

Annex 1: Cambourne's Sustainability & Net Zero Framework

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Introduction

Report Purpose and Structure

This report brings together a summary of the policy review and case study research undertaken for the Cambourne Growth Strategy Programme (CGSP) on the topics of sustainability and net zero carbon.

The report begins by exploring the national and local policy landscape in relation to sustainability and net zero, drawing out key requirements that should be met by the proposed masterplan.

The case study analysis outlines examples of sustainability and net zero commitments taken by other similar developments, and what actions have been taken against these commitments to achieve their targets.

Finally, the report draws together these sections to provide a summary of the sustainability and net zero vision considerations and priority actions to consider through the early stages of masterplan development.

This report follows the structure outlined below:

1. Policy Context: High-level summary of national and local policy review with relevance to sustainability and net zero,

2. Case Studies: Six case studies presented to demonstrate best practice in embedding sustainability and net zero considerations within similar schemes, both within the UK and Internationally,

3. Cambourne Sustainability & Net Zero Vision and Priorities: Bringing together the findings of the policy and case study review to highlight to top sustainability and net zero vision and spatial priorities for the Cambourne site.

Introduction

Scope of this Report

To frame the analysis undertaken within this workstream, it was first important to establish the focus of the scope of the research.

Sustainability is an expansive topic, covering a wide range of environmental, economic and social topics. The topic of net zero carbon is just one of the sub-categories that sits within the wider sustainability definition but still has a number of key sub-themes.

Taking inspiration from wider sustainability frameworks (such as BREEAM), and more focused net zero frameworks (such as LETI and PAS:2080), a broad list of topic areas were compiled. Information on each of these frameworks is provided in Appendix A. This report sits alongside other GCSP documents which cover separate but related topics, as illustrated in Figure 1.

A final 'analysis framework' was devised for this scope of research, as summarised in Figure 1.

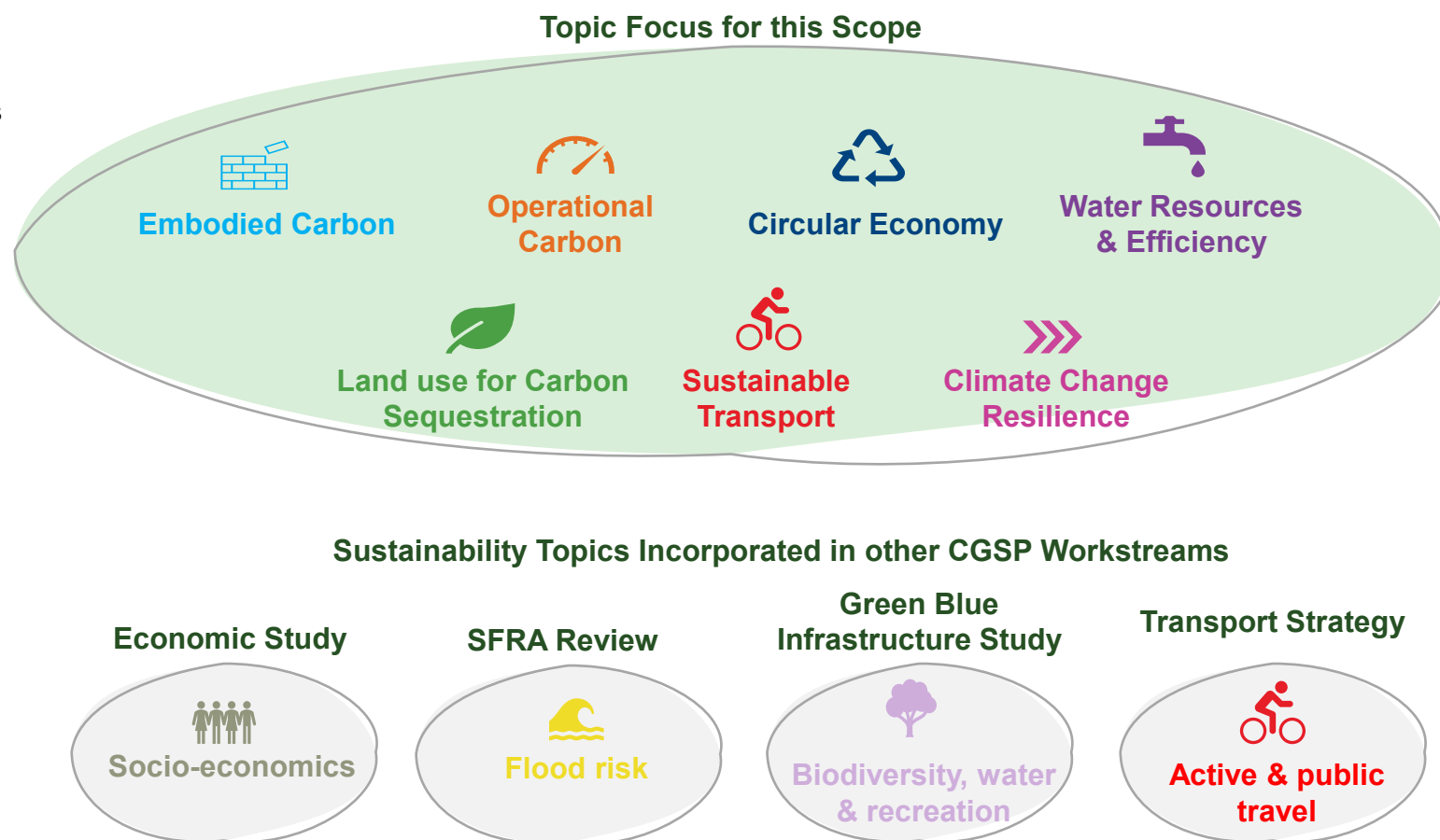


Figure 1: scope of this report

Policy Context

National: NPPF and National Design Guide

Section 2: Achieving Sustainable Development

One of the three overarching objectives of sustainable development to 'protect and enhance our natural environment' which includes the following:

- Making effective use of land,
- Improving biodiversity,
- Using natural resources prudently,
- Minimising waste and pollution,
- Mitigating and adapting to climate change,
- Moving to a low carbon economy.

Section 5: Delivering a sufficient supply of homes (Identifying land for homes)

The supply of large numbers of new homes can often be best achieved through larger scale development, (e.g. significant extension), and they should include the following which relate to sustainability:

- Genuine choice of transport mode,
- Scope for environmental net gains,
- Clear expectations of quality e.g. following Garden City Principles,
- Size supports a sustainable community with access to services.

Key thematic sections

- Section 14: Meeting the challenge of climate change, flooding and coastal change
- Section 9: Promoting Sustainable transport
- Section 11: Making effective use of land,
- Section 12: Achieving well-designed places
- Section 15: Conserving and enhancing the natural environment

Embodied Carbon

- Make as much use as possible of previously-developed or brown-field land,
- Encourage the reuse of existing resources including the conservation of existing building
- Consider construction techniques impacts [in relation to carbon emissions].

Circular Economy

- Encourage reuse of materials and resources and reuse of existing buildings.

Water Resources & Efficiency

- Inappropriate development in areas at risk of flooding should be avoided,
- Use opportunities provided by new development to reduce the cause and impacts of flooding,
- Making as much use as possible of natural flood management,
- Take into account the impacts of climate change on flooding impacts.

Operational Carbon

- Identify opportunities for development to draw its energy from decentralised, renewable or local carbon energy supply,
- Follow the energy hierarchy,
- Consider impacts of landform, layout, building orientation, massing and landscaping to minimise energy demand.

Policy Context

National: NPPF and National Design Guide (continued)

Climate Change Resilience

- Design new developments to avoid increased vulnerability to the range of impacts arising from climate change,
- Consider impacts from flooding, water supply, changing environment, overheating and drought and rising temperatures,
- Manage risks through suitable adaptation measures, e.g. green infrastructure and sustainable drainage systems.

Land use for Carbon Sequestration

- Encourage multiple benefits from land use, taking opportunities to achieve net environmental gains,
- Encourage opportunities to incorporate trees within developments,
- Development should help to improve local environmental conditions such as air and water quality.

Sustainable Transport

- Sustainable transport modes are prioritised, taking into account context of the site and existing systems,
- Giving first priority to pedestrian and cycle movements, and second priority to high-quality public transport linking to existing transport systems,
- Enable charging of plug-in and other ultra-low emission vehicles in safe, accessible and convenient locations.

Policy Context

Local: Greater Cambridge Local Plan Policy First Proposals Consultation 2021

Overarching Sustainability Key Topics

Climate Change: Strong focus in the plan on driving a transition to net zero carbon by 2050, ensuring that development is sited in places that help to limit carbon emissions, is designed to the highest achievable standards for energy and water use and is resilient to current and future climate risks.

Water Supply: Focus on the need for new strategic water supply infrastructure to provide current and future water needs, as supply from chalk aquifer south of Cambridge is stretched and needs protecting. Solutions being considered in the areas include sourcing water from other locations that do not rely in the chalk aquifer, seeking maximum efficiency in water use, and reducing wastage through leakage.

Transport: Creating opportunity for and promoting modal shift away from cars and into active and public transport is a key priority.

Policy S/CB: Cambourne

There is a policy within the Local Plan which focuses on how development within Cambourne should be delivered. In relation to net zero, this includes to the following:

- Creating a well-connected place through high quality public transport, cycling and walking facilities
- Considering development within the context of existing service provision in local neighbourhoods, to provide sustainability benefits to the wider area including nearby villages,
- Consider how the development can help deliver the Western Gateway Green Infrastructure project, linking to the wider landscape setting, providing recreation and biodiversity enhancement opportunities such as woodland planting,
- Take opportunities to reduce flood risk to surrounding areas, that take innovative solutions to the management and reuse of water.

Embodied Carbon (Policy CC/NZ)

- New developments to calculate whole life carbon emissions through a nationally recognised whole life carbon assessment,
- Should demonstrate actions to reduce carbon emissions,
- Should include construction emissions.

Circular Economy (Policy CC/CE)

- Require CEMPs, proportionate to development,
- Include approach to waste management,
- Align with waste hierarchy,
- Require storage space and collection systems aligned with RECAP waste management design guide,
- All major developments to submit Circular Economy statement: reuse of materials, material demand, end of life principles

Policy Context

Local: Greater Cambridge Local Plan Policy First Proposals Consultation 2021 (continued)

Operational Carbon (Policy CC/NZ)

- Space heating demand 15-20 kWh per meter squared per year required in new buildings,
- All heating to be low carbon, and no new connection to gas grid,
- Energy use intensity targets depending on building type (dwellings: 35 kWh/ m2/ year)
- Proposals to generate at least their demand through renewable sources,
- Requirement for energy masterplan (Policy I/EI in Emerging Local Plan).

