PLANNING AND CLIMATE CHANGE
SUPPLEMENTARY PLANNING DOCUMENT

Supporting the Crawley Borough Local Plan 2015-2030

October 2016

Including:

- Sustainable Design and Construction
- District Energy Networks
- Tackling Water Stress
- Development and Flood Risk
- Sustainable Transport

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Crawley Borough Council

Contents

1. Introduction

1.1. Crawley Borough Council is committed to addressing climate change locally. The way in which we shape new and existing communities within Crawley can make a significant contribution to tackling climate change, both by reducing carbon emissions and by building resilience to its impacts.

1.2. The Crawley Borough Local Plan[1] identifies 'climate change mitigation and adaptation' as a key objective, while the accompanying Vision Statement requires that by 2030 'significant progress will have been made' towards achieving the council's aspiration of making the borough carbon neutral by 2050. The Local Plan policies establish environmental sustainability as a key facet of development, encompassing CO_2 reduction, water management and adaptation of the built environment in response to current and anticipated climatic change.

The Purpose of this Document

1.3. The Local Plan sets out the vision for the planning and management of development in the borough up to 2030. This document describes how development in Crawley should be designed in order to comply with those policies in Crawley's Local Plan which address the challenge of climate change. It focuses on the following policies which directly address this issue:

- ENV6: Sustainable Design and Construction
- ENV7: District Energy Networks
- ENV8: Development and Flood Risk
- ENV9: Tackling Water Stress
- IN3: Development and Requirements for Sustainable Transport

The SPD also provides guidance on the parts of the following policies which contribute to the agenda of addressing climate change:

- CH3: Normal Requirements of all New Development
- ENV1: Green Infrastructure

This document includes guidance on the specific information required to accompany planning proposals in order to demonstrate compliance. It will be adopted as a Supplementary Planning Document (SPD), meaning that it will become a material consideration in planning decisions taken by the council.

1.4. Further guidance on these policies, focusing on other Local Plan themes besides climate change, is provided in the Urban Design SPD, the Green Infrastructure SPD, and the Town Centre Wide SPD.

1.5. This SPD replaces the council's earlier Supplementary Planning Guidance document SPG 14: Sustainable Designs and supersedes some of the guidance contained in SPG 13: Landscaping and Greening.

1.6. This document was adopted by Crawley Borough Council's Cabinet on 5 October 2016, following public consultation carried out in March 2016.

National Legislative and Policy Context

1.7. The climate-change related policies in the Local Plan reflect a number of UK government policy commitments and initiatives of recent years:

- The Climate Change Act 2008
- The Energy Act 2008
- The Planning & Energy Act 2008

[1] Crawley 2030: Crawley Borough Local Plan 2015 – 2030, adopted December 2015

- The 2004 Planning & Compulsory Purchase Act, as amended by the 2008 Planning Act
- European Union (EU) directives[2] including:
  - the 2001 Strategic Environmental Assessment (SEA) Directive;
  - the 2009 Renewable Energy Directive; and
  - the 2010 Energy Performance of Buildings Directive.

For a summary of the above Acts and Directives, insofar as they relate to the Planning and Climate Change agenda, see Appendix 1 of this document.

1.8. The Local Plan policies concerned with climate change also respond to the National Planning Policy Framework (NPPF)[3]. The NPPF identifies various means by which Local Planning Authorities should respond to climate change[4]. These include:

- the promotion of energy efficiency in new and existing buildings;
- the encouragement of energy generation from renewable and low carbon resources;
- the identification of opportunities for carbon emission reductions more generally;
- the adaptation of the local environment in response to the effects of climate change, including flooding and restricted water supply.

1.9. National Planning Practice Guidance (PPG) on climate change identifies the task of addressing climate change as a core land use principle[5]. It sets out the means by which local plans can shape development so as to promote reductions in the emission of greenhouse gasses and increase the resilience of communities in the face of future flood risk, coastal change, threats to water supply and quality, and other effects of climatic change.

How this Document should be used

1.10. This document is intended for the use of developers, landowners, homeowners, planning officers, and other interested stakeholders, with the overall aim of helping development proposals to meet the requirements of relevant Local Plan policies. It should be read in conjunction with the Local Plan itself, including the introductory text and reasoned justification of each policy, as well as other guidance or evidence base documents which are referred to in the following text.

1.11. Applicants are advised to refer to this SPD as early as possible in the conception and design of development proposals. Early and considered engagement with the requirements presented here will simplify the task of considering (and demonstrating) the acceptability or otherwise of different solutions and avoid the disruption and delay that might arise from attempts to achieve policy compliance later on. Crawley Borough Council will be happy to provide assistance or clarification where requirements are unclear.

1.12. This document is set out so as to facilitate its use during the development process and in cross-referencing with the Local Plan. Chapter 2 and Appendix 2 provide an overview of how different kinds of development proposals should approach different stages of the planning application process. This includes general guidance on completing a Sustainability Statement, which is a local requirement for a wide range of development types under Policy ENV6 of the Crawley Borough Local Plan.

[2] Following the Referendum of 23 June 2016 these will remain applicable until such time as the United Kingdom formally leaves the EU, and will thereafter continue to be relevant to the extent that their requirements are replicated in UK legislation.
[3] National Planning Policy Framework, DCLG: 2012 (hereafter NPPF).
[4] NPPF, Section 10, pp.21-25.
[5] Planning Practice Guidance: Climate Change, DCLG: 2015 (most recent update).

1.13. The following chapters move through the different sustainability objectives set out in Policy ENV6, with the additional requirements of Policies ENV7, ENV9, CH3, and ENV1 being included under the corresponding ENV6 objective. The final two chapters respectively address the requirements of Policy ENV8, regarding Flood Risk Management, and IN3, regarding Sustainable Transport.

1.14. The chapters on ENV6 objectives are ordered in terms of overall priority. Objectives relating to climate change mitigation thus precede those relating to climate change adaptation. The mitigation objectives are also ordered in terms of the 'energy hierarchy', in accordance with the Local Plan and best practice:

- Be Lean: use less energy;
- Be Clean: increase efficiency of energy supply;
- Be Green: use energy from renewable and low carbon sources.

1.15. Each of the individual chapters begins with a short introductory section setting out how the topic covered by the chapter relates to the context of Crawley. This is followed by the relevant policy text from the Local Plan. Guidance on minimum **policy requirements** is then set out, followed by **best practice guidance**.

Policy Chapter Structure:

- Crawley Context
- Relevant Local Plan Policy Text
- Policy Requirements
- Best Practice Guidance
- Further Information

1.16. The sections on minimum **policy requirements** and **best practice guidance** are subdivided into material relevant to all developments on the one hand, and material relevant to specific types of development on the other. These sections are colour coded according to the following scheme for ease of navigating the document:

All Developments	**Black**
Householder Developments	**Blue**
Extensions and refurbishments to non-residential buildings and changes of use	**Green**
New dwellings	**Yellow**
New non-residential buildings	**Red**

The colours appear throughout the document in squares like those shown above, inserted to the right of the text. For sections of text relevant to multiple development types more than one square is used.

1.17. Technical Explanations, Useful Information and Recommendations are provided in boxed form throughout the document to provide additional assistance and detail.

2. Navigating the planning process and producing a Sustainability Statement

The Planning Process

2.1. In order to satisfy the policy requirements as efficiently and cost-effectively as possible applicants should take account of them from an early stage and discuss them with council officers where difficulties or queries arise. This is particularly important for larger applications which are likely to be subject to a range of requirements.

2.2. Relevant requirements and corresponding sections of the SPD can be quickly identified by consulting Table 2.1, which consists of a matrix showing which requirements are applicable to different types of proposal. Development types are listed in the left hand column, while the names of policies and policy requirements are listed along the top two rows, with page references for relevant sections of the SPD in the third row. By finding the relevant development type for your proposal in the left-hand column and then tracing right you will find the ticks identifying policy requirements which you will need to address, and the sections of the SPD which you will need to consult. Those requirements highlighted by two ticks must also be addressed in a Sustainability Statement submitted with your planning application.

2.3. Having identified the relevant policy requirements early on, developers should ensure that they are appropriately taken into account at each stage in the development process, ranging from the design stage, through pre-application discussions, and formal planning submission, to the post-determination stage, when planning permission may be made subject to certain requirements. Appendix 2 provides a summary of this process in the form of a table cross-referencing the policy requirements (as identified in Table 2.1) against different stages of the planning process.

Producing a Sustainability Statement

2.4. Policies ENV6, ENV7 and ENV9 all require certain types of development proposal to include a Sustainability Statement detailing how the proposal responds to the requirements of those policies. This section consists of guidance on how different types of development should respond to this requirement.

2.5. ‘Sustainability’ and ‘Sustainable Development’ are broad terms which can apply to economic and social matters as well as the environment, as set out in paras. 6-10 of the NPPF. The form of Sustainability Statement required here relates specifically to the environmental strand of ‘Sustainable Development’ and, in particular, to climate change mitigation and adaptation. Statements will therefore need to address climate change and the relevant policy requirements in order to be acceptable, regardless of what other aspects of ‘sustainability’ they cover.

Table 2.1. Policy requirements by development type (two ticks ✔ ✔ indicates requirement to be addressed in a Sustainability Statement)

Policy Driver:	*ENV8*	IN3	ENV6	ENV6	ENV6; ENV9	ENV6; ENV9	ENV7
Requirement Title:	***Flood Risk***	**Sustainable Transport**	**Sustainability Objectives (without Statement)**	**Sustainability Objectives (with Statement)**	**BREEAM Energy & Water Credits**	**Water efficiency in Dwellings**	**Decentralised Energy**
Page References:	**55-61**	**62-65**	**Guidance Note†**	**11-20, 21-23, 24-27, 28-37, 38-45, 46-49, 50-54**	**14-15, 48**	**47-48**	**28-37, Appendix 3**
Development Type							
Householder development including creation or refurbishment of up to 100sqm	✔	✔	✔				
Householder development involving creation or refurbishment of 100sqm or more	✔	✔		✔ ✔			
Minor development comprising 1-9 dwellings outside a District Energy Network priority area	✔	✔		✔ ✔		✔ ✔	
Minor development comprising 1-9 dwellings within a District Energy Network priority area	✔	✔		✔ ✔		✔ ✔	✔ ✔
New dwellings comprising major development[6]	✔	✔		✔ ✔		✔ ✔	✔ ✔
Non-residential extension(s), change of use, or refurbishment affecting up to 100sqm	✔	✔	✔				
Non-residential extension(s), change of use or refurbishment affecting more than 100sqm and comprising minor development	✔	✔		✔ ✔			
Non-residential extension(s) or change of use affecting more than 100sqm and comprising major development[7]	✔	✔		✔ ✔			✔ ✔
New non-residential building(s) comprising minor development and involving the creation of up to 1000sqm	✔	✔		✔ ✔	✔ ✔		
New non-residential building(s) comprising major development[6]	✔	✔		✔ ✔	✔ ✔		✔ ✔
Major development not coming within any other category[6]	✔	✔	✔				✔ ✔
All other development	✔	✔	✔				

† Guidance Note: Energy and Water Efficiency for Alterations and Extensions to Buildings – published separately by the council

[6] As defined by the Town and Country Planning (Development Management Procedure) (England) Order 2010, including: the provision of dwelling houses of 10 or more units or on a site of 0.5ha or more and dwelling numbers are unknown.

[7] As defined by the Town and Country Planning (Development Management Procedure) (England) Order 2010, including the provision of a building or buildings where the floorspace to be created is 1,000sq.m or more or development carried out on a site having an area of 1ha or more; and minerals and waste developments.

2.6. Those policy requirements which trigger a need for a Sustainability Statement are identified by a double tick on Table 2.1. It is important to note that just because a development may escape the requirement to include a Sustainability Statement in relation to one requirement, it may still trigger the need for one due to another requirement.

2.7. Where Sustainability Statements cover the policies identified in Table 2.1, the council will not be overly prescriptive about their format or structure. They may, where appropriate, be incorporated within other documents (e.g. planning statements) as long as they are clearly identified and distinct. Applicants may find it useful to construct their Statement around the energy hierarchy (be lean, be clean, be green). A template based on this structure is provided in Appendix 4, intended in particular to assist proposals which do not comprise major development. Alternatively, applicants may prefer to follow the order in which the seven sustainability objectives are set out in Policy ENV6.

2.8. The length, scope and level of technical detail of the Sustainability Statement will depend on the nature of the proposal and the policy requirements which the Statement seeks to satisfy. For developments with more limited sustainability implications, such as changes of use and refurbishments involving limited physical change, or extensions narrowly exceeding the 100sqm threshold, a more qualitative statement listing proposed measures will usually be acceptable.

