

# APPENDICES



## APPENDIX 1:

# Checklist for achieving required standards for sustainable buildings and places

This checklist can be used to demonstrate the requirements of Core Strategy Policies CS1 – Addressing Climate Change and Carbon Reduction and Policy CS2 – Delivering Sustainable Design and Construction.

It sets out what is required through planning policy for all types development. Select those which apply to the development.



Type of development – indicate those that apply	Policy requirement – check box to confirm compliance	SPD Section	Considerations	Supporting information – indicate those that apply
Residential development between 1 – 9 dwellings (including conversions) <input type="checkbox"/>	<b>CS2: Clause 1</b> – require energy efficient designs to reduce energy demand. <input type="checkbox"/>	Sustainable Design principles – <b>Code for Sustainable Homes</b>	Applications must demonstrate how the below measures have been considered and provide detail relevant detail within the application: <ul style="list-style-type: none"><li>• Design for health and wellbeing</li><li>• Energy use</li><li>• Demonstrate energy hierarchy</li><li>• Siting and orientation</li><li>• Passive design</li><li>• Material use</li><li>• Limiting risks of overheating/ Urban heat island effects</li><li>• Thermal mass</li><li>• Waste management</li><li>• Water use</li><li>• Surface water run-off</li><li>• Sustainable and Active Travel</li><li>• Land use ecology</li></ul>	The <b>Design and Access Statement</b> to include details on energy and sustainability or a separate <b>Energy/sustainability statement</b> can be submitted.  [The website includes a Design and Access statement template which may be used]. <input type="checkbox"/>
Non-residential development above 500m <sup>2</sup> <input type="checkbox"/>				<b>Pre-application discussions</b> may be appropriate <input type="checkbox"/>
Residential Developments over 10 dwellings (including conversions) <input type="checkbox"/>	<b>CS2: Clause 3</b> – require as a minimum Code for Sustainable Homes Level 4. This is equivalent to a 19% energy performance improvement on Building Regulations. <input type="checkbox"/>			Submit an <b>Energy (or sustainability) statement</b> . <input type="checkbox"/> Submit a <b>SAP compliance report</b> . <input type="checkbox"/>



Type of development – indicate those that apply	Policy requirement – check box to confirm compliance	SPD Section	Considerations	Supporting information – indicate those that apply
Residential development between 1 – 9 dwellings (including conversions) <input type="checkbox"/>	<b>CS2: Clause 2</b> – 10% predicted energy demand to be met through renewable/ low carbon sources. <input type="checkbox"/>	Renewable and low carbon energy generation	<p>Select applicable technologies:</p> <ul style="list-style-type: none"> <li>• Solar Photovoltaic (PV)</li> <li>• Solar Thermal</li> <li>• Heat pumps (ground, air or water)</li> <li>• Biomass burners/ boilers</li> <li>• Mechanical heat recovery systems</li> <li>• Domestic/micro combined heat and power systems</li> </ul>	<p>Within the <b>Energy Statement</b>, state how the required % of predicted energy demand will be met through renewable and low carbon sources.</p> <p>Submit a <b>SAP compliance report</b>. <input type="checkbox"/></p>
Residential development of 10 or more dwellings (including conversions) <input type="checkbox"/>	<b>CS2: Clause 2</b> – 15% predicted energy demand met through renewable/low carbon sources <input type="checkbox"/>		<p>Select applicable technologies:</p> <ul style="list-style-type: none"> <li>• Hydropower</li> <li>• Solar photovoltaic arrays</li> <li>• Solar Thermal</li> <li>• Air/water/ground source heat pumps</li> <li>• Combined Heat and Power systems</li> <li>• Wind turbines</li> <li>• District Heating schemes</li> </ul>	<p>Within the <b>Energy Statement</b>, state how the required % of predicted energy demand will be met through renewable and low carbon sources.</p> <p>Submit a <b>SAP compliance report</b>. <input type="checkbox"/></p>



