Climate Change and Sustainable Construction Supplementary Planning Document

April 2022









EAST HAMPSHIRE DISTRICT **LOCAL PLAN**

East Hampshire DISTRICT COUNCIL

Contents

1 Introduction

What is a Supplementary Planning Document (SPD)?

1.1 A Supplementary Planning Document (SPD) elaborates upon policies in the Development Plan, which in the case of East Hampshire are the 'saved' policies in the adopted East Hampshire District Local Plan Second Review (2006), the adopted Joint Core Strategy (2014, for the period 2011-2028), and the Local Plan: Housing and Employment Allocation Plan (2016).

1.2 This SPD primarily elaborates upon Joint Core Strategy Policies CP24, CP25, CP26, CP27, CP28, CP29 and CP31, and also applies to relevant Whitehill & Bordon Policies (CSWB) as set out in Chapter 3.

1.3 SPDs are a material consideration in planning decisions and decision makers will use them to help determine planning applications.

1.4 As SPD's do not form part of the development plan, they cannot introduce new planning policies into the development plan and should not add unnecessarily to the financial burdens that the Planning System places on development. The new emerging Local Plan will therefore incorporate new policies on climate change and sustainable construction which will then supersede this SPD.

What is the purpose of this SPD?

1.5 Planning policy provides an important mechanism for contributing to environmental sustainability in the built and natural environment1, including to design and deliver buildings to mitigate (reduce and ultimately eliminate) carbon emissions, and address how the environment is impacted by developed to enable people to adapt to a changing climate (also referred to as resilience).

1.6 It provides guidance and best practice on methods for delivering more energy efficient and more sustainable development. It takes account of the resources used in construction, and of the environmental, social and economic impacts of the construction process itself and how buildings are designed and used. It is relatively high level and acknowledges the fast pace of change in this arena, and that technologies and policies may change during the lifetime of the document

1.7 The function of this SPD is to support and supplement the planning policies contained in the East Hampshire Local Plan: Joint Core Strategy ('Local Plan') that deal with climate change and sustainable design, construction, and energy. The relevant Local Plan policies are highlighted in Chapter 2 and published in full in Appendix 3. These policies must always be

[1] National planning policy (NPPF, paragraph 7) sets out that the purpose of the planning system is to contribute to the achievement of sustainable development and its relationship with the 17 United Nations Global Goals for Sustainable Development

considered in conjunction with this SPD, alongside the Hampshire Minerals and Waste Plan (2013).

1.8 This SPD:

- Identifies design and energy-saving/efficiency measures that can result in a development minimising greenhouse gas emissions and energy use and waste and creating places that are amenable to biodiversity and adaptable to a changing climate (including through the integration of green infrastructure).
- Provides guidance on renewable and low-carbon energy solutions, for reduced reliance on fossil fuels and finite energy sources, and for efficient use of National Grid energy for electricity and gas.
- Considers potential solutions to water shortages and water use efficiency requirements.
- Addresses the materials and methods used in construction; and
- Provides clear guidance for anyone applying for planning permission, or wishing to comment upon a planning application, as well as providing a consistent approach to assessing planning applications

1.9 It is intended principally for applicants for planning permission and their agents, and for planning decision makers. It has been produced to ensure that applicants provide the right information so that planning decision makers can assess whether development proposals comply with Local Plan policies.

1.10 It is recognised that this SPD has been produced at a time of changing national policy, particularly in relation to carbon reduction from new development and measures to support electric vehicles. Changes to Building Regulations may have implications for the implementation of adopted policies in the East Hampshire District Council Local Plan. This guidance therefore sets out a range of approaches considered to be good practice that would contribute to enhancing the sustainability credentials of proposals and addressing the climate change emergency in the district.

1.11 The guidance should not be considered exhaustive; bodies such as the Building Research Establishment and the UK Green Building Council provide extensive guidance covering a range of matters and issues related to sustainable development – a number of which are listed in Appendix 2. The guidance that follows sets out approaches that are considered to be good practice. However, there may be instances where local circumstances mean that a greater sustainability benefit can be achieved by taking a different approach.

The structure of this SPD

1.12 Chapter 2 sets out the Policy context.

1.13 Chapter 3 – 8 set out range of key sustainable design, construction and climate change adaptation principles and matters that development

proposals should consider or, where required by policy, must be included as part of development proposals.

1.14 The guidance is split into the following topic areas:

- Chapter 3 Energy and Carbon reduction and on-site low carbon energy
- Chapter 4 Site layout, landscaping, urban form and building design
- Chapter 5 Water Efficiency
- Chapter 6 Green Infrastructure and ecology
- Chapter 7 Resources, materials and waste
- Chapter 8 Development location and measures that enable sustainable lifestyles

1.15 Chapter 9 considers opportunities for producing, storing, and using renewable energy on-site.

1.16 Chapter 10 sets out the relevant information/documents applicants need to submit with their planning applications to demonstrate development proposals are policy compliant.

1.17 The appendices cover supporting information and planning submission document templates.

What is Climate Change?

1.18 Climate change is the long-term shift and intensification of global weather patterns as a result of increasing average global temperatures from greenhouse gas (GHG) emissions. GHGs include carbon dioxide (CO2), methane (CH4), nitrous oxide (N2O) and fluorinated gases which all absorb infrared radiation and trap heat in the atmosphere. The acceleration of GHG emissions is the result of human activities from burning fossil fuels, clearing vegetation, and releasing industrial outputs. The resulting temperature increase is leading to hotter and drier summers, warmer and wetter winters, and sea-level rise. The above will produce more intensive and frequent weather events such as droughts, heatwaves, storms, and flooding from tidal and fluvial sources.

What is the Climate Emergency?

1.19 The “Climate Emergency” refers to the impacts from the intensified weather events mentioned above. These impacts include risks to biodiversity, food, natural assets, water supply and human health and wellbeing. The District Council declared a climate change emergency in July 2019.

What is Climate Change Adaptation and Mitigation?

1.20 The Town and Country Planning Association (TCPA) and the Royal Town Planning Institute (RTPI) define climate change adaptation and mitigation as measures to reduce climate change impacts, and reduce greenhouse gas (GHG) emissions, respectively. Adaptation comprises measures which alter

developments and change human behaviour[2] , whilst mitigation includes the delivery of renewable energy generation and energy efficiency improvements.

1.21 An important principle of sustainable construction is developments must be fit for purpose and remain so into the future. Developments should be designed to be adaptable to avoid increased vulnerability and to offer high levels of resilience to the full range of expected climate change impacts, including hotter and drier summers, warmer and wetter winters, and an increase in heavy rain, storm events and flooding.

1.22 It is also important to look to measures beyond buildings themselves, seeking opportunities within the landscape setting of new developments for adaptation – this will often require a multidisciplinary approach to design to maximise benefits, recognising the role of all members of the design team in responding to climate change.

1.23 Development proposals must set out the climate change adaptation measures that have been taken and demonstrate that they are appropriate and adequate to meet the challenge of climate change.

1.24 This SPD sets out a number of measures for climate change adaptation that can be taken to meet the challenge of Climate Change, including ways to address:

- the urban heat island through for example the choice of materials, and the use of green and blue features
- The hotter, drier summers and heatwaves through for example designing buildings to maximise the opportunities for natural ventilation, cooling and lighting, and through the choice of materials
- Wetter winters and heavy rainfall events through for example the management of surface water, the use of natural or permeable surfaces, the use of green roofs and walls

[2] This can include, but is not limited to, the delivery of Green Infrastructure (GI), local food production, rainwater harvesting systems, shades, shutters, and Sustainable Drainage Systems (SuDS).

2 Policy context

2.1 This chapter provides the wider context and the 'lens' to which to consider the local plan policies through, to support the Council's application of these local policies and explain the Council's interpretation within the changing national context, given the discontinued use of the Code for Sustainable Homes on which the Local Plan Policy CP24 is based. It particularly sets out the planning and wider policy context regarding:

- the mitigation of the causes of climate change;
- adaptation requirements; and
- broader sustainability issues.

International

2.2 The United Nations (UN) Sustainable Development Goal 13, and the ratification of the UN Framework Convention on Climate Change (UNFCCC) Paris Agreement 2015, recognise the urgent need to hold the increase in global temperature to below 2^{O}C above pre-industrial levels, and to work towards limiting the increase to 1.5^{O}C.

National

Legislation

2.3 The Planning and Compulsory Purchase Act 2004 (Section 19[1A]) – as amended by Section 182 of the Planning Act 2008 – sets out a duty for LPAs to include local plan policies which contribute to the mitigation of, and adaptation to, climate change.

2.4 The UK Climate Change Act 2008 – as amended by the 2050 Target Amendment Order 2019 - commits the UK to reaching "Net Zero" by 2050. This means that the amount of greenhouse gases (GHGs) being emitted must be no more than the amount of GHGs being removed from the atmosphere.

2.5 The "Green Future: Our 25-Year Plan to Improve the Environment" was published in January 2018 and sets out the Government's approach to tackling climate change, as well as protecting and improving international biodiversity.

National Planning Context

2.6 The NPPF highlights the UK's commitment to the United Nations 17 Goals for Sustainable Development[3] and requires climate change mitigation and adaptation to underpin plan-making and decision-taking, within land-use planning. It makes clear the need for planning to facilitate a move towards mitigation of climate change[4], including through support for renewable/ low

[3] Paragraph 7
[4] Paragraphs 8c, 153, and 154

carbon energy and infrastructure, and through the shaping of places to support reduced carbon emissions[5]. National planning policy also sets adapting to climate change as a key objective of planning[6], and contains policy on prudent use of natural resources, including minimisation of waste, and reduced pollution, as well as water supply, and green infrastructure and how this relates to sustainability.

2.7 The Planning Practice Guidance confirms that addressing climate change is a core principle of spatial planning, and that planning has an important role in the delivery of new renewable and low carbon energy infrastructure - in locations where the local environmental impact is acceptable – to help the transition of the UK's energy supply away from fossil fuels.

Future Buildings Standard

2.8 The Future Buildings Standard is a set of standards that will complement the Building Regulations to ensure new homes built from 2025 will produce 75-80% less carbon emissions than homes delivered under current regulations, including a ban on all fossil fuel-powered boilers from 2025. Prior to the introduction of the standards, changes to Building Regulations from June 2022 will require all new dwellings to deliver a 31% Co2 reduction in the Dwelling Emission Rate (DER) compared to the Target Emission Rate (TER).

Local

2.9 This SPD provides further guidance when applying a number of the East Hampshire District Council's Local Plan policies of the Joint Core Strategy adopted in June 2014. The relevant policies to which this guidance relates are set out below and in full in Appendix 2.

2.10 This SPD provides guidance for the following policies in the Joint Core Strategy Local Plan:

CP24	Sustainable Construction
CP25	Flood Risk
CP26	Water resources/Water quality
CP27	Pollution
CP28	Green Infrastructure
CP29	Design
CP31	Transport
CSWB5	Design

[5] Paragraph 153
[6] Paragraphs 8 and 154

CSWB6	Sustainable Construction
CSWB7	Waste
CSWB8	Sustainable Water Management
CSWB10	Green Infrastructure
CSWB12	Pedestrian and Cycle routes
CSWB13	Public Transport
CSWB18	Low Carbon Vehicles

Other relevant local policy documents

Climate and Environment Strategy 2020-2025

2.11 The purpose of this strategy is to provide a clear statement of the Council's climate and environment objectives and to set out how the Council will act to meet climate, environment, and sustainability challenges. The Climate and Environment Strategy sets out the Council's vision, approach, and priorities over the next five years. There are two high level objectives for the strategy:

> Strategic Objective 1 Climate
>
> To reduce carbon emissions in line with the Climate Change Act 2008 to be net-zero by 2050 for all Council services, whether they are delivered by us, or through a partnership. More than this, we will use our mandate as a local authority to ensure sustainable development and support our residents and enterprises to reduce carbon emissions to net-zero by 2050.
>
> Strategic Objective 2 Environment
>
> To protect, improve and enhance our natural environment locally for biodiversity net gain. The ecosystem services provided by the natural environment is our life-support system. We will work in collaboration to enable everyone to play a part in improving biodiversity, air and water quality.

2.12 The strategy outlines how the Council will reduce its emissions to net-zero, and how the Council will use its influence and powers as local planning authority to promote a sustainable low-carbon future where people and nature thrive.

Hampshire County Councils Climate Change Strategy 2020-2025

2.13 This strategy is based upon a set of key principles which will underpin the approach taken by Hampshire County Council. These principles will guide and shape the policies, actions and partnerships developed to deliver the Climate Change targets for Hampshire.

"Our vision for a well-adapted and resilient Hampshire will be essential to ensure that Hampshire's economy, environment, and society continues to thrive and prosper.

Our policy is to focus on embedding climate resilience and mitigation across key policies and sectors, working with communities across Hampshire".

Hampshire County Council's Minerals and Waste Plan 2011-2030

2.14 The Minerals and Waste Plan recognises that minerals and waste development can provide opportunities to mitigate and adapt to the inevitable effects of climate change. This may include:

- reduction in greenhouse gas emissions through diverting biodegradable waste from landfill[7];
- generation of renewable energy from energy recovery facilities;
- more sustainable use of resources through the use of recycled and secondary aggregates in construction;
- appropriate restoration of quarries and landfill sites;
- supplying aggregates for use in flood and coastal defences;
- opportunities for water storage in flood zones (e.g., mineral extraction voids); and
- the location of development adjacent to local markets which may provide opportunities to reduce emissions from or created by transport.

2.15 Issues relating to climate change are also dealt with through other sections and policies in the Plan. These include sections on 'Restoration of minerals and waste developments', 'Flooding - risk and prevention', 'Managing traffic impacts' and 'Design, construction and operation of minerals and waste development'.

[7] It should be noted that the HCC Mineral and Waste Plan was adopted in 2013, since this time, more waste has been diverted from landfill and waste that is not recycled is incinerated with energy recovery.

3 Energy Carbon Reduction and On-site Low Carbon Energy

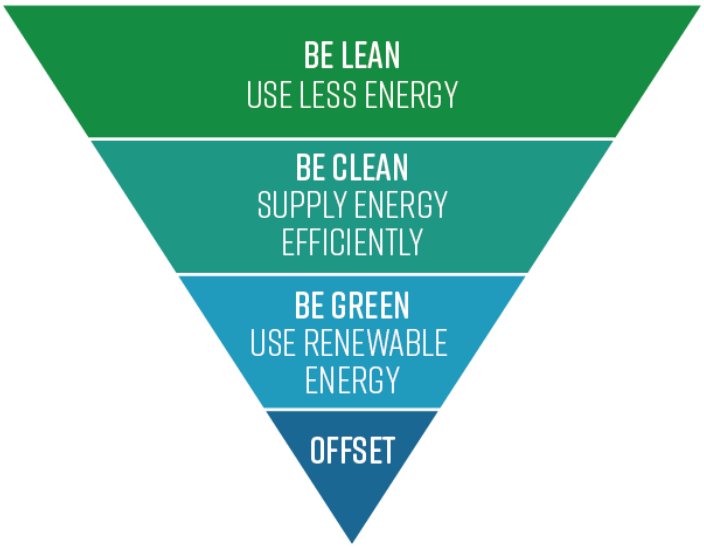
Relevant Local Plan Policy

- CP24 Sustainable Construction

Energy Hierarchy

3.1 The energy hierarchy (see Figure 1) is a fundamental principle of sustainable development. It shows the sequence of steps that must be taken order to reduce operational carbon emissions from new developments. The hierarchy is often summarised as “be lean, be clean, be green”.

Figure 1: The Energy Hierarchy



3.2 In the first instance, energy demand must be eliminated where possible (“Be lean”). Where energy demand cannot be eliminated, energy use must be reduced as much as possible through energy efficiency measures (“Be clean”). After these steps, the remaining energy demand must be met from renewable and/or low carbon energy sources (“Be green”). Please see Chapter 9 for further information on the latter. The development industry often uses the phrase “fabric first”. This means that before considering renewable and/or low carbon energy sources, energy demand must first be reduced by; 1) maximising performance of the components which make up the building fabric (i.e., materials); and 2) designing the building to make best use of the surrounding environment.