2.9. However, broadly speaking, Sustainability Statements should aspire to provide a quantitative account of a development's performance in relation to relevant sustainability objectives, and this will be expected of major developments. This should involve identifying a baseline level of performance, describing proposed sustainability features, and outlining the resulting level of performance achieved as a result. Evidence generated from modelling undertaken to assess compliance with Part L of the Building Regulations (e.g. Standard Assessment Procedure (SAP) reports and Building Regulations UK (part) L (BRUKL) output documents) can assist with this. Further detail on the quantitative indicators applicable to different sustainability objectives and different types of development is provided in the following chapters.

2.10. Where a BREEAM pre-assessment or design stage certificate is submitted as part of the planning application the information in it does not need to be repeated extensively in a Sustainability Statement, but should be cross referenced or summarised, so as to provide a clear and accessible overview of the proposed approach to climate change mitigation and adaptation. The same applies to SAP reports, BRUKL Output Documents, or documents produced as part of the Home Quality Mark (HQM) certification process for residential developments.

Multi-stage Consents

2.11. Where planning permission is sought for a given development in more than one stage (e.g. an outline or hybrid application followed by a reserved matters application), the council will apply the policy requirements related to this SPD at the most appropriate stage.

2.12. The implications of a given proposal in terms of flood risk (Policy ENV8) and transport impact (Policy IN3) concern the basic principle of development and should therefore be addressed at the outline stage.

2.13. The most appropriate stage at which to address the other requirements detailed in this SPD is likely to vary on a case-by-case basis, and pre-application discussion with the council is recommended as a means of identifying the best approach. Since the requirements of Policies ENV6, ENV7 and ENV9 will not usually affect the basic

principle of development, and since the energy demands and environmental performance of a development are partly dependent on built form, layout and scale, these policies will in many cases be best suited to treatment at the reserved matters stage. Where this is the case, the council will still seek to secure compliance by means of condition(s) attached to the outline consent.

Financial Viability

2.14. The policies in the Local Plan have been subject to viability appraisal as part of the examination process. This concluded that all residential and employment development proposed in the Plan is viable and deliverable, taking the impact of the policies and the introduction of the Community Infrastructure Levy into account. The general definitions and assumptions regarding viability which inform the Local Plan are set out in the 2015 Whole Local Plan and CIL Viability Assessment, which includes a 'Construction Cost Study' outlining the cost impact of Policies ENV6, ENV7 and ENV9 (see 'Further Information' section below).

2.15. The viability appraisal was based on the assumption that the Zero Carbon Standard for energy and CO_2 efficiency would be introduced nationally in 2016. The government has now indicated that the existing minimum energy efficiency standard for new dwellings will remain in place until further notice. By taking the opportunity to build to the current standard rather than the anticipated Zero Carbon Standard, future housing developments stand to save an estimated £42-64 per square metre, depending on dwelling types (Zero Carbon Hub estimate, 2014: see 'Further Information' section below). This relaxation of anticipated requirements should be borne in mind when considering the viability of policies ENV6, ENV7, ENV8 and ENV9 in relation to individual proposals.

2.16. Where development proposals affected by the policy requirements of ENV6, ENV7, ENV8 and ENV9 seek to be exempted from them on grounds of financial viability the site-specific justification for this should clearly be stated and explained in the Sustainability Statement and submitted with the application. It is particularly important that sufficient evidence is provided to demonstrate a lack of viability in relation to the following requirements:

- the minimum Energy and Water standards for BREEAM 'Excellent' required for non-residential buildings in Policies ENV6 and ENV9;
- the tighter water efficiency limit for dwellings in ENV9;
- incorporation of at least one of the hierarchy of options for decentralised energy described in ENV7;
- The requirement for incorporation of SuDS in ENV8 (here regard should also be had to paragraphs 83-85 of the Planning Practice Guidance 'Flood Risk and Coastal Change')[8].

2.17. Development which does not adequately mitigate against unacceptable impacts will be refused.

[8] Planning Practice Guidance: Flood Risk and Coastal Change, DCLG: 2015 (most recent update).

Further Information:

Crawley Borough Council

- Planning Permission & Applications Web Pages
  http://www.crawley.gov.uk/pw/Planning_and_Development/Planning_Permission__Applications/index.htm
- Crawley Borough Council Whole Plan & Community Infrastructure Viability Assessment, NCS: 2015
  http://www.crawley.gov.uk/pw/web/PUB250730
  - Appendix 2 ('Construction Cost Study')
    http://www.crawley.gov.uk/pw/web/PUB250677

Zero Carbon Hub (agency now defunct but website to be retained)

- Cost Analysis: Meeting the Zero Carbon Standard (2014)
  http://www.zerocarbonhub.org/resources/reports/cost-analysis-meeting-zero-carbon-standard

3. ENV6 Objective 1: Reducing the need of your development to consume energy

Objective 1 from Policy ENV6 is about making your development more energy-efficient. This chapter provides guidance on fulfilling this objective. It also provides guidance on meeting the requirements of Policy CH3 where relevant to reducing energy demand.

Crawley Context

In 2013, Crawley consumed an estimated 21.96 megawatt hours (MWh) of energy per resident. 72% of this was consumed at industrial, commercial and domestic premises[9]. This shows that improving the energy efficiency of buildings is key to reducing the borough's overall energy use, and highlights the important role of the development process in achieving this.

Per capita energy use by the industrial and commercial sectors accounted for 9.38MWh, exceeding the figure of 7.12MWh for the South East and the national average of 8.51MWh. This signals the borough's role as a focus for these activities, but also highlights the importance of achieving greater energy efficiency in these areas.

Energy use in the domestic sector stood at 6.3MWh per capita – significantly lower than the regional and national figures of 7.47MWh and 7.36MWh respectively. However, with some of the borough's housing consisting of poorly insulated properties from the 1950s and 60s there is still room for improvement in this sector.

Explanation:
Kilowatt hours (kWh), Megawatt hours (MWh), and Gigawatt hours (GWh) are all units of energy, measured as a quantity consumed by a given amount of power (kilowatts, megawatts, etc.) within an hour.

When thinking about these measurements it is important to appreciate the difference between energy, which is latent in the environment, and power, which is rate at which energy is consumed or transferred.

[9] 'Sub-national total final energy consumption statistics: 2005-2014', DECC (Department of Energy and Climate Change): 2015 (UK Census 2011 population).

3. ENV6 Objective 1: Reducing the need of your development to consume energy

Relevant Local Plan Policy Text

ENV6: Sustainable Design and Construction

In order to maximise carbon efficiency, all homes will be required to meet the strengthened on-site energy performance standards of Building Regulations, and any subsequent increased requirements.

Proposals for new non-domestic buildings should achieve BREEAM Excellent (for water and energy credits) where technically and financially viable.

All development, including the alteration and extension of existing buildings, should consider how it may achieve the following sustainability objectives:

In relation to carbon:

i. Take an active approach to reducing its need to consume energy;

…

CH3: Normal Requirements of All Development (key text in bold)

All proposals for development in Crawley will be required to:

…

d) Retain existing individual or groups of trees that contribute positively to the area and allow sufficient space for trees to reach maturity. Sufficient space should also be provided in private gardens that would not be overshadowed by tree canopies; **and proposals should ensure that rooms within buildings would receive adequate daylight**…

Policy Requirements

All Developments

3.1. Developers should seek to make the reduction of energy demand an integral part of the design and development processes. Developments must meet relevant requirements of Part L of the Building Regulations as a minimum, but should also consider how they might exceed these.

Development-specific Policy Requirements

Householder developments, changes of use and alterations to non-residential buildings

3.2. Where works of this nature affect the envelope of a building or its building services (e.g. heating, ventilation, air conditioning) they will need to meet minimum energy efficiency requirements under part L of Building Regulations, as set out in approved document L1B (dwellings) or L2B (non-residential buildings).

3.3. Developments of these kinds involving the creation, refurbishment, or change of use of a building of over 100sqm must include in their application a Sustainability Statement setting out how they propose to reduce the need of the development to consume energy. This should give consideration to whether there is reasonable potential to exceed applicable Building Regulations minimum energy efficiency requirements.

New dwellings

3.4. New dwellings will need to meet applicable Building Regulations energy efficiency standards, or any other national minimum standard introduced during the Plan period.

3. ENV6 Objective 1: Reducing the need of your development to consume energy

3.5. Proposals for new dwellings should set out as far as practicable in their Sustainability Statement or supporting document (e.g. SAP report) how the development will perform in relation to Building Regulations energy efficiency requirements. Information on the following will be particularly relevant:

- Nature of proposed heating system;
- U-values for parts of the building envelope (i.e. walls, floor, roof, doors, windows);
- Comparison of SAP calculations for the Dwelling Emission Rate (DER) with the Target Emission Rate (TER); and comparison of Dwelling Fabric Energy Efficiency (DFEE) rate with the Target Fabric Energy Efficiency (TFEE) (see 'Useful Information' below for further explanation of these criteria);
- Analysis of the technical, environmental and financial feasibility of using high-efficiency alternative energy systems. This is a Building Regulations requirement under regulation 25A of part L, but such analysis is likely to be more useful and meaningful when undertaken at the planning stage.

The level of detail provided in the Sustainability Statement should reflect the scale of the development. As a guideline, the council would expect proposals for the creation of 50 dwellings or more to be supported by a detailed energy master plan, including dynamic thermal modelling and details of total energy use and CO_2 emissions (both regulated and unregulated).

Useful Information:

New dwellings are currently subject to Building Regulations requirements on energy efficiency which are set out in the 2013 edition approved document L1A. This requires that new dwellings meet a minimum Target Emission Rate (TER) for CO_2 emissions as well as a Target Fabric Energy Efficiency (TFEE) Rate for energy consumption. The TER is expressed in terms of kilograms of CO_2 emitted per square meter of floor area per annum, while the TFEE is measured in kilowatt hours (kWh) of energy consumed per square meter of floor area per annum. Both are calculated and compared with the dwelling's actual performance as part of the Building Regulations process.

Document L1A also sets out certain minimum energy efficiency requirements for individual parts or aspects of the building fabric, which are set out in Table 3.1 below. Most of these 'limiting values' concern the insulation quality of fabric elements, expressed as u-values. In order to take account of unwanted flows of air through gaps and joints there is also a standard for air permeability (also known as air tightness), measured as a given flow of air per square metre of the building envelope at a given difference between indoor and outdoor air pressure.

It should be underlined that these limiting values represent minimum standards for the individual elements mentioned, rather than an acceptable overall building specification. A dwelling would thus need to significantly exceed most of them in order to achieve the relevant TER and TFEE rate (i.e. with elements at or near the limiting values being balanced by stronger elements elsewhere). It is also advisable to aim to exceed the TER and TFEE rate to allow for poorer than expected as-built performance.

Table 3.1: Approved document L1A (2013) limiting values for fabric energy efficiency in new dwellings

ELEMENT	LIMITING VALUE
Roof	0.2 W/(m^2.K)
Walls	0.3 W/(m^2.K)
Floor	0.25 W/(m^2.K)
Party Wall	0.2 W/(m^2.K)
Windows & Glazed Doors	2.00 W/(m^2.K)
Opaque doors	2.00 W/(m^2.K)
Semi-glazed Doors	2.00 W/(m^2.K)
Air Permeability	10.0 m^3/(h.m^2) at 50 Pa

Regulation 25A of document L1A further requires that prior to the commencement of work an analysis is carried out to assess the technical, environmental and economic feasibility of using high-efficiency alternative systems in the dwelling design. This must be retained for inspection by the Building Control Body on request.
Further criteria relate to:

- Quality of construction and commissioning: the dwelling should be constructed so that its as-built environmental performance meets the standards predicted on the basis of the SAP assessment.
- Provisions for energy-efficient operation of the dwelling: the owner of the building should be provided with sufficient information about the building, the fixed building services, and their maintenance requirements, to ensure that no more fuel and power is used than is 'reasonable in the circumstances'.

New non-residential buildings

3.6. New non-residential buildings will be expected, where financially viable and technically feasible, to undergo certification by the BREEAM UK New Construction scheme, and to achieve the minimum standards required for an 'Excellent' rating within the Energy issue category. For speculative buildings where user and fit-out details are unknown, 'shell and core' or 'core only' BREEAM assessments should be pursued, and any applicable minimum 'Excellent' standards will still apply. Further information is provided in the 'Useful Information' box below.

3.7. Developments which seek to pursue this target should submit a pre-assessment report at the point of applying for planning permission.

3.8. Evidence that the specified credits have been achieved through final BREEAM certification will be required as part of a condition attached to any planning approval. This evidence should be submitted before the building is occupied unless circumstances specific to the development are an obstacle to this and the council agrees in writing to accept the certification evidence at a later stage.