Water Resources & Efficiency (Policy CC/WE)

- Dwellings achieve a standard of 80 litres/person/ day unless demonstrated impracticable,
- Non-residential development will be required to achieve full credits for category Wat 01 of BREEAM unless demonstrated impracticable,
- Water re-use measures on site including surface water and rainwater harvesting, and grey water recycling,

Climate Change Resilience (Policy CC/DC)

- All new dwellings achieve a low overheating risk (Good Homes Alliance Tool),
- Modelling of future climates with appropriate data required integrated into assessments,
- Design to follow cooling hierarchy (passive design and cool materials first)
- Direct development towards areas least likelihood of flooding,
- Integration of sustainable drainage systems, permeable surfaces, as part of landscape design.

Land use for Carbon Sequestration (Policy CC/CS)

- minimise soil disturbance, compaction and disposal during construction projects,
- Protect and enhance existing carbon sinks,
- Link up with wider ecological network and GI opportunity mapping,
- Preserve, protect and increase the amount and distribution of tree canopy cover and hedgerows.

Sustainable Transport (Policy I/ST)

- Priority is given to people over vehicular traffic (with low speeds),
- Protect and enhance Public Rights of Ways,
- Seamless interchange between modes, such as use of travel hubs, consider the last mile,
- Accommodating new forms of mobility and such as micromobility, e-bikes and cycle hire, autonomous vehicles, MaaS,
- Deliver, safe, secure, and convenient cycle parking at homes, businesses, and travel hubs,
- Cycle parking areas accommodate non-standard cycles e.g. mobility scooters, electric cycles, cycle maintenance,
- Vehicle parking include electric charging infrastructure, designed into the public realm, with specific requirements set out by type of use.

Policy Context

Local: Local Plan Evidence Base Documents

Greater Cambridge Net Zero Carbon Evidence Base Non-Technical Summary (2021)

Operational Carbon

- The report describes a net zero carbon building as; 'having ultra-low energy needs, using low-carbon heat (heat pumps and direct electric heating, no gas boilers), matching energy with new renewable generation, ideally on site'.
- The report consider two types of heating to qualify as 'low-carbon' or compatible with net-zero carbon: heat pumps and direct electric, and heat pumps are preferable
- The report considers solar photovoltaic (PV) panels to be the only universally suitable on-site renewable energy for new buildings.
- Small wind turbines typically perform poorly in turbulent urban / suburban settings.

Greater Cambridge Green Infrastructure Opportunity Mapping (2020)

Land use for Carbon Sequestration

- Development focused around Cambourne introduces potential impacts on Eversden & Wimpole Special Area of Conservation (SAC) and the numerous Site of Special Scientific Interest (SSSI) (primarily woodland in character),
- Mitigation may include strategic woodland, parkland, species-rich grassland, and wetland creation across the Cambridge Hundreds,
- There is a risk of development (dwellings or supporting infrastructure) which may extend or exacerbate existing north-south severance across A428 corridor,
- Enhancing connectivity across the A428 is an important focus.

Local Plan Infrastructure Topic Paper (2021)

Operational Carbon

- There is a need to triple capacity to support the current growth agenda,
- The 132 kV and 33 kV networks between east and west Cambridge need to be extended,
- The Western extension will provide capacity to West Cambridge (including future developments in Bourn/Cambourne) and relieve existing grid substations,
- The Western and Eastern extensions will interconnect to the south of the city, to form a loop, thereby establishing the necessary resilience to sustain the expected demand growth,
- Of these major interventions, six are already being undertaken/ planned by UKPN, with a further three costed interventions required, including the West extension which is to be progressed by UKPN once development is certain.

Policy Context

Local: Local Plan Evidence Base Documents

Cambridgeshire Renewables Infrastructure Framework (CRIF) (2012)

Operational Carbon

- At time of publication (2012), Cambridgeshire had the greatest installed renewable energy capacity in the East of England and has one of the highest renewable energy outputs of any county in England,
- Key contributors to this are wind turbines and biomass plant in Ely, with around 7% of Cambridgeshire's energy demand met by renewables,
- Wind has the greatest technical potential in the county, followed by heat pumps and PV,
- For any specific development site, developers will need to assess the prospects for different technical solutions including combined heat and power, biomass, medium to large scale wind turbines, heat pumps, PV and solar water heating.

Cambridgeshire County Council: Low Carbon Energy (2025)

Operational Carbon

- The Cambridgeshire County Council website provides information on renewable energy schemes within the County,
- The website outlines that a Local Area Energy Plan is currently in development,
- It is also outlined that that Council is exploring how to support communities to shift away from oil and looking at community heating, district heating and heat networks as a way to facilitate this. It outlines that the Council is only considering low carbon solutions, with the most advanced stage project being Swaffham Prior,
- There is also a portfolio of Council large scale PV and energy infrastructure projects that have been delivered including Babraham Smart Energy Grid, North Angle Solar Park.

Policy Context

Local: Net Zero Strategies

South Cambridgeshire District Council Zero Carbon Strategy (2020)

- The Council has set a target to deliver a 50% reduction in carbon emissions from the South Cambridgeshire area by 2030 relative to a 2018 baseline, reducing to net zero carbon by 2050 at the latest,
- The report sets out useful context on existing carbon emissions within the borough;
 - There are 67,000 homes in South Cambridgeshire, and housing heating and power accounts for 20% of the district carbon emissions (250,000 tCO₂),
 - Providing heat and power to the 8,500 workplace accounts for around 30% of the districts carbon footprint (326,000 tCO₂),
 - Transport accounts for over half of the districts carbon footprint, with 98% of these emissions coming from road traffic, mainly from M11 and major A road use (679,000 tCO₂).

Cambridgeshire County Council Climate Change and Environment Strategy (2022)

- The County has set a net zero by 2045 target,
- The strategy outlines key strategic priorities including;
 - Enable low-carbon transport,
 - Reduce waste and pollution,
 - Build circular economy,
 - Develop climate resilient places and infrastructure,
 - Low-carbon buildings,
 - Sustainable use of land and green spaces,
 - Benefitting nature and biodiversity,
 - Effectively manage peatland,
 - Improve water security and flood resilience.

BedZED Village, South London

The UK's "first major mixed-use zero-carbon community"

Developer: Bioregional (partnering with ZEDFactory architects, Arup and Peabody Trust)

Details of the Scheme:

- The UK's first large-scale, mixed-use sustainable community comprising of 100 homes, office space, a college and community facilities.
- Completed in 2002. It won the Housing Design Award for sustainability from the Royal Institute of British Architects in 2001.

What was the Sustainability Commitment?

"The UK's first major mixed-use zero-carbon community"

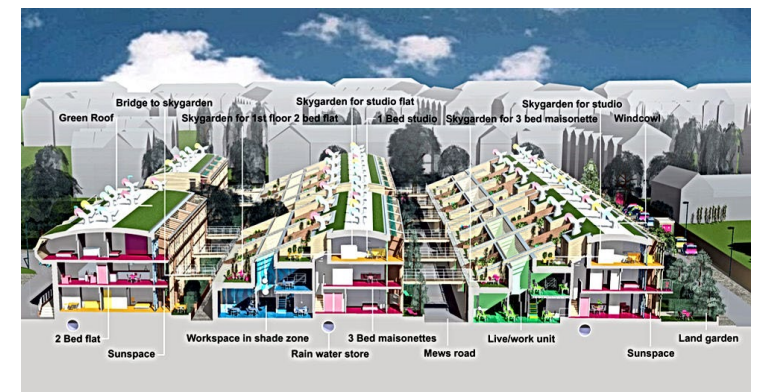
The sustainability principles that BedZED have pioneered have come together in the [One Planet Living](#) framework, which has been adopted to billions of dollars worth of property worldwide.

Key actions implemented:

- Highly **insulated, airtight homes** that maximise

natural lighting and heating

- Solar PV** on all homes and **PPAs** from renewable energy providers, and the site uses a biomass boiler.
- Built on reclaimed industrial land (sewage sludge site).
- Rooftop wind cowls** for air and heat circulation.
- Just over half (52%) of the **construction materials** by weight were **sourced within 35 miles**.
- 3,400 tonnes of construction material, 15% of the total used in BedZED, were **reclaimed or recycled products**.
- Low carbon transport enabling solutions (**cycle storage, public transport**) and spaces for **on-site urban agriculture**, as well as communal green space.
- A more holistic approach to sustainable housing, beyond just carbon and energy saving metrics, focussing on community and wellbeing, resident travel, food miles and more.



Images taken from the [ZedFactory webpage](#)

CITU, Climate Innovation District, Leeds

Low carbon, pre-fabricated homes integrated into walkable green spaces

Developer: CITU

Details of the Scheme:

- The Climate Innovation District will have 955 timber homes upon completion (2030) on former-industrial brownfield, as well as schools and other community assets. As of January 2023, there were ~200 residents.
- CITU have 2 other sites, another based in Kirkstall [Leeds](#), and one in [Sheffield](#).

What was the Sustainability Commitment?

- CITU's purpose is to "tackle the climate crisis" by creating "beautiful places, with **high-performance buildings**, where people can lead a happy low carbon life."
- CITU use innovative construction techniques to build "net zero homes", however the scope of this net-zero claim is not clear from online sources.

Key actions implemented:

- Highly **energy efficient** contemporary homes with very low capital and operational carbon, 13x more air-tight than UK building regulations (Passivhaus standards). With triple glazing in all windows and wood fibre insulation.
- The buildings are purposefully placed to **maximise natural heating (solar gain)** and cooling. All homes have a **Mechanical Ventilation Heat Recovery (MVHR)** unit, which recycles heat from outgoing air, our homes maintain consistent temperatures while ensuring a constant flow of fresh air. Newer CITU homes all contain ASHPs.
- Strong focus on innovation and modern methods of construction like on-site BOPAS accredited **pre-modularisation of timber frames** (capital carbon) and smart energy systems within homes (operational carbon).
- Purpose designed to **integrate nature, biodiversity**, recreational facilities and high-quality communal areas into the residential landscape.
- CITU build their homes on brownfield sites to deliver genuine urban regeneration.



Images taken from the [CITU webpage](#)

Oosterwold, Netherlands

Dutch peri-urban closed-loop sustainable community

Developer: ReGenVillages (+ partners)

Details of the Scheme:

- A Dutch peri-rural suburb home to 5,000 residents with a large emphasis on local low-carbon food systems and sustainable community-based living.
- Lessons learned from localised, low-carbon food production can be applied to a range of developments.

What was the Sustainability Commitment?

The vision: “ReGen village, in the Netherlands, will collect and store its own water and energy, grow its own food, and process much of its own waste. Also: no cars”

A “village OS” tech platform will use AI to simultaneously manage systems for renewable energy, food production, water supply, and waste.

Key actions implemented:

- The local government has a requirement that all residents must devote at least half of their plot to urban agriculture. Huge carbon reduction in food miles, and social value derived from short supply chains and healthy wholefood diets.
- The Oosterworld site is dominated by permaculture and agroforestry, which can sequester carbon if managed properly.
- Car-free zoning to encourage low carbon transport
- A fully integrated closed-loop (circular) urban metabolism ensures that the community is self-sustained in energy, potable water, food production, and wastewater management. Therefore all homes on the site generate renewable energy through solar PV, and there is abundant on site energy storage.
- Houses use rainwater harvesting techniques to lower water footprint (and associated carbon emissions).



