of appropriately sited green energy, effective spatial planning is an important part of a successful response to climate change as it can influence the emission of greenhouse gases. Local Planning authorities should ensure that protecting the local environment is properly considered alongside the broader issue of protecting the global environment. Planning also has an important role to play in increasing the resilience to climate change through the location, mix and design of development.

Section 182 of the Planning Act (2008) places a legal duty on local planning authorities to ensure that their development plan documents include policy to secure the contribution of development and the use of land in the mitigation of, and adaptation to climate change. Provisions in the Planning and Energy Act also enable local planning authorities to set requirements for carbon reduction and renewable energy provision, and it should be noted that while the Housing Standards Review did propose to repeal some of these provisions, amendments to the Planning and Energy Act have not taken place.

## Background/Context/Relevant Data/Corporate Council Objectives and Strategies

Both Cambridge City Council and South Cambridgeshire District Council have declared climate emergencies, pledging to support net zero through the development of planning policy, as well as other areas over which the Councils have influence.

In terms of corporate objectives:

Cambridge City Council: Caring for the planet

- A city that takes robust action to tackle the local and global threat of climate change, both internally and in partnership with local organisations and residents, and to minimise its environmental impact by cutting carbon, waste and pollution.

South Cambridgeshire District Council:

- Being green to our core – by the Council developing a plan for a carbon-neutral future for South Cambridgeshire, exploring opportunities for green energy generation and improving air quality.

## Cambridge and South Cambs Local Plans and other related planning documents

Cambridge Local Plan (2018):

- Section 4, policy 28 (carbon reduction, community energy networks, sustainable design and construction and water use)

South Cambridgeshire Local Plan (2018):

- Section 4 policies:
  - CC/1 (mitigation and adaptation to climate change);
  - CC/2 (renewable and low carbon energy generation);
  - CC/3 (renewable and low carbon energy in new developments);
  - CC/4 (water efficiency);
  - (CC/6 (Construction methods – covers issues such as CEMPs)

Greater Cambridge Sustainable Design and Construction SPD (adopted January 2020). This SPD provides guidance on the implementation of policies in the adopted Local Plans. With regards to NEC, site specific policies are to be developed as part of the AAP, so while some sections of the SPD will have relevance, for example guidance in relation to climate change adaptation, other elements of the SPD will not be relevant. It may be that a technical note will need to be developed to sit alongside the AAP, setting out those parts of the SPD that are relevant to NEC and updating the sustainability checklist so that it has direct relevance to policies in the AAP.

## NEC AAP Issues and Options Report Questions and representations received

The Issues and Options 2019 consultation considered the following options related to climate change and sustainable construction:

## Carbon reduction standards for residential development

Question 62 of the Issues and Options set out the following options for carbon reduction from residential Development:

- Carbon reduction. Given the difference between policy in the adopted Local Plans, it is considered that there are four options that should be explored in relation to carbon reduction from residential development:
  - A) a 19% improvement on 2013 Building Regulations (the current Cambridge Local Plan standard); or
  - B) a requirement for carbon emissions to be reduced by a further 10% using on-site renewable energy (the current South Cambridgeshire Local Plan standard); or
  - C) a 19% improvement on 2013 Building Regulations plus an additional 10% reduction using on-site renewable energy.
  - D) consideration of a higher standard and development of further evidence alongside the new joint Local Plan.

## Summary of responses

Of the 11 comments submitted to this question, there was clear support for Option D (6 comments) and the setting of targets that reflected the climate emergency. There was also some support for Option C as a minimum, with others calling for new housing to be constructed to the Passivhaus standard. There were also calls to take into account the decarbonisation of the grid, to ensure that the redevelopment of the area is not locked into the use of potentially higher emitting technologies over time

## Other approaches to sustainable design and construction

Questions 63 and 64 asked for people's views on the following construction standards:

- Water efficiency – 110 litres/person/day.

Non-residential development:

- Minimum requirement for achievement of Building Research Establishment Environment Assessment Methodology (BREEAM) 'excellent' with full credits achieved for category Wat 01 of BREEAM. Carbon reduction would be dealt with via the mandatory requirements associated with the energy credits associated with BREEAM (category Ene 01).