Residential Development

3.3 Policy CP24 in the JCS sets for all new residential development of one dwelling or more to achieve carbon compliance standards that were established by the various levels of the Code for Sustainable Homes (CfSH). Following the withdrawal of the CfSH, the equivalent of the CfSH Level 4 requirement was to achieve a minimum of 19% CO_2 reduction in the Dwelling Emission Rate (DER) compared with the Target Emission Rate (TER). A higher target of achieving a 31% reduction in CO_2 emissions has now been set out in Building Regulations from June 2022 as part of the Government's pathway to highly efficient non-domestic buildings which are zero carbon ready, better for the environment and fit for the future.

3.4 To determine whether a new dwelling passes or fails on its carbon emission targets set within Part L of the Building Regulations, the Regulations require the submission of a Standard Assessment Procedure (SAP) calculation for new dwellings prior to the commencement of work. The Council will request that the SAP calculation is submitted with a planning application[8] through the submission of a Carbon Reduction Statement (Appendix 5), so it is completed early in the design process to allow for consideration of the guidance set out in this SPD and to prevent any costly redesign.

Multi-Residential and Non-Residential Development

3.5 Policy CP24 requires multi-residential and non-residential development of 500sqm[9] or more to meet the mandatory credits required for the achievement of BREEAM New Construction "Excellent", unless proven to be financially or technically unviable. In instances where viability is demonstrated to be an issue, the Council will apply this policy requirement flexibly as follows:

- BREEAM "Very Good" for 500 to 999sqm.
- BREEAM "Excellent" for 1,000sqm or more.
- A greater degree of flexibility will be considered for community uses and simple buildings[10].

3.6 The above requires new development to follow the hierarchical approach to reducing energy demand and associated carbon emissions. All the above are minimum requirements and applicants are encouraged to go higher where possible. In the instances where the policy requirements are considered financially unviable or technically unfeasible, the applicant will need to demonstrate this with appropriate evidence in support of a planning application.

Energy Efficiency in Historic and Traditional Building

3.7 Energy efficiency improvements for traditional buildings can impact upon their heritage significance in a variety of ways. When considering the energy

[8] Applies to full planning applications of 1 or more dwellings, or to be completed on submission of reserved matters
[9] Gross Internal Area
[10] Simple Buildings are defined within the BREEAM New Construction Technical Manual

efficiency of historic and traditionally constructed buildings, some of the above measures relating to energy efficiency may not be suitable, such as those relating to insulation. The Building Regulations11 make clear that the characteristics of historic and traditionally constructed buildings warrant some exemptions and special considerations in reaching appropriate solutions. Where planning permission and/or listed building consent are required, both the nature and scope of proposed measures will be weighed against the risk of harming significance. Historic England have published a range of guidance[12] in improving the energy efficiency of historic buildings.

3.8 Historic England advocates a 'whole building approach' that includes an understanding of the building, its context, significance and all the factors affecting energy use to inform the most appropriate solutions. that save energy, sustain heritage significance, and maintain a comfortable and healthy indoor environment.

Allowable Solutions

3.9 Policy CP24 (note 4) of the JCS states allowable solutions will be operated to permit residual emissions to be mitigated between the minimum carbon compliance standards and zero carbon homes (equivalent of CfSh Level 5) by off-site means in agreement with the District Council.

3.10 Following the withdrawal of the CfSH and the Allowable Solutions carbon offsetting scheme, alternative carbon off-setting measures are only likely to be sought where proposals do not provide at least 10% of energy demand from decentralised and renewable energy sources (Policy CP24-b). For many proposals, it is unlikely that there will be no means of delivering 10% of the development's energy demand in accordance with CP24. Nevertheless, where the Council is satisfied, through the submission of evidence that demonstrates that relevant technologies are either unfeasible or unviable, alternative carbon-offsetting measures may be acceptable. These alternatives could involve the developer installing carbon dioxide saving measures off-site, such as the provision of alternative renewable energy on other buildings or emerging developments.

3.11 In the future, alternative offsetting solutions could include establishing a carbon offset fund to deliver carbon reduction projects. At the time of writing, no such fund has been established in the district.

The performance gap

3.12 The "performance gap" relates to evidence that the energy performance of new "as built" development (in operation) is around 20% lower than that agreed at the planning / design stage. This can be remediated through post-construction testing and post-occupancy monitoring by identifying and

[11] Approved Documents Parts L1B and L2B
[12] Energy Efficiency and Historic Buildings

remediating problems during the construction stage and, where appropriate, correcting occupant behaviour.

3.13 In attempting to reduce the performance gap, the Council will request post-construction testing and post-occupancy monitoring through planning conditions (as appropriate) on major developments to ensure “as-built” performance matches the calculated “design” performance assessment.

3.14 The Council strongly encourages applicant to use the following schemes which seek to address the performance gap:

- BRE’s Bridging the Design and Innovation Gap (BRIDG)
- BRE’s NABERS which focuses on energy-use in new office development
- BEPIT’s Better Building Tool Kit; and/or
- NEF’s Assured Performance Toolkit

Case Study 1 – Quebec Park, Whitehill & Bordon

Quebec Park was the first major mixed-use development created as part of the Whitehill & Bordon Green Town regeneration project and was designed to be an exemplary sustainable community that would establish a high standard for all future development.

Now, the future of the area is being shaped by the creation of a new Healthy Green Town offering 3350 new homes and 5500 new jobs. Quebec Park is situated on a brownfield site and former military base and has created 100 new homes alongside a community employment hub in the former barracks buildings, a community café, and a village green. The development is also connected to the town’s pioneering Green Loop of cycleways and footpaths.

East Hampshire District Council worked closely with developer Abri – formerly Radian Housing – and architects, Architecture PLB, to develop a blend of private, shared ownership, and affordable family houses, flats, and sheltered housing all designed to high sustainable standards through a ‘fabric-first’ approach. The project was used as a case study for the Zero Carbon Hub’s standards for Fabric Energy efficiency and Carbon Compliance. Although these standards have now been superseded, they proved to be a testbed for recent changes to energy regulations.

To ensure that the buildings continue to perform after completion, East Hampshire District Council partnered with Abri and the National Energy Foundation on the ‘Assured Performance Process’ (APP) pilot scheme. The Assured Performance Process approach was agreed for Quebec Park through the Section 106 agreement. This initiative is focused on ensuring that the energy performance of the homes in use aligns with their predicted design stage performance, helping to close the ‘performance gap’ between the two. An ongoing Post Occupancy Review has shown that this initiative has been successful.

Quebec Park was completed in 2018 and was the ‘Residential’ winner in the RICS Awards South East 2019 as well as the ‘Best use of brownfield land in placemaking’ winner at the Planning Awards 2019.

For more information visit the Greater South East Energy Hub.

4 Site layout, landscaping, urban form and building design

Relevant Local Plan Policy

- CP27 Pollution
- CP29 Design
- CSWB5 Design

Site layout, landscaping and urban form

4.1 Planning can be a powerful mechanism for reducing the energy requirements and related emissions associated with a development, through influencing factors such as the orientation of buildings and the layout of sites[13]. Development can be configured to achieve maximum benefit from natural resources, such as daylight, solar energy, and cooling breezes, simply through the layout/arrangement of buildings on a site; and this achieves a 'win-win' solution to sustainable development[14]. It can also create healthier living environments, for example, through maximising access to daylight within rooms, and reducing the need for air-conditioning – and associated noise. Other measures include insulation. This is known as passive design.

4.2 Furthermore, passive design can help with adaptation to climate change; buildings can be designed to utilise natural features of the environment, including the weather, to assist with cooling or heating, and to be resilient to more extreme weather conditions.

4.3 Similarly, the glazing or paint colour of a building can significantly reduce its carbon footprint, reducing or eliminating energy needs, and ensuring a high quality of insulation will achieve immediate reductions in the need for energy.

4.4 The layout of buildings and facilities, particularly for larger sites, can affect the amount of natural or shared heat and light available for energy efficiencies, and this is best considered at the design stage alongside and in balance with other design considerations, such as local distinctiveness, and the aesthetic quality of the development. For large[15] scale developments, including new communities the council encourages BREEAM Communities[16].

4.5 Where possible, taller buildings should be placed towards the northern section of a site to reduce the effect of shadowing across the site – but this should not be done in a regimented or artificial manner, subject to landscape concerns, and should be applied where it will provide overall

[13] National Planning Policy Framework, paragraphs 150 and 153 – and 131 re innovation
[14] National Planning Practice Guidance, paragraph 004/ Reference ID: 6-004-20140612
[15] 100 dwellings or more
[16] BREEAM Communities

benefits. Similarly, parking facilities such as garages can usefully be placed towards the north of buildings for similar reasons (e.g., to allow solar receipts to be maximised in southerly orientated living spaces), provided they do not harm the amenities of neighbouring sites and land uses. However, parking-dominated frontages should be avoided. (Please see section 3 of the Council's Vehicle Parking Standards SPD.)

4.6 The relationship between buildings and open spaces is important to create a quality public realm and a comfortable microclimate for people using outdoor spaces. Wrongly positioned buildings can result in excessive shadowing and little solar gain on external surfaces. Well positioned buildings will create spaces that maximise receipts of natural light and heat. The arrangement of buildings on sites should also be considered to strike a balance between gaining an optimum level of natural heat and light, including also considering efficiencies of reduced loss of heat through compact development, whilst avoiding contributing to the Urban Heat Island Effect in locations where this might be an issue.

4.7 Well placed deciduous trees can increase the shading and natural cooling of buildings and spaces during the summer months and allow more natural light and heat to be received during the winter months, after the leaves have fallen and when demand for heating and lighting is highest. Tree planting can also be used to shelter buildings from the wind and minimise unwanted cooling.

4.8 Planting can be used to create a more favourable microclimate and help to manage flood risk; strategically sited tree belts can provide shelter from prevailing winds and shade in the summer without blocking light in the winter. The Woodland Trust has published guidance on integrating tree planting into residential schemes[17].

4.9 The prevailing wind should be a consideration in site design as exposure to cold winds will increase heat loss and energy use. Conversely in the summer, gentle breezes can be used positively within design to enhance natural ventilation improving comfort levels and reducing energy use on mechanical cooling systems. Shelter belts (wind breaks) may be used to protect buildings from excessive winds. Shelter belts should be dense enough to reduce wind speeds by allowing some wind to pass through but not block the wind in its entirety, as this can result in an airflow accelerating over the top of the trees and descending in a turbulent fashion on the building.

4.10 However, as sites are configured to allow for optimum benefit from the sun's power and for adapting to climate change, the siting of solar panels and arrays on buildings in the vicinity of the site also need to be considered (in the same way as neighbouring amenities) and this may therefore inhibit the preferred choice of design/layout for the new development.

[17] Woodland Trust Residential Developments and Trees a Guide for Planners and Developers (2019)

Building design

Flexibility and Adaptation

4.11 Buildings should be designed from the outset to be flexible to accommodate changing needs[18] (including family size, home working, old age and disability). This will reduce the need for refurbishment and extensions and will prolong the life of the building. Alongside this, buildings built today will need to become zero carbon in the future. Buildings should be designed to enable, and not impede, future retrofit measures that improve energy efficiency or allow the use of zero carbon energy.

Passive solar gain, passive cooling and overheating

4.12 Passive solar gain refers to the process whereby a building is heated by the sun, either directly from sunlight passing through a window and heating the inside of the building, or indirectly as sunlight warms the external fabric of the building and the heat travels to the interior. The level of passive solar gain can significantly impact upon the quality of a building, how it is used, and the energy needed for it to be inhabited comfortably.

4.13 Key factors that influence passive solar gain include the physical characteristics of the site, immediate surroundings, orientation of buildings, external design, internal layout and the construction materials used.

4.14 Whilst passive solar gain can reduce the carbon emissions associated with heating, if used incorrectly it can lead to overheating, which in turn can lead to the installation of mechanical cooling equipment (e.g., air conditioning). This results in energy consumption and carbon emissions and requires maintenance, resulting in costs, and produces heat that requires dissipation. The need for mechanical cooling can be avoided or lessened by designing-in passive ventilation and passive cooling measures. It is recommended that developments do not incorporate mechanical cooling unless passive measures have been fully explored and appraised.

4.15 Applicants should seek to apply passive design principles in a proposal's layout and design having regard to the following:

- Orientation and layout of habitable rooms, and window size and orientation, should be carefully considered in relation to the path of the sun.
- Rooms that are most frequently occupied should benefit from a southerly aspect, but with appropriate measures to avoid overheating.
- Rooms that include a concentration of heat generating appliances (e.g., kitchens) or are less frequently occupied (e.g., bathrooms) should be located in the cooler part of the building, generally the northern side.
- Conservatories and atria can be used to assist natural ventilation in the summer by drawing warm air upward to roof vents, and to collect heat during the spring and autumn.

[18] In line with the principles of JCS Policy CP29

- Deep projections that overshadow windows should be avoided, particularly on south facing elevations. Projections should be sized appropriately so that they provide shading from the sun during the hottest part of the year but allow solar gain in the colder months.
- Where there is a chance that overheating can occur (e.g., due to large expanses of glazing on roofs and south facing elevations), design measures such as roof overhangs, brise soleil, external shuttering, photochromatic and thermochromic glass and a lighter colour palette can help.
- Zonal heating and ventilation systems and controls can be used allowing areas subject to high solar gain to occupy their own temperature control zone. Dynamic controls reduce energy waste.
- Use of materials to build in thermal mass to absorb excess heat during warmer periods and release it slowly during cooler periods (e.g., day/night, summer/winter).
- Cross ventilation with windows located on opposite walls and/or roof mounted turbines or wind cowls that assist with circulation of air by drawing air through windows or top floor openings and
- Passive stack ventilation (PSV) that uses pressure differences to draw in fresh air from outside to replace rising warm air which is released from the top of the building. A heat exchanger can be placed where the air escapes the building to reduce heat loss.

Natural light

4.16 Natural lighting reduces the energy used for artificial lighting and creates a healthier internal environment. Issues to consider include how much of the sky is visible through a window, the dimensions of the interior living/working space and distance from the window, and the proportion of glazed surfaces. The depth of the room is an important factor in determining the amount of natural light received. Naturally dark rooms may be lit naturally through measures such as sun tubes which ‘pipe’ sunlight from sunny areas to internal areas.

4.17 Applicants must consider potential negative impacts on the dark night skies reserve in the South Downs National Park (SDNP) and nocturnal species.

4.18 Non-residential buildings must be designed to best meet their intended use. Natural light is beneficial to a good working environment, but care is needed to avoid creating spaces with excessive heat gain. This could occur if solar gain is combined with the heat associated with internal lighting, high occupancy and operating equipment such as machinery and computers. A higher proportion of glazing on north facing surfaces can increase natural lighting without significantly increasing solar gain, thereby minimising excessive heat gain.

4.19 Glare created by natural or artificial light can be uncomfortable for people both inside and outside a building. This can be minimised if considered early in the design process through building layout (e.g., low eaves height) or building design (e.g., blinds, brise soleil screening). If considered together with a lighting strategy this can reduce energy consumption.

Insulation

4.20 Around half of the heat lost in a typical home is through the walls and roof spaces. Increasing insulation levels significantly beyond current building regulations requirements is the cheapest and most effective method of reducing CO2 emissions, and energy needs. It requires minimal maintenance and should last the life of the building. It reduces heat losses and gains through the fabric of the building and minimises the costs of heating and cooling systems. Buildings are kept warmer in the winter and cooler in the summer. Insulation measures include:

- Loft insulation;
- Tanks and pipe insulation;
- Cavity wall insulation;
- Solid wall insulation;
- Floor insulation;
- Draught proofing; and
- Double and triple glazing.

4.21 However, as with all measures, this should be weighed against other design considerations. In particular, the use of solid wall insulation should be avoided where this can affect the appearance of traditional brickwork and tile hangings or where the above measures will not be suitable for historic or traditionally constructed buildings (see Chapter 3).