3.9. Where achieving the mandatory Energy credits for BREEAM 'Excellent' is found to be either unviable or unfeasible, sufficient evidence to justify this claim should be submitted with the application. In these circumstances BREEAM certification should still be sought, where feasible and viable, with the intention of achieving as many of the specified credits as these constraints will allow. The standard requirement for a Sustainability Statement addressing the objective of reducing energy consumption will also still apply.

3.10. For all new non-residential buildings subject to the requirement for a Sustainability Statement (i.e. exceeding 100sqm of internal floorspace) a BRUKL report, produced as part of the Simplified Building Energy Model (SBEM) calculation for Building Regulations compliance, should be submitted. The information it contains does not need to be repeated extensively in the Sustainability Statement, but should be summarised or cross referenced there.

3.11. More generally the level of detail provided in a Sustainability Statement should reflect the scale of the development. As a guideline, the council would expect proposals for the creation of over 5,000sqm to be supported by a detailed energy master plan, including dynamic thermal modelling and details of total energy use and CO_2 emissions (both regulated and unregulated).

Useful Information:
The BREEAM (Building Regulations Establishment Environmental Assessment Methodology) standard provides an internationally recognized means of assessing and accrediting the environmental performance of buildings. It is applied locally through a network of licensed assessors. New non-residential buildings in the UK are assessed under the BREEAM New Construction scheme.

Assessments under the scheme cover 10 different environmental issue categories. Each of these contains a given number of credits which in turn have different weightings within the overall score awarded. The 'Energy' category contains 31 credits making up 15% of the available score for a fully fitted building.

The scheme identifies a number of credits and criteria which are mandatory for the achievement of an 'Excellent' rating. Within the Energy category these 'minimum standards' include 5 credits for reductions in CO_2 emissions and energy use, amounting to a reduction of 37.5% over and above standard allowed by Building Regulations, as well as 1 credit for the sub-metering of major energy consuming systems.

For 'shell only' or 'shell and core' assessments some of the minimum 'Excellent' criteria do not apply or are modified. Full scheme details and technical manuals are available at www.breeam.org

In order to ensure that the assessment methodology is integrated into the design and development processes as cost-effectively and smoothly as possible, BRE recommends that a BREEAM assessor or Sustainability Champion is appointed early on and, specifically, no later than the 'Preparation and Brief' stage of the project (RIBA Stage 1 or equivalent).

Best Practice Guidance

All Developments

CBC Recommends: identify a baseline energy demand for the proposed development against which improvements can be measured.

3.12. The reduction of energy demand in new developments can help achieve the goal of limiting carbon emissions while also reducing energy costs. Carefully targeted interventions at this stage will often enable owner-occupiers to recoup their investment in energy efficiency over time, and enable speculative developers to make their development more marketable.

3.13. Measures to reduce the energy demand of buildings can generally be divided into 'passive' and 'active' categories. 'Passive' measures reduce the energy demand of the development without themselves consuming energy, and are therefore to be preferred. 'Active' measures involve efficiencies in energy consumption by building services, such as heating, ventilation and air conditioning, and should only be considered after the potential of passive measures to reduce energy demand has been fully exploited.

3.14. Passive approaches to energy reduction generally relate to the building fabric and are likely to vary between different types of development proposal. They are described in more detail below in relation to specific development types. Active approaches are likely to be more widely applicable. They include the following:

- Installing energy-efficient cooling technologies (e.g. mechanical ventilation using fans and/or evaporative cooling) and lighting technologies (e.g. LED lighting) (these will in any case need to meet minimum Building Regulations standards, set out in the Compliance Guides accompanying approved documents L1B and L2B);
- Including heat recovery capacity in any mechanical ventilation services (preferably including a summer bypass to ensure that internal heat is purged during the summer);
- Installing 'smart' energy metering (the UK government plans to make these standard in homes by 2020);
- Ensuring that building service controls such as lighting and gas boiler controls, and management systems services are efficient, up to date, and complementary (e.g. avoid competition between heating and cooling systems and equipment)

3.15. A further way of reducing energy consumption by active means is to reduce 'unregulated' energy use, which is not currently subject to control by Building Regulations. This includes energy consumption by transportation services such as lifts as well as electrical appliances, IT and cooking/refrigeration equipment, and generally accounts for at least a third of the total energy usage of a building. The following measures can help achieve efficiencies here:

- Consult CIBSE Guide D for best practice guidance in respect of transportation services (see 'Further Information' section on p.20);
- Use energy efficient white goods and electrical appliances (suppliers are currently legally obliged to display an EU Energy Efficiency Label, including an energy rating, at the point of sale). Also look for the following labels:
  - ENERGY STAR®;
  - Energy Saving Trust Endorsed;
  - EU Ecolabel (on electronic equipment, heat pumps, water-based heaters);
- Ensure that building and equipment users are trained in their energy-efficient use and understand the importance of sustainable practices, including through the provision of user guides and fit-out guides.

Development-specific Best Practice Guidance

Householder Developments, changes of use and alterations to non-residential buildings

CBC Recommends: carry out a payback analysis to identify cost-effective energy-efficiency improvements.

3.16. The following passive measures can be used to maximise the energy efficiency of new additions to buildings:

- Ensuring that new extensions, individual fabric elements and fittings exceed the minimum energy efficiency requirements of Building Regulations. These are in practice less stringent than for new buildings, since the TER and TFEE rates are not applicable; they also allow for optional approaches where more design flexibility is required through relaxation of some design elements in return for compensating measures elsewhere;

- Ensure that the amount and location of new windows achieves a good balance between the requirements of adequate daylighting and adequate insulation (Building Regulations approved document L1B suggests that the area of glazing in extensions to dwellings should generally be equal to around 20-25% of the corresponding floor area);
- Avoiding unnecessary gaps or thermal bridges in new parts of the building fabric (thermal bridges are parts of the fabric which are significantly less effective at containing heat than the surrounding parts).

3.17. In considering these approaches it is important to assess the new additions in the context of the energy performance of the whole building. For example, adding an extension with outstanding insulating qualities may have limited impact if poorly performing parts of the existing building fabric are retained. Therefore, the options given above should be considered alongside the guidance, given in Chapter 4, on making improvements to existing buildings.

New dwellings and non-residential buildings

CBC Recommends: for dwellings, aim where feasible and viable to achieve or exceed the model Building Regulations compliant specification set out in Table 3.2 below.

3.18. When planning new buildings a wide range of passive measures can be considered and incorporated, as ‘designing in’ energy efficiency is much more cost-effective than pursuing it through retrofitting and improving existing buildings.

3.19. One issue with implications for energy demand is the orientation of the building in relation to sunlight and prevailing winds. There are a number of factors to be considered here:

- Winter solar gain: this can be exploited by ensuring that elevations with extensive glazing (such as the rear walls of houses) as well as rooms likely to be occupied during the day face to within 30 degrees of due south.
- Summer (i.e. unwanted) solar gain: this encourages the consumption of energy in the form of mechanical cooling. It can be limited by reducing the exposure of rooms likely to be occupied during the day (or containing mechanical cooling/refrigeration equipment) to sunlight from the east, west, or directly overhead. This can be achieved by using less fenestration on relevant elevations, by using glass with a lower g-value, and/or by providing shading or overhangs.
- Natural ventilation: there are many ways of enabling passive ventilation and thereby reducing reliance on mechanical cooling. These include locating openable windows or vents on the windward and lee sides of a building where there is clear space for airflows in between; obstructing wind with a side fin on one side to create variable air pressure and cross-currents; and using chimneys or cowls to draw warm air up and out of the building.

Explanation:
G-values describe the transfer of solar energy through a transparent or translucent material such as glass. They fall between 1, representing maximum energy transfer, and 0, representing no energy transfer.

3.20. The selection of materials for the building envelope provides further opportunity to reduce energy demand. One way of doing this is to use thermal elements and fittings with lower u-values than required by the Building Regulations. Table 3.2 sets out u-value and air permeability standards from the 'concurrent notional dwelling specification' detailed in approved document L1A. This represents a model design for compliance. It may not always represent the most cost-effective approach, but is considered feasible for standard types of dwelling, and represents a useful reference point for demonstrating compliance.

Table 3.2: U-value/air permeability standards for a notional dwelling[10]

ELEMENT	VALUE
External walls	0.18 W(m^2.K)
Party walls	0.0 W(m^2.K)
Roof	0.13 W(m^2.K)
Floor	0.13 W(m^2.K)
Windows/ glazed doors	1.4 W(m^2.K)
Opaque doors	1.0 W(m^2.K)
Semi-glazed doors	1.2 W(m^2.K)
Air Permeability	5.0 m^3/($h.m^2$) at 50 Pa

3.21. Energy efficiency can be further improved by careful location of thermal mass, in the form of high-density material such as concrete, brick or stone. At its most effective, thermal mass can absorb heat during the day and release it at night, thereby evening out temperature variations over the course of the day. In the UK, thermal mass is best used for surfaces exposed to the winter sun, such as the floors and outer walls of south-facing rooms, and exposed ceilings. Where such surfaces are exposed to the summer sun they can likewise reduce daytime overheating, although it is important to ensure that their location is well-ventilated during the night as they continue to emit heat.

3.22. Green roofs and walls are a design solution combining numerous environmental advantages. They are surfaces which have been deliberately covered with vegetation, usually through the addition of extra layers, including a growing medium, to the surface of the building fabric. They can achieve summer cooling through shading, plant and soil processes as well as other benefits relating to energy efficiency and other sustainability objectives, including:

- Good insulating properties, helping to avoid unwanted heat loss as well as unwanted heat gain;
- Climate change mitigation through additional CO_2 absorption;
- Slower surface water runoff, helping to reduce the risk of flooding from surface water;
- Enhanced biodiversity;
- Enhanced amenity value;
- Increased durability of underlying roof materials.

3.23. Green roofs and walls are relatively inexpensive and are likely to be feasible for many developments. However, there are a number of considerations that need to be taken into account. Roofs and walls must be structurally capable of supporting the additional layers. In Crawley, any likely impact on bird movements should also be considered from the perspective of aerodrome safeguarding. Where large and/or exposed green surfaces are being considered, it is advised to consult aerodrome safeguarding at Gatwick Airport (gal.safeguarding@gatwickairport.com) at an early stage.

[10] Taken from table 4 (p.25) of approved document L1A (2013).

Best Practice Example: Gales Place, Three Bridges, Crawley

The approved Crawley Borough Council development at Gales Place will comprise thirteen affordable homes (six flats and seven houses) built to the Passivhaus Standard. This standard illustrates the level of energy efficiency which can be achieved through a combination of passive and active design measures, combining optimal thermal performance, airtightness and orientation with mechanical ventilation in order to achieve an exceptionally low overall level of annual primary energy demand of no more than 120kWh/m^2. This compares with an England-wide average of 404kWh/m^2 in 2007 (English House Condition Survey 2007 Annual Report, DCLG: 2009, p.90).

Further Information:

UK Government

- Energy efficiency in buildings policy
  https://www.gov.uk/government/policies/energy-efficiency-in-buildings

BREEAM

http://www.breeam.org/

Building Regulations

- Approved documents L1A, L1B, L2A, L2B (via the planning portal)
  http://www.planningportal.co.uk/buildingregulations/approveddocuments/partl/approved

ofgem

- Energy Companies Obligation
  https://www.ofgem.gov.uk/environmental-programmes/energy-company-obligation-eco

Carbon Trust

- Low Carbon Buildings Guides
  http://www.carbontrust.com/resources/guides/energy-efficiency/low-carbon-buildings-design-and-construction/

Passivhaus (standard for low-energy heating and cooling)

http://www.passivhaus.org.uk/

Charterted Institution of Building Services Engineers (CIBSE)

- Introduction to Energy Efficiency (2012) (registration required)
  http://www.cibse.org/knowledge/cibse-guide/cibse-introduction-to-energy-efficiency-a-companio
- CIBSE Guides (membership or fee required)
  http://www.cibse.org/Knowledge/CIBSE-Publications/CIBSE-Guides
  Especially:
  CIBSE Guide A: Environmental Design (2015)
  CIBSE Guide B: Heating, Ventilating, Air Conditioning and Refrigeration (2001)
  CIBSE Guide D: Transportation systems in buildings (2015)
  CIBSE Guide F: Energy Efficiency in Buildings (2012)
  CIBSE Guide M: Maintenance Engineering and Management (2014)
- CIBSE Knowledge Series (membership or fee required)
  http://www.cibse.org/knowledge/cibse-publications/cibse-knowledge-series
  Especially:
  KS11: Green Roofs
  KS14: Energy Efficient Heating

Town and Country Planning Association

- ‘Sustainable Energy By Design: a TCPA ‘by design’ guide for sustainable communities’
  http://www.tcpa.org.uk/pages/sustainable-energy-by-design.html

4. ENV6 Objective 3: Improving existing buildings when adding alterations or extensions

Objective 3 of Policy ENV6 is about improving the energy efficiency of existing parts of a building when adding new elements. This chapter provides guidance on how to fulfil this objective.