## All development

- A requirement for all flat roofs to be green or brown roofs, except for where roof spaces are proposed to be utilised for amenity space (e.g. roof gardens);
- Requirements related to electric vehicle charging infrastructure to support the transition to low emissions vehicles;
- In order to minimise the risk of overheating, all development must apply the cooling hierarchy as follows:
  - Reducing internal heat generation through energy-efficient design;
  - Reducing the amount of heat entering a building in summer through measures such as orientation, shading, albedo, fenestration, insulation and, where appropriate, green roofs;
  - Managing heat within the building, e.g. through use of thermal mass and consideration of window sizes;
  - Passive ventilation;
  - Mechanical ventilation;
  - Only then considering cooling systems (using low carbon options).

Overheating analysis should be undertaken using the latest Chartered Institute of Building Service Engineers (CIBSE) overheating standards, with consideration given to the impact of future climate scenarios.

Reference was also made to how to enable sustainability targets to be reviewed over time to ensure that development of the district contributes to the transition to a net zero society, and the role of site wide approaches to issues such as water, energy and associated infrastructure.

## Summary of responses

There was generally support for the approach outlined in the AAP from the majority of the 21 respondents, with calls for the setting of clear and measurable targets for sustainability. There was some call for flexibility in the application of standards such as BREEAM 'excellent' to take account of the specific types of buildings being proposed as well as calls to go beyond the 'excellent' standard. There was also mixed support for giving consideration to the development of review mechanisms as part of planning permissions so that development can take account of changing national standards over time. On the one hand there was a call for developers to have certainty as to the standards they will be required to achieve, while on the other there was a recognition that not all future scenarios are foreseeable and that in order to avoid perverse outcomes in future it may be necessary to reappraise the policy requirements so that the most up to date and relevant standards are applied where necessary, reasonable and practicable. It was also considered advisable to follow guidance from notable charities and NGOs such as the UK Green Building Council, who have developed a Framework for Net Zero in the Built Environment.

There was also concern raised regarding the need for planning to take full consideration of climate change and water stress, with some respondents noting issues surrounding water abstraction and the impacts that this is having on the River Cam and other local watercourses. There was support from the Environment Agency for early consideration of integrated approaches to water management that take into consideration not just flood risk but also water resource availability. The opportunities that might be presented through a major landowner also being a water company were noted. Cambridge Water were supportive of setting the highest possible standards for water efficiency with reference to 80 litres/person/day for residential development.

## Site wide approaches

Questions 65 and 66 of the Issues and Options Report gave consideration to the following site wide approaches that could be taken as part of the Area Action Plan:

- Energy provision, through the development of decentralised energy systems and innovative approaches to energy infrastructure such as smart energy grids;
- Community scale approaches to water, taking an integrated approach to water management, which gives consideration not just to reducing flood risk but also

considers opportunities for water re-use and the wider benefits of managing water close to the surface.

- Application of the BREEAM Communities International Technical Standard<sup>2</sup> to the masterplanning of the site.

Of the 8 responses to question 65, there was clear support for the setting of an aspirational approach to sustainability for the site, although there were some calls for flexibility in how these aspirations were applied. There was some support for the use of the BREEAM communities standard, although others felt that further work was needed to see if such a standard would secure effective outcomes for the site. Many recognised the opportunities that the scale of development at the site presented in terms of energy and water.

In response to question 66, which asked if there were other approaches to sustainable design and construction that should be considered, there was support for the consideration of the embodied impacts of buildings and infrastructure as well as opportunities for the promotion of circular economy principles. Consideration should also be given to embracing and supporting innovative smart-tech and infra-tech.

## Key Issues (including any lessons learnt from other sites)

Some strategies for enhancing carbon reduction from new development can lead to unintended consequences if they are not correctly implemented and operated e.g. communal heating in new developments where payment mechanisms and maintenance fees can lead to fuel poverty for tenants in affordable housing or where incorrectly specified and installed systems are not performing as expected and in some cases are leading to excessive internal heat loads in communal areas, contributing to overheating. Policies should be technology agnostic but also make reference to best practice guidance and certification schemes where available. Consideration should also be given to the role of assured performance mechanisms to ensure that built performance

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<sup>2</sup> [BREEAM: Communities International Technical Standard 2020](#)

matches designed performance – Milton Keynes have recently adopted planning policy related to this.

A further key issue is that across the Greater Cambridge area, the electricity grid serving new developments is at capacity, and that significant grid reinforcement is required, not just to accommodate growth but also to accommodate an increased use of renewable energy and infrastructure such as electric vehicle chargepoints. There is a need to ensure that consideration is given not just to carbon reduction targets and the renewable energy options that could help to deliver these targets (as part of the energy hierarchy) but also to the infrastructure required to support decarbonisation, including innovative approaches to infrastructure provision. This will be picked up as part of work on the development of a Site Wide Energy and Infrastructure Study and Energy Masterplan for the site.