4.22 Thermal insulation is measured using ‘U values’. The U value is a measure of how readily heat will flow through the structure. The lower the U value, the less heat is transferred through the fabric of the building. An increased thickness of insulating materials will increase energy efficiency and reduce the U value. More information on home insulation can be found at the Energy Saving Trust.

5 Water resources

Relevant Local Plan Policy

- CP24 Sustainable Construction
- CP26 Water Resources / Water Quality
- CSWB8 Sustainable Water Management

Water efficiency

Residential Development

5.1 Policies CP24, CP26 and CSWB8 set water efficiency requirements for all new development comprising one dwelling or more for residential development, and 500sqm or more for non-residential development. For residential development, the standard set out in the now withdrawn CfSH was higher than the mandatory standard of 125 litres/person/day set out in Building Regulations and the optional national housing technical standard of 110 litres/person/day. The CfSH set out in Policy CP24 has been superseded, in part, by these new standards. Therefore, for residential development, as a minimum, the standard for water efficiency in new dwellings[19] is 110 litres[20] per person per day.

5.2 For all new dwellings, a completed "water efficiency calculator for new dwellings" worksheet (**www.thewatercalculator.org.uk/**) that accords with Part G of the Building Regulations must be provided prior to occupation. The calculation must demonstrate that the new dwellings will achieve a maximum water usage of 110 litres per person per day.

Non-residential Development

5.3 Policy CP24 states that all non-residential development of over 500sqm should meet BREEAM standard 'excellent'. Developers will be required to meet the BREEAM standards for water-efficiency for all non-residential developments[21] which equates to at least 25% improvement on baseline based on Part G of building regulations (2 credits) in the water consumption issue (Wat 01). This level of water efficiency can be relatively easily achieved using low flow toilets, taps and other fittings.

5.4 For water-intensive developments, such as golf courses, it will be necessary that the supply of water can be shown to be independent of public and environmental water stocks, for example through rainwater harvesting.

Water saving measures in construction

[19] The standard is set out in regulation 36(b) of the Building Regulations 2010 (as amended)
[20] the National Planning Practice Guidance (NPPG) also includes an additional standard for 105 litres per head per day, with an additional five litres provided for gardens
[21] As per the requirements of Policy CP24 that all non-residential development of over 500sqm should meet BREEAM standard 'excellent'.

5.5 Saving water during construction must be considered, especially where a lot of water will be required. Applications should demonstrate how water will be saved – in line with the principles of Policies CP24, CP26 and CSWB8. This may include the use of off-site construction methods, which can save water[22]. Water use during construction can be reduced through measures including:

- closed loop wheel washers,
- waterless wheel washing using angled steel grids to remove debris,
- high pressure low volume power hoses,
- recirculating water where possible,
- limiting the water used for flushing building services by stopping it as soon as the flush water turns clear, and
- employing a regime for monitoring water use and water waste.

Rainwater harvesting

5.6 Rainwater harvesting is the collection of rainwater directly from a surface it falls on (e.g., a roof). Once collected and stored it can be used for non-potable[23] purposes such as watering gardens, supplying washing machines and flushing toilets, thereby reducing consumption of potable water. Potable water is produced through a purification process and is pumped over large distances, both of which require energy and result in embodied carbon that is not present in water harvested locally. In a residential development, rainwater can be captured for domestic use using water butts connected to a down pipe. Down pipes must be carefully placed so that water collection is convenient for residents. Larger systems can use water stored in underground water tanks. Where such a system is to be use, consideration should be given to a system that releases stored/unused water during dry weather, ahead of a predicted storm so that storage capacity is then available to attenuate the flow.

Greywater re-use

5.7 Water that is recycled from bathrooms and kitchens for non-potable uses is known as greywater. Greywater systems must ensure treatment on a regular basis to prevent a build-up of bacteria, and some systems are powered, which entails an energy cost. As a result, greywater reuse is generally less preferable than water use minimisation measures.

5.8 Water recycling systems are better suited to new developments rather than retrofitting in existing buildings because of the excavation required for storage tanks and changes needed to the plumbing system, and they are generally more cost effective for new developments and developments of a larger scale.

[22] Such as 'modern methods of construction' https://www.rics.org/globalassets/rics-website/media/news/news--opinion/modern-methods-ofconstruction-paper-rics.pdf
[23] Potable water is water that is of drinking quality

5.9 Recycling systems should be backed up by a mains supply or a sufficiently large reserve storage system to meet higher demands during dry spells. Storage tanks will need an overflow to allow excess water to be released which should be able to flow into a soakaway.

Flood-risk, water run-off and Sustainable Drainage Systems (SuDS)

5.10 Flood-risk will increase with climate change. Furthermore, through increased development and higher building densities water runoff will become more restricted further increasing the risk of flooding.

5.11 Some potential measures to ameliorate these issues have been addressed in regard to trees and planting in Chapter 6 'Green Infrastructure' of this SPD, but in addition it may be necessary to include attenuation measures in new developments through the use of Sustainable Drainage Systems (SuDS), As well as ameliorating flood-risk, SuDS can by their very nature address wildlife and habitats needs; improve water quality; and provide for recreation and amenity, including ponds or even rainwater gardens. Green roofs may assist in avoidance of rainwater pooling. Advice on sustainable drainage systems (SuDS) for new developments has been published by Hampshire County Council as the Local Lead Flood Authority and CIRIA[24].

5.12 To address heavy rainfall events, buildings must be prepared with suitable gutters and pipes for more intensive events, and green walls and roofs can also be included for slowing the rate at which water is dispelled from buildings. All hard surfacing in new developments including footways/pavements, internal roads, car parking, etc, should be permeable enough to allow for a soaking away of surface water and prevention of water run-off and flash-flooding. This also allows for ground-water stocks to be replenished helping to maintain water supplies during drought events.

5.13 Developers will also be required to show that consideration has been given to ensuring that sewers will not be overwhelmed and cause flooding. Suitable drainage systems will need to be in place to avoid this.

5.14 National policy covers flooding and flood risk, and the National Planning Practice Guidance provides guidance on how national policy should be applied. Policy CP25 addresses flooding and flood risk management. Under national policy, some developments are required to produce a Flood Risk Assessment. When doing so, they must make an allowance for climate change, in accordance with Environment Agency guidance[25].

5.15 SuDS should be the primary source of surface water management under JCS Policies CP25 and CSWB8. Where SuDS are not proposed as the primary source of surface water management, a clear reasoning setting out why it would not be appropriate or effective should be provided.

[24] The SuDS Manual (C753F)
[25] https://www.gov.uk/guidance/flood-risk-assessments-climate-change-allowances

6 Green Infrastructure

Relevant Local Plan Policy

- CP28 Green Infrastructure
- CSWB10 Green Infrastructure

6.1 Green Infrastructure (GI)[26] including 'blue' infrastructure (ponds and rivers) is an important part of providing sustainable developments. It provides a broad range of benefits over time to occupiers/users (including exercise and access to nature for mental health and biodiversity), and it can assist in mitigating climate change – for example through carbon capture - and adapting to changes in weather, as well as well as helping to improve air quality. However, green infrastructure may itself be susceptible to climate change which must be considered early in the design stage.

6.2 Mitigation of, and adaptation to, climate change using green infrastructure can be achieved through shading and shielding from the elements; insulation; assisting with rain-water run-off; and providing refuge from heat. This can also assist wildlife through provision of enhanced habitats in the context of a changing climate, some of which need boosting, such as those assisting pollinating creatures.

6.3 In accordance with Policy CP28 of the JCS, all proposals will need to demonstrate that green infrastructure provision has been considered in response to policy requirements. In providing GI in accordance with Policy CP28, development proposals need to take forward the objectives and priorities of the District Council's Green Infrastructure Strategy[27]. The GI Strategy identifies a number of opportunities for the enhancement of the existing GI network and the delivery of new GI across the district, utilising a range of methods and principles as set out below.

Greening for carbon capture and cleaner air (sequestration)

6.4 Green infrastructure can assist in the reduction of carbon emitted through developments and associated infrastructure such as roads (from vehicles), through its ability to 'capture' residual atmospheric CO2. Carbon is stored in trees, woodland vegetation and soils, with Carbon Dioxide. The leaves, branches, stems and roots are able to absorb and store carbon dioxide from the air[28].

6.5 Carbon capture (and capture of other harmful pollutants) can be achieved through providing any planting – in open spaces, streets, or attached to

[26] The National Planning Policy Framework (NPPF) defines green infrastructure as 'a network of multi-functional greenspace, urban and rural, which is capable of delivering a wide range of environmental and quality of life benefits for local communities.'
[27] East Hampshire Green Infrastructure Strategy (LUC, May 2019)
[28] Leeds University study I Tree Leeds – Putting a value on the city's trees and green spaces (part of Leeds4Trees joint project)

walls and roofs[29] - that can capture particles and carbon and must be included within landscaping schemes for larger developments. Hedgerows, and also wetlands, where appropriate, have been shown to be very effective in some cases for absorbing carbon.

6.6 Large, mature trees are one of the most successful for carbon capture[30], so existing trees should be retained in developments and landscaping designs, wherever possible. Additionally, the canopies should be maintained and not excessively pruned during the tree's lifetime, to allow for the most beneficial effects, in capturing greenhouse gases and particles. Evergreen trees will also be helpful as part of planting and landscaping plans, to help with this process during the winter months.

6.7 Tree planting is particularly beneficial close to busy roads for capturing particles and carbon. Development of new roads, or on busy roads, should include tree planting for improving the character and quality of the public realm, as well as for health benefits, where this is safe to do so. This must always be approved by Hampshire County Council as the Highways Authority. Only suitable approved species should be used.

6.8 It will be important to ensure that planting is included in the most appropriate places in terms of soil types and water supply; large trees can need a large water supply to flourish, and also possibly particular types of uncompacted or aerated soil. The inclusion of local and native species is also important – and also the appropriate mix of tree species.

Cooling/shading - greenspace and tree canopy

6.9 The required provision of open space within new developments should carefully address the need for adaptation to hotter temperatures. This can be done through the cooling effects of green infrastructure via evapotranspiration, which absorbs and reduces the energy of heat as water evaporates from leaves and grass.

6.10 Adequate greenspace and greening should be provided as part of denser urban developments, where the cooling effects will be most needed as temperatures rise. Trees and shrubs should be considered for landscaping designs to provide shading for people and wildlife, and species with a denser foliage, or which provide a dappled shade, should be considered, such as London Plane, Field Maple, or Oak. Strategically placed trees within developments should also be considered for providing shade on routes and on green corridors, in public spaces, or in streets, and especially for areas with large expanses of hard surfacing, such as car parks.

[29] Though structural and insurance considerations need to be taken into account with such proposals
[30] Leeds University study I Tree Leeds – Putting a value on the city's trees and green spaces (part of Leeds4Trees joint project)

6.11 Water features (blue infrastructure) can also enhance these cooling greenspace features, as well as providing calming and relaxing places for people, as building development becomes denser.

6.12 Designs for required green spaces within/associated with new developments, and the developments' landscaping schemes, will also need to have considered how even small spaces can provide shading for people and animals, to ensure that the environment is shaped for the future to be suitable for different weather patterns; shading in green space should be a focus of landscaping designs, according to the Natural England adaptation manual. Alongside provision for people and domestic animals such as dogs/cats, designs should usefully provide vegetation or other structures that could be used by wildlife such as small creatures or birds.

Cooling buildings and their local environments

6.13 The design of buildings can incorporate the use of green roofs and/or walls. A green roof or wall is a part of a building that is covered completely or partially with vegetation or something that is growing. They can be referred to as 'intensive' (which are used to grow food or provide formalised green spaces), or as 'extensive' (which are more natural and may support wildflowers)[31]. They are planted over a waterproof membrane, and may also include a root barrier layer, and drainage/irrigation systems, and should always be considered very early on in the design of buildings to allow for additional loads, especially where this may retain water.

6.14 Green roofs and walls can be useful for managing the ambient temperatures around solar panels to keep them working most efficiently, providing insulation, cooling buildings and lowering urban air temperatures, and absorbing rainwater, alongside being aesthetically pleasing and providing habitats for wildlife. However, there can be drawbacks, including the need to factor in additional weights to buildings designs, and designing green walls that do not provide a climbing route for intruders to the building.

6.15 Green roofs and walls can reduce ambient temperatures around buildings – something that should be considered, especially regarding potential effects now and in the future of the Urban Heat Island effect. Greening on the outsides of buildings, whether roofs or walls, can allow heat/light that would otherwise be absorbed into the building's fabric and radiated back outwards to be intercepted. This process works through lowering the night-time heat radiating out from buildings, which has gathered throughout the day.

6.16 Developments should be designed to be as resilient to rising temperatures as possible. Applicants are encouraged to demonstrate how the opportunities for the cooling of buildings set out above have been considered, not just through the design of buildings within their

[31] Natural England/RSPB – Climate Change Adaptation Manual (NE751, Edition 2) (2020) – Evidence to support nature conservation in a changing climate

environments, but also in how environmental features have been included in the design to enhance natural cooling.

6.17 An additional sustainability benefit to the greening of buildings, is that it can reduce noise pollution (in and outside of buildings).

Green infrastructure and drainage/water storage

6.18 The government's Environment Plan[32] promotes a move toward natural flood-risk management. This is rooted in the Water Framework Directive which seeks to prevent deterioration of the water environment and improve water quality by managing water in natural river basin districts. Where there is likely to be excess surface water within developments, strategically placed street trees can assist in managing this, as well as improving pollution levels from surface water. Trees can provide natural solutions to flood attenuation. This needs to be in conjunction with sub-surface water retention systems under the paving, allowing water to collect and be absorbed by the trees, before the excess passes to the drains.

6.19 Where there is likely to be an issue with a large amount of rainwater run-off from buildings in a small amount of time (as rainfall events become more substantial), green roofs and walls, can be considered for ameliorating this through retaining water in the roof's substrate and allowing it to re-evaporate into the atmosphere. An additional benefit of this, for the health of the environment and people, is that contaminants in rainwater can also be retained, and acidic rainwater neutralised[33].

6.20 'Urban blue corridors' are where urban development is set back from watercourses, creating areas where water can flow over land and create natural ponds. This creates a mosaic of urban corridors which encourage the natural behaviour of water while reducing urban flooding, enhancing biodiversity and improving access to recreation. This approach represents an alternative way of thinking about opportunities and solutions to urban flood risk management and can be applied at the strategic as well as at a master-planning site-specific scale.

6.21 Green infrastructure can also contribute to the reduction of water pollution, by exploiting the natural processes of sedimentation, filtration and biodegradation to remove pollutants. Increased surface permeability may also make a small contribution to recharge of groundwater supplies, helping to maintain water levels over the year and reduce the risk of drought over the summer months.

Adaptation to climate changes – habitats, planting, and landscapes

6.22 Flora and fauna may also be susceptible to changes in climate, and there is evidence that this is starting to happen, for example the rapid drying-out of

[32] A Green Future: Our 25 Year Plan to Improve the Environment
[33] NE/RSPB - Climate Change Adaptation Manual (NE751, Edition 2) (2020)

wetlands, heathlands, and aquatic areas[34]. By 2050 Climate change could significantly impact a range of species and habitats. Already some native species and pollinators are under threat. Effective design of green infrastructure will need to take account of changing wildlife habitats as a result of climate change.

6.23 Some native species are tolerant to climate changes and should be considered as part of the planting proposal for a scheme. However, there are some notable less tolerant exceptions to this.

6.24 Climate change has implications for the historic natural environment and landscapes, which could create both opportunities and/or loss; some flora and fauna may be able to expand its habitat range, but those currently at the threshold of their tolerance for environmental conditions may be lost.

6.25 Hotter, drier conditions may also increase the risk of fire, particularly for upland landscapes. Flood water inundation and saturation can also damage historic buildings and designed landscapes, particularly if standing water conditions persist. Extreme weather, changes in temperature and future water availability will likely alter the character of parks and gardens, whose particular species are part of their appeal.