Crawley Context

Crawley Borough covers a relatively small area of around 4,500 hectares.

Most of this is built up, while most of the rest is subject to development constraints, including safeguarding for a possible second runway at Gatwick Airport. The Local Plan reflects a situation in which there is limited space for new buildings.

In this context, reducing CO_2 emissions from buildings during the Local Plan period will depend to a large extent on improving the environmental performance of the borough's existing buildings, many of which date from early phases of the development of the New Town, and have poor levels of energy efficiency by current standards.

Relevant Local Plan Policy Text

ENV6: Sustainable Design and Construction

All development, including the alteration and extension of existing buildings, should consider how it may achieve the following sustainability objectives:

In relation to carbon:

…

iii. Look at ways to improve the existing building when adding improvements or extensions;

…

Policy Requirements

Development-specific Policy Requirements

Householder developments, changes of use and alterations to non-residential buildings

4.1. When considering these kinds of proposals, applicants should look for opportunities to remedy areas of poor energy efficiency in those parts of the building which are to be retained. Where such proposals involve the creation, refurbishment, or change of use of over 100 square metres of internal floorspace, they should describe any proposed improvements to the existing building fabric and services in the Sustainability Statement accompanying their application.

Useful Information:
In some circumstances, alterations to existing buildings are subject to Building Regulations requirements regarding improvements to retained elements of the building (see approved documents L1B & L2B).

Where renovation or part-replacement of existing individual thermal elements meets certain thresholds in terms of the area affected, the renovation or replacement should be carried out so that the element as a whole meets certain specified standards for renovated and new thermal elements respectively.

Where a building or part of a building (including an existing dwelling) is converted into a self-contained dwelling this is considered a 'material change of use', meaning that the energy efficiency of the whole unit is required to meet tighter standards, potentially through the upgrade or replacement of retained thermal elements and controlled fittings and a reduction in the area covered by openings (i.e. windows, external doors) to 25% of the floor area.

Where works are proposed to a building with a useful floor area of over 1,000sqm, involving an extension, or the provision or upgrade of fixed building services, this triggers a requirement for 'consequential improvements'. These should ensure as far as technically, functionally and economically feasible that the building as a whole meets the current Building Regulations energy efficiency requirements.

Best Practice Guidance

Development-specific Best Practice Guidance

Householder developments, changes of use and alterations to non-residential buildings

CBC Recommends: carry out a payback analysis to identify cost-effective energy efficiency improvements to the existing parts of the building.

4.2. As noted in Chapter 3, new building fabric parts and building services will be required to meet minimum standards under Building Regulations. However, where existing parts of the building continue to use heat and/or energy inefficiently, there is a danger that there will be little or no overall increase in the building's performance. Improvements to existing parts of the building may also be a more cost-effective means of increasing energy efficiency than investing additional funds to ensure that the new additions significantly exceed the Building Regulations requirements.

4.3. The following kinds of measures are likely to improve the performance of an existing building where relevant and feasible:

- Upgrading heating, cooling, ventilation and lighting systems that are over 15 years old;
- Draft-proofing to improve air tightness;
- Upgrading existing parts of the building envelope to meet current Building Control insulation standards, e.g. through replacement or addition of insulating layers to existing walls, ceilings and floors, or replacement of doors and windows;
- Improving insulation of heating/hot water pipe work, fittings and cylinders;
- Installing energy metering;

4. ENV6 Objective 3: Improving existing buildings when adding alterations or extensions

- Implementing measures listed in the Recommendation Report accompanying the building's Energy Performance Certificate, where available.

Explanation:
Since 2008, there has been a requirement to produce an Energy Performance Certificate for buildings which have been built, sold, rented or modified so as to reduce or increase the number of parts (i.e. units) and to provide or extend fixed heating, air conditioning or ventilation services. This should give the building (or building part) an energy efficiency rating of A to G, and include a Recommendation Report describing how its energy efficiency can be improved.

Further Information:

Crawley Borough Council

- Insulation and Energy Efficiency grants
  http://www.crawley.gov.uk/pw/Homes_and_Housing_Services/Private_Sector_Housing/Insulation___Energy_Efficiency_Grants/index.htm

Carbon Trust

- Buildings Energy Efficiency resources
  http://www.carbontrust.com/resources/guides/energy-efficiency/buildings-energy-efficiency/

Energy Saving Trust

- Home improvement resources
  http://www.energysavingtrust.org.uk/domestic/improving-my-home-0

Department of Energy and Climate Change

- Bonfield Review of Consumer Advice, Protection, Standards and Enforcement for UK home energy efficiency and renewable energy measures – introduction and Terms of Reference
  https://www.gov.uk/government/publications/bonfield-review-terms-of-reference

5. ENV6 Objective 4: Minimising carbon emissions during the development process

Objective 4 of Policy ENV6 seeks to reduce CO_2 emissions resulting from the implementation and construction of new development. This chapter provides guidance on how this can be achieved. It also provides guidance on where relevant measures can assist in compliance with Policy ENV1.

Crawley Context

By 2030, Crawley is expected to see the construction of over 5,000 dwellings and the creation of over 90,000sqm of employment floorspace[11].

This level of growth represents a considerable concentration of construction (and associated demolition) work within a relatively small area.

This anticipated development activity alone will generate considerable CO_2 emissions (the Department of Business, Innovation and Skills (BIS) has estimated that 17% of the CO_2 emissions subject to the influence of the construction industry relate to the development process rather than to the use of buildings)[12].

The borough can reinforce its contribution to the mitigation of climate change by ensuring that the CO_2 emissions resulting from the development process are as low as reasonably possible. The impact of development activity can be further mitigated by taking measures to ensure that 'green infrastructure' on, or near, development sites is protected and, where possible, enhanced.

Relevant Local Plan Policy Text

ENV6: Sustainable Design and Construction

All development, including the alteration and extension of existing buildings, should consider how it may achieve the following sustainability objectives:

In relation to carbon:

…

iv. Minimise the amount of carbon emitted throughout the implementation and construction process and ensure any existing embedded carbon onsite is retained;

…

[11] The employment floor space figure is a conservative estimate, based on the available 23 hectares identified in Local Plan Policy EC1, and the assumption that at least 40% of the land will become floor space (i.e. as distinct from car parking, access roads, landscaping etc.)

[12] 'Estimating the amount of CO_2 emissions that the construction industry can influence', BIS: 2010.

5. ENV6 Objective 4: Minimising carbon emissions during the development process

ENV1: Green Infrastructure

Crawley's multi-functional green infrastructure network will be conserved and enhanced through the following measures:

i. Development which protects and enhances green infrastructure will be supported;

ii. Development proposals should take a positive approach to designing green infrastructure, utilising the council's supplementary planning documents to integrate and enhance the green infrastructure network;

iii. Proposals which reduce, block or harm the functions of green infrastructure will be required to be adequately justified, and mitigate any loss or impact or as a last resort compensate to ensure the integrity of the green infrastructure network is maintained;

iv. The strategic green infrastructure network is afforded the highest protection due to its high value from existing or identified potential multiple functions, for example as recreation, routeways, access to the countryside, wildlife and climate mitigation;

v. Proposals should maximise the opportunity to maintain and extend green infrastructure links to form a multi-functional network of open space, providing opportunities for walking and cycling, and connecting to the urban/rural fringe and the wider countryside beyond;

vi. Large proposals will be required to provide new and/or create links to green infrastructure where possible.

Policy Requirements

All Developments

5.1. All development proposals should consider ways of minimising the quantity of CO_2 emitted as a result of the development process, including the ultimate removal or demolition of the development.

5.2. Development proposals including the creation of dwellings, or the creation, refurbishment, or change of use of more than 100sqm of internal floorspace should describe in their Sustainability Statement how they propose to pursue this objective, where relevant.

5.3. Where proposals involve the creation of 50 or more dwellings or 5,000sqm of floorspace, a detailed resource management plan, including a site waste management plan, should be adopted.

5.4. Consideration should be given to the impact of development activity on green infrastructure, bearing in mind its benefits both in terms of climate change mitigation through CO_2 sequestration and climate change adaptation through better surface water drainage, cooling of the local environment, and shading of built surfaces that might otherwise be vulnerable to overheating on account of exposure to the sun. Developments should seek to enhance and strengthen local green infrastructure where possible and exploit the environmental opportunities it provides. The net loss of green infrastructure should be avoided or at least minimized and mitigated. Further requirements arising from Policy ENV1 and related policies is set out in the Green Infrastructure SPD.

Best Practice Guidance

CBC Recommends: identify a baseline level of CO_2 consumption for the implementation of the proposed development and seek to make improvements against it.

All Developments

5.5. By the time a building has been completed it will already have consumed a considerable quantity of CO_2 through the production and assembly of materials, with extraction, manufacturing and transportation processes being particularly carbon-intensive. In consequence, building materials often come to represent a considerable quantity of 'embodied' or 'embedded' carbon over the course of their life cycle. All developments should avoid unnecessary inefficiency in this regard over the course of their lifetime, including their eventual removal or demolition. This is particularly important for temporary uses and structures.

5.6. The quantity of carbon emitted as a result of the build (and, where appropriate, subsequent removal/deconstruction) can be reduced by taking the following steps:

- Retaining and refurbishing existing buildings/features rather than demolishing and rebuilding unless the loss of 'embedded' carbon can be offset by resulting improvements in the energy efficiency of the building in line with the guidance in Chapters 3 and 4;
- Design the building footprint to avoid unnecessary use of materials;
- Use low-carbon supply chains for construction materials, e.g. by using local or UK sourced materials rather than imports;
- Use materials, components, and construction techniques which make for durability and ease of deconstruction and re-use (for example, a simpler structure with fewer components and fewer, simpler fastenings will be easier to dismantle and recycle);
- Use environmentally-friendly materials identified by the BRE Green Guide to Specification;
- Avoid materials that are high in embedded carbon or which are associated with the emission of other pollutants, such as CFCs;
- Use pre-fabricated off-site construction where feasible;
- Make efficient use of the 'embedded' carbon already present in onsite building materials by adhering to the following 'waste hierarchy', set out in the 2008 EU Waste Framework Directive, which proceeds from the most desirable to the least desirable options:
  - Prevention: avoiding and minimising the generation of waste;
  - Preparing for re-use: e.g. repairing and re-using or selling on building components and architectural features;
  - Recycling: e.g. turning building waste into aggregate for use in foundations or driveway surfaces;
  - Recovery: e.g. generation of energy from waste through incineration;
  - Disposal: landfill or incineration without energy recovery.

5.7. In order to ensure that the potential contribution of existing and proposed new green infrastructure to climate change mitigation (and adaptation) is fully realised, consideration should be given to such matters as selection of plant/tree species, maintenance requirements, and site-specific opportunities and constraints, including the presence of watercourses.

5. ENV6 Objective 4: Minimising carbon emissions during the development process

5.8. Further guidance on the role of trees and forest in addressing climate change is published by the Forestry Commission and Woodland Trust (see 'Further Information' section below).

5.9. The Green Infrastructure SPD provides further guidance on the range of factors to be considered, and on how development proposals should take account of green infrastructure requirements over the course of the design and planning processes.

Further Information:

UK Government

- Environmental Management: Waste
  https://www.gov.uk/topic/environmental-management/waste

BREEAM

- Green Guide to Specification
  www.bre.co.uk/greenguide
- SMARTWaste
  http://www.smartwaste.co.uk/page.jsp?id=1

Forestry Commission

- Climate change resources
  http://www.forestry.gov.uk/fr/climatechange

GreenSpec

www.greenspec.co.uk

SEDA (Scottish Ecological Design Association)

- Design Guide No. 1: Design and Detailing for Deconstruction
  http://seda.uk.net/index.php?id=136

WRAP (Waste Resource Action Programme)

- Resource Efficient Construction
  http://www.wrap.org.uk/content/resource-efficient-construction
- Site Waste Management Plan template
  http://www.wrap.org.uk/content/site-waste-management-plan-template-lite

SalvoMIE (Materials Information Exchange)

www.salvomie.co.uk

Woodland Trust

- Planting trees and climate change
  https://www.woodlandtrust.org.uk/plant-trees/why-plant-trees/climate-change/
- Publications related to climate change
  http://www.woodlandtrust.org.uk/publications/search/?query=&sortby=date&count=10&subject=100007512

6. ENV6 Objective 5 and ENV7: Supporting the establishment of District Energy Networks

Objective 5 of Policy ENV6 promotes the development of District Energy Networks in Crawley, and Policy ENV7 further develops the council's requirements relating to this objective. This chapter provides guidance on complying with both policies.

