



North East Cambridge Area Action Plan Proposed Submission

Topic Paper: Climate Change, Energy, Water and Sustainable Design and Construction

Greater Cambridge Planning Service
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Introduction

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

- Development forms will support the transition to net 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 Agreement¹ 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 (CO₂) 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 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. The recently adopted sixth carbon budget, which was translated into law in June 2021, requires 63% reduction in emissions from 2019 to 2035 (78% relative to 1990). 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.

¹ [Intergovernmental Panel on Climate Change: Global Warming Report](#)

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 NEC to the Cambridge North Railway Station, Guided Bus route, Waterbeach Greenway and Public Transport Corridor 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 NEC 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

- [Greater Cambridge Local Plan: Net Zero Carbon Evidence Base – Non Technical Summary \(August 2021\)](#)
- [Greater Cambridge Local Plan: Net Zero Carbon Study – Defining Net Zero Carbon \(August 2021\)](#)
- [Net Zero Carbon Study – Carbon Reduction Targets \(August 2021\)](#)
- [Net Zero Carbon Study – Policy Recommendations \(August 2021\)](#)
- [Net Zero Carbon Study – Technical Feasibility \(August 2021\)](#)
- [Net Zero Carbon Study – Cost Report \(August 2021\)](#)
- [Net Zero Carbon Study – Offsetting \(August 2021\)](#)
- WSP (2021). North East Cambridge Energy Infrastructure Capacity Study and Energy Masterplan
- Stantec (2021) [Greater Cambridge Integrated Water Management Study: Outline Water Cycle Study](#)

- Stantec (2021) [Greater Cambridge Integrated Water Management Study: Level 1 Strategic Flood Risk Assessment](#)
- Stantec (2021) [Greater Cambridge Integrated Water Management Study Strategic Flood Risk Assessment - Appendix B \(Setting\)](#)
- Stantec (2021) Greater Cambridge [Integrated Water Management Study Strategic Flood Risk Assessment - Appendix B \(Key Hydraulic Features\)](#)
- Stantec (2021) Greater Cambridge [Integrated Water Management Study Strategic Flood Risk Assessment - Appendix C \(Geology\)](#)
- Stantec (2021) [Greater Cambridge Integrated Water Management Study Strategic Flood Risk Assessment - Appendix C \(Source Protection Zones\)](#)
- [Stantec \(2021\) Greater Cambridge Integrated Water Management Study Strategic Flood Risk Assessment - Appendix D1 \(EA Flood Zones\)](#)
- [Stantec \(2021\) Greater Cambridge Integrated Water Management Study Strategic Flood Risk Assessment - Appendix D3 \(Modelled Flood Extents\)](#)
- Stantec (2021) [Greater Cambridge Integrated Water Management Study Strategic Flood Risk Assessment - Appendix D4 \(Modelled Climate Change Flood Extents\)](#)
- Stantec (2021) [Greater Cambridge Integrated Water Management Study Strategic Flood Risk Assessment - Appendix D5 \(Areas Benefiting from Defences\)](#)
- Stantec (2021) [Greater Cambridge Integrated Water Management Study Strategic Flood Risk Assessment - Appendix D6 \(Functional Floodplain\)](#)
- Stantec (2021) [Greater Cambridge Integrated Water Management Study Strategic Flood Risk Assessment - Appendix D7 \(Historic Flooding\)](#)
- [Stantec \(2021\) Greater Cambridge Integrated Water Management Study Strategic Flood Risk Assessment - Appendix D8 \(Surface Water Flood Risk\)](#)
- Stantec (2021) [Greater Cambridge Integrated Water Management Study Strategic Flood Risk Assessment - Appendix D9 \(Reservoir Flood Risk\)](#)
- Stantec (2021) [Greater Cambridge Integrated Water Management Study Strategic Flood Risk Assessment - Appendix D10 \(Groundwater Flood Risk\)](#)
- Stantec (2021) [Greater Cambridge Integrated Water Management Study Strategic Flood Risk Assessment - Appendix D11 \(Sewer Flooding\)](#)
- Stantec (2021) [Greater Cambridge Integrated Water Management Study Strategic Flood Risk Assessment - Appendix D12 \(Flood Warning Areas\)](#)
- Stantec (2021) [Greater Cambridge Integrated Water Management Study Strategic Flood Risk Assessment - Appendix D2 \(Best Available Hydraulic Models\)](#)
- [Carbon Neutral Cambridge \(2019\). Zero Carbon Futures Symposium. Event Report.](#)
- CUSPE (October 2019): [What actions must Cambridgeshire County Council take to reach net zero carbon emissions by 2050.](#)
- 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.](#)
- 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.](#)
- [Greater Cambridge Shared Planning \(September 2019\) Cambridge Northern Fringe East Area Flood Risk Assessment](#)

- [Greater Cambridge Shared Planning \(September 2019\) Cambridge Northern Fringe East Surface water drainage space allocation for master planning](#)
- Element Energy and Terence O'Rourke Ltd (2010). [Decarbonising Cambridge Study: A renewable and low carbon energy study for Cambridge.](#)
- Cambridgeshire Horizons – Cambridgeshire Renewables Infrastructure Framework:
 - [1st Report: Baseline Data, Opportunities and Constraints](#) (2012).
 - [Final Report: Finance, Delivery and Engagement](#) (2012).
- Cambridgeshire Horizons – Carbon Offset Fund for Cambridgeshire:
 - [Scoping Report: Feasibility of a Carbon Offset Mechanism for Cambridgeshire](#) (2010).
 - [Cambridgeshire Community Energy Fund. Stage 2 Final Report](#) (2012).
- Asset Utilities for Greater Cambridge Partnership – 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 \(2018\).](#)
- UK Green Building Council (UK-GBC) [Framework for Net Zero Built Environment and the Policy Playbook.](#)
- Heat Network Delivery Unit (HNDU) work on heat mapping for Cambridge (2019).