There is a legal duty on the Councils to set carbon reduction targets to get to net zero carbon in line with the Climate Change Act. Reading have successfully defended their new policy of all major new development achieving zero carbon status (in line with the requirements of the London Plan – 35% improvement on Part L 2013 plus carbon offsetting) at their Local Plan examination. This sets an interesting precedent for other local planning authorities to set carbon reduction targets beyond those suggested by the National Planning Policy Framework and Planning Practice Guidance. However, this policy only relates to energy use in buildings, while net zero carbon requirements have much greater implications for new development. In addition, the current consultation on changes to Building Regulations in 2020 proposed to implement the changes to the Planning and Energy Act, which would restrict the role of local planning authorities in setting new targets for carbon reduction in new development.

## Preferred Approach

### Policy 2: Designing for the climate emergency

Development of a wider climate change and sustainable construction policy as suggested in the Issues and Options 2 paper. This will cover the issues that need to be considered as part of Sustainability Statements, including:

- **Construction standards for non-residential and mixed use buildings**

- **Adaptation to climate change** - to ensure that the district is climate proofed, not just in terms of buildings but also the spaces around buildings and the infrastructure required to serve the development. Consideration should be given to a range of climate risks, including flood risk, overheating and water availability. In order to minimise the risk of overheating, all development must apply the cooling hierarchy as follows:
  - Reducing internal heat generation through energy-efficient design;
  - Reducing the amount of heat entering a building in summer through measures such as orientation, shading, albedo, fenestration, insulation and green roofs and cool materials. All flats roofs should be green or brown roofs;
  - Managing heat within the building, e.g. through use of thermal mass and consideration of window sizes;
  - Passive ventilation;
  - Mechanical ventilation;
  - Only then considering cooling systems (using low carbon options).

Overheating analysis must be undertaken using the latest CIBSE overheating standards, and include consideration of future climate scenarios using 2050 Prometheus weather data<sup>3</sup>.

- **Carbon reduction** – to ensure that development at NEC is on a clear pathway to support the delivery of net zero carbon by 2050. Consideration should be given to carbon emissions associated with operational energy and construction, including materials, as well as wider emissions, for example those associated with transport.
- **Water management** – to ensure that development includes high levels of water efficiency in order to respond to the water stress facing Greater Cambridge, and to ensure that development takes an integrated approach to water management.
- **Site waste management** – to ensure that all new development is designed to reduce construction waste and integrate the principle of designing for deconstruction, and to make it easier for occupants to maximise levels of recycling and reducing waste sent to landfill with reference to the RECAP Waste Management Design Guide.
- **Use of materials** – All major new development should take into consideration the embodied carbon associated with materials using the RICS Whole Life Carbon<sup>4</sup> approach or successor documents. Development should be designed to maximise resource efficiency and

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<sup>3</sup> <http://emps.exeter.ac.uk/engineering/research/cee/research/prometheus/>

<sup>4</sup> RICS Whole Life Carbon Assessment for the Built Environment professional statement 2017

identify, source and use environmentally and socially responsible materials, giving consideration to circular economy principles and design for deconstruction.

- **Wider approaches to sustainable design and construction** - including food growing; biodiversity and ecology; environmental health considerations; transport, mobility and access; health and well-being; culture, heritage and the quality of built form including efficient use of land.
- **Futureproofing** – all development, particularly that being brought forward at the early phases of NEC, must consider how the scheme can be futureproofed to enable future occupiers to easily retrofit or upgrade buildings and/or infrastructure in the future to enable achievement of net zero carbon development.
- Flood risk and sustainable drainage to be considered as part of a separate policy.
- Requirements related to electric vehicle charging infrastructure to support the transition to low emissions vehicles – some of this will get picked up by future Building Regulations, but we will need to consider whether there will be instances where we will need to set requirements e.g. multi-storey car parks or car barns serving multiple buildings and also the need to ensure electric vehicle charge points are integrated into landscaping proposals where surface parking is provided, for example through the provision of electric vehicle charge points integrated into street furniture such as lampposts. There may also be a need to consider an approach for encouraging a switch to low emissions Heavy Goods Vehicles in the area e.g. role of hydrogen. These issues will be picked up as part of the Connectivity chapter of the Area Action Plan.