Explanation:
District Energy Networks (DENs) generate and supply energy (potentially including electricity, heat, and cooling) on a local scale, such as within a town centre or large housing estate. By generating energy close to the point of use they are able to achieve a higher degree of efficiency in the supply of power.

Crawley Context

Crawley is a compact urban area with high energy demand from a wide range of domestic, commercial, industrial, public sector and other buildings. The council commissioned the 'Decentralised Energy Study' for Crawley (2011) to give more detailed consideration to the viability of DENs in the borough.

The study modelled the incidence of factors likely to enhance network potential (the presence of dense, relatively constant demand; the presence of large 'anchor loads' as potential customers; and plans for new development) as well as installation costs and the predicted market environment. It identified potential for viable networks in the town centre, at the K2 Crawley Leisure Centre, within Manor Royal and at the North East Sector/Forge Wood.

These have been allocated as DEN priority areas in Policy ENV7 and the accompanying Local Plan Map, which is reproduced as Map 6.1.

Relevant Local Plan Policy Text

ENV6: Sustainable Design and Construction

All development, including the alteration and extension of existing buildings, should consider how it may achieve the following sustainability objectives:

In relation to carbon:

…

v. Consider the establishment of district energy networks within heat priority areas or near potential sources of waste energy and consider connection or futureproofing of developments for connection (see Policy ENV7);

…

Policy ENV7: District Energy Networks

The development of district energy networks and associated infrastructure is encouraged and should be approved unless it results in significant adverse impacts on the environs.

Priority areas for the delivery of District Energy Networks are identified on the Local Plan Map.

Any major development within the borough, and all development proposals within a priority area for District Energy Networks that would involve the creation of a new dwelling or the creation of over 1000sqm of internal floorspace, should demonstrate how they have considered the following hierarchy:

i. where a network is in place in the immediate area: connect to an existing District Energy Network; or

ii. where a network is not yet in place, development should:

a) consider developing its own system for supplying energy to any surrounding existing or planned buildings. Any system installed should be compatible with a wider district energy network and developments should ensure that connection to a wider network is facilitated in the future through good design and site layout; or
b) consider how it may include site-wide communal energy systems; or
c) be "network ready", optimally designed to connect to a District Energy Network on construction or at some point after construction.

An alternative approach to securing decentralised low carbon energy may be justified, on a case-by-case basis, where developments demonstrate that the objectives of Policy ENV7 cannot be achieved in line with the criteria above, due to technical or financial viability; or due to site or development specifics.

…

Policy Requirements

All Developments

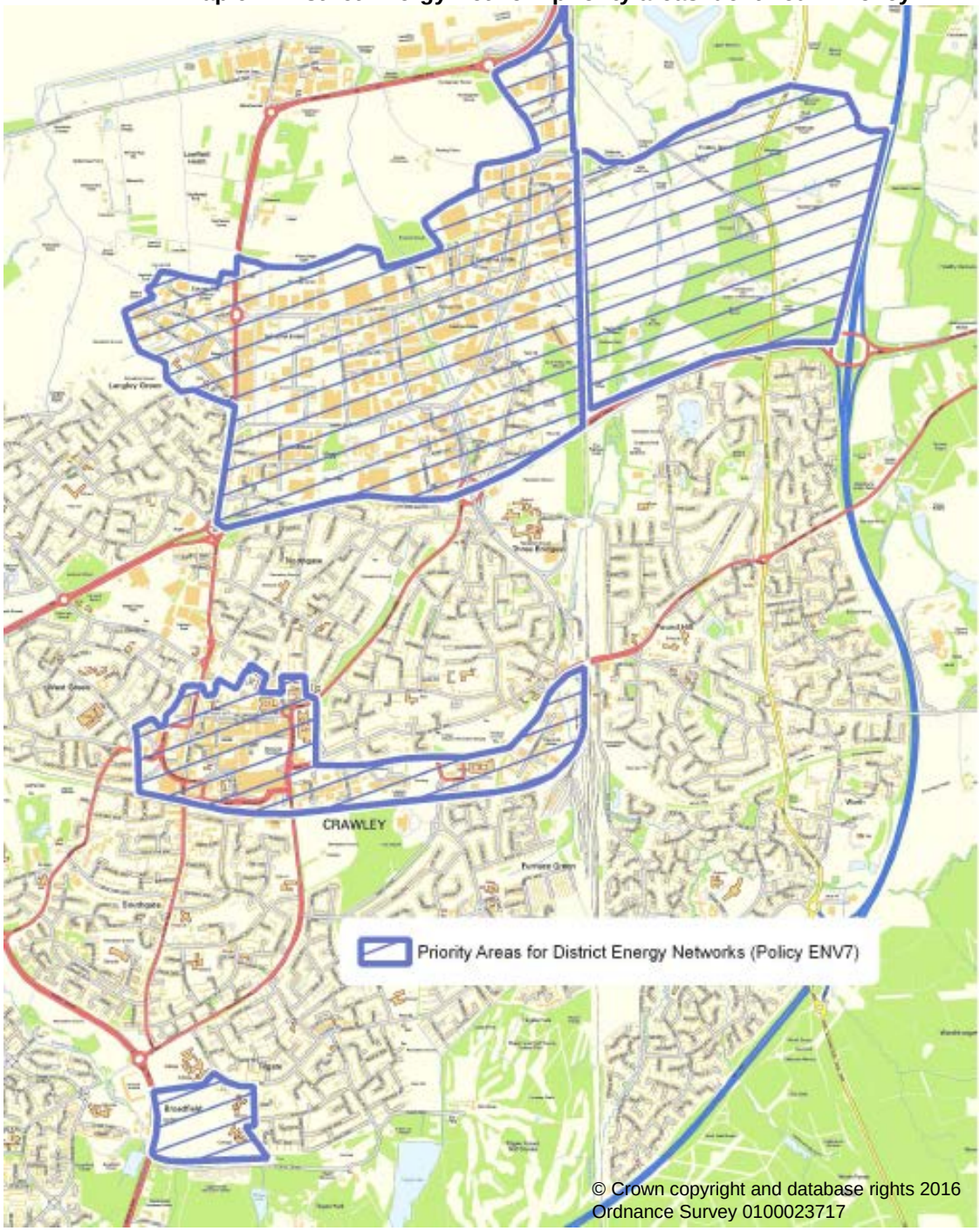
6.1. All development proposals should consider whether there is reasonable opportunity for them to generate or use decentralised energy, or to be futureproofed for future connection to a District Energy Network. The key factors here will be the development's scale, location, energy needs and the proximity of any existing or planned DENs. For prospective DENs the stage of their implementation should be considered, e.g. in terms of demonstrating viability, securing funding, and timetabling of works and commencement of supply.

6.2. Consideration of opportunities for the use or generation of decentralised energy should include the following types of energy:

- Electricity
- Heat
- Cooling

6. ENV6 Objective 5 and ENV7: Supporting the establishment of District Energy Networks

Map 6.1: District Energy Network priority areas identified in Policy ENV7



District Energy Network (DEN) Options

6.3. Proposals incorporating particular design options set out in Policy ENV7 should include the following detail at the planning application stage:

Connecting to an existing or planned network:

- confirm that the technical requirements for connection set out in Appendix 3, or specified by the proposed DEN provider, will be incorporated within the scheme and provide a plan showing the route of the proposed pipe connection to the point of connection to the network.
- Provide evidence of engagement with the providers of existing or proposed DENs and describe outcomes of any discussions as regards timing and technical requirements.

- Identify a target date for the development to begin to be supplied by the DEN and outline any interim measures/energy plant proposed for use prior to that point.

Establishing a new DEN exporting energy/heating/cooling to other developments:

- Show the location of the energy/heating centre on the proposal plans as appropriate
- Provide a plan of the network including the routes of pipework; provide confirmation of the compatibility of other developments and their willingness to connect.
- Detail the energy source, proposed thermal storage and output levels.
- Provide details of any potential future network extension.

Providing site-wide communal energy/heating/cooling:

- Show the location of the energy centre on the proposal plans as appropriate and detail the energy source and proposed output levels.
- Where feasible the system should be futureproofed for DEN connection by satisfying the 'network ready' requirements.

Making the development 'network ready':

- Confirm that the technical requirements for 'network ready' status set out in Appendix 3 will be incorporated within the scheme and provide a plan showing a feasible route for a pipe connection between the development's energy/heating centre and the public highway.
- Where this confirmation cannot be provided this should be raised with the council as early as possible.

Taking an alternative approach where use of decentralised energy is not viable or feasible:

- Demonstrate the lack of viability or feasibility of decentralised energy to a degree proportionate to the size and nature of the development and justify the impact of the proposed alternative approach in terms of the reduction of CO_2 emissions.

Development Specific Policy Requirements

Householder developments, changes of use, alterations to non-residential buildings and new non-residential buildings

6.4. Development proposals involving the creation, refurbishment, or change of use of more than 100 square metres of internal floorspace should detail their response to the ENV6 objective regarding DENs in their Sustainability Statement.

6.5. Proposals involving the creation of over 1,000 square metres of floorspace within a DEN priority area or major development in any part of the borough should also respond to the hierarchy of options set out in Policy ENV7 by following the flowchart in Figure 6.1 below and setting out the resulting conclusions in their Sustainability Statement.

6.6. When considering the viability and feasibility of the ENV7 options, development proposals will be expected to provide evidence at a level of detail proportionate to the scale of the proposal. Proposals for the creation of over 5,000 square metres which propose to install individual heating rather than use a DEN or communal energy supply should provide a feasibility study including whole-life-cost comparisons, assessing the proposed individual solution against an alternative site-wide system.

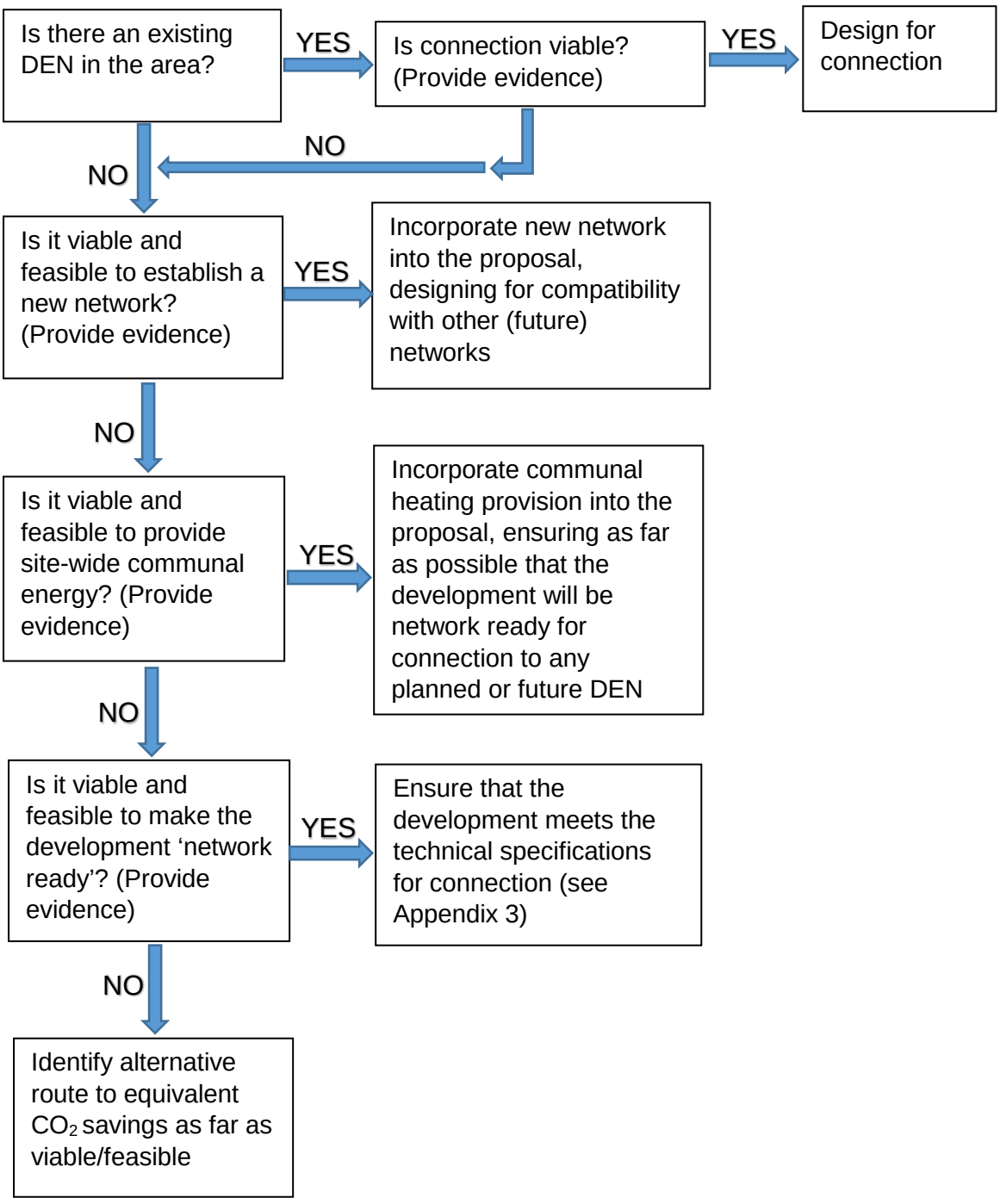
New dwellings

6.7. All proposals for new dwellings should detail their response to the ENV6 objective regarding DENs in their Sustainability Statement.