National Planning Policy Framework (NPPF) 2021 and other relevant national legislation and guidance

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 53 of paragraph 153 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.

With regards to water resources, paragraph 20 of the NPPF requires that strategic policies should set out an overall strategy for the pattern, scale and quality of development and make sufficient provision for infrastructure, including water supply. Again, paragraph 153 comes into play, as taking a proactive approach to mitigating and adapting to climate change includes taking into account long-term implications for water supply.

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.

The PPG Water supply, wastewater and water quality (2019) provides guidance on all aspects of the water environment including water supply. It emphasises the need for early discussion with water and sewage companies in order that growth can be reflected in their long-term water resources management plans so that adequate infrastructure will be in place when and where needed.

The PPG Housing: optional technical standards (2015) explains how planning authorities can gather evidence to set optional technical standards for new housing and includes an option for tighter water efficiency standards for new homes to help manage demand. All new homes already have to meet the mandatory national standard set out in Building Regulations of 125 litres/person/day. The guidance states that where there is a clear local need, authorities can include a Local Plan policy requiring new dwellings to meet the tighter Building Regulations optional requirement of 110 litres/person/day. It also sets out how a local planning authority can establish that there is a clear need and the evidence that could be used to support this.

A National Framework for Water Resources was published in 2020 by the Environment Agency. This was in response to two pledges set out in the Government's Environment Plan:

- to leave the environment in a better state than we found it; and
- to improve the nation's resilience to drought and minimise interruptions to water supplies.

The framework supports the case for water resource investment to increase drought resilience, so that the nation's water supplies are fit for the future. It also makes a shift to strategic regional planning and established five regional groups, based upon water companies and other water users and stakeholders. Greater Cambridge falls within the Water Resources East region (see below). The framework sets out what the regional plans must deliver in order to drive a step-change in water resources planning. This includes:

- Increasing resilience to drought
- Delivering greater environmental improvement
- Long-term reductions in water usage
- Leakage reduction
- Reducing the use of drought permits and orders
- Increasing supplies
- Moving water to where it's needed

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. In January 2021, government issued a response to its consultation on the [Future Homes Standard](#). As part of this consultation, government had asked whether it should 'ban' local planning authorities from going beyond Building Regulations, effectively removing the provisions of the Planning and Energy Act that were suggested as part of the Housing Standards Review in 2014. Having considered the responses received, government have decided not to and reconfirmed its position that Local Plans can set energy standards for new homes that go beyond Building Regulations.

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

The Cambridgeshire and Peterborough Combined Authority (CPCA) have established the Cambridgeshire and Peterborough Independent Commission on Climate to conduct a thorough review of the ways that climate change is impacting on the region's local economy and community and to determine what action should be taken. The Commission's [initial recommendations report](#), published in March 2021, notes that the region's emissions are approximately 25% higher per person than the UK average, and that if the area continues on this trajectory, we will only have around 6 years remaining before we have exhausted all of our 'allowed' share on emissions to 2050. Urgent action is therefore required, with the report noting that local government powers in transport and planning, amongst others, will be critical in driving transformation. The report makes a number of recommendations of relevance to the built environment, including:

- Calling on central government to provide increased powers for local authorities to require higher standards in planning, building and transport.
- Adopting a net zero carbon standard for new homes by 2023, with adoption of a similar standard for non-domestic buildings.
- Development of new build guidance to address embodied emissions with targets strengthening over time.
- Performance should be actively monitored and standards full enforced, with performance measurements reflecting real-world energy use.
- For Central Government and Ofwat to provide for the investment to allow intercompany trading and water infrastructure improvements by 2025 to enhance water supply, including eliminating Cambridge's dependence on the groundwater aquifer.
Review new build regulation standards to allow local authorities to set more ambitious standards for water consumption, especially in current and future water-stressed areas.

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. Cambridge City Council has a shared vision for the city of Cambridge to be net zero carbon by 2030 in its current Climate Change Strategy 2021-2026. South Cambridgeshire District Council's Zero Carbon Strategy sets out the council's ambition to halve carbon emissions in the district by 2030 and reduce them to zero by 2050.

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 Cambridgeshire 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)
- Section 4, policy 31 (integrated water management and the water cycle)
- Section 4, policy 32 (flood risk)

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)
 - CC/7 (water quality)
 - CC/8 (sustainable drainage systems)
 - CC/9 (managing flood risk)

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 2019 Questions and representations received

Chapter 11 of 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 sustainable design and construction standards:

Residential development:

- 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 including water

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 including the use of sustainable drainage systems.
- Application of the BREEAM Communities International Technical Standard² to the masterplanning of the site.

Summary of responses

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

² [BREEAM: Communities International Technical Standard 2020](#)

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.