Images Sources; Top, Bottom

Brent Cross South, London

Mixed- use development with neighbourhood-wide heat network

Developer: Barnet Council and Related Argent

Details of the Scheme:

- Brent Cross Town is a £7bn new town centre development of 150 hectares, set around 50 acres of parks, open space and playing fields.
- It is a major new destination with 4 million sq. ft of office space, 6,700 new homes, student accommodation, restaurants, sports and leisure facilities. The project received £148m Homes England loan for infrastructure.

What is the Sustainability Commitment?

- Net zero carbon town by 2030 aspiration, achieved by “driving down the embodied carbon in buildings and infrastructure, on-site energy supplied and offsetting the remainder.”

Key Actions Implemented:

- Minimising offsite disposal and import of material through the sustainable reuse of material

excavated from a former landfill to achieve low-carbon construction.

- A site-wide ‘materials management plan and planning framework’ (MMPPF) to assist the sustainable reuse of materials through the project lifecycle and provide confidence to regulators.
- Achieved a very high reuse of site won material (>95%) on a brownfield site.
- 50 acres of green space and partnered with London Wildlife Trust to establish site-wide baseline for ecological richness.
- Neighbourhood-wide heat network, providing low carbon heating to all buildings and cooling to selected plots.
- 6,600 cycle spaces, 2.75km of new cycling routes, and low-speed roads, alongside new bus routes and a new mainline railway station.



Harlow and Gilston Garden Town, Essex

Large-scale Garden Town Masterplan with Outline Planning Permission

Developer: Harlow Council, East Herts and Epping Forest District councils, Essex and Hertfordshire County councils, Places for People and Taylor Wimpey.

Details of the Scheme:

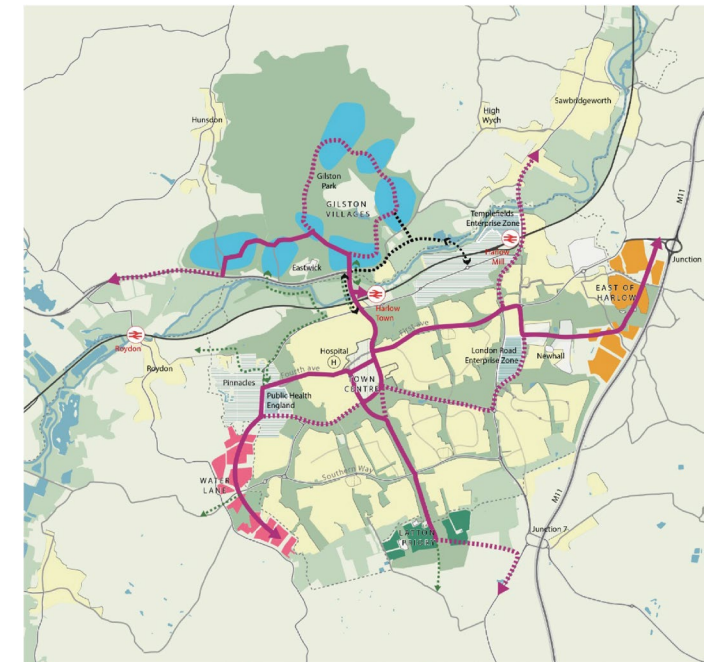
- 10,000 new homes approved with outline planning permission, as part of a wider masterplan with 16,000 homes in total.
- Four new Garden Town neighbourhoods in Water Lane, Latton Priory and East of Harlow, with the fourth made up of seven new Garden villages in Gilston, including regeneration of Harlow Town Centre.

What is the Sustainability Commitment?

- Enhancing the natural environment through biodiversity and zero carbon approaches, and ensuring climate resilience.

Key Actions Proposed:

- Development of Sustainability Guidance & Checklist for shaping development proposals.
- All new buildings are expected to adopt a **fabric first approach in line with Passivhaus Standards**.
- Buildings will **not use fossil fuels and will be powered by 100% renewable energy**.
- A **whole life carbon assessment should be undertaken** at pre-application, planning application and after completion.
- **Heat pumps, PV and solar thermals to be explored for adoption**, as well as **joining a heat sharing network**.
- Development to achieve at least **10% Biodiversity Net Gain**, with plans for at least 30 year land stewardship in place.
- Planned sustainable transport corridors, strategic public travel routes, and mobility hubs at transport interchange, **all homes within 800m from a hub and 400m to bus stop**.



Images Source: [HGGT](#)

Fen Road and Ditton Fields

The first in a pilot of Passivhaus low-carbon social housing in Cambridge

Developer: Pollard Thomas Edwards developed designs for Cambridge Investment Partnership

Details of the Scheme:

- 18 Passivhaus certified homes that are targeting net zero. Homes 100% affordable rent, spread across two small sites in the cities suburban fringe.

What is the Sustainability Commitment?

- First in a pilot of Passivhaus low-carbon social housing in Cambridge, building confidence in the Council for a city-wide commitment for all new build Council homes to be Passivhaus standard

Key Actions Implemented:

- Designs use [offsite pre-fabricated timber frame construction](#),
- [Recycled newspaper insulation](#),
- [Energy Use Intensity \(EUI\) target: 35 kWh/m²/yr \(RIBA 2030\)](#), and [Space heating demand: 15 kWh/m²/yr \(Passivhaus\)](#),
- [Air source heat pump, PV solar panels wastewater heat recovery technologies](#) in each home.
- [EV charging provided](#) for both sites,
- [Overheating risk in homes assessed](#) (use of CIBSE TM59),
- [Biodiversity net gain of 20%](#), with mature trees retained on the site.



Images Source: [Good Homes Alliance](#)

Knights Park

New Cambridge neighbourhood designed with a fabric first approach

Developer: Hill, Pollard Thomas Edwards and Alison Brooks Architects

Details of the Scheme:

New private sector led net-zero neighbourhood with 249 new homes in construction.

What is the Sustainability Commitment?

- Zero-carbon neighbourhood in terms of its operational CO² and sitewide sustainable infrastructure.

Key Actions Implemented:

- Fabric first approach with Passivhaus principles in mind,
- Code for Sustainable Homes level 5,
- PV panels to provide 100% of regulated energy demand on-site,
- District heat network (CHP) and HIU,
- Underground waste and recycling scheme,
- Space heating demand target: 39 and 46 kWh/m²/yr (FEES),
- 15% (by volume) of construction materials to be from reused and recycled materials
- Non-potable water supplied to each home for WC and irrigation,
- A community centre, shops, hotel and a school are all within the 15-minute walk of the new neighbourhood.



Images Source: [Good Homes Alliance](#)

Cambourne **Sustainability & Net Zero** **Vision and Priorities**

Cambourne
Growth
Strategy
Programme

Sustainability & Net Zero Vision

Recommendations for the Programme Vision

Topic
Embodied Carbon

Vision Suggestion

The scheme will minimise embodied carbon emission by embedding innovative and exemplary deep decarbonisation actions through design and construction, informed by regular whole life carbon assessments.

Justification

- This approach is aligned with national and local policy, which requires WLCA to inform design and construction decision-making,
- Even when following and exceeding best practice regarding deep decarbonisation in construction and design, a project of this scale and location is likely to require a significant amount of carbon offsetting to achieve net zero in embodied carbon,
- As such, prior to setting a final vision relating to achieving net zero embodied carbon, a WLCA should be undertaken on an early iteration of the masterplan to gain an understanding of residual emissions are likely for the project after deep decarbonisation actions have been embedded, to support an informed and considered view on vision setting.

Key Policy Link

First Proposals, Policy CC/NZ: Net zero carbon new buildings

Topic
Operational Carbon

Vision Suggestion

The scheme will be net zero in operation, delivering a high-standard of energy efficiency and with 100% of site energy demand (in line with First Proposals Policy (CC/NZ)), being supplied through on-site renewable energy.

Justification

- This is required in national and local policy, with specific targets outlined for energy efficiency of buildings, and the need for 100% of site energy demand to be met through renewable energy.
- The suggestion of 100% on-site renewable energy goes beyond requirements and on-site capacity to deliver this should be understood at an early stage of masterplan design.

Key Policy Link

First Proposals, Policy CC/NZ: Net zero carbon new buildings

Sustainability & Net Zero Vision

Recommendations for the Programme Vision

Topic
Circular Economy

Vision Suggestion

The scheme will integrate circular economy principles into design (including Zero Avoidable Waste in construction, maximising opportunities for reuse and recycling of materials across whole life-cycle) and will encourage zero waste living in operation for future residents through provision of services and facilities.

Justification

- Aligns with local policy requirements to produce a Circular Economy statement, including information on reuse of materials, material demand, end of life principles.
- Maximising reuse and recycling of materials in construction will help contribute towards reducing embodied carbon emissions,
- Design of buildings will enable zero waste living in operation, for example providing storage space and collection systems aligned with RECAP waste management design guide.

Key Policy Link

First Proposals, Policy CC/CE: Reducing waste and supporting the circular economy

Topic
Water Resources & Efficiency

Vision Suggestion

The scheme will demonstrate UK best practice in water use efficiency and on-site water reuse.

Justification

- Aligns with local policy requirements relating to achieving water consumption limits, which are already aligned to ambitious targets,
- Maximising on-site water reuse will minimise need to water supply from existing stretched local water resources,
- Will require higher-level strategic thinking to push vision to further ambition level (e.g. large-scale investments such as integrating wastewater treatment works, reservoir, or connection to other water company source).

Key Policy Link

First Proposals, Policy CC/WE: Water efficiency in new developments

Topic
Sustainable Transport

Vision Suggestion

The scheme will deliver infrastructure which makes active and public transport the preferred option for residents' daily journeys

Justification

- Ambitious focus needed on provision of infrastructure for sustainable transport, with transport emissions noted as a key on-going contributor to emissions within the local plan area.

Key Policy Link

First Proposals, Policy I/ST: Sustainable transport and connectivity

Sustainability & Net Zero Vision

Recommendations for the Programme Vision

Topic
Climate Change Resilience

Vision Suggestion

The scheme will embed climate change adaption measures into design, and explore opportunities to building resilience and adaptive capacity into the scheme, with decisions supported by analysis of appropriate range of climate change hazard projection data (e.g. flooding, heatwaves, drought)

Justification

- With the low-lying nature of the local area, with proximity to flood zone 3 areas around Cambourne, consideration of current and predicted future flood risk will be very important for the scheme,
- The vision outlines the need to look at a wide range of applicable climate hazards including increased temperature, is highlighted in the Local Plan.
- This needs to consider designing measures to mitigate potential impacts of Urban Heat Island (UHI) effect, such are minimising hard surfaces, and integration of green infrastructure within built- up areas of the scheme.