6.8. Proposals involving new dwellings within a DEN priority area or major development including dwellings should also respond to the hierarchy of options, set out in Policy ENV7 by following the flowchart in Figure 6.1 below and setting out the resulting conclusions in their Sustainability Statement.

6.9. When considering the viability and feasibility of the ENV7 options, development proposals will be expected to provide evidence at a level of detail proportionate to the scale of the proposal. As a guideline, the council would expect proposals for the creation of over 50 dwellings which propose to install individual heating rather than use a DEN or communal energy supply to provide a feasibility study including whole-life-cost comparisons, assessing the proposed individual solution against an alternative site-wide system.

Figure 6.1: Flowchart for assessing options from Policy ENV7



Best Practice Guidance

CBC Recommends: consult the 'Decentralised Energy Study', including the heat maps, as a starting point for considering the viability and feasibility of the ENV7 options: www.crawley.gov.uk/pw/web/pub183762 **.**

All Developments

District Energy Network (DEN) Options

6.10. A key consideration in assessing the options set out in ENV7 will be the nature, extent, and timetabling of any existing or planned DENs. Plans for the different priority areas are at different stages. At the time of writing the council is working on increasing CHP generation capacity at the K2 Leisure Centre, prior to developing a DEN in the locality. The council is also playing a leading role in relation to the town centre, where the outline shape and extent of a future network have been identified, and proposals to secure funding are well advanced. Developers should contact the council for the most up-to-date information. A separate 'Guide for Developers' document relating to DENs is also under preparation and will be updated as new proposals and details regarding costing and technical requirements emerge.

6.11. District Energy Networks raise a number of specific local and technical issues. For example, costs of connection will depend to a considerable extent on the distance of the development to any existing, planned or proposed networks and the ease of connection to them, e.g. taking into account physical obstacles and constraints. The financial and practical implications of the technical specifications required for connection or 'network ready' status – set out in Appendix 3 – should also be carefully considered.

6.12. Where proposals intend to incorporate particular design options set out in Policy ENV7, the following measures are recommended:

- **Connecting to an existing or planned network:** When incorporating this option, engagement with the network operator should begin at an early stage in the design process. This will ensure that measures required for connection can be integrated into the scheme as efficiently and cost-effectively as possible. Where a network is planned but not yet in place, this is especially important in order to establish the probable timing of the completion of the network and identify any resulting implications for the proposed development, such as a requirement for an interim energy solution.
- **Establishing a new DEN exporting energy/heating/cooling to other developments:** In considering this option it is vital to identify the extent of the network, including alternatives allowing for different future scenarios where possible, and distinguishing stages according to their financial viability, technical feasibility and their dependence on uncertain factors. Internal rates of return should be identified where possible as a means of attracting investment. Engagement with potential investors, customers and local authorities should begin at an early stage with an emphasis on establishing the political, institutional, and economic foundations of the project. One available approach is to secure finance, expertise and management capability through partnership with an ESCO (Energy Services Company), but other business models exist.
- **Providing site-wide communal energy/heating/cooling:** Proposals involving site-wide communal energy systems should design these systems for maximum flexibility in terms of potential for the energy source to be upgraded, changed, or

removed, and in terms of potential for connection with a future DEN. The technical specifications set out in Appendix 3 should be used as a guideline.

Communal site-wide systems are compatible with a range of technologies, including some low and zero carbon sources that are eligible for government subsidy schemes referred to in Chapter 7 below. One of the most common is Combined Heat and Power (CHP). As its name suggests, this involves the production of electricity and heat in combination, with heat from the process of power generation being supplied to provide space and hot water heating. The technical feasibility and efficiency of this solution is related to the extent to which demand is constant throughout the daily cycle. Therefore, its advantages tend to increase in proportion to the overall scale of the development and its associated energy demand. Correctly sized thermal stores can be used to store excess heat to enable the system to run more flexibly, covering periods of low heat demand and allowing greater electricity generation during high tariff hours. Communal CHP systems, like district-wide ones, are compatible with various fuels including gas and biomass.

- **Making the development 'network ready':** Where this is the most appropriate approach to supporting decentralised energy the technical specifications set out in Appendix 3 should be incorporated at an early stage in the design process. Where this raises any difficulties this should be raised with the council early on (and at least by the pre-application stage) in order to facilitate further engagement over this issue.
- **Taking an alternative approach where use of decentralised energy is not viable or feasible:** Alternative means of achieving reductions in CO_2 emissions could involve strengthened energy efficiency measures of the kind set out in Chapter 3, or more substantial deployment of renewable and low carbon energy sources such as those described in Chapter 7. Whatever solutions are pursued, they should be based on the aim of achieving emission reductions comparable in scale to those which could have been achieved through the use of decentralised energy.

Viability/feasibility issues

6.13. In considering the viability and feasibility of decentralised energy solutions the following issues should be given detailed consideration and should clearly inform the chosen approach:

- The size, heat loads and energy demand of the development;
- The land use mix of the proposed development and of the surrounding built environment (i.e. the extent to which heat demand is constant);
- The density of heat demand in the wider built environment, including in particular the proximity of public sector facilities and developments with communal heating systems, such as swimming pools, hospitals and large housing estates (the 2011 'Decentralised Energy Study' includes heat maps for the Crawley area);
- Local opportunities for the recovery of waste heat;
- The willingness and capability of the owners of neighbouring buildings or estates to enter into agreements to connect to any proposed network;
- Adequate consumer safeguards in relation to the supplier. In order to provide greater protection the government has supported the establishment of The Heat Trust, an industry-led, voluntary consumer protection scheme, including published customer service standards and an independent complaints handling process provided by the Energy Ombudsman.

6.14. In considering the financial basis of potential decentralised energy schemes, the following benefits should be properly taken into account:

- Where a network is already in place close to a proposed development, any additional cost associated with connection is likely to be limited, since the necessary Heat Interface Units (HIUs) and meters are generally no more expensive (and sometimes cheaper) than the installation of individual boilers, whether in residential or commercial buildings;
- Where individual boilers can be excluded from a scheme early on this will reduce labour and maintenance costs, while space can be saved and put to other uses;
- A heat network may provide a lower cost method of achieving carbon targets than the equivalent deployment of micro renewables or other low carbon technologies;
- The use of DENs may significantly reduce the cost of compliance with Building Regulations;
- New DENs which generate energy from renewable or low carbon sources (including CHP schemes which achieve certification with the CHP Quality Assurance programme (CHPQA)) can benefit from additional incentives, including Contracts for Difference and the Renewable Heat Incentive (see Further Information below);
- The energy efficiencies generated by decentralised energy will have benefits for end-users of developments, increasing their marketability. These include lower energy costs, reduced exposure to volatility in fossil fuel prices and, where applicable, reduced liabilities under green levies on business users such as the CRC Energy Efficiency Scheme and European Emissions Trading Scheme (ETS). There is also future potential for the aggregation of networks and connection to alternative energy centres/heat sources/technologies, leading to further efficiencies and greater network resilience.

Best Practice Example: Thameswey Energy in Woking, Surrey

The Woking town centre DEN is one of a number which have been developed by local authorities in the UK. The council created Thameswey Ltd, an Energy Services Company (ESCo) to advance the project and take advantage of the fiscal and financial benefits and expertise available from private sector involvement. The network derives electricity, heating and absorption cooling from a gas-fired CHP station, and was the first such town centre 'trigeneration' system in the UK.

The Woking town centre network highlights several of the key advantages of DENs. The low-carbon nature of the technology means that the power generated is exempt from the Climate Change Levy, while the overall efficiency of the process makes it economical to supply energy to customers at lower and more stable prices than the previous 'brown' energy, notwithstanding the higher cost of the 'green' energy plant. The system is also able to export a minimum of 30 per cent surplus power after meeting its own needs and can operate in 'island mode' during a power cut.

Useful Information:

Applicable technologies

The basic principle of DENs and communal energy systems is the localised nature of energy generation rather than the use of a particular energy source. Networks can draw their energy from a wide range of potential sources, and these can be altered over time as new technologies develop and as the economics of energy generation change. Networks and communal systems should therefore be designed for flexibility in this regard. The following technologies can be considered, whether separately or in combination:

Combined Heat and Power (CHP): As its name suggests, CHP involves the generation of electricity and heat in combination as part of the same process. The heat by-product of electricity generation is captured and used rather than being released as waste heat. This achieves a far higher level of fuel efficiency than conventional separate generation, with small-scale CHP networks being able to cut primary fuel consumption by 30-45%.

Large CHP units are usually themselves powered by grid-supplied gas. They can also use other fossil fuels, such as hydrocarbon oils, and more carbon-efficient alternatives exist in the form of biomass (i.e. plant and animal material). Biomass is considered a renewable fuel source because the CO_2 released during its combustion was recently sequestered from the atmosphere during growth. It can be used independently as a heat source, and is further discussed as such in Chapter 7. The applications compatible with CHP include wood chip and biogas.

Solar Thermal: The use of heat from the sun to provide hot water is more common at the scale of individual buildings than at the network scale, and it is accordingly discussed in Chapter 7 below as a renewable energy source. Solar thermal heat networks do, however, exist in Germany and Denmark, and the technology is proposed for use in a new DEN at Cranbrook, near Exeter.

Heat pumps: Heat pumps absorb heat from the surrounding environment, with different types drawing heat from the air, the ground and from water. Like solar thermal, heat pumps are more common at the individual building scale, and are again discussed more fully in Chapter 7. They can, nonetheless, also be used as network element, or indeed as a main energy source, as in the case of the water source heat pumps used for the DEN at Drammen in Norway.

Development-specific Best Practice guidance

Householder developments, changes of use, and alterations to non-residential buildings

CBC Recommends: check with the council to assess whether any DEN is planned or proposed in your immediate area.

6.15. Where alterations to existing buildings are proposed, opportunities to generate or use decentralised energy will usually be more limited than when one or more new buildings are being planned. Whether any of the options set out in Policy ENV7 is suitable will vary widely according to the location and the nature of the development.

6. ENV6 Objective 5 and ENV7: Supporting the establishment of District Energy Networks

6.16. Where heating systems are replaced or upgraded it is recommended that consideration be given to the feasibility of low-temperature heating systems, for example using underfloor heating and large area radiators. As well as being more compatible with larger heat networks these are generally more efficient and more suitable for use alongside other low carbon and renewable sources, as set out in Chapter 7.

Further Information:

Department for Business, Energy and Industrial Strategy (BEIS)

- Combined Heat & Power Quality Assurance Programme https://www.gov.uk/combined-heat-power-quality-assurance-programme
- Contracts for Difference https://www.gov.uk/government/collections/electricity-market-reform-contracts-for-difference
- Heat Networks Delivery Support https://www.gov.uk/guidance/heat-networks-delivery-support

ofgem

- Renewable Heat Incentive https://www.ofgem.gov.uk/environmental-programmes/domestic-renewable-heat-incentive

Greater London Authority (GLA)

- London Heat Network Manual (2014) http://www.londonheatmap.org.uk/Content/TheManual.aspx

Carbon Trust

- 'Introducing Combined Heat and Power' http://www.carbontrust.com/resources/guides/renewable-energy-technologies/renewable-energy-and-combined-heat-and-power-(chp)

Chartered Institution of Building Services Engineers (CIBSE)

- Heat Networks Code of Practice (membership or fee required) http://www.cibse.org/Knowledge/CIBSE-other-publications/CP1-Heat-Networks-Code-of-Practice-for-the-UK
- AM12: Combined Heat and Power for Buildings (membership or fee required) http://www.cibse.org/knowledge/cibse-am/am12-combined-heat-and-power-for-buildings-(chp)

The Heat Trust
http://www.heattrust.org/index.php

Combined Heat and Power Association
www.chpa.co.uk

Association for Decentralised Energy
http://www.theade.co.uk/

Local DEN Case Studies

- Islington: http://www.islington.gov.uk/services/parks-environment/sustainability/energy-services/Pages/bunhill-heat-power.aspx
- Milton Keynes: http://cfg.homesandcommunities.co.uk/milton-keynes-chp
- Woking: http://www.thamesweygroup.co.uk/wp-content/uploads/2013/08/Thameswey-Woking.pdf

7. ENV6 Objective 2: Using renewable or low carbon energy sources

Objective 2 of Policy ENV6 requires developments to use renewable and low carbon technologies where appropriate. This chapter provides guidance on satisfying this requirement.