6.26 Therefore, schemes for redevelopment will need to address these needs as part of landscaping and planting schemes. Natural England/RSPB's Climate Change Adaptation Manual[35] suggests providing for a 'matrix' of habitats, catering for a diverse range of species. Planting should incorporate cool and shaded areas of 'refuge' for wildlife during hot/dry periods, and water should be included in designs for the benefit of animals and people. Also, where appropriate, wetlands or semi-natural habitats should be considered.

6.27 Invertebrates can thrive with the provision of green roofs, and these can also provide linkages between habitats for birds or flying insects – so depending on the siting of the development this should be considered. For the best attenuation of water, habitats with greater diversity of species perform better, whilst supporting greater biodiversity, and assistance to wildlife can also be integrated into schemes for sustainable drainage systems (SuDS).

6.28 The choice of planting will need to reflect the weather conditions that are likely to be prevalent in coming years, for example drought-tolerant planting is likely to be most successful in drought conditions. Therefore, indigenous plant species – or those with local characteristics – should preferably be considered for planting in landscaping schemes, where these are suitable for soil conditions, climate, existing habitats and offer benefits for wildlife. Consideration should however be given to inappropriate tree planting that may have impacts on biodiversity due to the habitat type of a proposed planting site, which could result in a loss of carbon sequestration and/or overall climate change mitigation, such as afforestation of habitat types with

[34] Natural England Climate change, biodiversity and Nature-based Solutions
[35] Climate Change Adaptation Manual 2020

high carbon storage rates whereby trees can impact upon such habitats and their carbon storage effectiveness.

6.29 In general, it will be prudent to consider a changing climate in all schemes, with a view to 'future-proofing' the district's green infrastructure and landscapes, though many native species have a wide temperature range and distribution.

Preserving local ecology/trees in the design of developments

6.30 Natural England's guide to climate adaptation also notes the importance of brownfield sites to biodiversity, and how this can be lost through development. Where a site is redeveloped into a more urban form, applications should show how compensatory habitat has been considered in accordance with policies CP21 and CP28. This could be through the provision of green walls or roof areas that can support wildlife, provision of tree belts and planting in gardens and car parks.

6.31 New developments should preferably retain existing trees and plants, and schemes should where possible be built around existing trees (in particular mature trees). A 'scorched Earth' approach to design should be avoided.

Greenspace for renewables

6.32 Greenspaces, for example in school grounds, provide space that can be used for renewable energy sourcing (see Chapter 9, regarding ground-source heat pumps), that is unobtrusive. These can supply local buildings (e.g., schools; swimming pools) with heat and district heating systems can be used to transfer heat, and a suitable way to contribute to renewables for housing developments.

Biodiversity Net Gain

6.33 Mandatory biodiversity net gain as set out in the Environment Act (2021) is likely to become law in 2023 following the respective amendments to the Town and County Planning Act. BNG is expected to be maintained for a period of at least 30 years on all new developments and infrastructure projects. The Council will encourage developers to deliver, as a minimum, 10% BNG as part of the wider package of GI to be delivered in accordance with Policy CP28 (Green Infrastructure).

6.34 To achieve biodiversity net gain, proposals should follow the 'mitigation hierarchy' which compels planning applicants to avoid harm in the first instance, then mitigate or finally compensate for losses preferably on-site, then consider off-site or through a combination of the two solutions. A range of guidance and best practice on delivering BNG has been published by the Planning Advisory Service (PAS)[36]. Where BNG is being proposed, developers should consider the District Council's Green Infrastructure Strategy which sets out opportunities for on-site and off-site delivery of GI

[36] Planning Advisory Service – Biodiversity Net Gain

and BNG, including habitat restoration and improving connectivity of the existing GI network and the Council's biodiversity and planning guidance[37].

[37] East Hampshire District Council Biodiversity and Planning Guidance (June 2021)

7 Resources, materials and waste

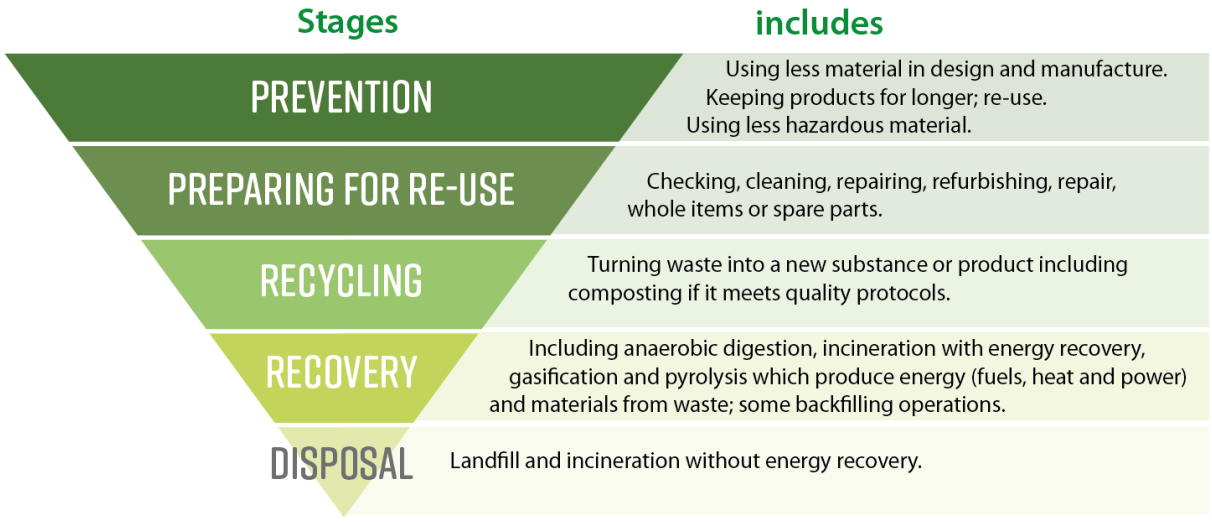
Relevant Local Plan Policy

- CP24 Sustainable Construction
- CSWB7 Waste

7.1 The issues of efficiency in the use of mineral resources, waste minimisation and reuse of buildings and materials are closely linked. Large amounts of waste can be avoided, and consumption of new materials can be reduced, by refurbishing, retrofitting and repurposing existing buildings rather than demolishing them and rebuilding.

7.2 New developments must apply the principles of the waste hierarchy (see Figure 2) and seek to eliminate waste as the first step, reuse waste as the second step, send waste materials for recycling/reclamation as a third step and ensure waste is sent for energy recovery or safe disposal as a last resort, depending on the material.

Figure 2: The Waste Hierarchy



7.3 Construction and demolition are important considerations in the drive to reduce carbon emissions and pollution, and to reduce wastage of resources and pressure on landfill. This chapter of the SPD sets out key areas for construction companies and developers to address, potentially as part of a planning application/ planning condition, and in regard to Construction Management. These are:

- Materials;
- Demolition reclamation of building materials;
- Embodied Carbon; and
- Construction operations.

Materials

7.4 Responsible sourcing and use of materials in construction – managing a product from the point at which a material is mined or harvested in its raw state, through to manufacture and processing, to use, re-use and recycling, until its final disposal as waste, all have an important contribution in reducing carbon emissions and wastage.

7.5 BRE Global[38] has developed a framework standard for the responsible sourcing of construction products, and there are a number of certification schemes which seek to increase both public and industry confidence that risks are being minimised or avoided. This may include the use of legally harvested and traded timber and the use of recognised certification schemes for other construction materials such as the Forest Stewardship Council (FSC). Their use ensures that specifiers are able to demonstrate the responsible nature of their selection decisions.

7.6 For residential developments, applicants are encouraged to consider and set out what measures they are taking to maximise the use of green building materials[39] and that all construction timber is 'Grown in Britain' certified, or where this is not feasible, FSC certified.

7.7 For non-residential and Multi residential development applicants should consider measures to maximise the use of green materials (with reference to BREEAM New Construction credits for Major development[40]) and that all construction timber is 'Grown in Britain' certified, or where this is not feasible, FSC certified.

7.8 The construction industry is the single largest user of materials in the UK[41] and 10% of national energy consumption is used in the production and transport of construction materials and construction products. There are many environmental impacts associated with the production and transfer of building materials including CO2 emissions; water pollution; habitat loss/deforestation; fossil-fuel depletion; and use of precious water resources.

7.9 The Council will encourage applicants to demonstrate that the selection of materials for use in the scheme has been carried out with due regard to the prior extraction of aggregate where there is a viable mineral resource and the potential for use of local recyclable materials in the first instance, and then the use of locally manufactured/produced materials (to reduce emissions from transport of goods) in line with the protocols set out in accredited certification schemes. These cover the use of recycled materials within schemes, and the use of sustainable procurement plans to support the use of responsibly sourced materials including from local sources.

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[38] BRE – Sustainable Products and Materials

[39] Green building materials are composed of **renewable**, rather than non-renewable resources. Green materials are environmentally responsible because impacts are considered over the life of the product

[40] Technical Manual SD5078: BREEAM UK New Construction 2018 3.0

[41] Equating to 420 million tonnes every year

Demolition and reclamation of building materials

7.10 The most sustainable solution, and the one that would in most cases have the lowest construction carbon emissions, is to re-use any existing buildings (either all or some of the structures on the site), and it may be possible to achieve other environmental objectives (such as improving energy efficiency) by small additions and adaptations to the fabric (such as new window fittings and extra insulation).

7.11 Whilst the demolition of buildings and structures and the clearance of the site will be an essential element for many construction projects, this needs to be undertaken in a sustainable way. The re-use of demolition materials on-site where possible, such as for aggregate, fill or landscaping, or as part of new structures, helps reduce carbon emissions and waste, and it will be necessary for this to be set out as part of the Construction Environment Management Statement.

7.12 Materials that it may be possible to salvage and re-use from demolition may include bricks; wood (from buildings); asphalt (from roads and roofing shingles); gypsum (the main component of drywall); metals (such as copper and steel); glass; and some plastics, all of which should be salvaged as far as possible. Similarly, it may be possible to salvage components of buildings, such as: doors; windows; and plumbing fixtures.

7.13 As well as building materials and components, there may also be some natural materials that will be salvageable as a by-product of site-clearance which might include trees, stumps, earth and rocks.

7.14 How this salvage work is managed on site, and how materials and components are re-used, is crucial to reducing carbon emissions and other pollution, and reducing the wastage of resources/pressure on landfill. The Institution of Civil Engineers (ICE) have published a demolition protocol[42], developed in collaboration with the Resource Sustainability Initiative and the Chartered Institution of Wastes Management (CIWM), which provides methods to assess and recover demolition material, and the sustainable use of resources through use of reclaimed and recycled materials for use in new build.

7.15 Where demolition forms part of the development, a plan for the sorting and collection of demolition materials for reuse and recycling following the ICE demolition protocol (or equivalent) is recommended. This is best included with the planning application, or a condition will be applied to a future planning permission to provide such a plan before works commence.

Embodied carbon

7.16 Embodied carbon is a term used for making an assessment regarding a building's greenhouse gas (GHG) emissions' footprint (which includes carbon dioxide). Depending on the scope of the assessment, it will include

[42] https://www.ice.org.uk/

the total emissions generated through the various processes necessary to create the building, including the extraction/manufacture/processing of materials, and the transportation and assembly of these and all related elements/products used in the building's construction. It may also include the maintenance and replacements of parts, and the building's final disassembly and parts disposal.

7.17 Embodied carbon does not include the operational elements of running the building; it is concerned with the building's construction and fabric. It is sometimes referred to as 'capital carbon'. Embodied carbon assessments are an emerging requirement influencing the selection of construction material and are likely to become normal practice as the country moves towards zero carbon.

7.18 EHDC will be supportive of all measures to consider the embodied carbon of materials used within the built environment, including the specification of building materials with lower embodied energy and through the application of embodied carbon assessments. This may include the use of modern methods of construction, such as pre-constructed building elements.

Construction operations

7.19 All construction sites must be carefully managed to prevent environmental damage and pollution, including the careful prevention of sediment and chemicals from being washed into waterways including via roads/drains; and the production of excess dust, noise/light, and vibrations, causing disturbance to surrounding properties and wildlife. Mud on roads and pavements can become very slippery and dangerous unless cleaned off regularly.

7.20 Planning conditions may be used to control impacts from the construction of new development. Conditions can include restrictions on hours of operation and construction and the type of machinery used. Applicants will also be required to prepare a Construction Environment Management Statement to show how the construction will be undertaken including incorporating the measures outlined in this SPD.

7.21 Aware of the challenges that construction can have on the wider community, a national Considerate Constructors Scheme[43] has been created by the industry. The scheme is a voluntary code of considerate practice, to which participating construction companies can sign up their sites. Registered sites should do all they can to reduce any negative effect they have on the environment, and should work in an environmentally conscious, sustainable manner. They should provide clean, appropriate facilities for those who work on them comparable to any other working environment and should do all they can to reduce any negative impact they may have on the area in which they are working. Construction companies working in the district are

[43] https://www.ccscheme.org.uk/

encouraged to follow best practice or preferably become registered in such schemes.

7.22 Modern forms of prefabricated construction are supported as they can be a highly efficient way of construction, consume less water, facilitate the reduction of embodied carbon, and reduce carbon emission.

7.23 As part of the Construction Environment Management Statement the types of matters to address could include whether the builder is registered with a considerate constructor's scheme, the inclusion in the demolition and construction phases of dust spreading prevention measures such as watering down the site and using dust screens, and whether (where appropriate) there will be pollution containment measures.

8 Development location and measures that enable sustainable lifestyles

Relevant Local Plan Policy

- CP31 Transport
- CSWB6 Sustainable Transport
- CSWB12 Pedestrian and Cycle Routes
- CSWB13 Public Transport

8.1 The selection of location for a new development is an important element in the sustainability of that development depending on its use – in particular the opportunity to minimise the need to travel using a vehicle[44]. However, it is important to consider the linkages between a development and adjoining areas, and how these can be enhanced to facilitate active travel and reduce car use to create places that are sustainable - reducing greenhouse gas and other harmful emissions.

8.2 This chapter of the SPD sets out measures that can be considered for achieving this aim but is limited to the design of developments for transport. Local Plan Policy CP31 sets out requirements for transport assessments (TA) and travel plans (for developments likely to generate significant movement) and includes requirements for contributions to local public transport facilities where necessary.

8.3 There are many measures that can be included in developments that enable the occupants of the new buildings (whether employees, residents or others) to live lifestyles that are more sustainable, such as the 20-minute neighbourhood[45]. The following measures should not be considered exhaustive.

Accessibility to local services and public transport (large developments)

8.4 All developments should be designed with residents' or users' access to other facilities and services - and to wider public transport services - in mind[46], facilitating walking and cycling (active travel), or reduce the length of vehicle trips – thereby cutting greenhouse and other polluting emissions and need for energy supplies. This can also contribute to the wider sustainability objectives of providing opportunities for healthy lifestyles, and opportunities for those without access to cars. 'Accessible places' is included as one of the ten characteristics of a well-designed place in the National Design Guide. Options for travel for those without cars should always be considered.

[44] As set out in JCS Policy CP31
[45] https://www.tcpa.org.uk/the-20-minute-neighbourhood
[46] JCS Policy CP31

8.5 For residential developments this should include access to schools, local retail and community services, and public transport/cycle route links to wider facilities, and for employment sites, access to public transport/cycle route links to surrounding areas should be designed into the scheme. Where travel plans are required, this can include provision such as mini-bus links to stations. It should also include secure parking for bicycles and/or shower/storage facilities, and the design of streets to make walking or cycling more safe or convivial. Access through and beyond larger sites should be planned at the outset as part of the design of the development. The following should be considered:

- The site's permeability should not only facilitate access for residents/users of the site, but also other pedestrians and cyclists where the site is large enough to block routes – or could enable access that was not previously available, to improve the wider network.

- For larger sites, safe pedestrian and cycle routes through the development – and connecting to wider networks – should be incorporated. This should include connections to green infrastructure leisure networks, or routes enabling access to schools (for residential developments), service centres, or wider public transport.

- Pedestrian routes to services and facilities in particular need to be as direct as possible – and the provision of a dedicated route should be included where the design of a development means that the roads take circuitous routes.