Key Policy Link
First Proposals, Policy CC/DC: Designing for a changing climate

Topic
Land use for Carbon Sequestration

Vision Suggestion

The scheme will seek to first protect and restore habitats that have a high carbon stock value and will add to this existing stock through planting of appropriate nature-based solutions that deliver a wide range of benefits for people and nature.

Justification

- Aligns with local policy which is focusing on the protect of existing carbon stocks,
- Type of habitat planting will need to provide multiple benefits, considering maximising carbon sequestration as one of the key decision-making factors.

Key Policy Link
First Proposals, Policy CC/CS: Supporting land-based carbon sequestration

Sustainability & Net Zero Spatial Priorities

Embodied Carbon

Embodied Carbon Vision: The scheme will minimise embodied carbon emission by embedding innovative and exemplary deep decarbonisation actions through design and construction, informed by regular whole life carbon assessments.

Key Action that Has Spatial Implication

Reuse of existing buildings, infrastructure and materials

Early 'Rules of Thumb' for Masterplan

- Though the north of Cambourne is mainly agricultural land, there are scattered homes, farm buildings and businesses, in addition to an existing road structure,
- Build the masterplan to work around existing buildings and roads to retain existing infrastructure.

Key Action that Has Spatial Implication

Density of development

Early 'Rules of Thumb' for Masterplan

- Generally building dwellings to a higher density and smaller footprint (e.g. flats, townhouses) are associated with lower carbon emissions (likely to need less materials, lower energy demand, less land required).

Key Action that Has Spatial Implication

Materials selection

Early 'Rules of Thumb' for Masterplan

- Early consideration of materials (e.g. use of timber/ recycled materials vs brick, concrete and steel) could impact decisions on density of development, and therefore overall massing of buildings,
- There are height restrictions for timber buildings within the UK (up to 18m).

Key Action that Has Spatial Implication

Modern Methods of Construction (MMC)

Early 'Rules of Thumb' for Masterplan

- Consider options for off-site fabrication and construction, giving early thought to location, capabilities, and capacity of nearby suppliers,
- Consider in the construction and phasing masterplan how use of MMC can reduce need for on-site construction areas/ compounds and therefore unlock land for quicker delivery of alternative uses such as green spaces or public realm.

Sustainability & Net Zero Spatial Priorities

Operational Carbon

Operational Carbon Vision: The scheme will be net zero in operation, delivering a high-standard of energy efficiency and with 100% of site energy demand being supplied through on-site renewable energy.

Key Action that Has Spatial Implication Orientation and efficiency of Buildings

Early 'Rules of Thumb' for Masterplan

- Southern exposure (or within 30 degrees of the south) is generally the best physical orientation for maximising solar gains, whilst balancing the risk of overheating in the summer, subject to site specific assessment,
- Considering and assessing form factor of buildings to maximise efficiency of buildings massing.

Key Action that Has Spatial Implication Solar Panels

Early 'Rules of Thumb' for Masterplan

- Locating houses on southern facing slopes can optimise solar access and minimise overshadowing,
- Maximising solar potential on roof space, for example pitched roof buildings can increase potential for more solar panels,
- Taking into account other requirements from roof space, typical rule of thumb is to assume 70% of a roof space can accommodate solar panels.

Key Action that Has Spatial Implication District Heat Network/ Communal Heating

Early 'Rules of Thumb' for Masterplan

- An early decision should be made about if a district heat network, or a series of smaller linked heat networks, will feature in the masterplan vision. If considering this option, it would need to consider the source of heat for the energy centre (e.g. recovering heat from co-locating centre near to heat generating processes, such as Data Centres or railway line, or renewable source e.g. biomass)
- Would need to retain part of the site for locating the energy centre and thermal store (size comparative to large industrial unit, with exact scale dependent on need case).

Key Action that Has Spatial Implication Wind turbines

Early 'Rules of Thumb' for Masterplan

- If considering wind turbines, as a rule of thumb for each wind turbine there would land requirement of around 0.5 km².
- Depending on the height of the turbine, there are limitations in regard to how close the turbines can be to residential dwellings (between 1,000 to 3,000m distance required between wind turbine and dwellings).

Sustainability & Net Zero Spatial Priorities

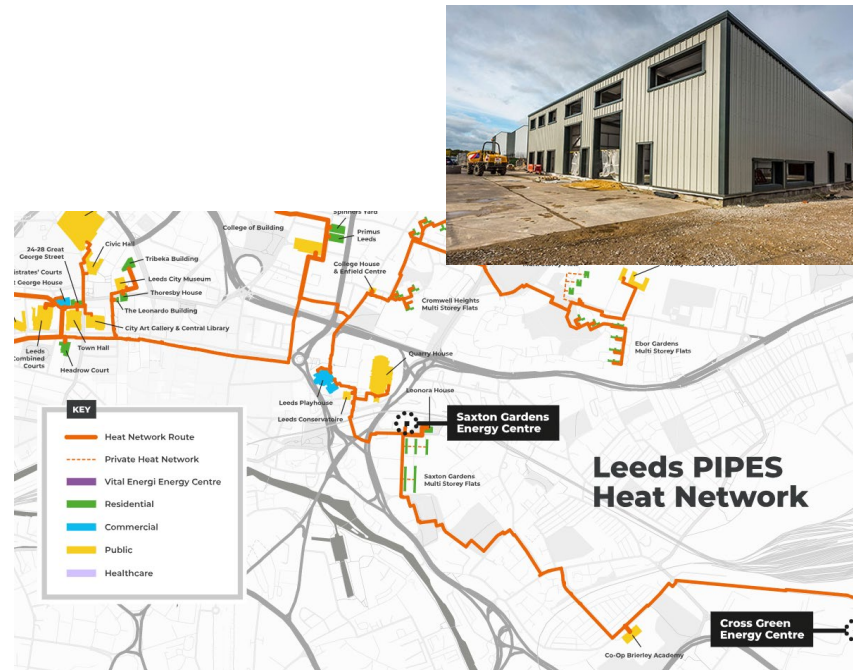
Operational Carbon

Operational Carbon Vision: The scheme will be net zero in operation, delivering a high-standard of energy efficiency and with 100% of site energy demand being supplied through on-site renewable energy.

District Heating and Communal Heating

- **District heating:** delivers district or neighbourhood scale heating from a centralised energy centre via insulated pipework to individual buildings. Heat interface units (HIU) are installed in buildings to control the heating and hot water received from the centralised system. Heat is typically supplied by large-scale generation of waste heat, with large pipes laid often under roads to transfer heating. Communal or community heating typically works in a similar way to district heating, but at a much smaller scale typically supplying single buildings.

Given the requirement in the Local Plan (Policy First Proposals) that there are no new connections to gas grid, the source of heat must be from a sustainable source of waste heat (e.g. renewable energy, industrial processes, transport systems). Opportunities for waste heat from the new trainline should be considered.



Left: Leeds PIPES Heat Network plans, with waste heat from Leeds Recycling and Energy Recovery Facility ([Link](#)), Top right Manchester Energy Centre using waste heat from Metro system ([Link](#)), Bottom right, Mersey Heat energy Centre supplying heating to Liverpool Waters developed from Leeds & Liverpool Canal heat ([Link](#))

Sustainability & Net Zero Spatial Priorities

Operational Carbon

Operational Carbon Vision: The scheme will be net zero in operation, delivering a high-standard of energy efficiency and with 100% of site energy demand being supplied through on-site renewable energy.

Maximising Renewables on Buildings

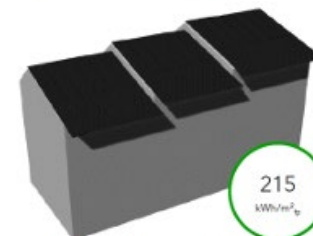
Work undertaken on the Greater Cambridge Net Zero Carbon Evidence Base provided analysis on use of renewable energy technologies within Cambridgeshire. The report outlines that solar photovoltaic (PV) panels are considered to be the only universally suitable on-site renewable energy for new building.

The report provided analysis on meeting energy demand for new houses utilising solar panels, finding that it is possible to achieve net zero in operational energy up to six storeys through adopting best practice roof design.

Operational energy demand for non-residential buildings and wider infrastructure will need to be considered across the masterplan site (e.g. retail, schools, community buildings and train station).

Best practice

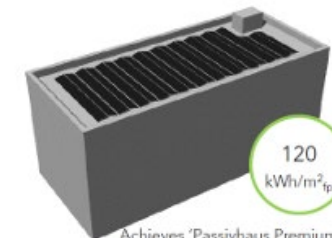
The roof is designed specifically to maximise solar generation. Large monopitch planes allow high panel density with no shading. Plant areas, stair cores and lift overruns are located in a strip along the north side of the building, partially covered by the solar roof structure. Any terraced areas are located under the solar array.



✓ Net zero possible up to six storeys

Flat roof - good practice

Improved approach where the solar array is at a 10-15 degree tilt angle and oriented to the East/West (+/- 45 degrees). This results in lower energy generation per panel, but much higher panel density for the roof, significantly increasing energy generation.



Achieves 'Passivhaus Premium'
✓ Net zero possible up to four storeys

Flat roof - business as usual

The solar panels are positioned at a 30 degree tilt angle and oriented South. Energy generation per panel is maximised, but the large gap required between rows to avoid shading results in poor utilisation of the roof for energy generation.



Sustainability & Net Zero Spatial Priorities

Operational Carbon

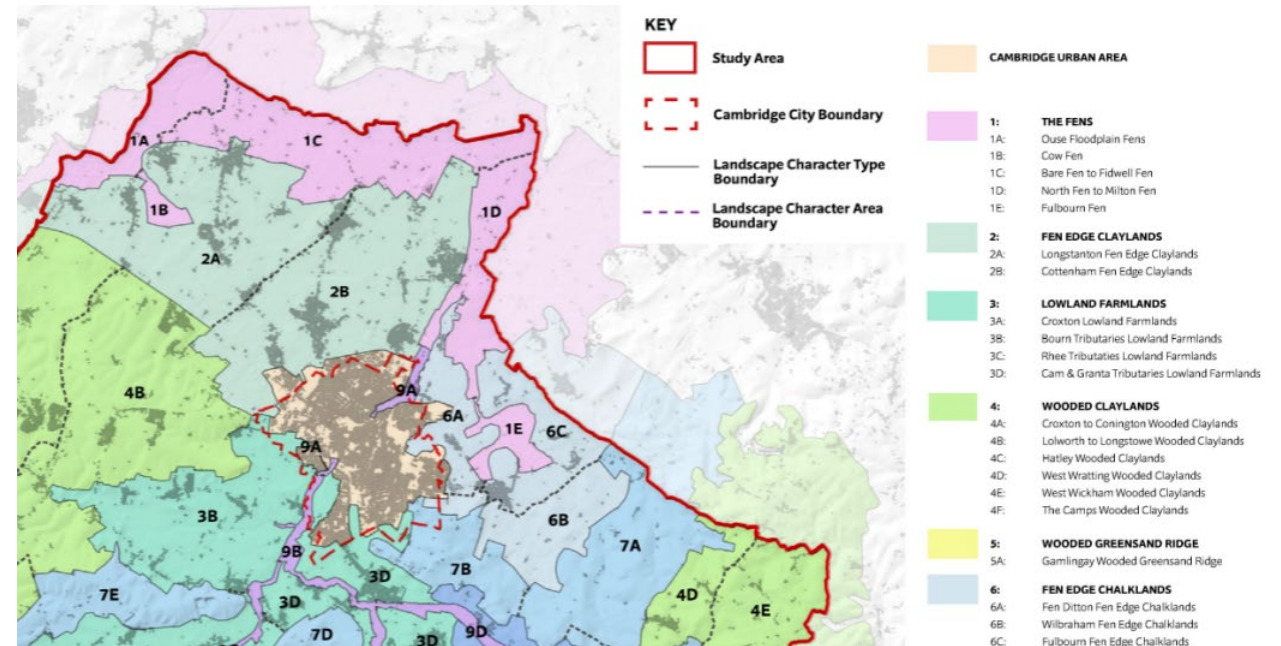
Operational Carbon Vision: The scheme will be net zero in operation, delivering a high-standard of energy efficiency and with 100% of site energy demand being supplied through on-site renewable energy.