On the issue of water quality, you told us that full investigations were needed to ensure that any remedial work on water contamination was fully explored and considered. Further support was received with regards to integrating water management with SuDS, water use/recycling and green infrastructure as part of an innovative management strategy.

Concerns were raised about the flood risk associated with the relocation of the Cambridge Wastewater Treatment Plant, with consideration of the suitability of relocation picked up in a Water Cycle Study. There was support for consideration of SuDS and integration with green infrastructure as part of any initial design stage.

Key Issues (including any lessons learnt from other sites)

Carbon Reduction

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 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 issue has been considered as part of work to assess current capacity on the grid serving the NEC site, as part of the Energy Infrastructure Capacity Study and Energy Masterplan.

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. Indeed, Government have confirmed, in their response to the [Future Homes Standards Consultation](#), that local planning authorities can continue to use Local Plans to set energy standards for new homes that go beyond Building Regulations.

Water Supply

Greater Cambridge is one of the driest areas in the UK and identified as an area of serious water stress. Evidence in the Greater Cambridge Integrated Water Management Plan (IWMP) (2021) has shown that existing abstraction is causing environmental problems. As a result, future development cannot be supplied with water by increased abstraction from the chalk aquifer and must be met in other ways. One of these ways is through reduced usage (demand management) and therefore the Area Action Plan must ensure that any future development achieves high levels of water efficiency. The efficient use of an important resources such as water is key to sustainable development and adapting to climate change, which will affect rainfall and evaporation.

Water Quality

It is extremely important that appropriate water and sewage infrastructure is provided on the site in a phased and timely manner to serve the development. Also that the water quality of both water courses and groundwater is maintained and enhanced in the AAP area and downstream.

Any site which may be contaminated to some degree by virtue of its previous usage forms a potential risk to water quality, especially if redevelopment takes place. Developers should contact the Environment Agency at their earliest opportunity to discuss the need for historical information and site investigations to determine the degree of contamination, if any, of both soil and groundwater.

Water from the AAP site will naturally drain into the River Cam. The IWMP (2021) provides further information about water quality. Water quality is measured in relation to the Water Framework Directive (WFD) Classification (2019). The River Cam has an overall water body status of 'moderate', with the reasons identified for not achieving 'good' being physical modification and point source pollution. Abstraction which is causing low flows decreases the dilution of treated effluent and other pollutant sources leading to poor water quality, which can also be compounded by the impacts of climate change such as increased water temperatures. Objectives and measure for managing water quality in the Greater Cambridge area are set out in the Anglian River Basin Management Plan.

Development at North East Cambridge will need to demonstrate that it will not contribute to any deterioration in WFD status and where possible it will support measures to improve water quality. Opportunities to improve water quality associated with the new development include well-designed green / blue infrastructure which will not only contribute to improved water quality and habitat, but also provide wider benefits for

wildlife and amenity. Sustainable drainage systems (SuDS) can help to filter water and control urban sources of pollution such as highways pollution which can help to improve water quality (also see section below on SuDS).

Flood Risk

The AAP needs to ensure that new development will not be affected by flooding from all sources including rivers, surface water, groundwater and sewers. Also that it does not cause flooding to occur elsewhere. Climate change must also be taken into account, as this is likely to increase the intensity and frequency of flooding events.

The Area Flood Risk Assessment (FRA) (2019) showed that the developable area is totally within the Environment Agency's Flood Zone 1 (low risk). There is some surface water (pluvial) flood risk, but the Assessment showed that this is confined to small local areas and could be mitigated through a carefully designed surface water management system, ground profiling and finished floor levels set to appropriate levels to avoid the areas of pluvial flood risk. The Assessment showed that groundwater levels are high at the site and there is a risk of groundwater flooding, although this is based upon mapping by the British Geological Survey based upon geological information and there are no recorded instances. The FRA states that this could be dealt with through onsite mitigation. The high groundwater level and potential contamination from previous and current uses of the site may have an effect on the type of surface water management that can be carried out at the site as infiltration may not be possible. However, this cannot be ruled out, and site-specific ground investigations will be necessary to define appropriate surface water management solutions.

The Level 1 Strategic Flood Risk Assessment for Greater Cambridge (2021) includes the most up-to-date flood mapping and does not show any significant changes to the maps in the FRA. The whole of the AAP area is in Flood Zone 1 and outside of the areas that would potentially be affected by climate change. There are parts of the site which have a risk of surface water flooding as was set out in the FRA.

Sustainable Drainage

In order to prevent flooding elsewhere as a result of the development, integrated water management, including the use of sustainable drainage systems (SuDS) is key. Water can be collected and re-used as an additional supply of non-potable water through rainwater harvesting systems. Water can also be channelled and collected in SuDS which mimic natural drainage, in order to prevent flooding. SuDS have multiple benefits: helping to slow down the flow of water and allowing infiltration (where possible) which prevents flooding; helping to filter water and improve water quality; and, also provide benefits for biodiversity and amenity within new developments.

The Cambridgeshire Flood and Water Supplementary Planning Document (SPD) (2016) was prepared by the Lead Local Flood Authority in conjunction with the other Cambridgeshire local planning authorities and water management authorities. It was adopted by both Cambridge City Council and South Cambridgeshire District Council as a material consideration when considering planning applications. The SPD provides best practice guidance on the approach that should be taken to design new

developments to manage and mitigate flood risk and includes detailed guidance on sustainable drainage systems (SuDS).