Crawley Context

During 2014, an estimated 4.6GWh of electricity was generated from renewable sources in Crawley[13]. This represents less than 1% of the 534.2GWh of electricity estimated to have been consumed in the borough in the same year, demonstrating that the proportion of Crawley's electricity consumption derived from renewable sources remains well under the overall UK 2014 figure of 17.8%[14].

This picture is partly reflective of a number of constraints upon large-scale renewable energy development which arise from Crawley's character and location. These constraints, discussed in further detail in this chapter, include the proximity of Gatwick Airport and the safeguarding of land for a potential second runway, as well as the built-up nature of the borough and its limited land supply.

Notwithstanding these issues, there is considerable potential for further deployment of renewable and low carbon technologies in Crawley during the Local Plan period, particularly at the smaller scale.

Relevant Local Plan Policy Text

Policy ENV6: Sustainable Design and Construction

All development, including the alteration and extension of existing buildings, should consider how it may achieve the following sustainability objectives:

In relation to carbon:

…

ii. Utilise renewable and low carbon energy technologies where appropriate;

…

Policy Requirements

All Developments

7.1. All development proposals should consider whether the planned works provide any reasonable opportunity to increase the renewable and low carbon energy generation capacity of the site.

[13] 'Renewable electricity by local authority: 2014', DECC: 2015.

[14] 'Sub-national electricity sales and numbers of customers 2005-14', DECC: 2015; 'Digest of United Kingdom Energy Statistics 2015', DECC: 2015, table 6A, p.161.

Development-specific Policy Requirements

Householder developments, changes of use, alterations to non-residential buildings and new non-residential buildings

7.2. Development proposals involving the creation, refurbishment, or change of use of more than 100 square metres of internal floorspace should detail their response to this objective in their Sustainability Statement. The level of detail provided should be proportionate to the scale of the proposal. In particular, where no renewable or low carbon technology is included in proposals for the creation of 5,000sqm of floorspace, this should be clearly and convincingly justified on financial, technical or practical grounds.

New dwellings

7.3. Development proposals for new dwellings should detail their response to this objective in their Sustainability Statement. The level of detail provided should be proportionate to the scale of the proposal. As a guideline, where no renewable or low carbon technology is included in proposals for the creation of more than 50 dwellings, the council would expect this to be clearly and convincingly justified on financial, technical or practical grounds.

Best Practice Guidance

All Developments

7.4. All development proposals should consider at an early stage whether the works provide any opportunity for the cost-effective introduction of appropriate renewable and low-carbon energy sources, taking energy cost savings and associated payback periods into account.

7.5. The following main renewable and low carbon energy technologies may be applicable in Crawley in some form during the Local Plan period:

Solar Panels

Explanation:
Solar PV (photovoltaic) panels convert energy from sunlight into electricity. In southern England an array of sixteen 250Wp panels, taking up around 20-25 square metres of space, can generate around 3,800 kilowatt hours of energy a year, which is equivalent to the annual electricity demand of an average household.

Solar thermal panels use heat from the sun to provide water heating. Domestic solar water heating systems currently require around 5 square metres of external surface space, as well as a compatible cylinder. Depending on current energy sources this kind of system can save an estimated 270-600kg of CO_2 a year, or in the region of 13-30% of 2013 UK per capita emissions from dwellings.

7.6. Solar panels are currently a significant source of renewable energy generation in Crawley, with solar PV panels accounting for over 40 per cent of the electricity generated from renewable sources in 2014. This was spread across over 600 installations with a mean capacity of 3.5kW, indicating that a large proportion of Crawley's PV generation capacity is accounted for by smaller-scale installations.

7.7. The more widespread installation of smaller-scale solar PV and thermal arrays has the potential to increase Crawley's renewable energy generation capacity considerably, and is encouraged subject to certain considerations. These include dimensions, appearance, local amenity, impact on specially designated areas and

buildings (such as Conservation Areas and Listed Buildings) as well as considerations of aerodrome safeguarding. Depending on their size, design and location solar panels have the potential to interfere with aviation interests through the reflection of solar glare, interference with radar equipment, and the attraction of birds. Applicants proposing installations with an area of over 9sqm or which are in the vicinity of the Gatwick Airport are therefore advised to consult aerodrome safeguarding at Gatwick (gal.safeguarding@gatwickairport.com) at an early stage.

Wind Power

Explanation:
Wind turbines convert the kinetic energy contained in the wind into electricity. Large scale turbines (i.e. those with the capacity of around 1MW or above) are typically used in the UK in commercial wind farms, with sizes now commonly being 2.5MW per turbine. Smaller turbines are also found in a wide variety of settings within the UK.

7.8. The setting and nature of Crawley borough place a number of significant constraints on the potential for wind energy development. One major factor is the presence of Gatwick Airport and the potential for wind turbines to disrupt the operation of radar facilities. The urban and suburban nature of the borough also imposes constraints associated with land availability, environmental impact, and localised turbulence effects at low levels which are considered to reduce wind speeds below the viability level for small-scale turbines. As a result, DECC only recorded a single 6kW turbine as being operational in the borough in 2014.

7.9. In light of these considerations, the Local Plan does not contain any specific policy on wind energy development or single out any part of the borough as being suitable for such development. This will in practice significantly reduce the likelihood of proposals for wind energy development receiving planning permission, as current government guidance requires that such planning applications are only approved on land identified as being suitable in a local or neighbourhood plan. In any case, developers seeking to promote proposals requiring planning permission within the borough should consult both CBC and aerodrome safeguarding at Gatwick (gal.safeguarding@gatwickairport.com) at the earliest opportunity.

Biomass

Explanation:
Biomass is a collective term for all plant and animal material, including wood, straw, and organic waste. It is considered to be a renewable form of fuel because the CO_2 emitted during combustion is offset by that absorbed during growth, although some additional emissions are associated with processing and transportation, which typically rely on grid electricity and fossil fuels.

Biomass fuel is most commonly encountered in the UK in the form of wood chips and pellets, and domestic consumption of these fuels is usually in boilers, providing space and water heating, and in heat-emitting stoves.

7.10. The generation of power from biomass on smaller and larger scales may prove to be feasible and cost-effective on some sites in Crawley. One existing local large-scale application is the sewage treatment facility at Tinsley Green, where biogas is used to

power a CHP system which provided more than half of Crawley's supply of electricity from renewable sources in 2014.

7.11. Smaller-scale installations are also likely to be feasible, especially when used in place of oil combustion or older electrical heating systems. The use of a biomass boiler for heating has the potential to remove a considerable share of a building's carbon emissions, with annual savings ranging between 4 and 16 tonnes of CO_2. Financial savings (not taking into account the Renewable Heat Incentive, referred to below) can vary more widely, depending on the availability of the fuel and the cost-efficiency of the fossil-fuel energy source to be replaced. The Crawley area contains a number of suppliers of wood fuel, as well as some woodland and lower-grade agricultural land which could potentially be used to grow biomass fuel.

7.12. When contemplating the use of biomass energy systems their operational and maintenance requirements need to be considered. Biomass boilers are larger than their gas and oil equivalents and require a legally compliant flue or chimney (which may require planning permission). Ash and soot deposits must be periodically removed. Convenient space is also required for the storage of fuel, which is cheapest when bought in quantity.

7.13. Although biomass is a renewable energy source, its consumption also generates pollutants which can in large concentrations have an adverse impact on air quality. For this reason biomass boilers are subject to various regulatory regimes and their use is controlled in Air Quality Management Areas (AQMAs). Crawley currently contains one AQMA along the A2011, Crawley Avenue, and surrounding areas[15]. The potential impact of biomass consumption on air quality should also be considered in other areas of poorer air quality and high traffic emissions. The council's approach to considering the air quality implications of planning proposals is detailed in Local Plan policy ENV12 and the supporting text.

Best Practice Case study: Crawley Library and Registry Office

Crawley Library, opened in 2008, is supplied with heating from a wood-chip-fuelled biomass boiler with a capacity of 149kW. This was one of several features that enabled the building to achieve a BREEAM 'Very good' rating.

[15] For details see:
http://www.crawley.gov.uk/pw/Environment_and_Health/Environmental_Health/Pollution/PUB266051

Micro Combined Heat and Power (CHP)

Explanation:
As its name suggests Combined Heat and Power (CHP) involves the production and supply of electricity and heat in combination. Electricity is generated close to the point of use, ensuring that the heat produced by the process can also be used, achieving greater fuel efficiency than is typical of grid-supplied electricity.

7.14. CHP technology is currently most mature and effective at larger scales, as with the centralised and district networks discussed in the previous chapter (see p.34). Micro-CHP operating at the scale of individual homes is nonetheless becoming more common. The main type of installation currently available is based on the Stirling engine: a gas fuelled combustion engine providing heat and power at a ratio of about 6:1. Space requirements are similar to those of a standard boiler, and maintenance costs are also estimated to be comparable.

Air/ground/water source heat pumps

Explanation:
Heat pumps are low carbon rather than renewable devices as their operation requires electricity (usually derived at least in part from fossil fuels). Air, ground and water source heat pumps provide water and space heating by absorbing heat from those three elements. Their performance is accordingly linked to the average temperatures of those elements. When designed to operate in reverse they can also provide cooling.

Air source heat pumps are installed outside, where they absorb heat (even in very low temperatures) into fluid which is further heated by compression before connecting with the internal system. They can produce a degree of noise, with an air conditioning style unit often being placed on an external wall. These units should be placed to ensure that they will not affect the amenity of users of the development or any surrounding properties.

Ground source heat pumps absorb heat through the circulation of fluid through piping below ground level, which is connected to the pump via a heat exchanger. The necessary ground works mean that unless installation can be combined with other building work these devices can be considerably more expensive than air source heat pumps. On the other hand they are quieter, and the greater consistency of the underground temperature means that they are more efficient.

Water source heat pumps are less common and require the proximity of large water bodies. They can work through piping or panels placed in the water – similar to ground source pumps – or through the diversion of water flow through a heat exchanger. This avoids the need for ground works although 'open' systems involving extraction and discharge require measures to limit the risk of corrosion and freezing and are likely to require licence from the Environment Agency.

7.15. Heat pumps of one form or another are likely to be widely applicable to residential and commercial buildings although certain key features of the technology should be borne in mind. While they can provide hot water and space heating they are more efficient in providing the latter exclusively, with hot water being provided by a complementary system such as solar thermal. Since they are most efficient at providing heat at lower temperatures than a typical gas system they also work best

with underfloor heating or large radiators and will need to be on for longer in order to achieve any given desired temperature.

7.16. Heat pump technologies can provide significant CO_2 savings in comparison to standard electrical heating systems (6 to 12 tonnes per annum in a large detached house), since they require around a third less electricity. Due to the carbon intensity of the grid, CO_2 emissions from heat pumps are currently similar to those of an efficient gas heating system. Running costs are also comparable with and often higher than an equivalent gas system as electricity is currently around four times more expensive than gas.

Government subsidy schemes

7.17. There are two main subsidy schemes for smaller scale renewable and low-carbon energy generation. The eligibility requirements for these schemes and the tariffs they provide should be taken into account when assessing the cost of potential installations.

Renewable Heat Incentive

7.18. Under the Renewable Heat Incentive scheme registered installations are entitled to a tariff per kilowatt hour of energy generated. The domestic tariff is paid for 7 years and adjusted for inflation. The eligible technologies include the following:

- Solar thermal (flat plate and evacuated tube) – domestic and non-domestic schemes
- Biomass – domestic and non-domestic schemes
- Air/ground source heat pumps – domestic and non-domestic schemes
- Water source heat pumps – non-domestic scheme
- Renewable/low carbon-powered CHP – non-domestic scheme

For further information see https://www.ofgem.gov.uk/environmental-programmes/domestic-renewable-heat-incentive

Feed-in Tariffs

7.19. The following technologies are eligible for the government's feed-in tariff scheme. Subject to meeting scheme requirements, installations can be registered with a licensed electricity supplier to receive a tariff for electricity generation and an additional tariff for any power exported to the grid.