Location of Renewables

The Greater Cambridge Landscape Sensitivity Assessment (2021) provides analysis of the potential impact of wind turbines and solar panel developments on the landscape character at a strategic level across the County. The analysis is specific to undesirable impacts on landscape character and the visual amenity across the landscape.

In relation to wind turbines, the assessment states that for landscape area 4 (wooded claylands), there are four operational wind developments (including a 20m high turbine in Cambourne). For new wind turbines, the assessment concludes that there is low/medium landscape sensitivity for development of a single or small-scale wind farm (up to 5 turbines/ up to 30m in height), but higher sensitivity for any larger scale development.

In relation to Solar PV, the assessment states that for landscape area 4 (wooded claylands), there are no operational PV developments. It outlines that for a small-scale solar farm (up to 20ha in extent), there is a medium landscape sensitivity, but for anything larger, there is a medium/high sensitivity.



Section of the landscape character map used within the Greater Cambridge Landscape Sensitivity Assessment (2021)

Sustainability & Net Zero Spatial Priorities

Circular Economy

Circular Economy Vision: The scheme will ensure Zero Avoidable Waste in construction, maximising opportunities for reuse and recycling of materials, and will encourage zero waste living for future residents

Key Action that Has Spatial Implication
Reuse and recycling of materials for construction

Early 'Rules of Thumb' for Masterplan

- In terms of the 'construction masterplan', taking a reuse/recycle approach can require larger compounds than average area to store materials.

Key Action that Has Spatial Implication
Recycling Centre

Early 'Rules of Thumb' for Masterplan

- In line with Cambridgeshire County Council requirement, developments must contribute to provision of household recycling centre and bring sites within the Local Authority area.
- As such, space within the scheme to provide a household recycling centre for the local community should be considered.

Key Action that Has Spatial Implication
Library of Things and repair shops

Early 'Rules of Thumb' for Masterplan

- Plan in space for a communal building for a Library of Things and repair shop, within the local high-street or other easily accessible location.
- Consider this within the wider planning for proposed community facilities within the masterplan.

Sustainability & Net Zero Spatial Priorities

Water Resources & Efficiency

Water Resources & Efficiency Vision: The scheme will demonstrate UK best practice in water use efficiency and on-site water reuse

Key Action that Has Spatial Implication Waste Water Treatment Works

Early 'Rules of Thumb' for Masterplan

- An early decision should be made about if a waste water treatment works will feature in the masterplan,
- A WWTW for this scale of new homes would require a large area of land, with specific land requirements depending on water treatment processes required and expected demand.

Key Action that Has Spatial Implication Swales

Early 'Rules of Thumb' for Masterplan

- Swales should be placed in areas that drain well, such as on gentle slopes or in areas where there is lots of run off (e.g. alongside roads),
- Swales size will vary, as a rule of thumb area around 3-5 meters wide, and are generally not restricted in length, with longer swales generally preferred.

Key Action that Has Spatial Implication Rainwater harvesting / greywater

Early 'Rules of Thumb' for Masterplan

- Need to consider if tanks would be per property, or communal, and therefore the location of these tanks, considering the potential viability and benefits of a community wide water reuse system,
- Size of tanks will depend on multiple factors including average estimated rainfall, number of people and proposed uses. As a rule of thumb, tanks for individual homes will be a couple of m² in size.
- If looking at greywater recycling, this will require additional space for treating water before use for each tank.
- Connect considerations on rainwater harvesting system into designs for location and sizing of SuDS, taking an Integrated Water Management approach and Sustainable Drainage Strategy across the scheme,

Sustainability & Net Zero Spatial Priorities

Water Resources & Efficiency

Water Resources & Efficiency Vision: The scheme will demonstrate UK best practice in water use efficiency and on-site water reuse

Water Management Strategy

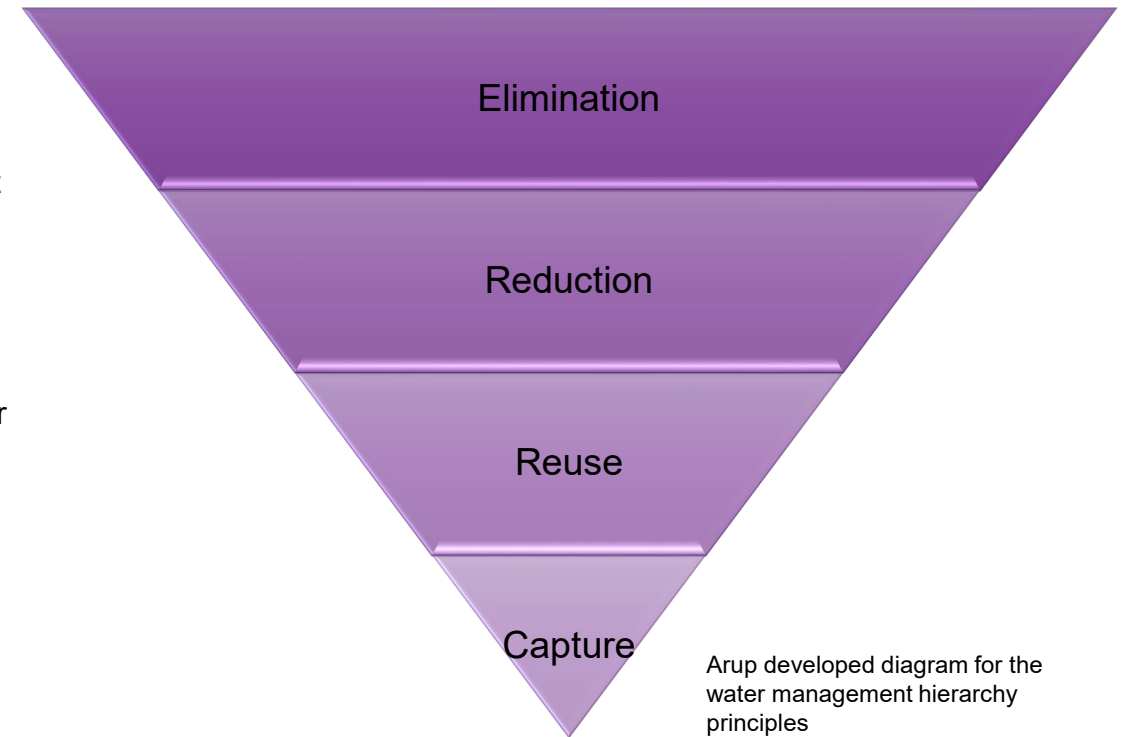
To achieve the standard of 80 litres/person/ day as outlined in Local Planning Policy, a range of complimenting measures need to be implemented, which follow the water hierarchy and come together in a cohesive Water Management Strategy.

The water hierarchy follows these priority steps:

- **Elimination:** avoid water use through behaviour change and awareness raising
- **Reduction:** decrease the amount of water used through use of technology or education,
- **Reuse:** using the same water for multi-purpose,
- **Capture:** options for rainwater capture and storage in ponds and reservoirs for year-round treatment.

The types of technologies that need to be considered include:

- **Site wide:** swales, ponds, communal rain gardens, wetlands, attenuation ponds, storage tanks, wastewater treatment works, reservoir.
- **Building scale:** individual plot water recycling and storage, high-efficiency appliances and fixtures, water metering, awareness campaigns.



Sustainability & Net Zero Spatial Priorities

Water Resources & Efficiency

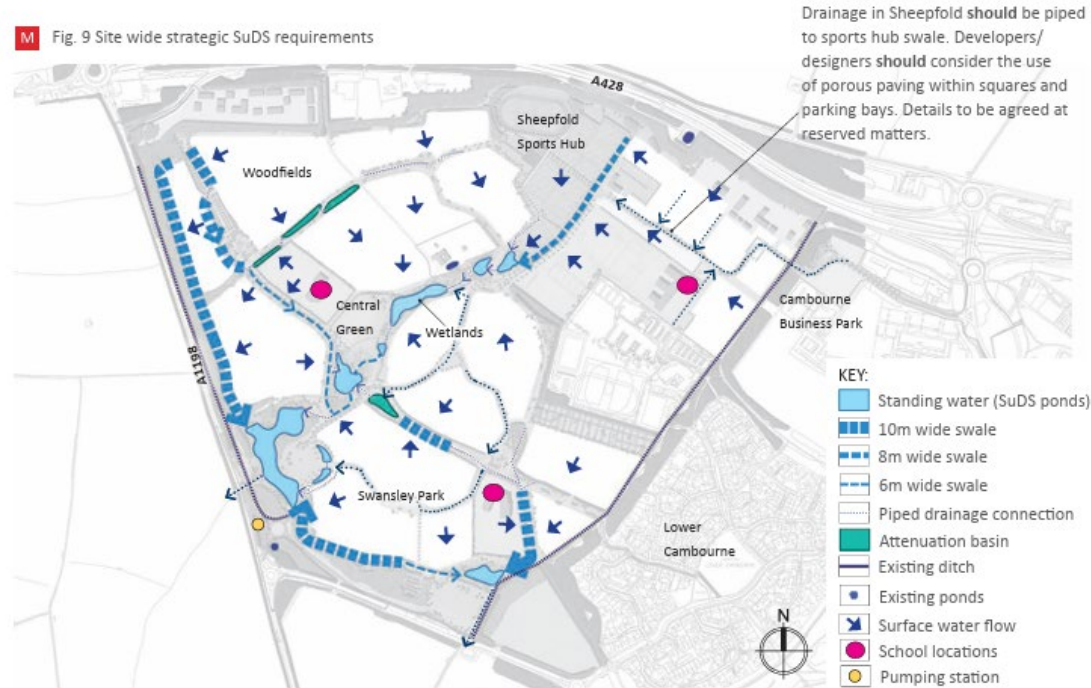
Water Resources & Efficiency Vision: The scheme will demonstrate UK best practice in water use efficiency and on-site water reuse

Water Needs

At an assumption of 80 litres/person/ day and a potential population of 47,500 people (mid point estimate of 19,000 new homes x 2.5 people per home), this equates to an additional demand of 3,800,000 litres/ day.