Type of development – indicate those that apply	Policy requirement – check box to confirm compliance	SPD Section	Considerations	Supporting information – indicate those that apply
Non-residential development between 500m <sup>2</sup> and 1000m <sup>2</sup>	<b>CS2: Clause 3</b> – BREEAM 'very good' standard will be required on all non-residential developments over 500m <sup>2</sup> and 'Excellent' over 1000m <sup>2</sup> <input type="checkbox"/>	BREEAM assessment	Minimise energy demand ahead of energy efficiency and renewable and low carbon technologies. Measures via assessment criteria: <ul style="list-style-type: none"> <li>• Health and Wellbeing</li> <li>• Management</li> <li>• Energy</li> <li>• Transport</li> <li>• Water</li> <li>• Materials</li> <li>• Waste</li> <li>• Land Use and Ecology</li> <li>• Pollution</li> </ul>	A Pre-assessment/Design-stage report is required with the planning application. <input type="checkbox"/>
Non-residential developments over 1000m <sup>2</sup> <input type="checkbox"/>				Applicants are encouraged to submit a Post-Construction certificate. <input type="checkbox"/>



Type of development – indicate those that apply	Policy requirement – check box to confirm compliance	SPD Section	Considerations	Supporting information – indicate those that apply
All new development <input type="checkbox"/>	<b>CS2: Clause 5</b> – require the application of best practice Sustainable Drainage Systems to reduce the impact of additional surface water run-off from new development, in-line with the requirements of the forthcoming national standards for SuDS. Such environmental infrastructure should be integrated into the design of the scheme and into landscaping features and be easily maintained. <input type="checkbox"/>	Sustainable drainage systems	Principles to follow: <ul style="list-style-type: none"> <li>• Plan SuDS from start</li> <li>• Replicate natural drainage</li> <li>• Prevention and source control</li> <li>• Design for easy maintenance and access</li> </ul>	Drainage design proposals and calculations for the site should be submitted; including maintenance plans and schedules which identify the SuDS system is maintained. <input type="checkbox"/>
All new developments <input type="checkbox"/>	<b>CS1: Clause 10</b> – Areas will be enhanced to be resilient to the impacts of climate change including flood defence and public realm enhancements including the integration of effective shading through, for example, tree planting <input type="checkbox"/>	Climate change adaptation measures	Details on adaptation measures must demonstrate: <ul style="list-style-type: none"> <li>• Flood resilience measures</li> <li>• Methods to avoid overheating</li> <li>• Measures to minimise the Urban Heat Island Effect</li> <li>• Measures incorporating green infrastructure and rewilding</li> </ul>	All <b>sustainability/energy statements</b> should contain detail on how changing climatic conditions have been considered as part of the design of the development <input type="checkbox"/>



Type of development – indicate those that apply	Policy requirement – check box to confirm compliance	SPD Section	Considerations	Supporting information – indicate those that apply
All new developments <input type="checkbox"/>	<b>CS1: Clause 5</b> “a network of multifunctional green infrastructure will be planned for and delivered through new development. They should be located throughout and in adjacent developments and demonstrate a functional relationship to the proposed development and existing area including the potential to relate to the Area of Outstanding Natural Beauty. This would include not only green spaces but also the creation and enhancement of woodland areas;	Climate change adaptation measures	Details on adaptation measures must demonstrate: <ul style="list-style-type: none"> <li>• Flood resilience measures</li> <li>• Methods to avoid overheating</li> <li>• Measures to minimise the Urban Heat Island Effect</li> <li>• Likely to include measures incorporating green infrastructure and rewilding</li> </ul>	All <b>sustainability/energy statements</b> should contain detail on how changing climatic conditions have been considered as part of the design of the development <input type="checkbox"/>



Type of development – indicate those that apply	Policy requirement – check box to confirm compliance	SPD Section	Considerations	Supporting information – indicate those that apply
	<p><b>CS1: clause 6</b> “protecting and enhancing biodiversity across North Somerset including species and habitats that are characteristic of the area, in order to support adaptation to climate change. This should be achieved through on and off-site measures to conserve and enhance species and habitats as well as the reduction or preferably elimination of any adverse impacts through sensitive design and layout and construction of developments”</p> <p><input type="checkbox"/></p>	Climate change adaptation measures	Natural solutions must be considered where they can build resilience. This can include to stabilise slopes to attenuate flood water, absorb carbon and increase the use of trees to reduce urban heating.	





## APPENDIX 2

# Documentation to submit to demonstrate Code for Sustainable Homes Level 4 equivalent energy performance standard

Where Part L documents are required, the TER and BER/DER should be clearly displayed on the output documents as illustrated below.