- Routes provided should be convenient, safe, and legible, for all ages and abilities to use, with appropriate signage, lighting and overlooking. They should also be convivial, where possible, with the provision of seating for pedestrians, and planting.

- Pedestrian and cycle routes should also avoid areas of potential flooding within sites and provide natural shelter from the sun and rain (for climate adaptation).

Local Case Study 2 – Whitehill & Bordon Green loop

The Whitehill & Bordon Green Loop – set to be completed in 2022 – will be a 7-kilometre continuous, multi-functional network of walking and cycling paths, forming the basis of a green infrastructure network. It is designed to link key destinations in Whitehill & Bordon, including public open spaces, pocket parks, and suitable alternative natural green spaces (SANGs), along with education and community facilities.

A number of challenges were identified through community engagement including a lack of accessibility to local facilities and existing transport routes were considered unsafe creating barriers to active travel. The Green Loop project will address these issues, improving access to active travel for all while ensuring connection between the new and existing parts of the town. The scheme will also include a Green Grid – a secondary network of footpaths and cycle paths connecting the town to the Green Loop.

The 'value of statistical life' tool was used to measure the economic benefits of the Green Loop to Whitehill & Bordon, calculating a benefit of approximately £4.3 million. These economic benefits include increased physical activity and the prevention of premature deaths alongside carbon reduction through reduced car journeys.

Strong partnerships between East Hampshire District Council and Hampshire County Council – together with developers and landowners – have been central to the successful delivery of the Green Loop and Green Grid. To fund selected elements of the project, we secured over £4 million from the EM3 Local Enterprise Partnership (LEP), alongside Section 106 developer contributions.

Street design (large sites)

8.6 The design of roads within larger sites should be approached with regard to how pedestrians and cyclists can use them safely and conveniently, although this should be integrated with a consideration of a street's important contribution to the design and character of the area. Street design will also need to be sensitive to local character in relation to building lines, the height-to-width ratios of roads and the inclusion of green infrastructure, such as trees and shrubs. The visual relationships between homes, plot frontages and streets are important for respecting or improving the local sense of place.

8.7 A holistic consideration of climate-responsive design and local character is particularly important in respect of clear, legible, attractive and safe routes to schools and local services. Proposals should address the need for crossings points (pelican crossings for areas likely to be busier, and centre refuges) and consider the design of junctions of residential streets with main roads, avoiding large visibility splays that make crossing the ends of roads difficult

for pedestrians.it is sometimes also possible to include raised level crossings across these.

8.8 20mph zones may be suitable for some residential development, but there are likely to be better alternatives, or even Home Zones where vehicle access would be limited and safe spaces for children to play outside would be created. In suitable residential developments, sensitive parking designs can be used to slow traffic speeds and provide aesthetic appeal, for example through the use of planter schemes. This needs to be carefully balanced against potential air quality issues which can result from lower vehicle speeds or additional waiting and circulating.

Bicycle parking and storage

8.9 Adequate parking for bicycles should be provided for users/residents and visitors to developments, depending upon their size and function, and this should be secure, preferably covered, and sensitively screened, for example through the use of planting schemes. Requirements for cycle parking are set out in the Council's Vehicle Parking Standards SPD[47]. Consideration should also be given to provision of parking and charging facilities for electric bicycles on larger schemes.

Electric vehicle charging points

8.10 To accelerate the transition to electric vehicles, the UK Government has announced a ban on the sale of new petrol and diesel cars and vans from 2030, with hybrid vehicles allowed to be sold until 2035. Changes to Building Regulations from June 2022 will mandate electric vehicle charging infrastructure for many new and renovated homes and commercial buildings. The Government expects the home to be central to the future EV charging network as charging EV at home overnight using a dedicated charge point is generally cheaper and more convenient for consumers.

8.11 Electric vehicles (EV) do not emit NO2 or polluting particulates from exhaust pipes – although some particles are still generated from the use of tyres – and can reduce GHG emissions further where the source of electricity is decarbonised.

8.12 EV charge points should be located in safe, accessible, and convenient locations. There are different types of design of charge points, and these should be incorporated into a scheme so that they are discrete and avoid obtrusiveness and clutter, whilst also avoiding any light pollution effects. The developer may need to plan for increased power supplies and should provide the advance provision of cabling and ducting in line with government guidance.

[47] The East Hampshire District Local Plan Vehicle Parking Standards Supplementary Planning Document (July, 2018)

8.13 The technical guidance[48] regarding the installation and charge point requirements in Part S to the Building Regulations takes effect from June 15 June 2022. The guidance applies to new residential and non-residential buildings, buildings undergoing a material change of use to dwellings, residential and non-residential buildings undergoing major renovation and mixed-use buildings that are either new or undergoing major renovation.

Recycling storage

8.14 Internal and external storage areas for recycling purposes should be integrated into a development. To future proof developments, recycling storage space should be adequate to allow the occupants of buildings to separate their recyclable waste, taking into account the size of recycling material containers, the frequency of collection and an allowance for seasonal variation. For commercial developments, space should be allowed for the collection and storage of bulk material for recycling. The proposed refuse and recycling storage points should be identified when detailed plans are submitted.

Community food growing

8.15 Proposals for larger developments, community food growing spaces help achieve sustainable development in the following ways:

- locally grown food reduces food miles, lowering embodied carbon and contributing to
- improved air quality,
- vegetated open spaces reduce the urban heat island effect,
- the permeable surfaces of food growing spaces and the harvesting of rainwater contribute to sustainable drainage, and
- rooftop gardens provide accessible open space in high-density developments.

8.16 The guidance document “Good planning for good food - using planning policy for local and sustainable food” (2011), prepared by Sustain, explores how local authorities and communities can use planning policy and decisions to create more local and sustainable food systems. The report is available at: https://www.sustainweb.org/publications/good_planning_for_good_food

8.17 The Alton Local Food Initiative[49] is an example of a local scheme that encourages and enables people in the local community to be involved in growing, sourcing and eating local, seasonal and responsibly produced food.

8.18 The inclusion of community composting facilities can increase the sustainability of community food growing by reducing the amount of organic

[48] Infrastructure for the Charging of Electric Vehicles: Approved Document S (2021)
[49] https://altonlocalfood.org.uk/

waste transported off site and the amount of compost transported into the site.

9 Renewable and/or low-carbon, and local power and heating

Relevant Local Plan Policy

- CP24 Sustainable Construction

9.1 Once the demand for energy has been minimised, the heating and cooling energy demands for the development must be assessed in regard to the energy requirements of surrounding land uses, as efficiencies between uses in proximity may be achievable. This also applies to land uses within larger developments. Measures to consider may include a connection to district heating networks or onsite combined heat and power (CHP) systems.

9.2 In addition to exceeding TER by 31%, residential developments are required to provide either on-site renewable energy generation, or connection to a renewable or low carbon community energy scheme, to contribute to a further 10% reduction in the residual carbon emissions in accordance with Policy JSCP24.

9.3 To help meet national and international50 targets for reducing emissions of greenhouse gases, including carbon, and to ensure constant energy supplies, there is a need to further reduce or eliminate the burning of fossil fuels, such as gas, for power and heat51, and this chapter provides advice on how this can be achieved in new developments. The installation of gas boilers in new homes will be phased out by 2025 and replacement boilers phased out by 2035, providing essential impetus to plan for suitable alternatives in new development, such as hydrogen fuel boilers.

9.4 The technologies set out present a variety of approaches to contributing to a reduction in the use of fossil fuels for energy. The first section looks at systems of heating and power that aim to harness the residual energy from other processes, thus creating efficiencies in the existing use of energy – whether fossil fuels or renewables. This includes systems such as Combined Heat and Power (CHP) systems, district heating, and thermal storage. The second part considers the use of renewable technologies such as solar and wind power, and measures such as heat pumps or solar for direct heating.

9.5 There is also a need to reduce energy wastage through grid-transmission, which can be achieved through greater use of locally-generated power – and all the systems set out in this chapter can contribute to this objective. This chapter also touches upon requirements for those considering setting up renewable technology farms or stations.

[50] https://unfccc.int/process-and-meetings/the-paris-agreement/the-paris-agreement

[51] Targets have been largely met so far by changes to national electricity generation, according to the UK's Climate Change Committee.

Efficient use of residual energy technologies

9.6 The middle tier of the Energy Hierarchy encourages the use of technologies that are able to make use of locally available energy that would otherwise have been wasted, to produce heat and energy, thereby to reducing the overall level of carbon emissions. These technologies produce some carbon emissions but at lower rate than traditional means such as existing domestic gas or oil fuelled central heating boilers or the use of large grid-based systems which lose in the region of 26 terawatts per hour in the transmission process[52].

9.7 There are several renewable technologies that are currently suitable for onsite (decentralised) energy generation, which developers may wish to explore:

- Biomass heating systems
- Solar thermal
- Solar photovoltaics
- Wind turbines

The following low carbon energy generation technologies may be adopted to reduce carbon emissions:

- Combined heat and power (CHP)
- Heat pumps

9.8 Applicants should have regard to the Council's Renewable and Low Carbon Study 2018[53], which assesses the technical potential for renewable energy and where different renewable energy technologies and low carbon sources are most suitable in the district, including potential sources of biomass fuel.

District Heat and Cooling Systems

9.9 District heat and cooling systems are well-established and use highly insulated pipes to distribute excess heat generated from a centralised location – i.e., existing industrial processes, or heat produced by traditional boilers or incinerators - to surrounding non-residential and residential premises.

Combined Heat and Power (CHP)

9.10 CHP is a highly efficient process (over 80 per cent) that captures and utilizes the heat that is a by-product of the electricity generation process and would otherwise be wasted, reducing the need for additional fuel to be burnt. By generating heat and power simultaneously, CHP can reduce carbon emissions by up to 30% compared to the separate means of conventional generation via a power station and then a boiler. The heat generated during

[52] https://www.statista.com/statistics/322834/transmission-distribution-and-other-losses-of-the-public-electricity-distribution-system-in-the-united-kingdom-uk/
[53] Renewable and Low Carbon Study for the East Hampshire District (easthants.gov.uk)

this process is supplied to an appropriately matched heat demand whose needs would otherwise be met by a conventional boiler. The technology is regarded as 'low-carbon' rather than renewable because most CHP installations in the United Kingdom use natural gas as the fuel, although biofuel can also be used. When considering the use of CHP, the Council recommends the use of renewable CHP generation which reduces further still the carbon intensity of power generation through the use of carbon neutral, renewable fuels.

9.11 For many larger developments, CHP is the measure that offers the most significant single opportunity to reduce energy costs and improve environmental performance. Furthermore, transmission and distribution losses are reduced and there is increased fuel supply security. The Government supports the development of CHP and has set up a free service, CHP Focus[54], providing the necessary information and online tools to assist developers, including a Site Assessment Tool, the UK CHP Development Map, and a CHP Scheme Database.

9.12 However, CHP does have some challenges with regard to the location of the facility and the associated flue, and impacts upon air quality, noise and visual amenities, all of which need to be carefully considered when using this technology; for example schemes using CHP will be unlikely to be given permission in areas – or where it could affect areas – already affected by poor air quality issues, such as Air Quality Management Areas (AQMA).

9.13 CHP plants need permanent availability of access, and there are also issues surrounding developing and connecting to the network and setting aside paths for future expansion - including ducting to accommodate future upgrades, which need to be considered early in the design of the scheme.

9.14 Applicants should refer to government guidance[55] and contact CHP operators in the early design stages to ensure designs are optimised for CHP use.

Micro-CHP (Micro Combined Heat and Power)

9.15 Micro-CHP boilers are designed to generate all the heating and hot water and a significant percentage of the electricity needed by a typical home. Such technology can significantly reduce carbon emissions. They also benefit from increased efficiency as they generate electricity directly on site, therefore avoiding the transmission losses that occur when power is taken from the grid.

Heat pumps

9.16 Heat pumps need electricity to run, and so an element of carbon may be required. The pumps extract heat from the air, ground, or water to heat a building. The ratio of electrical energy required to run the pump, compared

[54] https://www.gov.uk/guidance/combined-heat-and-power
[55] Department for Business, Energy and Industrial Strategy – Combined Heat and Power

to the heat energy produced, is called the Co-efficient of Performance (CoP). In terms of sustainability, the heat generated outweighs the electricity requirements.

9.17 There are three different types of heat pumps as follows.

Air Source Heat Pumps (ASHPs).

9.18 ASHPs can heat a home and its water supply by extracting heat from air outside of a building (even at -15^{O}C) - in a similar way that a refrigerator extracts heat from its inside – and use this to heat radiators and underfloor heating systems. Although easier to install than other forms of renewable technology, there is not the same level or consistency of heat compared to gas or oil boilers, as ASHPs deliver heat at lower temperatures over longer periods. They are, therefore, potentially more efficient in combination with good insulation, large radiators and/or underfloor heating systems. In addition, ASHPs typically work with thermal store systems, allowing stored heat to be used than turning the pump on and off when demand is lower.

9.19 It should be noted that ASHPs are not typically able to provide hot water at temperature high enough to kills bacteria such as Legionella. As such, additional power supplies would be needed to ensure water was heated high enough for this purpose – i.e. 60^{O}C. In term of other issues, the location of ASHPs needs to be appropriately considered. A suitable outside ground space will be needed with sufficient air circulation space around it – for examples, sunny walls are ideal. Notwithstanding the above, ASHPs can have a negative visual, and modest vibration and noise, impact. For these reasons, the amenity of neighbouring properties (particularly in flats and high-density developments) will need to be considered.

Ground Source Heat Pumps (GSHPs)

9.20 GSHPs extract heat from the ground via buried pipes (ground loops). To do this, water and anti-freeze is circulated around underground pipes. The heat from the soil is absorbed into the fluid and is passed via a heat exchanger/compressor into the heat pump. This heat is then used to heat radiators, underfloor or warm air heating systems. Cooled water then re-enters the circuit and starts the process again.

9.21 GSHPs can be utilised all year-round as sub-surface ground temperatures stay fairly constant. However, the amount of heat that can be generated is dependent on the length of the loops installed which, in turn, is dependent on the ground space available. This infrastructure could be placed outside the curtilage of a building, where appropriate. The loop area must be free from trees and underground structures. GSHP loops can either be laid horizontally in a trench – about 1m below the surface – where there is sufficient outdoor space to allow this or, alternatively, they can be laid vertically by drilling boreholes from 90-160m deep. The latter is not advisable in locations of Water Source Protection Zones (SPZs).

9.22 GSHPs can be installed without planning permission. However, it is advisable to check with the LPA regarding archaeological, ecological, environmental and conservation requirements.

9.23 GSHPs typically work with thermal store systems, allowing stored heat to be used than turning the pump on and off when demand is lower.

9.24 GSHPs are a useful renewable energy resource that can work in tandem with the provision of green infrastructure and open space (utilising heat from the ground in these spaces). They can also be laid for several properties and therefore with fewer boreholes, and to provide the ready infrastructure for new properties. However, like other forms of renewable technology, they will require regular testing and maintenance to ensure effective operation. The same also applies regarding the need for larger radiators or underfloor heating systems.

Renewable energy and heating sources

9.25 Renewable energy is energy 'generated from natural resources such as the sun, wind, and water, using technology which ensures that the energy stores are naturally replenished' [56].

9.26 It will be necessary to carefully consider appropriate technologies and systems to compliment the development. Whilst each have benefits regarding sustainability, there are also limitations for each, as set out in the descriptions below. Specialist advice should be sought to design the most effective solution for the development.

Solar Photovoltaic Panels

9.27 To reduce or off-set CO2 emissions generated by the use of mains electricity the most cost-efficient method of reducing CO2 emissions is often by installing photovoltaic (PV) solar panels or tiles.