This water need will have a significant impact in terms of space on the site for water storage, to maximise water reuse in line with the water hierarchy.

Exact storage capacity of SuDs and storage tanks will be determined by factors such as run-off rates, infiltration, catchment area, and rainfall intensity, and modelling would need to be completed to calculate this potential on the site.



Cambourne West Design Code Rev O, Randal Thorp ([Link](#)), providing example of SuDS incorporated into nearby housing development, with approx. 15,000m² pond to the southwest of the site.



Swale in Lamb Drove, Cambourne ([Link](#))



108 rain gardens added to streets in Grangetown, Cardiff, providing storage of 40,000m³ (40,000,000 litres) of surface water ([Link](#))

Sustainability & Net Zero Spatial Priorities

Sustainable Transport

Sustainable Transport Vision: The scheme will deliver infrastructure which makes active and public transport the preferred option for residents' daily journeys

Key Action that Has Spatial Implication Transport Hub

Early 'Rules of Thumb' for Masterplan

Around the proposed new train station, allow for space for a multi-modal transport hub, incorporating space for bus stops, cycling storage, in addition to potential for emerging forms of mobility such as cycle hire or sharing system, electric car clubs and MaaS (Mobility as a Service), link up with any existing provisions/providers operating nearby (e.g. Cambridge Science Park).

Key Action that Has Spatial Implication Bus stops

Early 'Rules of Thumb' for Masterplan

Placement of stops so that residents are no more than 400m from bus stop.

Key Action that Has Spatial Implication Cycle infrastructure

Early 'Rules of Thumb' for Masterplan

Design roads that have space for segregated cycle lanes and other measure to provide safe cycle infrastructure (e.g. in line with UK Cycle Infrastructure Design Guide).

Key Action that Has Spatial Implication Cycle storage

Early 'Rules of Thumb' for Masterplan

- Within cycle storage, allow for space for non-standard cycles and cycle maintenance areas, requiring large cycle storage than average,
- Make allowances for cycle parking at homes, businesses and travel hubs.

Key Action that Has Spatial Implication PRoW and existing cycle networks

Early 'Rules of Thumb' for Masterplan

Protect and enhance existing PRoW and cycle networks, building up this existing infrastructure.

Key Action that Has Spatial Implication Electric vehicle charging

Early 'Rules of Thumb' for Masterplan

Build in allowed for electric vehicle charging in homes, businesses and public realm, in alignment with Local Plan set requirements (see policy review).

Sustainability & Net Zero Spatial Priorities

Climate Change Resilience

Climate Change Resilience Vision: The masterplan will embed climate change mitigation and adaption measures to create a scheme that is resilient to climate change hazards, with decisions supported by analysis of appropriate climate change projection data

Key Action that Has Spatial Implication
Shading in public areas

Early 'Rules of Thumb' for Masterplan

- Consider planting of trees to providing shading along public walking and cycling routes, and in public realm,

Key Action that Has Spatial Implication
Flood Zones

Early 'Rules of Thumb' for Masterplan

- Avoidance of building in or adjacent to Flood Zone 3.

Key Action that Has Spatial Implication
Bodies of water

Early 'Rules of Thumb' for Masterplan

- Provision of water features, such as retention ponds, wetlands, swales, can help support both cooling in built up areas and flood risk mitigation,

Key Action that Has Spatial Implication
Strategic planning of green infrastructure

Early 'Rules of Thumb' for Masterplan

- Consider strategic location and type of green infrastructure across the site to support adaptation to climate change (e.g. placement of trees for shading in heatwaves in places where people dwell, placement of SuDS alongside hard standing such as roads to support flood mitigation).

Further details regarding spatial parameters relating to flood risk mitigation is provided through the Green and Blue Infrastructure Framework.

Sustainability & Net Zero Spatial Priorities

Climate Change Resilience

Climate Change Resilience Vision: The masterplan will embed climate change mitigation and adaption measures to create a scheme that is resilient to climate change hazards, with decisions supported by analysis of appropriate climate change projection data

Use of climate change projection data

Data from the Met Office Local Authority Climate Explorer provides information on expected climate change within Cambridgeshire, projected out to 2080s. The key climate hazards that need to be considered within the masterplan design include:

- Heatwaves (up to +7.3°C maximum temperature increase),
- Drought and dry weather (up to -24mm of precipitation per day in summer),
- Cold temperatures in winter with frost and ice warning,
- Flooding (up to +15mm of precipitation per day in winter,
- Increase in frequency and intensity of storms and wind.

		0.6°C GWL Baseline 1981- 2000	1.0°C GWL Recent Past 2001-2020	1.5°C GWL Paris Agreement	2°C GWL Guidance: Prepare	4°C GWL Guidance: Assess risks
	TEMPERATURE	°C	°C	°C change	°C change	°C change
	Summer Maximum Temperature	30.3 29.8 to 30.4	32.6 31.1 to 33.6	+3.0 +1.5 to +3.8	+3.4 +2.4 to +5.3	+7.3 +6.6 to +8.6
	Summer Average Temperature	16.2 16.2 to 16.2	17.4 17.1 to 17.8	+1.4 +1.1 to +2.0	+2.2 +1.5 to +2.8	+4.3 +3.8 to +5.2
	Winter Average Temperature	4.3 4.3 to 4.3	4.9 4.6 to 5.4	+1.0 +0.6 to +1.3	+1.3 +0.7 to +1.6	+2.8 +1.9 to +3.4
	Winter Minimum Temperature	-7.8 -8.5 to -7.5	-6.2 -7.7 to -5.8	+2.0 +1.6 to +3.0	+2.3 +1.5 to +3.4	+4.3 +3.7 to +6.0
	Annual Average Temperature	10.0 10.0 to 10.0	10.8 10.7 to 11.1	+1.1 +1.0 to +1.3	+1.7 +1.2 to +1.9	+3.5 +3.0 to +4.0
	PRECIPITATION	mm/day	mm/day	% change	% change	% change
	Summer Precipitation Rate	1.59 1.58 to 1.60	1.63 1.45 to 1.76	+3 -8 to +10	-5 -19 to +2	-24 -42 to -15
	Winter Precipitation Rate	1.39 1.37 to 1.39	1.44 1.34 to 1.67	+3 -5 to +19	+7 +1 to +14	+15 +10 to +27

Met Office Local Authority Climate Explorer: Cambridgeshire Key Climate Trends 'Global Warming Level (GWL)' ([Link](#))

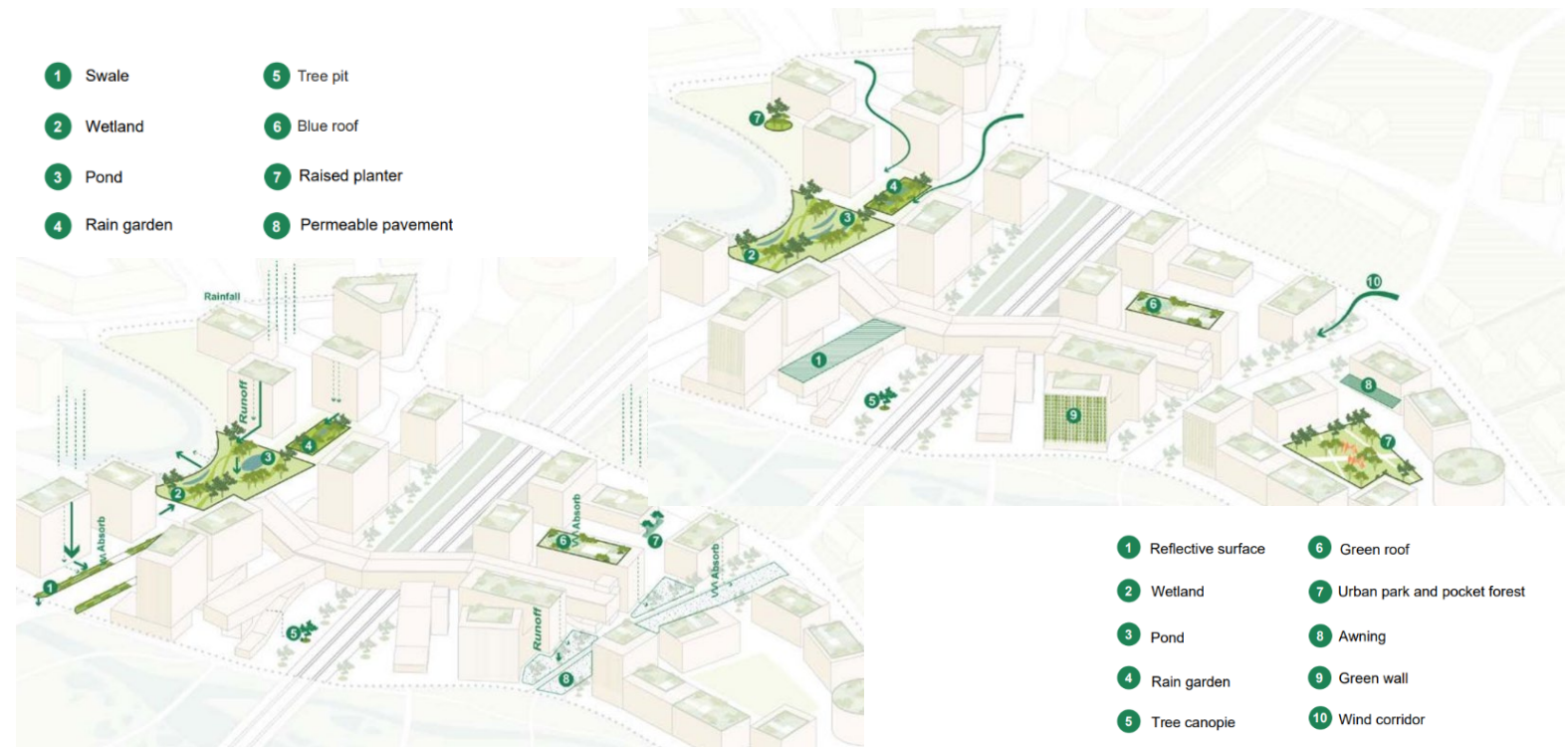
Sustainability & Net Zero Spatial Priorities

Climate Change Resilience

Climate Change Resilience Vision: The masterplan will embed climate change mitigation and adaption measures to create a scheme that is resilient to climate change hazards, with decisions supported by analysis of appropriate climate change projection data

Consideration in Building and Infrastructure Design

- Increase tree canopies, green roofs, and green walls to reduce urban heat,
- Integration of swales, ponds, rain gardens to reduce urban heat and provide water storage and slower flow,
- Using light-coloured paving, porous surfaces and heat-absorbing materials for temperature regulation,
- Incorporate awnings, pergolas and shaded walkways for heatwave where appropriate, focusing more urbanised spaces with high footfall such as around the train station,
- Integration of retention and detention ponds to allow managed water flow inland and store excess rainwater for slow release or reuse,
- Wetland restoration to protect and restore wetlands along rivers to manage flooding and erosion,
- Rainwater harvesting and storage to collect and reuse rainwater for irrigation.