### a. SAP summary for dwellings

Below is an excerpt from a sample SAP Part L document with the TER and DER circled:

### Sample Calculations

To meet the CS2 requirement for new build, the DER figure above (5.44) must be 19% lower than the TER figure (30.51). The calculation is therefore:

$$\begin{aligned} 30.51 - 5.44 &= 25.07 \\ 25.07 / 30.51 \times 100 &= 82.16 \\ &= 82.16\% \text{ reduction in emissions} \end{aligned}$$

This example meets the CS2 requirement.

**BASIC COMPLIANCE REPORT**  
Calculation Type: New Build (As Designed)

Design SAP  
elmhurst energy

Property Reference	1	Issued on Date	08/01/2020		
Assessment Reference	001	Prop Type Ref	1		
Property	1, Anywhere Crescent, BATH, BA1 1XX				
SAP Rating	96 A	DER	5.44	TER	30.51
Environmental	96 A	% DER<TER	82.17		
CO <sub>2</sub> Emissions (t/year)	0.27	DFEE	40.41	TFEE	65.92
General Requirements Compliance	Pass	% DFEE<TFEE	38.70		
Assessor Details	Mr. Michael Andrews, Energy Saving Experts Ltd, Tel: 01225 862266, mike@energy-saving-experts.com		Assessor ID	N388-0001	
Client					

**SUMMARY FOR INPUT DATA FOR New Build (As Designed)**

**Criterion 1 – Achieving the TER and TFEE rate**

**1a TER and DER**

Fuel for main heating	Electricity
Fuel factor	1.55 (electricity)
Target Carbon Dioxide Emission Rate (TER)	30.51 kgCO <sub>2</sub> /m <sup>2</sup>
Dwelling Carbon Dioxide Emission Rate (DER)	5.44 kgCO <sub>2</sub> /m <sup>2</sup>
	-25.07 (-82.2%) kgCO <sub>2</sub> /m <sup>2</sup>

**1b TFEE and DFEE**

Target Fabric Energy Efficiency (TFEE)	65.92 kWh/m <sup>2</sup> /yr
Dwelling Fabric Energy Efficiency (DFEE)	40.41 kWh/m <sup>2</sup> /yr
	-25.5 (-38.7%) kWh/m <sup>2</sup> /yr

**Criterion 2 – Limits on design flexibility**

**Limiting Fabric Standards**

SAP basic compliance report



## APPENDIX 3:

# Documentation to submit to demonstrate BREEAM energy performance compliance

### BRUKL summary for non-residential


Below is an excerpt from a sample SBEM Part L document with the TER and BER circled:

### Sample Calculations

To meet the CS2 benchmark for new build, the BER figure above (19.4) must be 19% lower than the TER figure (24). The calculation is therefore:

$$\begin{aligned} 24 - 19.4 &= 4.6 \\ 4.6 / 24 \times 100 &= 19.16 \\ &= 19.16\% \text{ reduction in emissions} \end{aligned}$$

This example meets the CS2 requirement.

**BRUKL Output Document**  HM Government  
Compliance with England Building Regulations Part L 2013

**Project name**  
As designed

**Date:**

**Administrative information**

<b>Building Details</b> Address: London,	<b>Owner Details</b> Name: Lend Lease Telephone number: Address:
<b>Certification tool</b> Calculation engine: TAS Calculation engine version: "v9.4.0" Interface to calculation engine: TAS Interface to calculation engine version: v9.4.0 BRUKL compliance check version: v5.2.g.3	<b>Certifier details</b> Name: Telephone number: Address:

**Criterion 1: The calculated CO<sub>2</sub> emission rate for the building should not exceed the target**

CO <sub>2</sub> emission rate from the notional building, kgCO <sub>2</sub> /m <sup>2</sup> .annum	24
Target CO <sub>2</sub> emission rate (TER), kgCO <sub>2</sub> /m <sup>2</sup> .annum	24
Building CO <sub>2</sub> emission rate (BER), kgCO <sub>2</sub> /m <sup>2</sup> .annum	19.4
Are emissions from the building less than or equal to the target?	BER ≤ TER
Are as built details the same as used in the BER calculations?	Separate submission