There are many examples of successful SuDS schemes in Greater Cambridge. The CIRIA guidance 'Delivering better water management through the planning system' (2019) provides advice to planners on good practice when preparing plans and policies and provides case studies of good local plan policy and developments on the ground. The study uses several case-studies from Cambridge as examples of best practice. Policy 31: Integrated water management and the water cycle of the Cambridge Local Plan (2018) is identified as an example of good local policy. Clay Farm and North West Cambridge are included as case-studies in the document.

The Cambridge Northern Fringe East Surface water drainage space allocation for master planning (2019) sets out a number of recommendations for integrating sustainable drainage in the new development. It advises that between 10-15% of the overall development parcel should be allowed for sustainable drainage features at the masterplanning stage, although this is highly dependent on the nature of the sustainable drainage features employed and may be adjusted or not required in the detailed design (see also the section below on the Development Framework).

In addition the NEC AAP Surface Water Drainage Core Principles: Key Parameters (2021) provides further guidance on the type of SuDS that would be suitable at the site. This is clear that a SuDS scheme would need to be considered early in the design of the site and include both features on a plot level close to where the rain falls and a site-wide scheme across the whole of the AAP area. In particular it considers that there could be constraints to infiltration because of contamination but that lined SuDS features will be possible, and that pumped surface water outfalls should be minimised. It also recognises that SuDS can be provided within informal open space and should form an integral part of the open spaces to deliver additional biodiversity and amenity benefits. Guidance is provided on the further steps that will need to be taken by developers in consultation with the Councils to develop a successful SuDS scheme at the site.

Other related Water Issues

Development Framework and Capacity

The North East Cambridge Typologies and Development Capacity Study sets out the broad land uses and development numbers for North East Cambridge. In total, the AAP area could deliver approximately 8,350 new homes, 15,000 new jobs whilst retaining the existing amount of industrial floorspace as part of a consolidation within Cowley Road Industrial Estate and Chesterton sidings. The Open Space Topic Paper identifies that the AAP area can provide the informal open space and children's play space requirements in line with the adopted Cambridge Local Plan standards. As part of this open space provision, SUDs design and features should be integrated within a landscape led masterplan to ensure effective integration whilst also allowing for the proper management and maintenance of these systems. Within each development parcel within the AAP area, a broad allowance of 10-15% of the gross area has been assumed for localised SuDs systems which is consistent with the Area Flood Risk Assessment (2020).

Open Space and SuDS approach

The Cambridge SuDS Design and Adoption Guide notes that development that includes a substantial area of public open space can incorporate SuDS schemes and sets out examples of how this can be achieved. There is also an opportunity for open spaces in new developments to replicate the water meadows found in the centre of Cambridge and to enhance biodiversity provision within SuDS.

Land Contamination

It will be important to ensure that in terms of flood risk and drainage, consideration is given to any contaminated land issues on the AAP site. An Environmental Health Topic Paper has been produced which considers the land contamination at a high level across North East Cambridge. A stage one desk top assessment has been undertaken which concludes that further invasive surveys need to be concluded before a full understanding of what contaminants are currently in the ground.

Delivery of water related infrastructure

The IDP will identify specific projects that have been costed and phased to assist with the delivery of NEC. The River Cam corridor improvements as set out in the Green Infrastructure Opportunities Mapping are one such project. This project has been identified in order to address water quality issues and bankside habitats for the River Cam. The Improvements to the chalk streams including enhanced management practices, improving water levels, better managing flow and reducing abstraction where possible as set out in the Green Infrastructure Opportunities Mapping has also been identified in the IDP. Other network improvements for capacity increase are the responsibility of the utility provider so will not form an infrastructure cost associated with development directly.

Preferred Approach in Draft Area Action Plan July 2020

This section sets out the policies that were included in the Draft AAP and the reasons for selecting them at the time.

Policy 2: Designing for the climate emergency

Development of a wider climate change and sustainable construction policy was suggested in the Issues and Options 2019. As part of the draft plan published for consultation in July 2020, the policy included the following approach:

- **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 flat 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 data³.

- **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 Carbon⁴ approach or successor documents. Development should be designed to maximise resource efficiency and 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

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

⁴ RICS Whole Life Carbon Assessment for the Built Environment professional statement 2017

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 80 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.

Policy 4b: Water quality and ensuring supply

A Water Quality Risk Assessment will be required and secured through a planning obligation to identify foul sewage, surface water and groundwater on surface and groundwater systems and consider appropriate avoidance measures before incorporating appropriate mitigation measures including works to the First Public Drain where necessary.

The Councils will expect developers to demonstrate that all proposed development will be served by an adequate supply of water, appropriate sewerage infrastructure and that there is sufficient sewage treatment capacity to ensure that there is no deterioration of water quality.

Prior to commencement of development the potential for contaminated land (both human health and controlled waters) shall be comprehensively characterised, investigated and risk assessed including the consideration of remediation as necessary having regard to the proposed end uses.