Images from: Arup's Guide to Climate Change Adaptation in Masterplanning

Sustainability & Net Zero Spatial Priorities

Climate Change Resilience

Climate Change Resilience Vision: The masterplan will embed climate change mitigation and adaption measures to create a scheme that is resilient to climate change hazards, with decisions supported by analysis of appropriate climate change projection data

Consideration in Landscape Design

Creating an ecologically resilient landscape will result in a landscape which is also more resilient wider shocks and stresses, such as those from climate change. Key features and considerations include:

- Connecting up new and existing habitats, such as existing mature woodlands, to create habitat corridors,
- Focusing on promoting species richness and diversity of planting, with priority for native plants that are well suited to the local climatic conditions,
- Integration of water features, including SuDS, through the landscape design to provide evaporative cooling impacts,
- Focusing on interventions that will improve soil health,
- Creating layered habitats with planting at various levels including scrub and transitional planting,
- Promoting self-seeding or rewilding/ natural regeneration practices can result in areas with higher ecological complexity making them more adaptable to change,
- Ensuring for long-term management and protection, with adaptive planning in place to respond to the climate as it changes.

Creating a resilient landscape will also help to support the long-term storage of carbon in nature, minimising the risk of release of carbon back into the atmosphere due to natural disasters.



Cambourne Green and Blue Infrastructure Framework Phase 1, with areas highlighted for priority natural regeneration/ rewilding consideration, watercourse (blue), and woodland (green)

Sustainability & Net Zero Spatial Priorities

Land use for Carbon Sequestration

Land use for Carbon Sequestration Vision: The scheme will seek to first protect and restore habitats that have a high carbon stock value and will add to this existing stock through planting of appropriate nature-based solutions that deliver a wide range of benefits for people and nature

Key Action that Has Spatial Implication

Protection and restoration of existing carbon stocks

Early 'Rules of Thumb' for Masterplan

- As a first priority, protect existing habitat that provide high carbon stock value (which for this site area is likely to be trees and hedgerows, wetlands and pond sites, noting that it is understood that there is no peatland/peat soils on the site).
- Minimising excavation and disturbance of soils as much as possible during construction to protect existing below ground carbon stocks.

Key Action that Has Spatial Implication

Planting of high sequestering habitats

Early 'Rules of Thumb' for Masterplan

- Looking at opportunities to create high sequestering habitats (e.g. woodland, wetlands), but with consideration given to maximising multiple benefits and in a way which is sensitive to the existing landscape. (e.g. to benefit biodiversity and natural flood management)
- Noting that a large amount of tree planting needs to take place to have substantial impacts in terms of carbon sequestration (on average, one hectare of native broadleaf woodland will store 300 - 350 tonnes of carbon over a 100-year period, with sequestration rates increasing as the tree grows, up to its maturity ([see further information on the Woodland Trust website here](#))).

Sustainability & Net Zero Spatial Priorities

Land use for Carbon Sequestration

Land use for Carbon Sequestration Vision: The scheme will seek to first protect and restore habitats that have a high carbon stock value and will add to this existing stock through planting of appropriate nature-based solutions that deliver a wide range of benefits for people and nature

Area for Nature Based Sequestration

If a small proportion of the potential site can be allocated for a continuous woodland restoration or natural regeneration area, this would have significant positive benefits for biodiversity, climate resilience and carbon sequestration, amongst wider environmental and social benefits. An example scenario has been developed to estimate carbon sequestration potential for a 50ha site, connecting to Elsworth Wood, an existing ancient woodland. Figures provided below are calculated with high-level assumptions:

- **Naturally regenerated woodland:** after 20 years, an estimated 5,200 tonnes of CO₂e could be sequestered and stored (utilising 5.20 tCO₂e ha⁻¹ yr⁻¹ sequestration rate from Knepp Wildland Carbon Project ([link](#))),
- **Planted new native woodland:** after 20 years, an estimated 6,050 tonnes of CO₂e could be sequestered and stored (utilising 6.05 tCO₂e ha⁻¹ yr⁻¹ sequestration rate from Woodland Carbon Calculator ([link](#))).

These habitats would continue to sequester carbon until the habitat has reached maturity and will provide long-term storage, if protected from harm. Whilst natural regeneration has a slightly lower carbon sequestration rate in its early growing stage, it would reach equilibrium with a planted woodland once mature, and would be considered a more robust habitat for long-term storage against shocks and stresses.



Vision and Spatial Options Report: From ambition and long list to preferred option

Appendix A: Sustainability & Net Zero Frameworks

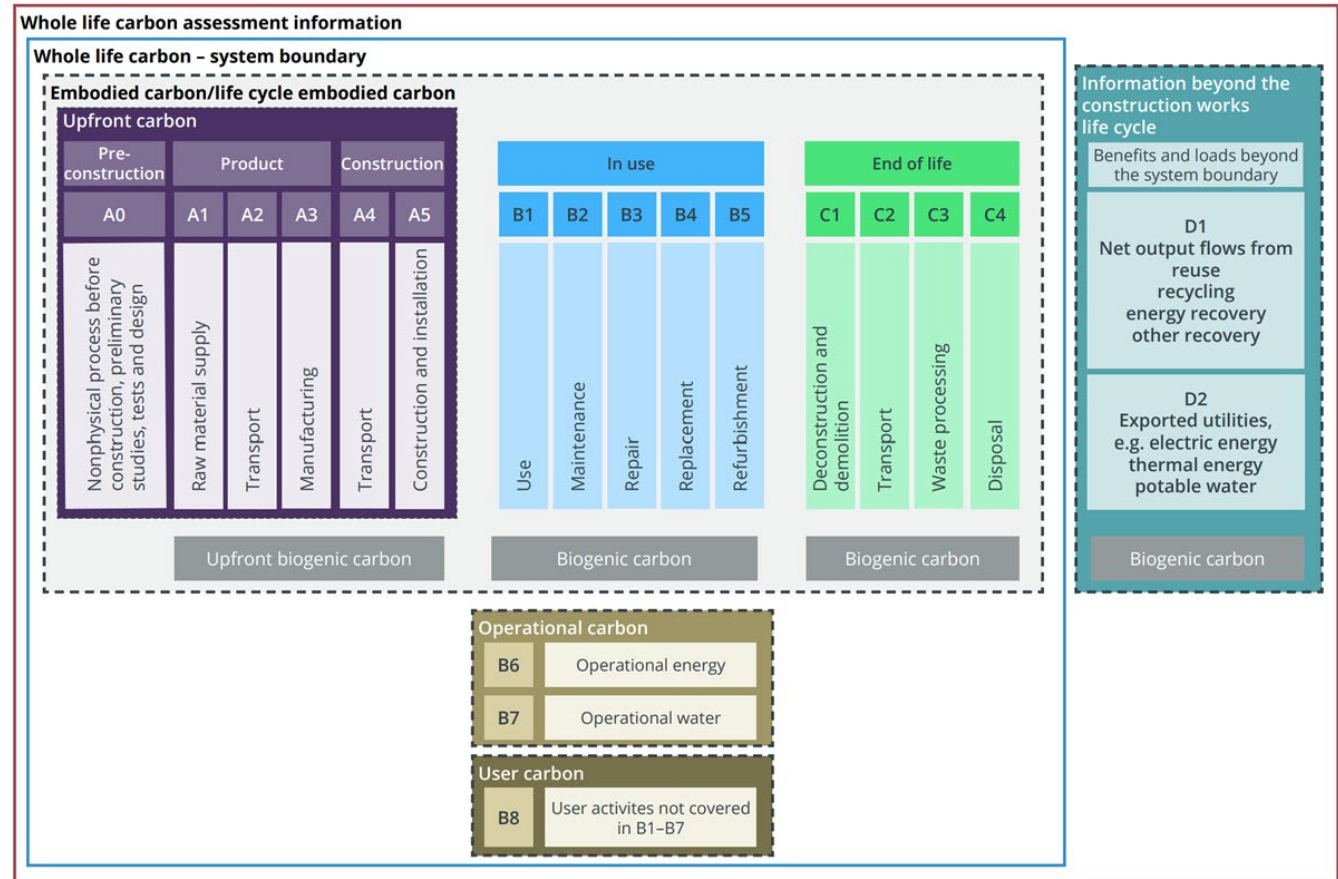
Existing Frameworks

PAS:2080

PAS 2080 RICS whole life carbon assessment (WLCA) standard is a framework specifically designed to manage and reduce carbon emissions in infrastructure which includes:

PAS 2080 is relevant to asset owners & managers, designers, constructors and product or material suppliers within the value chain. Embodied emissions from the perspective of the site's developer and operator are expected to include:

- Transport and use of construction material
- Building construction, refurbishment and installation, including energy consumption for construction, operations and vehicles
- Refurbishment or decommissioning demolition



Existing Frameworks

BREEAM and LETI

BREEAM

BREEAM is a sustainable building and infrastructure certification that provides a third-party verification of delivery against sustainability and net zero aspirations.

The framework covers a range of topics as captured in the diagram below.