9.28 The installation of PV on the roof of most new houses should achieve the 20% CO2 reduction figure in almost all cases. For non-residential buildings this will be more variable, according to available roof area and the predicted building use. PV systems are described in terms of the amount of power they generate (kWp). Domestic PV arrays typically range from 1 to 4kWp which might require a roof area of approximately 8- 28 sqm respectively. This may be a conservative estimate of the power generated per square metre and the efficiency of PV is improving every year. When incorporating solar PV into a scheme, developers should consider:

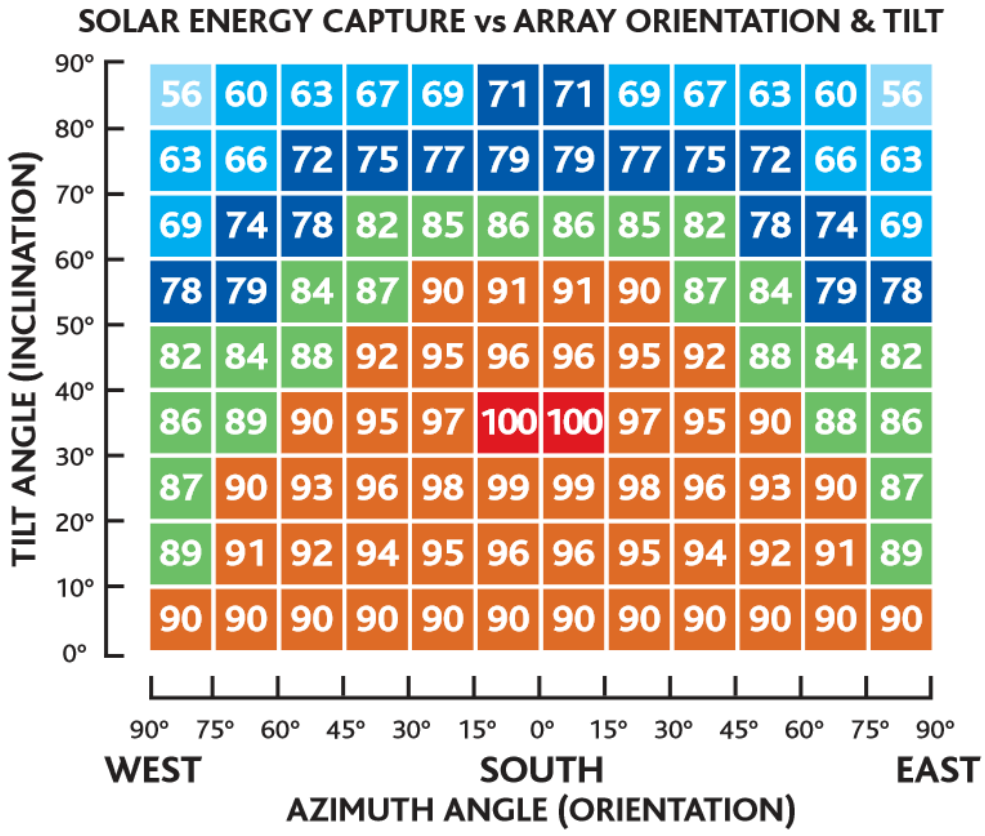
- Roof orientation
- Overshadowing and the movement of shadows during the day and over the year

[56] https://energysavingtrust.org.uk/

9.29 In some circumstances, there may be visual impact considerations that make solar panels inappropriate. This may be because of the sensitivity of the site and the potential visual impact on the landscape. Where PV is visible from the public realm, building integrated systems (for instance set within the roof or as rain screen cladding on walls) are preferred to bolt on panels. Where visual impact is an issue (such as in conservation areas) PV tiles may be more acceptable than PV panels and panels on ancillary buildings such as garages, stores and sheds may be less prominent. All solar panels must be of an appropriate design and the Council encourages the use of PV panels of a design and colour that are sensitive to the existing building and surrounding area's character.

9.30 As can be seen from Figure 3 below the ideal roof would be facing due south and would be at an angle of 30-40 degrees. Angles facing due east or west will have only approximately 85% of the solar collection efficiency which means that approximately 18% more solar panels are needed to generate the same amount of electricity.

Figure 3: Solar collection efficiency due to orientation and roof angle



Source: [The Renewable Energy Hub UK]

Solar thermal heating

9.31 Solar thermal systems absorb heat from the sun with panels that are called collectors, which heats a transfer fluid, which in turn heats water for use in the building. Solar thermal collectors are usually mounted on the roof of a building. South facing at a 30-40o angle is ideal, but as the panels do not rely on direct sunlight, they can still be efficient at other angles.

Solar Photovoltaic – thermal

9.32 Solar Photovoltaic-Thermal (PV-T) is a hybrid solar panel combining the functionality of solar thermal collectors and solar PV in one panel. The panels create not only electricity but also produce hot water for use in the home.

9.33 As with PV, where there is likely to be significant overshadowing from existing or proposed large trees or from neighbouring structures, solar water heating may be much less feasible.

Bio-solar/Smart Green Infrastructure

9.34 The efficiency of solar panels can be enhanced when combined with the provision of green/living roofs[57]. Evapotranspiration from a green roof can keep PV panels closer to an optimum temperature of around 25 degrees C[58], and the greenery can also keep dust and air-pollution at bay, so that dust levels affecting the panels would be lower than on a bare roof in the same location[59].

Wind turbines

9.35 Wind turbines harness energy from the wind which can be converted into electricity for homes and businesses.

9.36 Wind energy is a very sustainable renewable resource with no associated carbon emissions or air pollutants. There are two types of wind turbine – those that are free-standing on a pole located in an exposed position, and smaller ones mounted onto a building. The amount of electricity generated is dependent on the strength of the wind, and the size of the wind turbine; wind speed inconsistencies can create problems, and realistically the best locations are often on hill ridges where the winds are more constant. Electricity generated in this way can be stored in specially designed storage systems such as batteries (see below), for use when there is less wind. It should however be noted that the potential for wind energy generation in the District is low[60].

9.37 Nonetheless there are a number of important planning issues that will need to be considered, including the impacts of noise and vibration and visual impacts on neighbouring properties, Conservation Areas, the setting of listed buildings, the setting of the South Downs National Park, and wildlife.

Storing excess heat and energy

9.38 An important consideration is not wasting the heat and energy generated from the various processes described above. Thermal stores and batteries enable any excess heat or energy generated from low-carbon and renewable systems to be utilised at a time that is convenient.

9.39 Some systems for energy storage have ‘smart’ options, allowing for tracking of energy-use online and decisions regarding optimum times for charging the system or drawing power from it.

Thermal stores (Heat storage)

9.40 Thermal stores consist of a very well insulated water container which can store the heat produced from the technology described above for many hours. They also have at least one heat-exchanger fitted. Typically, these

[57] Chemisana & Lamnatou 2014; Tomazin 2016 - Natural England/RSPB – Climate Change Adaptation Manual (NE751, Edition 2) (2020) – Evidence to support nature conservation in a changing climate
[58] Information from Turfonline/Treeliving/Livingroofs.org
[59] Green Roof Technology 2015
[60] Renewable and Low Carbon Study for the East Hampshire District (LUC, 2018)

containers can vary in size from between 120 litres to 500 litres capacity. Thermal stores can also utilise 'phase-change' materials technology. To accommodate such a system, adequate space will be required.

9.41 The Energy Savings Trust notes[61] that the full benefit of thermal stores is derived from a design which allows a variety of inputs and outputs (e.g., for heating or hot water, etc), and thermal stores are noted as working particularly effectively to enhance the efficacy of solar water heating and heat pumps. SMART systems will prioritise the use between the renewable source and the thermal storage to ensure the most effective distribution of the energy available.

Batteries and Inverters

9.42 An alternative to thermal stores is the use of deep cycle batteries which can store power from a variety of electricity-generating systems so that it is available when needed. However, inverters may also be needed alongside batteries for running many standard AC appliances, and for battery charging.

Energy from Biomass Combustion

9.43 Burning logs, chips, or pellets can be a more sustainable option than burning coal, oil or gas with regard to carbon emissions, but there are concerns regarding the effects of biomass on air-quality, and therefore this should only be considered in areas of low population density.

9.44 It is important that the biomass is sourced locally, so that carbon reductions are not lost through the transport of this fuel. The Council's Renewable Energy study notes that there there are a number of woodfuel suppliers in the area around East Hampshire and potentially a good supply of woodfuel in East Hampshire.

9.45 Log-burning boilers are larger than standard boilers, so additional room would need to be provided for this, and for adequate storage space for the delivery and storage of the fuel. Additionally, the homes would need to be designed with flues/chimneys, and fire safety standards applied.

9.46 A biomass system based on wood-burning (e.g., log-boilers) is more effective when accompanied by a thermal storing system (see below), given the need to burn batches of logs at high efficiency levels rather than in small quantities throughout the day[62], allowing some of the excess heat generated at maximum output to be stored for when it is needed. So additional room for thermal stores tanks may also need to be considered on the site. In addition, consideration should be given to the ease of use of systems for residents.

[61] https://energysavingtrust.org.uk/
[62] https://energysavingtrust.org.uk/

9.47 For a development of groups of houses, or for larger buildings, wood chips can be used provided the proposal can meet the environmental requirements.

10 Planning Application Requirements

10.1 It is important that the principles of climate change mitigation and adaptation and sustainable construction are considered from the outset of a development proposal to help shape the design. The guidance in this SPD should assist applicants in producing their Sustainability Checklist as well as other documents required to support planning applications.

10.2 It is recognised that this SPD has been produced at a time of changing national policy, particularly in relation to carbon reduction from new development and Biodiversity Net Gain. Changes to Building Regulations may have implications for the implementation of adopted policies in the East Hampshire District Council Local Plan. In light of this, further technical guidance on the implementation of affected policies may be produced once such changes are brought in.

Sustainability Checklist

10.3 The District Council will work with developers to maximise the opportunities for climate change mitigation and adaptation and the purpose of the Sustainability Checklist (Appendix 4) is to help developers consider the potential measures possible and so encourage appropriate design solutions.

10.4 The checklist is required to be completed and submitted with planning applications for all development. It is acknowledged that proposals affecting Listed Buildings and other non-designated heritage buildings may not be able to comply and in these Case Officer discretion will be used as to what is feasible on a case-by-case basis.

10.5 The Sustainability Checklist has been designed to assist applicants to review their approaches to sustainability in the design of proposals for the development, meeting the minimum policy requirements and, where feasible, exceeding these requirements. Applicants are expected to work through this during the preparation of the planning application, starting from the pre-app consultation and/or engagement with planning officers.

Carbon Reduction Statement

10.6 The Carbon Reduction Statement (CRS) is an assessment of the carbon emissions for each unit in the scheme using the Standard Assessment Procedure (SAP) method. As referred to earlier, this information is a requirement of Building Regulations, however where proposals seek to demonstrate the reductions in emissions that would be achieved at the planning application stage, the Council requests the submission of the SAP data utilising the CRS template in Appendix 5. The CRS will be sought for proposals of one of more dwellings seeking full planning permission or, for outlines proposals, submission with applications for reserved matters.

Construction Environment Management Statement

10.7 A Construction Environment Management Statement will be required for some developments to address various impacts in relation to water, waste, noise and vibration, dust, emissions and odours, ground contamination and soil pollution, wildlife and features and heritage/archaeology. The scope of and timing of the submission of the Statement should be discussed with planning officers at the pre-application stage.

When should information be submitted?

10.8 The process of producing the information must inform emerging proposals and help to steer them towards sustainable outcomes. For full plans applications, the Sustainability Checklist must be provided with the planning application at the point of submission.

10.9 For outline planning applications, the information in the Sustainability Checklist submitted with the application must cover any matters covered by the outline plan. For example, if an outline plan includes a site layout, it must be accompanied by information setting out how the layout complies with the matters set out in policy and this SPD (e.g., how the layout is designed to reduce energy consumption, adapt to climate change, etc.) The level of detail within submitted information should be proportionate to the level of detail within the application.

10.10 For reserved matters planning applications, the information submitted with the application must cover any matters covered by the reserved matters application. For example, if an application includes details of the buildings that will be constructed, it must be accompanied by information showing how the construction will comply with the matters that relate to buildings (e.g., energy and carbon performance, water efficiency, construction and demolition waste management etc.).

Viability considerations

10.11 As part of the process of developing the Joint Core Strategy (2014), the viability of all of the policy requirements has been tested as part of the examination process. With regards to the policies considered by this SPD, the requirements set out in these policies were all found to be viable.

10.12 Integrating sustainability considerations early in the development process can go some way to ensure that policy requirements and opportunities for delivering best practice can be achieved in a cost-effective manner. Nevertheless, it is recognised that viability considerations can change and are influenced by many factors, particularly where there have been changes in buildings regulations and technical standards relating to sustainable design and construction. Technical feasibility may also have a bearing on the ability of proposals to fully meet policy requirements in some situations. In such instances, the Council would strongly recommend that applicants seek early engagement with the council in order to consider and agree in principle alternative ways in which the aims of the council's sustainability policies and objectives can be achieved, even if full policy compliance is not

possible. Such an upfront approach can help to minimise delays after the formal submission of planning applications.

Other matters

10.13 When granting planning permission, the Council will apply conditions requiring work to be carried out in accordance with the proposals and measures set out in the submitted Sustainability Checklist, Carbon Reduction Statement and Construction Environment Management Statement.

10.14 Any documents submitted to support a planning application should have text that can be highlighted and copied throughout (i.e., the text should not be an image of a page, and the file must not be restricted or encrypted to prevent the copying of text). This is because decision makers may need to copy information from the document (e.g., to check calculations) or to search the document for specific references.

Appendix 1: Glossary

Biodiversity Net Gain – As part of any development habitats should be left in a better state than before development.
BREEAM (Building Research Establishment Environmental Assessment Method) – a sustainability assessment method used to masterplan projects, infrastructure and buildings. BREEAM assessment evaluates the procurement, design, construction and operation of a development against a range of targets based on performance benchmarks.
Brise Soleil - A device, such as a perforated screen or louvres, for shutting out direct or excessive sunlight.
Dwelling Emissions Rate – The actual building/dwelling CO2 emissions rate. It is expressed in terms of the mass of CO2 emitted per year per square metre of the total useable floor area of the building (kg/m2/year).
Climate change adaptation - Adjustments made to natural or human system in response to the actual or anticipated impacts of climate change, to mitigate harm or exploit beneficial opportunities.
Climate change mitigation - Action to reduce the impact of human activity on the climate system, primarily through reducing greenhouse gas emissions.
Combined Heat and Power – The simultaneous generation of heat and power in a single process.
Communal Heating/ Cooling – A heating/ cooling system where heat and cooling is supplied to multiple dwellings and/ or non-domestic uses from a shared source.
Decentralised – broadly refers to energy that is generated off the main grid, including micro-renewables, heating and cooling. It can refer to energy from waste plants, combined heat and power, district heating and cooling, as well as geothermal, biomass or solar energy.
Energy Assessment/strategy – An energy assessment/ strategy is a document which explains how targets for CO2 reduction will be met for a particular development within the context of the energy hierarchy.
Energy hierarchy – A classification of energy options, prioritized to assist progress towards a more sustainable system.
Embodied Carbon – A notional quantity of carbon, representing the amount of CO2 already emitted in order to manufacture or assemble any given construction material (s) and transport it to site.
Evapotranspiration – Evapotranspiration is the combined name for the processes of evaporation and transpiration.
Flood attenuation – Rainwater capture and slow release to reduce the risk of flooding further downstream.
Green Infrastructure - Green infrastructure is a network of multi-functional green space and other green features, urban and rural, which can deliver quality of life and environmental benefits for communities.
Green Materials - Green building materials are composed of renewable, rather than non-renewable resources. Green materials are environmentally responsible because impacts are considered over the life of the product
Kilowatt (kW) – One thousand watts. A watt is a measure of power.
Megawatt (MW) – One million watts. A watt is a measure of power.