Policy 4c: Flood Risk and Sustainable Drainage

All development proposals will be permitted providing it is demonstrated that:

- a. the peak rate of run-off over the lifetime of the development achieves greenfield run-off rates. If this cannot be technically achieved, then the limiting discharge should be 2 litres per second per hectare for all events up to the 100-year return period event;

- b. the development is designed so that the flooding of property in and adjacent to the development would not occur for a 1 in 100-year event, plus an allowance for climate change and in the event of local drainage system failure;
- c. the discharge locations have the capacity to receive all foul and surface water flows from the development, including discharge by infiltration, into water bodies and sewers;
- d. there is a management and maintenance plan for the lifetime of the development, which shall include the arrangements for adoption by any public authority or statutory undertaker and any other arrangements to secure the operation of the scheme throughout its lifetime; and
- e. where reasonably practical, the destination of the discharge complies with the following priority order:
 - 1. Water reuse and brown water harvesting;
 - 2. To ground via infiltration (where reasonable and practical);
 - 3. To a water body; and lastly
 - 4. To a surface water sewer

Discharge to a foul water or combined sewer will be unacceptable.

Development proposals will be required to carry out a Strategic Flood Risk Assessment following the principles of the National Planning Policy Framework (2019).

In addition, proposals will be supported for an undeveloped site:

- f. if it is not located within the Environment Agency's flood zone 3b, unless it is a water-compatible development and does not increase flood risk elsewhere by either displacement of flood water or interruption of flood flow routes and employs flood resilient and resistant construction, including appropriate boundary treatment and has a safe means of evacuation; and
- g. if it is not located within the Environment Agency's flood zone 3a, unless it is a water compatible development or minor development when the principles in a) and b) above apply; and
 - 1. it is located within the Environment Agency's flood zone 2 or a surface water wetspot and employs flood resilient and resistant construction as appropriate; and
 - 2. floor levels are 300mm above the 1-in-100-years flood level, plus an allowance for climate change where appropriate and/or 300mm above adjacent highway levels where appropriate.

To minimise the risk of flooding in North East Cambridge all development will be required to implement a Sustainable Drainage System (SuDS) in accordance with the Cambridgeshire Flood and Water SPD. Development will be permitted provided that:

- h. surface water is managed close to its source and on the surface where reasonably practicable to do so;
- i. priority is given to the use of environmental improvements, with SuDS naturalised to enhance green and blue infrastructure;
- j. water is seen as a resource and is re-used where practicable, offsetting potable water demand, and that a water sensitive approach including impacts of climate change are considered in the design of the development;
- k. the features that manage surface water are commensurate with the design of the development in terms of size, form and materials and make an active contribution to placemaking;
- l. Surface water management features are multi-functional where possible;
- m. Any flat roof provides an element of green or brown roof;
- n. There is no discharge from the developed site for rainfall depths up to 5 mm of any rainfall event.

Adopted SuDS schemes will be discounted from formal open space calculations.

Reasons for selecting preferred approach for the Draft Plan stage

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 was proposed to carry forward the options consulted on as part of question 63. Some of these elements included within the 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 153, 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 was recommended as the minimum construction standard, in line with adopted policy for the rest of Cambridge, as set out in the 2018 Cambridge Local Plan. Subject to further work, it was 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 have been 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 would be considered as part of the Viability work for NEC.

While the focus of policy is on BREEAM certification, the policy was also 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 was 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 was 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 was required to identify what future targets would look like, and this was being developed in the form of the Greater Cambridge Local Plan Net Zero Carbon evidence base, which would 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 would promote the development of such an approach, supported by the commissioning of a Site Wide Energy and Infrastructure Study and Energy Masterplan. This would 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 155 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, the policy in the draft AAP required use of the national technical standard of 110 litres/person/day for all new residential development, and 5 BREEAM credits for non-residential development (Wat 01) which is the maximum level of water efficiency. However, these targets alone may not be sufficient to secure long term sustainability of water supply, and it was 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 was considered that the site could represent an opportunity for a site wide approach to water reuse as part of an integrated approach to water management, and therefore the policy also

referred to moving towards a target of water use of no more than 80 litres/person/day giving consideration to rainwater harvesting and/or water recycling.

Water quality (policy 4b)

The policy in the draft AAP recognised that the maintenance and enhancement of water quality of both water courses and groundwater within North East Cambridge is imperative. Not only can these be an important source for water supply, but they can also provide a valuable general amenity, biodiversity and recreational resource. The majority of North East Cambridge falls within a medium category for groundwater vulnerability. This means that the area offers some groundwater protection.

The Environment Agency publication 'Policy and Practice for the Protection of Groundwater' provides useful information and guidance on the risks to groundwater quality. It also explains the concepts of source and resource protection.

Any site which may be contaminated to some degree by virtue of its previous usage forms a potential risk to water quality, especially if redevelopment takes place. Any developers of sites which fall into this category should contact the Environment Agency at their earliest opportunity to discuss the need for historical information and site investigations to determine the degree of contamination, if any, of both soil and groundwater.

Although the River Cam is not within the Area Action Plan boundary the river catchment does cover the Area Action Plan. There is over-abstraction from the aquifer within the catchment of the River Cam. Water is abstracted primarily to supply homes and businesses but also as part of an 'augmentation scheme' in which Cambridge Water abstracts from the aquifer, to pump into the rivers to ensure they 'run'. There is also seasonal abstraction for agricultural purposes. Much of the water extraction takes place up stream of the River Cam from the Area Action Plan area, in particular from the chalk streams which feed the river, and which have an impact on flow.