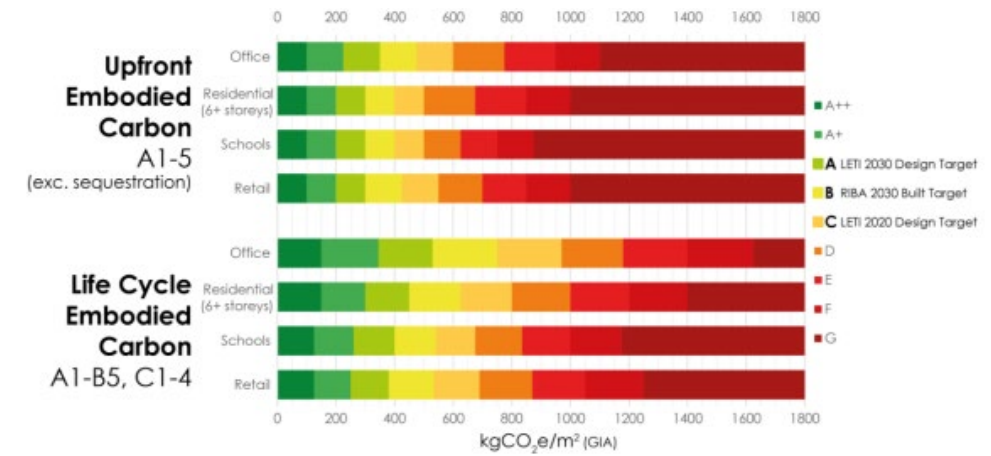


BREEAM (2025) The categories within BREEAM Assessments ([link](#))

LETI

LETI provides useful guidance on the requirements of buildings that align with climate target, including:

- Whole Life Carbon
- Embodied Carbon
- Embodied Carbon Target Alignment
- Carbon Definitions for the Built Environment, Buildings & Infrastructure



LETI (2025) The embodied carbon letter bandings for four typologies ([link](#))

Existing Frameworks

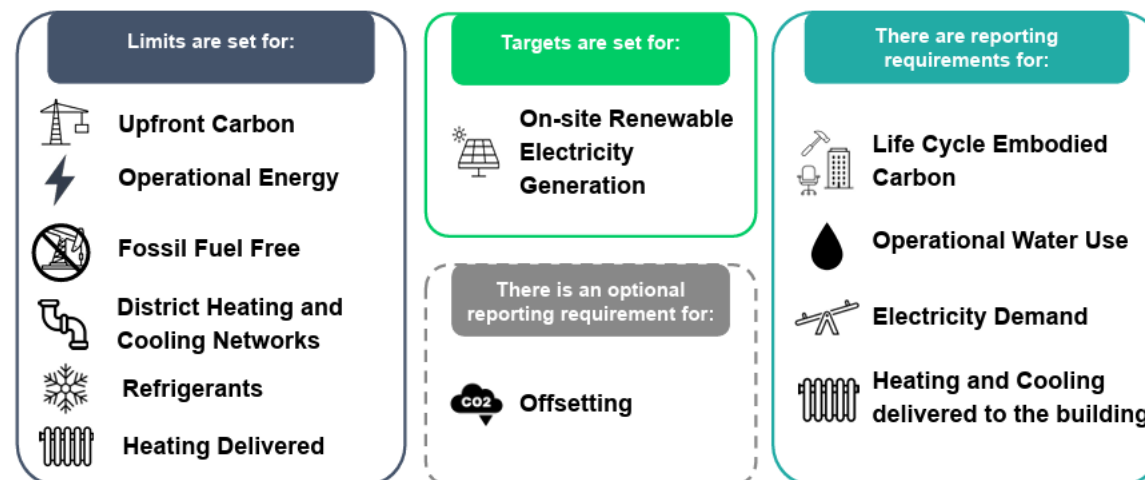
UK Net Zero Carbon Buildings Standard (UKNZCBS)

UK Net Zero Carbon Buildings Standard (UKNZCBS)

The UKNZCBS is an emerging standard that has been developed by a cross-industry group (BBP, BRE, Carbon Trust, IStructE, LETI, RIBA, RICS and UKGBC) bringing together Net-Zero Carbon requirements for all major building types.

Currently, a Pilot Version of the Standard has been launched which enables users to robustly prove their built assets are net zero carbon and in line with the UK's climate targets.

Once launched, it will link up to a third-party verification process which will verify net-zero claims utilising measured data.



[UKNZCBS](#) (2024) Pilot Version guidance: standard requirements ([link](#))

Appendix B: Supplementary Policy Review Information

Introduction

National: Overarching NPPF Policy Framing

Identifying Land for Homes

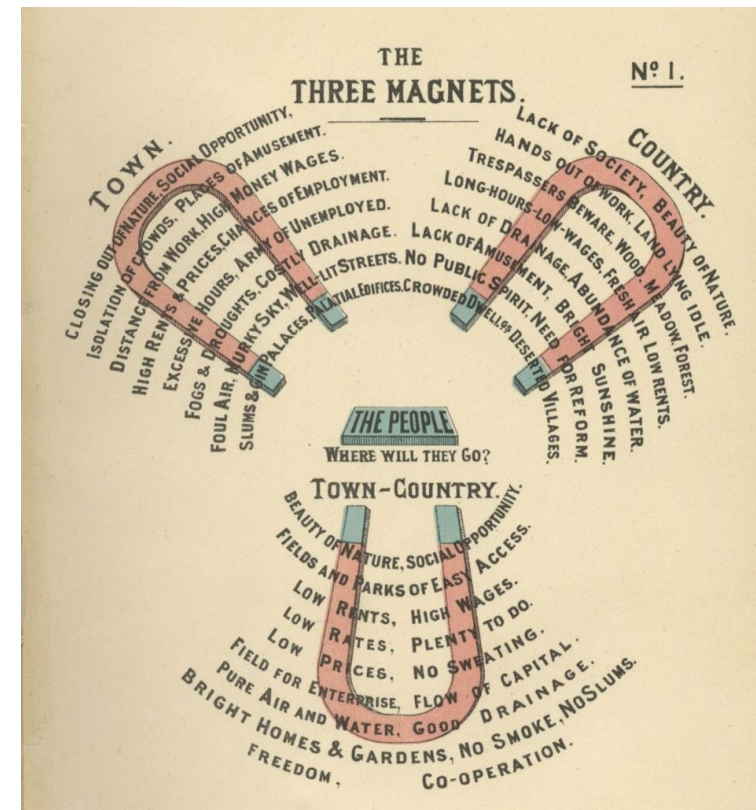
The supply of large numbers of new homes can often be best achieved through larger scale development, (e.g. significant extension), and they should include the following which relate to sustainability:

- Genuine Choice of transport mode,
- Scope for environmental net gains,
- Following Garden City Principles.

Garden City Principles

Emerging out of the Garden City Movement in the 20th Century Urban Planning, these principles still have strong relevance for designing sustainable and net zero focused development, relating to the following principles:

- Promoting self-sufficiency (in energy, water, food consumption)
- Embedding public parks and open spaces,
- Well connected (via sustainable modes of transport)
- Shared ownership models, focus on community cohesion and cooperation,
- High quality of air and water.



Introduction

National: Overarching NPPF Policy Framing

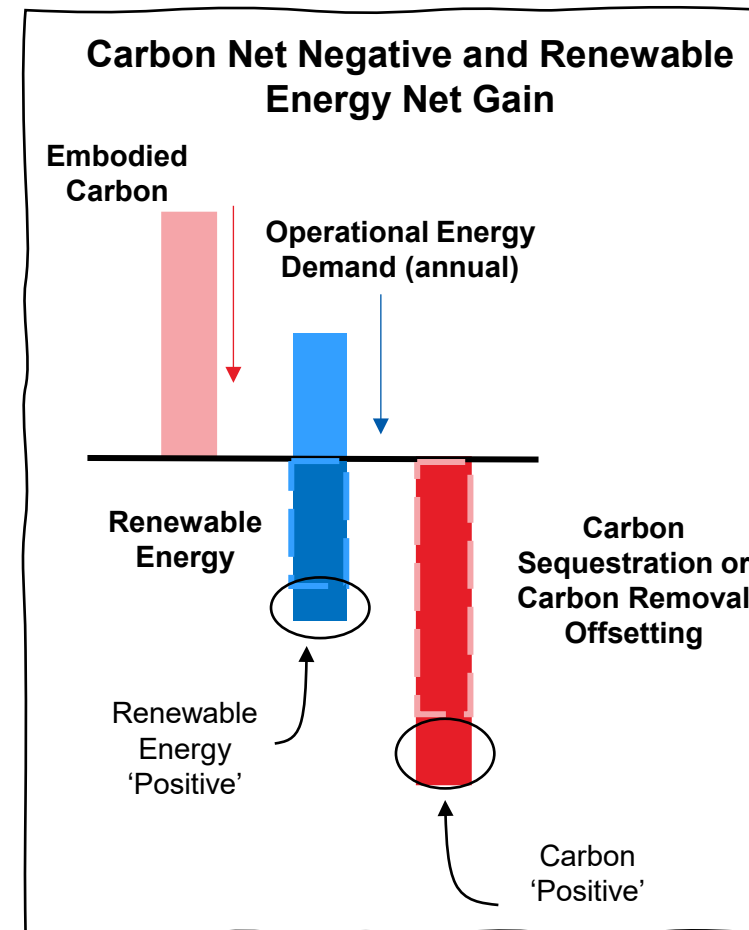
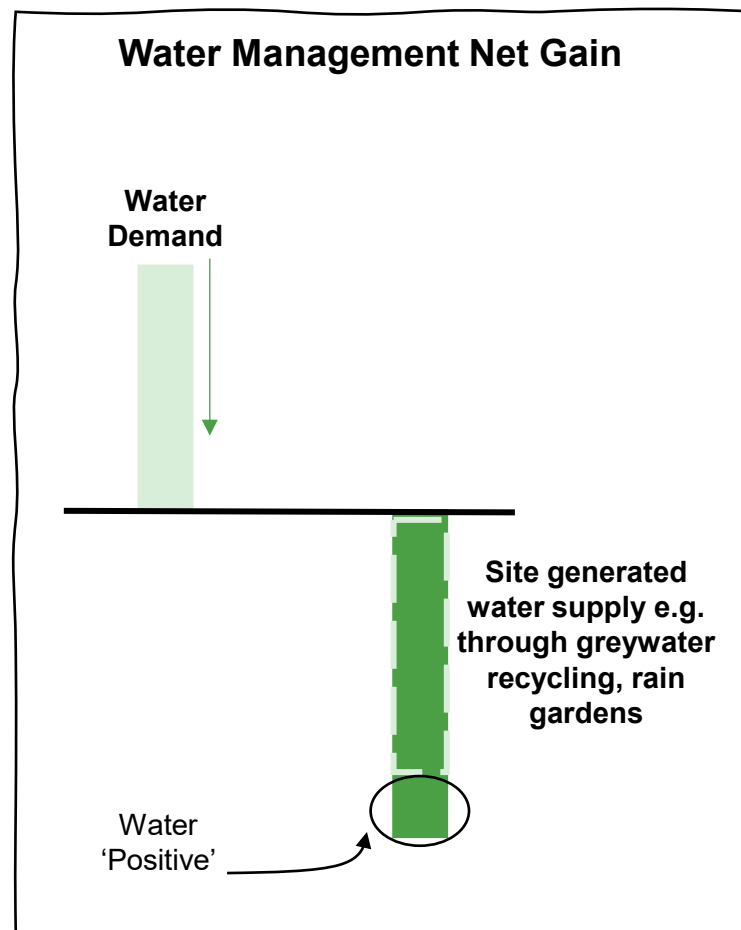
Environmental Net Gain

Within the NPPF, achieving environmental net gain in new development is referenced on several occasions.

In the Government '25-year Environmental Plan', environmental net gain refers to leaving the environment in a better state than before, extending the approach used in biodiversity net gain to wider natural capital benefits.

This term is similar to the concept of being nature 'positive', which commits to giving back more than you take.

To the right of the page, there are examples of what nature 'positive' systems would consist of.



WW+P



ARUP