Network Ready – The state of a development being optimally designed for connection to a District Energy Network
Part L of the Building Regulations – Approved documents L1A and L2A of the Building Regulations relate to the conservation of fuel and power in new dwellings and new buildings other than dwellings respectively.
Passive Design – integrates the way the climate can maintain a comfortable temperature range in developments.
Regulated CO2 emissions – The CO2 emissions arising from energy used by fixed building services, as defined in Part L of the Building Regulations. These include fixed systems for lighting, heating, hot water, air conditioning, and mechanical ventilation
Standard Assessment Procedure (SAP) – A methodology introduced by the Government to assess and compare the energy and environmental performance of buildings to make sure that any new developments will not only meet Building Regulations, but also all energy and environmental policy initiatives.
Solar Gain - The increase in temperature of a building, object, or space that is caused by solar radiation
Simplified Building Energy Model – A computer program that provides an analysis of a building's energy consumption. The purpose of the software is to produce consistent and reliable evaluations of energy use in non-domestic buildings on a development.
Sustainable Drainage Systems (SuDS) – an alternative approach to improving the sustainable management of water for a site, by managing rainwater runoff from buildings and hardstanding surfaces. A benefit of the system is to reduce the quantity and rate of surface water flow, running directly to rivers via stormwater networks.
Target CO2 Emission Rate – The minimum energy performance requirement for a new dwelling/ building. It is expressed in terms of the mass of CO2 emitted per year per square metre of the total floor area of the building (kg/m2/year).

Appendix 2: Further guidance

This section provide links to further information and guidance further to those set out in the footnotes of this SPD.

Department for Transport Manual for Streets 2007

Good Homes Alliance, 2019 Tool and guidance for identifying and mitigating early stage overheating risk in new homes

CIBSE, 2013 TM52: The Limits of Thermal Comfort: Avoiding Overheating in European Buildings

CIBSE, 2017 TM59: Design Methodology for the Assessment of Overheating in Homes

BREEAM

Department for Business, Energy and Industrial Strategy 2021 – A detailed Guide for CHP Developers parts 1-6

LETI Embodied Carbon Primer 2020

Micro Generation Certification Scheme

The Climate Crisis – A guide for local authorities on planning for Climate Change (TCPA/RTPI, Oct 2021)

Susdrain

www.bregroup.com

www.wrap.org.uk

http://www.ice.org.uk

GreenBookLive - reference source and online listing of environmental products and services

BRE Environmental & Sustainability Standard (2016)

RICS - Whole life carbon assessment for the built environment (2017)

Considerate Constructors Scheme

Appendix 3: Relevant Local Plan Policies

CP24 SUSTAINABLE CONSTRUCTION

Planning permission will be granted for development which on completion:

a) meets the following minimum Code for Sustainable Home threshold level, and equivalents for non-residential development (unless proven to be financially or technically unviable), as set out below:

All residential development achieves at least the following level of the Code for Sustainable Homes and meets the minimum carbon compliance standards set out under the Zero Carbon Hub report recommendations[2]		All multi-residential and non-residential developments with a floor space of over 500 m² must achieve at least the following BREEAM[3] standards`
Until the end of 2012	3	BREEAM 'very good'
from 2013	4	BREEAM 'excellent'
from 2016	5*	BREEAM 'excellent'

(* Level 5 can include for 'allowable solutions'[4].)

b) provides at least 10% of energy demand from decentralised and renewable or low carbon energy sources (if possible, including connections to a district heating system), unless it is proven that this is not feasible or viable;

c) for major areas of development, provides adequate land or funding for waste management infrastructure[5].

Major areas of development[6] must ensure that their on-site renewable or low carbon energy production and resource efficiency is maximised. Where on-site proposals to achieve higher levels of carbon reduction are not feasible or viable 'allowable solutions' should be used.

Note: The policy approach to sustainable construction is currently under review by the Government and all or some elements of this policy may be superseded by the changes. In this eventuality development proposals would be assessed in accordance with the latest Government policy.

[1] For these purposes, 'development' means 1 dwelling or more and 500m² or more of non-residential floorspace.
[2] http://www.zerocarbonhub.org/about.aspx
[3] BREEAM (Building Research Establishment Environmental Assessment Method) http://www.breeam.org/page.jsp?id=66
[4] 'allowable solutions' will be operated in accordance with the Zero Carbon Hub report recommendations, as developed by Government policy, to permit residual emissions to be mitigated between the minimum carbon compliance standards and zero carbon homes (equivalent of Code Level 5) by off-site means in agreement with the Local Authority. 'Allowable Solution' applies to water, energy and waste.

[5]Waste management infrastructure includes all physical aspects of the waste hierarchy, ranging from adequate refuse storage space within the curtilage of individual dwellings for non recyclable, recyclable and composting waste to the provision of construction material recycling and material recycling centres in major developments
[6]major areas of development' is defined as 10 dwellings or more, or 0.5 hectares or more.

CP25 FLOOD RISK

Development in areas at risk of flooding, now and in the future, as identified on the latest Environment Agency flood risk maps and the Council's Strategic Flood Risk Assessment will be permitted provided that:

a) it meets the sequential and exception test (where required) as outlined in Government guidance;

b) a site–specific flood risk assessment demonstrates that the development, including the access, will be safe without increasing flooding elsewhere, and where possible, will reduce flood risk overall;

c) the scheme incorporates flood protection, flood resilience and resistance measures appropriate to the character and biodiversity of the area and the specific requirements of the site;

d) appropriate flood warning and evacuation plans are in place; and

e) new site drainage systems are designed taking account of events which exceed the normal design standard.

All development will be required to ensure that there is no net increase in surface water run off. Priority will be given to incorporating SUDs (Sustainable Drainage Systems) to manage surface water drainage, unless it can be demonstrated that SUDs are not appropriate. Where SUDs are provided, arrangements must be put in place for their whole life management and maintenance.

Specific areas in the District, which overlay the Chalk geology, can be prone to groundwater flooding as shown on the Council's Strategic Flood Risk Assessment maps. Rivers in East Hampshire which are sourced in the chalk area are the River Meon, River Wey and Lavant Stream, and thus groundwater fed. Development should be avoided in areas at risk from, susceptible to, or have a history of groundwater flooding. If this is not possible then the development should be designed to incorporate flood resistance and resilience measures.

CP26 WATER RESOURCES/WATER QUALITY

Development will be required to protect the quality and quantity of water, and make efficient use of water. Development will be permitted provided that:

a) it protects and enhances the quality and quantity of groundwater, surface water features and controls aquatic pollution to help to achieve the requirements of the European Water Framework Directive;

b) it has an adequate means of water supply (even in a drought), sufficient foul and surface water drainage and adequate sewage treatment capacity. Development must be phased to take into account the timing of any water and/or wastewater infrastructure required which must be in place prior to the occupation of development. The developer must show that additional provision or improvement of local infrastructure is required and demonstrate that adequate funding is available for that infrastructure in advance of development taking place;

c) demand management technologies are incorporated to meet the appropriate levels of the Code for Sustainable Homes as set out in Policy CP24.

Development within Groundwater Source Protection Zones will only be permitted provided that it has no adverse impact on the quality of the groundwater source or a risk to its ability to maintain a public water supply.

Proposals by service providers for the delivery of wastewater services to meet the needs generated by new development and by existing communities will be encouraged and/or permitted, subject to other relevant policies.

The Council and National Park Authority have a duty to take account of the Water Framework Directive (WFD) objectives. Any development which will impact on a known water body will be required to seek out opportunities to introduce mitigation and enhancement measures to help ensure the objectives of the WFD are met.
The site identified for the Havant Thicket reservoir will be safeguarded from development (see Map 3).

CP27 POLLUTION

Development must not result in pollution which prejudices the health and safety of communities and their environments.

Developments that may cause pollution, and developments sensitive to pollution, will only be permitted if they are appropriately separated and designed to remove the risk of unacceptable impacts. Engineering or administrative controls may be required to provide sufficient protection to focus on reducing pollution at source.

Development which includes a lighting scheme will not be permitted unless the minimum amount of lighting necessary to achieve its purpose is proposed. Glare and light spillage from the site must be minimised. In determining an application, consideration will be given to the aesthetic effect of the light produced and to its effect on local residents, vehicle users, pedestrians and the visibility and appreciation of the night sky.

Development will not be permitted if it would have an unacceptable effect on the amenity of the occupiers of neighbouring properties through loss of privacy or through excessive overshadowing.

Any development which is likely to lead to a significant effect on an internationally designated site is required to undertake an appropriate assessment under the Habitats Regulations. As part of any mitigation/avoidance package any impacts on air quality will require a regime

for continued air quality monitoring to be set up before the introduction of any mitigation measures, and thereafter maintained.

CP28 GREEN INFRASTRUCTURE

Development will be permitted provided that it maintains, manages and enhances the network of new and existing green infrastructure. Development will need to take forward the objectives and priorities presented in the District's Green Infrastructure Study and Strategy, the South Hampshire Green Infrastructure Strategy and its Implementation Framework and the avoidance and mitigation measures set out in the Joint Core Strategy's Habitats Regulations Assessment. Account will also need to be taken of other relevant joint core strategy policies such as landscape, historic environment, biodiversity, flood risk and design. New green infrastructure must be provided either through on-site provision or financial contributions. The size of contribution will be linked to the scale of the development and the resulting new green infrastructure must be located as close as possible to the development it is intended to serve.

CP29 DESIGN

The District's built environment must be of an exemplary standard and highly appealing in terms of visual appearance. All new development will be required to respect the character, identity and context of the district's towns, villages and countryside and must help to create places where people want to live, work and visit.

New development will be required to:

a) seek exemplary standards of design and architecture with a high quality external appearance that respect the area's particular characteristics;

b) take particular account of the setting and context of the South Downs National Park where relevant, be in accordance with the National Park purposes and duty if in the National Park and take account of these purposes and duty where the National Park's setting is affected;

c) reflect national policies in respect of design, landscape, townscape and historic heritage;

d) ensure that the layout and design of development contributes to local distinctiveness and sense of place, and is appropriate and sympathetic to its setting in terms of its scale, height, massing and density, and its relationship to adjoining buildings, spaces around buildings and landscape features;

e) ensure that development makes a positive contribution to the overall appearance of the area by the use of good quality materials of appropriate scale, profile, finish, colour and proven weathering ability;

f) make provision for waste and recycling bin storage and collection within the site;

g) be designed to the Lifetime Homes Standard as appropriate;

h) take account of local town and village design statements, neighbourhood plans that identify local character and distinctiveness and the design elements of parish and town plans and conservation area appraisals;

i) be accessible to all and designed to minimise opportunities for crime and anti-social behaviour without diminishing the high quality of the overall appearance;

j) embrace new technologies as a considered part of the design and in a way which takes account of the broader impact on the locality;

k) provide car parking in a way that secures a high quality environment and is conveniently located, within curtilage wherever possible, taking account of relatively high levels of car ownership where necessary.

CP31 TRANSPORT

Through implementation of the Hampshire Local Transport Plan (2011 – 2031), the fullest possible use of sustainable modes of transport (including cycling, walking and public and community transport) and reduced dependence on the private car will be encouraged.

Development proposals will include a range of mitigating measures and, where appropriate, will be required to:

a) enhance the quality, viability, availability, accessibility and frequency of public transport and alternative community transport provision, especially in rural areas, to ensure that those without access to a private car have access to services and facilities necessary for their well-being;

b) protect and provide safe and convenient cycle and pedestrian links that integrate with existing cycle and pedestrian networks, such as the South Downs Way and Shipwrights Way, and reflect the amenity and rural character of the area;

c) ensure that highway design and associated signing meets the needs of vehicular traffic and the need for safety whilst also placing a high priority on meeting the needs of pedestrians, cyclists and public transport users and without detriment to the quality of the environment;

d) plan for new highway infrastructure that will reduce congestion, improve highway safety, increase accessibility to the District's town and district centres and enhance economic prosperity of the District;

e) improve access to rail stations at Rowlands Castle, Petersfield, Liss, Liphook, Alton and Bentley Station by sustainable modes of transport and, where appropriate, provide additional car and cycle parking at rail stations;

f) provide adequate, convenient and secure vehicle and cycle parking in accordance with adopted standards;

g) ensure that the type and volume of traffic generated would not harm the countryside or the rural character of local roads;

h) protect sunken and rural/green lanes so that their convenience and safety are enhanced for their users, and their ecological, landscape and recreational value are enhanced;

i) improve access for people with impaired mobility to all forms of transport and to all developments to which the public will reasonably expect to have access; and

j) produce and implement transport assessments and travel plans for proposals that are likely to have significant transport implications;

k) include measures, to be funded by the developer, that address the impact of the new development so as to ensure the continued safe and efficient operation of the strategic and local road networks.

New development should be located and designed to reduce the need to travel. Development that is likely to generate a significant number of additional vehicular movements will normally be expected to be located near existing centres and supportive infrastructure.

A high quality transport system will be required as part of the growth proposed in Whitehill & Bordon. Proposals for new development in the town must improve transport links from the surrounding settlements to the town, and within the town, providing opportunities to reduce reliance on the private car and encourage other modes.

Financial contributions will be sought from developments towards the implementation of identified transport infrastructure schemes, having regard to the costs of those schemes and the likely availability of public funding.

POLICY CSWB5 DESIGN

In addition to the criteria set out in Policies CP29 and CP30 new development should:

a) demonstrate an integrated approach to sustainable design to achieve the policy requirements on energy, water, transport, green infrastructure and biodiversity;

b) be in accordance with the character area design codes, design guidance, the neighbourhood quality charter and Town Design Statement;

c) **where opportunities arise, for example in the new town centre, incorporate taller landmark or locally distinctive ex-military buildings into the overall design to create an identity to the town and the overall development area.**

POLICY CSWB6 SUSTAINABLE CONSTRUCTION

Proposals should, where technically or financially viable, demonstrate best practice, innovation and higher levels than those outlined in policy CP24 whilst at the same time being in accordance with wider national government policy on sustainable construction. The carbon footprint of the whole town will not exceed the carbon footprint of the existing settlement. This will include the provision of localised energy centres and help the Eco-town to de-carbonise

the energy infrastructure by employing such solutions as biomass and energy from waste systems, decentralised heat and power networks and smart grids

All new development must comply with the District's Sustainable Construction policy (CP24).

In addition, development proposals must (unless proven to be financially or technically unviable):

a) Connect to any District heating systems, or have the infrastructure to connect if this is not yet installed. Developments which are not connecting to the district system should provide reasons for this and provide alternative low carbon heating solutions;

b) Ensure that the orientation of new homes is maximised to make use of solar power at the domestic and neighbourhood level in conjunction with incentives, such as the Feed-in-Tariffs (FITs)[63] and Green Deal[64].

Proposals for new development or refurbishment, including infrastructure, will be required to outline how sustainability will be delivered during construction and future maintenance. Supporting evidence will need to address:

c) The reduction of carbon dioxide and other greenhouse gas emissions, both in manufacture, construction, delivery and in the location and mode of travel of the workforce;

d) How pollution and waste is to be minimised;

e) Life Cycle (Whole Life) Costings; and

f) the effective use of resources. In particular, the reduction of demolition or construction waste to landfill, the re-use of buildings, recycling of materials and reduction in water use.

The use of factory assembly and modern methods of construction will be encouraged, particularly if these methods can be shown to have a positive impact on the local economy by bringing in new skills and manufacturing processes to the Eco-town.

POLICY CSWB7 WASTE

Planning applications should include a sustainable waste and resource plan covering both domestic and non-domestic waste. The plan should consider:

a) The use of arboricultural arisings and farm waste as biomass fuel;

b) The use of locally generated waste as part of the energy solution for the town;

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[63] Feed-in tariffs: The Feed-in Tariffs (FITs) scheme was introduced on 1 April 2010, under powers in the Energy Act 2008, and work with the Renewable Heat Incentives, Department of Energy and Climate Change, March 2011.

[64] The Green Deal – A summary of Government's proposals, Department of Energy and Climate Change, 2010.

c) Composting schemes;

d) **Using organic waste for anaerobic digestion.**

POLICY CSWB8 SUSTAINABLE WATER MANAGEMENT

All development will be required to contribute to the overall Eco-town target of achieving water neutrality (no net increase in water abstraction or carbon emissions as a result of the Eco-town).

Development must be designed and delivered to limit the impact of new development on water resources, water quality and quantity. Innovative and sustainable water management systems must be used to help to achieve a 'water neutral' status.