The River Cam is experiencing a very low flow rate, where the majority of the water volume is outflow from the Waste Water Treatment Plant. Water pollution from both point of source and diffused pollution continue at the same rate, but if the river volume is low and moving slowly, the impact in terms of nitrification, algal bloom, deoxygenation and siltation is greater. The previous and current uses of the site indicate that ground contamination is likely to be an issue. Although this is not a flood risk issue, it will have an impact on the type of surface water management regime that should be utilised by any development proposal.

The policy in the draft AAP was clear that adequate site investigations will need to be undertaken to determine the level of contamination, locations and level of risk. This will define appropriate surface water management solutions. Sustainable drainage systems (SuDS) can be used effectively in areas of contaminated land as they are not limited to infiltration devices. Features such as ponds, swales and rain gardens can be lined to prevent the mobilisation of contaminants and purification can be attained through reed planting and other water-based planting.

Flood Risk (Policy 4c)

The policy in the draft AAP was comprehensive and based upon adopted policies in the Cambridge and South Cambridgeshire Local Plans and the principles in the National

Planning Policy Framework and the National Planning Practice Guidance which encourage Local Authorities to have a proactive approach in managing flood risk.

Flood risk is generally assessed on the basis of the potential source of flooding, with fluvial (river), pluvial (surface water), groundwater, sewers and reservoirs being the main potential sources. The North East Cambridge Area Flood Risk Assessment 2019 provided evidence to determine this.

Development may increase the flood risk downstream unless an adequately designed surface water management scheme is incorporated into the proposals. The policy set out the requirements for levels of permitted surface runoff, the priority order for the destination of discharge and the requirements for SuDS on site taking into account best practice.

The redevelopment of the site may offer an opportunity to improve the current situation where the majority of existing office and industrial developments do not meet current drainage standards, which have been significantly improved since these buildings were developed, and are discharging greater flows than would have been, prior to the site being developed.

SuDS have long been promoted by local authorities as a sustainable way of reducing run-off to greenfield rates, where workable. The Councils' preferred approach is to manage run-off through surface water attenuation, such as open swales which give an opportunity for flood attenuation by storing and slowly conveying runoff flow to downstream discharge points or infiltrating it into the ground, depending on soil and groundwater conditions. The policy also set out that land used for SuDS will be discounted from formal open space calculations to ensure the functionality of the SuDS system does not reduce the amount of useable formal open space provided on-site.

Findings of the Sustainability Appraisal of the Draft Plan 2020

With regards to policy 2, the SA noted significant positive effects in relation to SA objective 3 as the policy set 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 were also expected against SA objectives 7 (greenhouse gas emissions) and 8 (climate change resilience) as the 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 were 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 were 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. 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 were 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 were 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.

For policy 4b, significant positive effects were expected against SA objective 3 (water) as overall the policy sought to improve the water environment of NEC. Minor positive effects were also expected for SA objective 2 (air quality and pollution) as the policy required investigation and potential remediation of contaminated land.

As for policy 4c, the preferred approach was expected to have a minor positive effect on SA objective 3 (water) as the policy aimed to protect future development from flooding, which would protect the water environment. The policy required that certain thresholds be met for developing on existing development sites, such as a need for peak rate of run-off over the lifetime to achieve greenfield run-off rates. Where this is not possible, discharge of no more than 2 litres per second per hectare for all events up to the 100-year period event would be required. Furthermore, the policy included conditions depending on the Environment Agency's (EA) Flood Zone rating for undeveloped sites. If a site is in the EA Flood Zone 3b it must be a water-compatible development and not

increase flood risk elsewhere. Therefore, significant positive effects were expected against SA objective 8 (climate change resilience). The policy was expected to have a positive effect on SA objectives 5 (biodiversity), 6 (landscape and townscape), 9 (health and wellbeing) and 14 (economy), as the risk of future flooding could decrease which may protect public safety, and the requirement for naturalised SuDS that enhance green and blue infrastructure will benefit wildlife and the natural environment, improve the public realm and encourage inward investment.

Changes following Draft Plan Consultation for the Proposed Submission Plan 2021

Following on from consultation on the draft plan in 2020, a number of changes have been made to the climate change policies included in the proposed submission AAP, in part in response to evidence base documents and also in part in response to responses made during consultation. These changes are considered in more detail in the Consultation Statement, which includes a summary of issues raised.

Policy 2: Designing for the climate emergency

At the time of preparing the draft plan in 2020, the Councils' net zero carbon evidence base was not available, and as such the draft plan included a placeholder for the inclusion of specific targets once this work had been completed. Now that this evidence base has been completed, we have been able to provide greater detail on our approach to ensuring that development at NEC delivers net zero carbon development, which has led to a change in the preferred approach. Policy 2 now includes detailed technical requirements that will ensure that all new development at NEC meets requirements for net zero carbon from an operational energy perspective, as well as giving consideration to net zero carbon construction and reducing the embodied carbon associated with new development.

Our Net Zero Carbon study advises that new buildings need to be built to net zero carbon as soon as possible for Greater Cambridge to play its part in meeting the UK's Climate budgets. This will require rapid decarbonisation across all sectors of the UK economy, including the built environment. To achieve true net zero carbon, the policy needs to target all energy use in buildings as well as the carbon associated with constructing those buildings.