### Policy 3: Energy and associated infrastructure

- In order to support the transition to net zero carbon and deliver energy efficiency, a site wide approach to energy and associated infrastructure should be investigated and, where feasible and viable, implemented.

### Policy 4a: Water efficiency

- All new residential developments must achieve, as a minimum, water efficiency equivalent to 110 litres/person/day moving towards a target of water use of no more than 80b litres/person/day giving consideration to rainwater harvesting and/or water recycling.

- Proposals for non-residential development must achieve 5 BREEAM credits for water use (Wat 01), unless it can be demonstrated that such provision is not technically or economically viable.

## Reasons for selecting preferred approach

### Responding to the climate emergency/sustainable design and construction

With regards to wider approaches to sustainable design and construction and responding to the challenges posed by our changing climate, it is proposed to carry forward the options consulted on as part of question 63. Some of these elements included within this policy are those that the councils are required by law to include in its local plans. For example, the Planning Act (2008) places a legal duty on all local planning authorities to include climate change adaptation policies in their plans. Other elements are supported by the National Planning Policy Framework, which, at paragraph 149, places a duty on local planning authorities to adopt “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”.

The options outlined in the recommendations for policy development would help to ensure that development of North East Cambridge mitigates its climate impacts in terms of reducing emissions, as well as ensuring that the site is capable of adapting to our future climate.

In terms of construction standards for new non-residential development, as per the option outlined in the 2019 Issues and Options Report, BREEAM excellent is recommended as the minimum construction standard. This is in line with adopted policy for the rest of Cambridge, as set out in the 2018 Cambridge Local Plan. Subject to further work, it is also suggested that the policy contains an aspiration for at least one of the non-residential buildings at the site could target the BREEAM outstanding target, which would be in keeping with the vision of the site being a place for innovative living and working. BREEAM outstanding represents innovation, with less than 1% of the UK's new non-domestic floorspace achieving this standard. BREEAM 'excellent' still represents best practice, being equivalent to the performance of the top 10% of UK new

non-domestic floorspace. This would build on the approach being taken on other sites in Cambridge, for example at the University of Cambridge's West Cambridge site, where there is a commitment as part of the outline application for the site for 2 buildings to achieve 'outstanding' status. The precise number of buildings that could achieve this standard will be considered as part of the Viability work for NEC.

While the focus of policy is on BREEAM certification, the policy will also be supportive of alternative sustainable construction standards for both non-residential and residential development. For example, the Passivhaus standard can be applied to non-residential as well as residential schemes.

### Energy and associated infrastructure

The preferred approach to carbon reduction is to develop policy that will ensure that development at NEC supports the transition to net zero carbon, supported by the Greater Cambridge Local Plan Net Zero Carbon Evidence Base. Consideration was given to including Cambridge City Council's current policy requirement for a 19% improvement in emissions compared to Part L of the Building Regulations, which is in keeping with national planning policy. Alternatively, carbon reduction could be left to Building Regulations, although this approach would only consider energy use in buildings and not the wider emissions reduction that is required to get to net zero carbon by 2050. However, footnote 48 of the NPPF requires planning policies to be in line with the objectives and provisions of the Climate Change Act 2008, which requires the UK to achieve net zero carbon status by 2050. To only require a 19% improvement on current 2013 Building Regulations would not be in line with the objectives and provisions of the Climate Change Act. For the Councils to achieve this legally binding target, urgent action is needed to address the carbon emissions associated with new development and the planning system has a clear role to play in this, in line with the requirements of Section 182 of the Planning Act (2008). In addition, future changes to Part L of the Building Regulations will mean that assessing a 19% reduction in emissions compared to Part L 2013 will become increasingly difficult to determine.

In light of the legal obligations, it is considered that it is important that the North East Cambridge Area Action Plan should help to put new development in the area on a clear pathway towards net zero carbon by 2050. Further work is required to identify what future targets would look like, and this is currently being developed in the form of the

Greater Cambridge Local Plan Net Zero Carbon evidence base, which can inform future stages in the AAP process.