Compliance check sheet for BRUKL



# GLOSSARY

<b>Allowable Solutions:</b>	Allowable Solutions is the term for the carbon offsetting process and the various measures which house builders may support to achieve the zero-carbon standards.
<b>Biodiversity:</b>	is a measure of the variety of organisms present in different ecosystems.
<b>Embodied energy:</b>	the total energy consumed during resource extraction, transportation and manufacture.
<b>Energy conservation:</b>	measures to reduce demand at source, such as roof and wall insulation to reduce heat loss. It leads to a reduction or elimination of unnecessary energy use. It can include behavioural change measures, such as switching appliances off when not in use.
<b>Energy efficiency:</b>	using less energy to provide the same level of energy benefit, for example through the use of low energy light bulbs or mechanical heat recovery systems.
<b>Energy security:</b>	the uninterrupted availability of energy sources at an affordable price

<b>Fabric Energy Efficiency Standard:</b>	the proposed maximum space heating and cooling energy demand for zero carbon homes. This is the amount of energy that would normally be needed to maintain comfortable internal temperatures and in a dwelling.
<b>Feed-in tariff:</b>	a payment made by government for eligible renewable electricity-generating schemes.
<b>Green Infrastructure:</b>	a strategically planned and delivered network comprising the broadest range of high-quality green spaces and other environmental features.
<b>Greenhouse gas emissions:</b>	gases emitted into the atmosphere that absorb and emit radiation within the thermal infrared range. These include carbon dioxide, methane and nitrous oxide of which carbon dioxide is the most prevalent.
<b>Low carbon energy:</b>	energy derived from processes or technologies that produce power with substantially lower amounts of carbon dioxide emissions than is emitted from conventional fossil fuel power generation.



**Natural stack ventilation:**

where air is driven through a building by vertical pressure differences developed by thermal buoyancy. Warm air inside a building is less dense than cooler air outside, and thus will try to escape from openings high up in the building envelope (such as chimneys); cooler denser air will enter openings lower down. The process will continue if the air entering the building is continuously heated, typically by casual or solar gains.

**Passivhaus:**

a standard of building design, where the heat losses are reduced so much that minimal heating is required. Passive heat sources like the sun, occupants, household appliances and the heat from the extract air cover a large part of the heating demand.

**Renewable energy:**

energy that comes from resources which are naturally replenished and are not depleted by being used, such as sunlight, wind, rain, tides, waves and geothermal heat.

**Renewable Heat Incentive:**

a payment made by government to eligible renewable heat technologies.

**Retrofitting:**

the addition of new technology or features to older systems.

**Supplementary Planning Document:**

a document which provides additional information on planning policies in a development plan.

**Sustainable Development:**

commonly defined as 'development that meets the needs of the present without compromising the ability of future generations to meet their own needs.'

**Urban Heat Island Effect:**

an urban area that's significantly warmer than the surrounding countryside, especially at night. This is due to the land surface in towns and cities, made of man-made materials which absorb and store heat. This coupled with concentrated energy use and less ventilation than in rural areas, creates a heating effect. Often up to 10 degrees Celsius hotter than surrounding countryside.



# SUSTAINABLE BUILDING CASE STUDY:

## 'Zero Carbon Homes,' equivalent to Code for Sustainable Homes Level 6 in Portishead:

Built by Halsall Construction for Alliance Homes in 2013

### Key features:

- High levels of air tightness and thermal efficiency.
- Mechanical ventilation with heat recovery to harness and recycle warmth from within the home (91% efficiency).
- Energy is generated onsite through renewable energy from solar photovoltaic (PV) panels for electricity production and solar thermal panels for hot water use.

### Key benefits:

- Greatly lowered space and heating demand and therefore running costs, due to very high levels of fabric energy efficiency.
- Large triple glazed windows create a well-lit and pleasant living space.
- Reduced water bills due to efficient internal water fittings and appliances.
- Energy display devices allowing occupants to monitor current and historic energy use and production.
- Enhanced sound insulation.

### Lessons Learnt:

- Code 6 homes are achievable and at a reasonable cost.
- Marketing and executing strategy key to success



This publication is available in large print, Braille or audio formats on request.  
Help is also available for people who require council information in languages other than English.  
Please contact [planning.policy@n-somerset.gov.uk](mailto:planning.policy@n-somerset.gov.uk)