The revised policy approach sets requirements around how much heating a building will need as well as setting targets for overall energy use in buildings, with renewable energy used to meet that energy requirement. For those developments unable to meet those requirements fully on-site, consideration is given to the use of a carbon offset mechanism, which would be used to invest in additional renewable energy generation. Consideration is also given to the carbon associated with the construction process and the materials used to construct new buildings, known as embodied carbon. These requirements seek to go beyond current proposals for changes to Building Regulations as part of the Future Homes Standard, in that they consider all energy used in Buildings in order to deliver home that are true net zero carbon from an operational emissions perspective, as well as considering the carbon associated with the materials used to construct those buildings, which is an aspect not included within Building Regulations. Assured performance is another important aspect of actually delivering on our net zero carbon targets, an aspect that is not currently considered by Building Regulations,

leaving a considerable policy gap. It is well documented that there is a 'performance gap' in how our new buildings are designed to perform and how they actually perform. Work carried out by the Zero Carbon Hub between 2011 and 2014 revealed widespread evidence of a performance gap across all stages of the process of providing new homes. Without action, new development cannot be relied upon to play its part in achieving national carbon budgets. In response to this, the preferred option includes a requirement for new developments to utilise an Assured Performance process. This approach is considered vital if growth in Greater Cambridge is to contribute towards net zero carbon. The preferred approach does not go as far as requiring the use of a specific Assured Performance scheme, leaving the choice of process to the developer. There are a number of schemes available including NABERS UK, the National Energy Foundation's Assured Performance Process, The Building Energy Performance Improvement Toolkit managed by Bioregional and Passivhaus certification. A number of local planning authorities have already adopted or are looking to adopt similar policies to address the performance gap in their local plans, including Milton Keynes and Solihull.

In terms of the ability for local planning authorities to set policy requirements related to carbon associated with new buildings, legally, this is something that a local planning policy can do, a matter confirmed in January 2021, when government issued a response to its consultation on the [Future Homes Standard](#). As part of the consultation, government had asked whether it should 'ban' local plans from going beyond Building Regulations. But having considered the responses received, it has decided not to and reconfirmed its position that Local Plans can set energy standards for new homes that go beyond Building Regulations.

Leaving the delivery of net zero carbon to Building Regulations and the Future Homes/Buildings Standard has been rejected as it does not fulfil our statutory duty as set out in the Climate Change Act and Planning Act and will not enable Greater Cambridge to achieve its carbon budget. Building Regulations only considers regulated energy, whereas in order to achieve net zero carbon, all energy consumption from new buildings must be met by renewable energy. The Future Homes Standard, as currently drafted, only requires homes to be 'zero carbon ready', leaving further carbon reduction to achieve net zero carbon to home owners or landlords, adding to the retrofit burden and the 28 million homes in the UK already needing retrofit to achieve net zero carbon by 2050. In addition, the issue of embodied carbon is not, at present, considered by any other regulatory framework, and there do not appear to be any plans for it to be considered through Building Regulations. This leaves a significant policy gap in the delivery of net zero carbon. As buildings become more energy efficient, embodied carbon becomes more significant and can represent 40-70% of Whole Life Carbon in a new building.

With the introduction of policy requirements related to net zero carbon development, it has been determined that requirements related to non-residential development achieving BREEAM certification should be removed from the policy. The net zero carbon targets set within this policy are such that they exceed current BREEAM requirements, although developers may still choose to use BREEAM, or standards such as Passivhaus, to meet the assured performance aspects of the policy. Wider policies in the Area Action Plan also cover many of the other topics considered within BREEAM, such as sustainable drainage, water efficiency, biodiversity net gain and environmental health requirements. The Councils have been mindful of the costs of certifying developments against these standards, money which we consider could be better spent on the measures actually needed to deliver net zero carbon buildings. The metrics

proposed within the policy also are much simpler than those utilised by the BREEAM assessment and will help to drive down energy use in new buildings.

Policy 3: Energy and associated infrastructure

In order to support the transition to net zero carbon and deliver energy efficiency, the draft Area Action Plan in 2020 included a policy to encourage a site wide approach to energy and associated infrastructure. Further work has now been undertaken with the commissioning of a North East Cambridge Energy Infrastructure Capacity Study and Energy Masterplan. This document considers the current capacity available to support the development envisaged in the Area Action Plan, taking into consideration proposals related to net zero carbon policy and the electrification of transport.

In order to facilitate the level of development envisaged in the Area Action Plan, the local grid (the Milton Primary Sub-Station) will require reinforcement, and the energy masterplan recommends that this be facilitated via an extension to the existing primary sub-station with works delivered by the district network operator (UK Power Networks). This reinforcement work will help to facilitate the levels of growth envisaged in the Area Action Plan as well as allowing for the transition to net zero carbon, including decarbonisation of heating and transport. Policy 3 has therefore been updated to highlight the need for an extension to the Milton Road Primary Sub Station.

With regards to the energy masterplan for the site, the study recommends that in order to reduce the levels of grid reinforcement required for the site, that the enhancement of fabric and services as recommended in the net zero carbon study be incorporated into the Area Action Plan. This is covered in policy 2. As these standards effectively reduce the heating requirements of the site, the study has concluded that this approach effectively reduces the feasibility of a site wide district heating system. However, smaller networks may be feasible, whereby a smaller number of buildings are connected together. As such, policy 3 has been updated to require schemes to be accompanied by feasibility assessments for alternative, more efficient heating systems including the provision of smaller heat networks. The policy will also require all development proposals maximise space for rooftop photovoltaic (PV) panels, with an expectation that all flat roofs as well as inclined roofs (+/- 90° from south) should include PVs.