With regards to renewable energy provision, in light of the opportunities that the redevelopment of the NEC site presents for site wide approaches to energy, and in light of the support for this approach at Issues and Options, policy will promote the development of such an approach, supported by the commissioning of a Site Wide Energy and Infrastructure Study and Energy Masterplan. This will help to identify at an early stage the level of energy infrastructure required to support the development of NEC, taking a proactive approach to assessing the energy requirements of the site in order to ensure that infrastructure constraints do not delay development from coming forward. This approach is in keeping with paragraph 151 of the NPPF, which states that: To help increase the use and supply of renewable and low carbon energy and heat, plans should:

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

#### Water efficiency (Policy 4a)

In terms of water efficiency, due to the levels of water stress facing Cambridge, it is proposed that policy requires use of the national technical standard of 110 litres/person/day for all new residential development, and the specification of maximum water efficiency BREEAM credits for non-residential development (Wat 01). However, it is noted that these targets alone may not be sufficient to secure long term sustainability of water supply, and it is noted that in their response to the 2019 Issues and Options consultation, Cambridge Water reiterated their support for the setting of an 80 litre/person/day standard for all residential development at the site. It is considered that the site could, due to a number of factors, represent an opportunity for a site wide approach to water reuse as part of an integrated approach to water management, and as such policy in the AAP should promote this approach.

## Sustainability Appraisal (with input from Sustainability Appraisal Consultants)

With regards to policy 2, the SA noted significant positive effects in relation to SA objective 3 as the policy sets out that the principles of sustainable design and construction must be clearly integrated into the design of NEC. All development proposals shall be accompanied by a Sustainability Statement which will outline water management and adaptation to climate change. Furthermore, development must be designed to maximise resource efficiency and identify, source and use environmentally and socially responsible materials, the development must include high levels of water efficiency to reduce water stress.

Significant positive effects are also expected against SA objectives 7 (greenhouse gas emissions) and 8 (climate change resilience) as this policy outlines how development in NEC will need to support the transition to a net zero carbon society. Consideration must be given to carbon emissions associated with operational energy and construction, including materials and wider emissions such as those associated with transport. Development must also be supported by decentralised renewable and low carbon energy combined with smart approaches to energy infrastructure including energy storage. The policy also outlines that the district must ensure it builds resilience to climate change through green infrastructure and considering the wide range of climate risks. Therefore, building resilience to and reducing the area's vulnerability to climate change is addressed through this policy.

Minor positive effects are expected against SA objectives 2 (air quality and pollution), 4 (protected habitats and species), 5 (biodiversity), 6 (landscape and townscape), 9 (health and wellbeing), 10 (open space), 12 (equality), 14 (economy) and 16 (sustainable travel) as this policy aims to reduce carbon emissions, which will likely have a positive effect on air pollution due to disincentivising use of private vehicles, incorporate green infrastructure, which could include green spaces around the development which increases health and wellbeing, access to green space and wildlife habitats, and consider transport, mobility and access. In addition, the incorporation of green infrastructure could improve the public realm thereby enhancing the townscape of

the area. All of which will improve the adaptability of the local economy to a net zero carbon society.

Regarding policy 3, significant positive effects are expected against SA objective 7 (greenhouse gas emissions) as this policy outlines how development will be delivered in line with the Site Wide Energy and Infrastructure Study and Energy Masterplan, which is currently being developed. The aim of the study and masterplan is to support the energy demands of the development and the transition to net zero carbon, considering energy use in buildings and transportation thereby reducing the development's contribution to climate change. Development of the energy masterplan will help to identify opportunities for decentralised energy including district energy systems. Minor positive effects are expected against SA objective 2 (air quality and pollution) as the promotion of innovative smart energy that reduces carbon emissions will also help to reduce air pollution resulting from burning of fossil fuels. Uncertainty is attached to each positive effect as it is not clear what the outcomes of the Site Wide Energy and Infrastructure Study and Energy Masterplan will require. The SA did recommend that additional text be added to promote local energy communities and local collaboration to encourage community ownership of any decentralised energy network opportunities, and that specific reference to achieving net zero carbon and energy efficiency be added to the policy. These amendments have been incorporated into the policy and supporting text.

For policy 4a, Significant positive effects are also expected against SA objective 3 (water) as this policy states that all new residential development must achieve, as a minimum, water efficiency equivalent to 110 litres/person/day. Also, proposals for non-residential development must achieve 5 BREEAM credits for water use. Consideration should also be given to community scale approaches to water, taking an integrated approach to water management. Minor positive effects are expected against SA objective 8 (climate change resilience) as improving water efficiency will help adapt to lower water availability, which is likely to occur as a result of climate change.