All buildings will be equipped with water efficiency measures to achieve Level 5/6 of the Code for Sustainable Homes specifically for water.

Development must be phased to take account of the timing of water and/or sewerage infrastructure to support the Eco-town. All necessary infrastructure provision and water quality improvements must be funded and in place in advance of development taking place.

Development proposals for Whitehill & Bordon must comply with the district-wide Policy CP23 'Flood Risk'. Where appropriate, Sustainable Drainage Systems (SUDS) must be provided which are fully integrated into the network of multi-functional green spaces, help to enhance local biodiversity, provide open space, and offer flood risk and water quality benefits.

POLICY CSWB10 GREEN INFRASTRUCTURE

New and existing greenspaces will be part of a well managed, high quality, green infrastructure network, which is linked to the wider countryside for the benefit of communities and wildlife (see also Policy CP28).

Land is broadly identified for greenspace as illustratively shown on the Proposals Map.

Development will need to maintain and manage the network of new green infrastructure and where appropriate, the enhancement of existing green infrastructure and seek to accord with the Whitehill & Bordon Green Infrastructure Strategy and Habitats Regulations Assessment.

The implementation of green infrastructure must be in advance of occupation which is in line with the phased delivery of the Strategic Allocation.

POLICY CSWB12 PEDESTRIAN AND CYCLE ROUTES

Development proposals will provide:

a) A comprehensive network (Green Grid) of well signed walking and cycling routes separated from the road where possible, in and around the town and linking to other destinations. Proposals must include safe, convenient and attractive travel options for non-car modes of travel from the home to

the town's facilities, schools, service and employment areas;

b) High quality cycle parking facilities within its neighbourhood centres, the town centre, at employment locations and within each residential area.

POLICY CSWB13 PUBLIC TRANSPORT

Development proposals will deliver:

a) a high-quality, frequent, modern and attractive public transport system, comprising a 'three-tiered' bus system offering town-wide services, local services and strategic services to key destinations;

b) high-quality bus infrastructure throughout the development;

c) a Transport Hub within the new town centre to provide a focal point for all town travel information and services. Neighbourhoods will include 'Sub-Hubs' to act as local information points.

POLICY CSWB18 LOW CARBON VEHICLES

Development proposals will promote the use of low-carbon vehicles, including electric vehicles and other alternative low-carbon fuel technology, to reduce the carbon emissions resulting from the development. The development will promote and deliver the necessary infrastructure to support electric vehicles and alternative fuel travel.

Appendix 4: Sustainability Checklist Template

Applicant's Name	
Agent's Name	
Site Address	
Description of Proposal	
Date Checklist Completed	

ID	Energy Carbon Reduction and On-site Low Carbon Energy	Yes / No / N/A	Minimum policy Requirement (marked with ✓)	Development Type	Summary of approach Please also state which document this information is available i.e. Design & Access Statement including paragraph/page/plan reference
	Energy Efficient Residential Development				
ER1	Do all the units in the scheme achieve a minimum of 31% carbon reduction Dwelling Emission Rate above the Target Emission Rate? Has the Carbon Reduction Statement (Appendix 5) been submitted with the application?			Minor Residential Major Residential	
	Energy Efficient Non-residential Development				
ER2	Have you carried out a BREEAM pre-assessment and met the mandatory energy requirements for BREEAM 'excellent'?		✓	Minor Non-residential Major Non-residential	
	Renewable Energy				
ER3	Please set out how at least 10% of the development's energy needs be met using renewable technologies.		✓	Minor Residential Major Residential Minor Non-residential Major Non-residential	
ER4	To contribute to the reductions in carbon emissions and/or energy reductions, have a variety of energy saving and/or renewable energy measures been considered (such as those set out in this document)?			Minor Residential Major Residential Minor Non-residential Major Non-residential	
ER5	Has the scope for connection of larger developments schemes to an existing District Heat and Cooling System, or CHP system been assessed? Has reference been made to the government's CHP Focus site assessment tools?) Or has the incorporation of a new CHP system been considered?			Minor Residential Major Residential Minor Non-residential Major Non-residential	

ER6	Have biomass energy sources been considered where this could have sustainability benefits?			Minor Residential Major Residential Minor Non-residential Major Non-residential	
ER7	Have renewables technologies such as solar/PV or wind turbines been considered for the scheme, possibly in combination with other technologies such as those for storage of energy?			Minor Residential Major Residential Minor Non-residential Major Non-residential	
ER8	Where solar panels are being incorporated have you considered the impacts of shadowing on the panels and how it could affect their power output and has the visual impact been minimised?			Minor Residential Major Residential Minor Non-residential Major Non-residential	
ER9	How has the energy hierarchy been considered to prioritise reducing the need for energy and implementing the 'fabric first approach'?			Minor Residential Major Residential Minor Non-residential Major Non-residential	
ER10	Have ASHP/GSHP technologies been considered, particularly where there is available space?			Minor Residential Major Residential Minor Non-residential Major Non-residential	
ER11	For all listed technologies, has consideration been given to the ecological/and or design requirements and suitability, and have air quality issues been assessed where this is an issue?			Minor Residential Major Residential Minor Non-residential Major Non-residential	

ID	Site Layout, landscaping, urban form and building design	Yes / No / N/A	Minimum policy Requirement (marked with ✓)	Development Type	Summary of approach Please also state which document this information is available i.e. Design & Access Statement including paragraph/page/plan reference
	Site layout, landscaping, urban form				
SL1	Does the layout utilise design to minimise shadowing, and gain heating efficiencies?			Minor Residential Major Residential Minor Non-residential Major Non-residential	
SL2	Has the planting of shrubs been considered for cooling the outside of buildings?			Minor Residential Major Residential Minor Non-residential	

				Major Non-residential	
SL3	How have mature or large trees on the site been retained and incorporated into the design of the new proposal?			Minor Residential Major Residential Minor Non-residential Major Non-residential	
	Building Design				
SL4	Does the proposed site layout and building orientation demonstrate a consideration of passive design principles?			Minor Residential Major Residential Minor Non-residential Major Non-residential	
SL5	How has the design and layout maximised natural light?			Minor Residential Major Residential Minor Non-residential Major Non-residential	

ID	Water Resources	Yes / No / N/A	Minimum policy Requirement (marked with ✓)	Development Type	Summary of approach Please also state which document this information is available i.e. Design & Access Statement including paragraph/page/plan reference
	Water Efficiency				
WR1	Does the proposal comply as a minimum with Building Regulations water usage requirements limit of 110 litres per day, per person? Please submit evidence of water calculations using the http://www.thewatercalculator.org.uk/ or equivalent tool.		✓	Minor Residential Major Residential	
WR2	For non-residential development have you included information to demonstrate that your proposal will be able to meet the requirement for achievement of 5 credits from Wat01 of the BREEAM assessment?		✓	Minor Non-residential Major Non-residential	
	Water Saving Measures – construction				
WR3	Will the development require water-intensive processes for construction and, if so, have water-saving measures been proposed to reduce this?			Minor Residential Major Residential Minor Non-residential Major Non-residential	
	Rainwater Harvesting / Greywater Re-use				
WR4	For water-intensive developments, has the storage of water been considered, for avoidance of drawing on public water supplies (e.g., golf courses)?			Minor Non-residential Major Non-residential	

	Have measures been included into the scheme to reduce the amount of treated/purified water that would need to be pumped to the site, for example through measures to allow the harvest/recycling of rain, or 'grey' water (for example for gardens and other non-drinking water uses such as flushing toilets or possibly washing)?			Minor Residential Major Residential Minor Non-residential Major Non-residential	
	Flood-risk, water run-off and Sustainable Drainage Systems (SuDS)				
WR5	Have you designed-in measures to minimise surface water run-off, e.g., minimising paved areas and impermeable surfaces, or including soak-aways?			Minor Residential Major Residential Minor Non-residential Major Non-residential	
WR6	Where paved surfacing is used, can it be permeable and enable enhanced water-storage?			Minor Residential Major Residential Minor Non-residential Major Non-residential	
WR7	What measures have been included to address flood risk/rainwater attenuation? (For example, for landscaped areas, the inclusion of ponds or rainwater gardens, or for developments without landscaping possible green walls or roofs.)			Minor Residential Major Residential Minor Non-residential Major Non-residential	
WR8	Have you considered incorporating sustainable urban drainage (SuDS) into your development proposal?			Minor Residential Major Residential Minor Non-residential Major Non-residential	
WR9	Have you defined maintenance responsibilities for any proposed SuDS?			Minor Residential Major Residential Minor Non-residential Major Non-residential	

ID	Green Infrastructure	Yes / No / N/A	Minimum policy Requirement (marked with ✓)	Development Type	Summary of approach Please also state which document this information is available i.e. Design & Access Statement including paragraph/page/plan reference
	Greening for carbon capture and cleaner air (sequestration)				

GI1	For developments on or close to roads, have trees or planting been considered for carbon capture and/or sequestration of air pollution (particles, etc)?			Minor Residential Major Residential Minor Non-residential Major Non-residential	
	Cooling/shading - greenspace and tree canopy				
GI2	For denser urban developments, has greenery been included in some form - for cooling surrounds and buildings?			Minor Residential Major Residential Minor Non-residential Major Non-residential	
GI3	Have evergreen trees been considered in designs, to allow for carbon capture (and capture of air pollution) in the autumn/winter months?			Minor Residential Major Residential Minor Non-residential Major Non-residential	
	Cooling buildings and their local environments				
GI4	Does the scheme incorporate green roofs/walls? In denser developments, have green roofs/walls been included to allow for linkages between habitats for birds and invertebrates, for example through measures such as living pillars?			Minor Residential Major Residential Minor Non-residential Major Non-residential	
	Adaptation to climate changes – habitats, planting, and landscapes				
GI5	Does the proposed scheme incorporate green infrastructure for increased resilience and adaptation to potential changes in climate?			Minor Residential Major Residential Minor Non-residential Major Non-residential	
GI6	Will the proposal deliver a minimum of 10% in Biodiversity Net Gain, on and/or off-site? Please complete the Biodiversity Net Gain metric (currently Version 3)			Minor Residential Major Residential Minor Non-residential Major Non-residential	
GI7	Where there is landscaping in schemes have native tree/planting species been considered for inclusion, and are they suitable for a changing climate?			Minor Residential Major Residential Minor Non-residential Major Non-residential	
	Water Drainage / Storage				
GI8	Does the scheme incorporate any green infrastructure measures to assist with water attenuation?			Minor Residential Major Residential	

				Minor Non-residential Major Non-residential	
GI9	Have measures to conserve, enhance and/or restore biodiversity (including to assist pollinators) in and around the development been considered, including to compensate for habitats lost through development of brownfield land, or through changes to the climate?			Minor Residential Major Residential Minor Non-residential Major Non-residential	
GI10	Where there are flood-risks and /or rainwater attenuation issues, have Sustainable Drainage Systems (SuDS) been considered – which can also assist in the enhancement/maintenance of wildlife habitats and eco-systems?			Minor Residential Major Residential Minor Non-residential Major Non-residential	
GI11	Have you considered how green and blue spaces within the development will be connected to the wider green infrastructure assets of the district?			Minor Residential Major Residential Minor Non-residential Major Non-residential	
GI12	How will you be protecting existing ecological features from damage during site preparation and completion of construction works where practicable?			Minor Residential Major Residential Minor Non-residential Major Non-residential	
GI13	Does the proposal provide for on-going management of green and blue spaces, including biodiversity habitats?			Minor Residential Major Residential Minor Non-residential Major Non-residential	

ID	Development location and measures that enable sustainable lifestyles	Yes / No / N/A	Minimum policy Requirement (marked with ✓)	Development Type	Summary of approach Please also state which document this information is available i.e. Design & Access Statement including paragraph/page/plan reference
DL1	Have you developed and submitted to HCC an appropriate Travel Plan, Transport Assessment and/or Statement (as appropriate)?		✓	Minor Residential Major Residential Minor Non-residential Major Non-residential	
	Accessibility to local services and public transport				
DL2	Does the location of the proposed development minimise distances to the main employment centres, shops, recreation and community facilities, and schools?			Minor Residential Major Residential	
DL3	Have you demonstrated how the development proposals give priority for walking and cycling over cars, linking the development with the			Minor Residential Major Residential	

	surrounding walking and cycling network including planned projects?			Minor Non-residential Major Non-residential	
DL4	Does the proposal provide appropriate levels and standards of car parking in accordance with local guidance?		✓	Minor Residential Major Residential Minor Non-residential Major Non-residential	
DL5	Will the development incorporate electric vehicle charging points (that are unobtrusive and avoid street clutter)?			Minor Residential Major Residential Minor Non-residential Major Non-residential	
	Bicycle parking and storage				
DL6	Does the proposal provide appropriate levels of, and secure facilities for, cycle parking/storage?		✓	Minor Residential Major Residential Minor Non-residential Major Non-residential	
	Recycling Storage				
DL7	Has consideration been given to internal/external recycling storage space?			Minor Residential Major Residential Minor Non-residential Major Non-residential	
	Community Food Growing				
DL8	For major residential development of 100 dwellings or more, is there provision for allotments or opportunities for rooftop gardens?			Major Residential (schemes of 100 dwellings and above)	

ID	Resources, materials and waste	Yes / No / N/A	Minimum policy Requirement (marked with ✓)	Development Type	Summary of approach Please also state which document this information is available i.e. Design & Access Statement including paragraph/page/plan reference
	Sustainable Sourcing of Materials & Durability				
RMW1	Can the scheme demonstrate that the selection of materials has incorporated locally recycled or produced materials where possible?			Minor Residential Major Residential Minor Non-residential Major Non-residential	
RMW2	Has a framework or certification scheme been used to establish the responsible sourcing of			Minor Residential Major Residential	

	materials for the scheme? Or is there a clear rationale for the materials selected?			Minor Non-residential Major Non-residential	
	Embodied Carbon and Energy				
RMW3	Has consideration been given to embodied carbon, and/or the submission of an embodied carbon assessment?			Minor Residential Major Residential Minor Non-residential Major Non-residential	
	Demolition and reclamation of building materials (and waste stream management)				
RMW4	Where site demolition will be necessary, have procedures for the salvage of building materials been put in place (including any natural materials on site) Has regard been had to the Institution of Civil Engineers (ICE) demolition protocol?			Minor Residential Major Residential Minor Non-residential Major Non-residential	
RMW5	Has consideration been given to whether any of the salvage could be recycled back into the proposed development? Or how materials can be sustainably recycled?			Minor Residential Major Residential Minor Non-residential Major Non-residential	
RMW6	Where viable mineral resources are available, has consideration been given the prior extraction and use of these mineral resources?			Major Residential Major Non-residential	
	Construction operations				
RMW7	Have you set out how construction will be undertaken and submitted a Construction Environment Management Statement or equivalent information? Is the construction company(ies) delivering the scheme part of a Considerate Constructors Scheme?			Minor Residential Major Residential Minor Non-residential Major Non-residential	

Appendix 5: Carbon Reduction Statement Template for Residential Development

1. When submitting SAP calculations, the below table should be completed for each unit proposed as part of a development in line with the latest SAP methodology.

2. Where a building contains multiple dwellings, it is acceptable to assess this issue based on the average energy performance of all dwellings within the building (e.g. for apartments or terraced housing). The area weighted average DER and TER must be calculated in accordance with the block averaging methodology defined in clauses 2.7 and 2.16 of Approved Document L1A. For dwellings where area weighting does not apply, the Carbon reduction requirement should be achieved for each unit.

2. The Target Emission Rate (TER) and Dwelling Emission Rate (DER) should be derived from the calculations carried out for Building Regulations compliance (Part L).

3. Alongside the table above, the main body of the Statement should include a summary of the measures proposed to reduce carbon emissions following the energy hierarchy (be lean, be clean and be green). Where renewable energy technologies are proposed to meet some of the carbon reduction requirement, the location and layout of those technologies should be shown on relevant drawings (for example, roof plans should show the layout of any proposed photovoltaic panels).

Unit Number / Address	Target Emission Rate	Dwelling Emission Rate	% Improvement on Part L of Building Regulations

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