Policy 4a: Water efficiency

The main change to policy 4a is in relation to the levels of water efficiency sought from new residential development. In the 2020 draft AAP the baseline requirement was for the achievement of 110 litres/person/day in line with the national optional technical standard. Substantial weight was to be afforded to schemes that achieved 80 litres/person/day. Since consultation on the draft AAP, further evidence has come forward in the Greater Cambridge Integrated Water Management Study (IWMS) (Outline Water Cycle Study). This has shown that there is no environmental capacity for additional development to be supplied by water by increased abstraction from the chalk aquifer and that water supply must be met in other ways. One of these ways is through reduced usage (demand management) and therefore the Area Action Plan must ensure that any future development achieves high levels of water efficiency.

In light of this, policy 4a had been updated to require water use of no more than 80 litres/person/day. The IWMS has shown that 80 litres/person/day is achievable by making full use of water re-use measures on site including surface water and rainwater

harvesting, and grey water recycling. It also shows that the cost effectiveness improves with the scale of the project, and that a site-wide system is preferable to smaller installations.

80 litres/person/day goes beyond what Local Authorities are currently able to do (as set out in the Deregulation Act 2015), but the case for greater water efficiency is so strong that there is a case for seeking this approach. This level of water efficiency is also supported by Cambridge Water. The environmental principles for the Oxford-Cambridge Arc are clear that they will encourage local partners to exceed minimum standards required by building regulations on issues such as water consumption, and that they will be working with Government on this issue.

For non-residential developments the draft AAP policy already required a high water efficiency level of 5 credits for category Wat 01 of BREEAM. This remains the same in the policy, although has been amended to be described as 'full credits' rather than '5 credits' so that it replicates the wording of existing policy in the Cambridge Local Plan (2018).

Policy 4b: Water Quality and Ensuring Supply

As mentioned above since the draft AAP, the evidence in the Greater Cambridge IWMS (2021) has shown that future development cannot be supplied with water by increased abstraction from the chalk aquifer and must be met in other ways. In addition, consultation responses to the draft AAP were seeking reassurance that new development would be served by adequate water supply and that water quality should not deteriorate. As a result, the policy has been strengthened and requires that planning applications must demonstrate that all proposed development will be served by an adequate supply of water that will not cause environmental harm.

Additional supplies of water will be necessary to protect the integrity of the chalk aquifer. Water Resources East is preparing a Water Management Plan for the region to cover the period to 2050 and it is understood that this will include planning for significant new infrastructure including a new Fens Reservoir, alongside other measures, to provide water supply that is designed to address both environmental and growth needs. Anglian Water and Cambridge Water have decided to accelerate the programme for a Fens Reservoir and made a joint submission for the development of the reservoir under the government's RAPID process in summer 2021. However, on current timelines this will only be available to supply water from the mid 2030s. In the short/medium term solutions could lie in measures such as sourcing more water from other locations that do not rely on the aquifer and seeking maximum efficiency in water use and further reducing wastage through leakage. This approach could have dual benefits in reducing pressures from existing development and meeting short/medium term risks until the mid 2030s.

Until more is known about the proposals for water supply that will be contained in the new regional Water Management Plan, there remains some uncertainty whether water supplies can be provided in a way that is sufficient for the early phases of the North East Cambridge site to be delivered ahead of provision of the new reservoir. For this reason Policy 4b requires that any planning application will therefore need to demonstrate that there is sufficient water supply available to meet the demands generated by the development without putting additional pressure on the aquifer such as to give rise to environmental harm to the chalk streams and the River Cam in particular. It will not be

sufficient to rely, in meeting this policy requirement, on the ability to statutorily requisition a supply from the water undertaker; evidence will be required to demonstrate that the anticipated water demand of the new development can be met without environmental harm that further abstraction from the aquifer will be likely to cause. However, once the new Water Management Plan for the region is completed, it is possible that this may provide the necessary evidence to meet the policy requirement. The local planning authority will consider the matter in relation to each planning application and the level of certainty that can be demonstrated at the time it is being determined.

Other changes to the policy include removing the previous reference to a Water Quality Risk Assessment, as this is not a term recognised by the Environment Agency. However, the policy maintains the requirement for development proposals to provide an assessment of the measures taken to protect and enhance water quality within the surrounding water environment, including contamination issues. Planning applications will be required to demonstrate there is appropriate sewerage infrastructure, and that there is sufficient sewage treatment capacity to ensure that there is no deterioration of water quality.

Policy 4c: Flood Risk

Since the draft AAP, the policy has been amended to make it more effective. This has included changes to correct minor errors, removal of sections relating to areas of flood risk that are not applicable to the AAP area, greater clarity on the requirements of site specific flood risk assessments and restructuring to make it clear that some parts of the policy relate to preventing flooding to the development and some are focused on preventing flooding from the development. The policy also includes a clarification regarding the relationship of SuDS with different types of open space. In line with comments from Historic England it also includes a requirement for the design of SuDS to consider the possibility of archaeology on site.