- Micro CHP
- Solar PV

For further information see https://www.ofgem.gov.uk/environmental-programmes/feed-tariff-fit-scheme

Accreditation of products and suppliers

7.20. The following accreditation schemes exist for low carbon and renewable energy technologies:

- Microgeneration Certification Scheme
- Carbon Trust Green Business Directory

The government has commissioned the Bonfield review to further consider the framework of standards and consumer advice and protection governing renewable energy products for installation on existing dwellings. The review's conclusions and recommendations are due to be published in the latter part of 2016.

Development-specific Best Practice Guidance

Householder developments

7.21. Many kinds of renewable or low carbon energy installation can be introduced on domestic premises without planning permission, as they benefit from 'permitted

development' rights[16]. They are subject to certain limitations and conditions[17] related to such matters as the visual impact and physical dimensions of the equipment, other amenity issues, and additional safeguards for Conservation Areas, Listed Buildings and other designated sites. Therefore, it is important to contact the council planning department before progressing with these. The technologies concerned include the following:

- Solar equipment;
- Air, ground and water source heat pumps;
- External flues for biomass and CHP systems;
- Wind turbines.

Changes of use and alterations to non-residential buildings

7.22. Many kinds of renewable or low carbon energy installation can be introduced on the premises of a non-residential building without planning permission, as they benefit from 'permitted development' rights[18]. These too are subject to limitations and conditions[19], including some requirements to apply to the local planning authority for 'prior approval'. The technologies covered include:

- Solar equipment;
- Ground and water source heat pumps;
- External flues for biomass and CHP systems.

New Dwellings and new non-residential buildings

CBC Recommends: aim to supply at least 10% of the baseline energy demand of the development from renewable or low carbon energy sources.

7.23. The use of renewable and low carbon energy sources as part of new domestic and non-residential development is recommended where there will remain energy demand and CO_2 emissions after any feasible measures regarding energy efficiency and decentralised energy have been taken into account. The potential for use of such energy sources and the compatibility of different technologies with the proposal should be taken into account at an early stage in the development process.

[16] Classes A to I of part 14 of schedule 2 of the 2015 Town and Country Planning (General Permitted Development) Order (GPDO). See: http://www.legislation.gov.uk/uksi/2015/596/contents/made
[17] As set out in the GPDO.
[18] set out in classes J to O of schedule 2 of part 14 of the 2015 GPDO
[19] set out in the GPDO

7. ENV6 Objective 2: Using renewable or low carbon energy sources

Further Information:

UK Government

- Low carbon technologies https://www.gov.uk/government/policies/low-carbon-technologies?keywords=&public_timestamp%5Bfrom%5D=&public_timestamp%5Bto%5D=
- Bonfield review terms of reference https://www.gov.uk/government/publications/bonfield-review-terms-of-reference

Crawley Borough Council

- Renewable energy web page http://www.crawley.gov.uk/pw/Environment_and_Health/YourEnergySussex/PUB230910

Environment Agency

- Guidance on hydro-energy schemes https://www.gov.uk/government/collections/hydropower-schemes-guidelines-and-applying-for-permission

Carbon Trust

- Renewable energy and CHP resources http://www.carbontrust.com/resources/guides/renewable-energy-technologies/renewable-energy-and-combined-heat-and-power-chp/
- Using biomass as an energy source - tools and guidance http://www.carbontrust.com/resources/guides/renewable-energy-technologies/biomass-heating-tools-and-guidance/

Energy Saving Trust

- Renewables resources http://www.energysavingtrust.org.uk/domestic/content/renewables

Chartered Institution of Building Services Engineers (CIBSE)

- Renewables resources (membership of fee required) http://www.cibse.org/knowledge/topic/renewables?t=52&#results

Gatwick Airport Limited (GAL)

- Aerodrome Safeguarding http://www.gatwickairport.com/business-community/airlines-business/business/aerodrome-safeguarding/

8. ENV6 Objective 6 and ENV9: Tackling water stress

This chapter provides guidance on satisfying the requirements of objective 6 of Policy ENV6 and of Policy ENV9, which encourage water efficiency as a means of tackling the serious water stress in the borough.

Crawley Context

Crawley is identified by the Environment Agency as falling within an area of 'serious water stress', indicating that household demand for water currently constitutes a high proportion of the available effective rainfall, or is likely to do so in the future.

The local dimensions of the problem are set out more fully in the Gatwick Sub-Region Water Cycle Study of 2011 and the Crawley Water Cycle Study Update of 2013, both of which form part of the evidence base for the Local Plan[20].

These indicate that demand for water is anticipated to weigh increasingly on available supply in future decades, partly as a result of climate change, environmental constraints, and population growth.

These documents emphasise the importance of Local Plan policy, alongside the water companies' demand management and resource development strategies, in helping to ensure that demand and supply remain in balance.

The measures recommended include the setting of water efficiency targets for new development.

Relevant Local Plan Policy Text

Policy ENV6: Sustainable Design and Construction

For … locally-specific climate change issues relating to Crawley, all development should consider how it will:

vi. Tackle the serious water stress in the borough (see Policy ENV9);

…

Policy ENV9: Tackling Water Stress

Crawley is situated within an area of serious water stress, and development should, therefore, plan positively to minimise its impact on water resources and promote water efficiency.

New dwellings should, where viable and feasible, meet the Building Regulations optional requirement for tighter water efficiency.

For non-residential development, where technically feasible and viable, development should meet BREEAM Excellent including addressing maximum water efficiencies under the mandatory water credits.

Should BREEAM be replaced, or any national standards increased, then this requirement will also be replaced by any tighter standard appropriate to an area of serious water stress…

[20] 'Gatwick Sub-Region Outline Water Cycle Study: Final Report', Entec: 2011; 'Crawley Water Cycle Study Update and Review of Policy Options: Final Report', Amec, 2013.

Policy Requirements

All Developments

8.1. All development proposals should consider whether the intended works provide any opportunity to tackle water stress by increasing water efficiency. This might include, for example, the use of water-efficient taps, showers, and toilets, or the collection and re-use of rainwater.

Development-specific Policy Requirements

Householder developments, changes of use and alterations to non-residential buildings

8.2. Developments of these kinds involving the creation, refurbishment, or change of use of over 100 square metres of internal floorspace should detail their response to the ENV6 objective regarding water stress in their Sustainability Statement.

8.3. Regardless of whether they require a Sustainability Statement, proposals to convert a building which is not a dwelling into a dwelling, or to create a flat where one did not previously exist, will be required to meet a water efficiency standard as part of the Building Control process[21].

New Dwellings

8.4. Proposals for new dwellings should detail their response to the Policy ENV6 objective regarding water stress in their Sustainability Statement.

8.5. Policy ENV9 also requires new dwellings to meet the 'optional' tighter Building Regulations water efficiency target where viable and technically feasible[22]. This requires dwellings to achieve an estimated wholesome water consumption rate of 110 litres per person per day, rather than the current standard rate of 125 litres per person per day[23].

8.6. As required by the 2015 edition of approved document G, the application of the 'optional' standard will be triggered by means of condition attached to new planning permissions. The person carrying out the building work must inform the Building Control Body (BCB) that the 'optional' water-efficiency requirement applies, and compliance must then be demonstrated by the submission of a notice to the BCB after completion, stating the potential water consumption of each dwelling. Once compliance has been confirmed by the BCB, evidence of this will need to be submitted to CBC planning in order to discharge the relevant condition.

Useful Information:

In order to comply with Building Regulations water efficiency requirements the potential water consumption of new dwellings can be calculated using 'The Water Efficiency Calculator for new dwellings', published by the Department of Communities and Local Government:

https://www.gov.uk/government/publications/the-water-efficiency-calculator-for-new-dwellings

An alternative way of complying with the tighter water efficiency standard is to use the 'fittings' approach. As set out in the 2015 edition of part G, this removes the need to calculate water consumption where the individual fittings of new dwellings do not exceed

[21] This is set out in the 2015 edition of approved document G.
[22] Set out in the 2015 edition of approved document G.
[23] This 110litres/person/day standard includes 105l indoor use and an allowance of 5l for outdoor water consumption, making it the equivalent of the now discontinued Code for Sustainable Homes Level 3.

the consumption given below. The notice of compliance given to the BCB should then state 'Less than 110 litres/person/day using fittings approach'.

Table 8.1: Water efficiency specification for conformity with 110 litre/person/day target

WATER FITTING	MAXIMUM CONSUMPTION
WC	4/2.6 litres dual flush
Shower	8 l/min
Bath	170 litres
Basin taps	5 l/min
Sink taps	6 l/min
Dishwasher	1.25 l/place setting
Washing machine	8.17 l/kilogram

New non-residential buildings

8.7. Policy ENV9 reiterates the requirement in Policy ENV6 for new non-residential buildings to achieve the minimum standards for BREEAM 'Excellent' within the Water category where financially viable and technically feasible. Basic details and guidance about the BREEAM New Construction scheme and the assessment process are provided in Chapter 3 (see pp.14-15). The Water category within the scheme contains 9 credits, accounting for 7% of the score available for a fully fitted building. The mandatory 'Excellent' requirements comprise one credit for water consumption, involving a 12.5% reduction in water consumption over a baseline, and a requirement for metering on the mains water supply to each building. For 'shell only' or 'shell and core' assessments these criteria will be modified or relaxed in accordance with the BREEAM scheme compliance notes. As outlined in Chapter 3, developments subject to this requirement should submit a pre-assessment report when applying for planning permission.

8.8. Where the minimum water standards for BREEAM 'Excellent' are found to be either unviable or unfeasible, sufficient evidence to justify this claim should be submitted with the application. Where such developments involve new non-residential buildings with a total area exceeding 100sqm, a Sustainability Statement addressing the objective of tackling water stress should still be submitted.

Best Practice Guidance

All Developments

CBC Recommends: when obtaining new water and sanitary fittings ensure that they do not exceed the consumption limits set out in Table 8.1 above.

8.9. The following measures can help reduce water consumption across the full range of development types:

- Rainwater harvesting: rainwater is considered 'grey' water, suitable for collection and re-use for irrigation or toilet flushing. It can be collected in a butt or tank or using a more elaborate rainwater harvesting system integrated into the pipework of a building;
- Water metering of individual dwellings or units (including flats) will allow better monitoring and management of consumption;
- Choose fittings and equipment identified as highly efficient by the European Water Label.

Best Practice Example: Digital Realty/Rackspace Data Centre, Manor Royal, Crawley

Opened in 2015, the Digital Realty data centre incorporates a range of sustainable measures enabling it to achieve a BREEAM 'Excellent' rating. These include water efficient appliances and a rainwater recycling system for toilet flushing, irrigation, and use by the building's evaporative cooling systems

Further Information:

Department of Communities and Local Government

- Planning Practice Guidance: Housing- Optional Technical Standards
  https://www.gov.uk/guidance/housing-optional-technical-standards
  Water efficiency calculator for new dwellings

- http://sites.wrcplc.co.uk/partgcalculator/

BREEAM
http://www.breeam.org/

Building Regulations

- Approved Document G (via the planning portal website)
  https://www.planningportal.co.uk/info/200135/approved_documents/69/part_g_-_sanitation_hot_water_safety_and_water_efficiency

Energy Saving Trust

- Saving Water
  http://www.energysavingtrust.org.uk/domestic/saving-water

Chartered Institution of Building Services Engineers (CIBSE)

- KS01 Reclaimed Water (membership or fee required)
  http://www.cibse.org/knowledge/cibse-ks/ks01-reclaimed-water

Thames Water

- Saving Water resources
  http://www.thameswater.co.uk/home/540.htm

9. ENV6 Objective 7: Coping with future temperature extremes

Objective 7 of Policy ENV6 is concerned with the adaptation of development to take account of future temperature extremes. This chapter provides guidance on meeting this requirement.

Crawley Context

Climate change is expected to bring more extreme temperatures, including more frequent and more intense heat waves, with significant implications for health and economic performance. By the 2040s, average summer temperatures in the South East of England could rise by over 2ºC, meaning that conditions experienced during the 2003 heat wave, which was connected to 2,000 extra deaths in the UK, would become the norm, with yet further rises possible by the end of the century.

In a relatively built-up environment such as Crawley, these impacts can be reinforced by the release of heat from buildings and vehicle exhausts, resulting in an 'urban heat island' effect.

The buildings and structures created during the Local Plan period are likely to remain in use in future decades, when the impacts of climate change will be felt more severely. Measures taken during the design and development processes to limit future users' vulnerability to these impacts can help avoid more substantial future costs arising from the retrofitting of buildings and the health and economic impacts of more extreme weather.

Relevant Local Plan Policy Text

ENV6: Sustainable Design and Construction

For … locally-specific climate change issues relating to Crawley, all development should consider how it will:

…

vii. Cope with future temperature extremes, and ensure it does not unduly increase the impact of heatwave events.

Policy Requirements

All Developments

9.1. All development proposals should consider whether the intended works provide any opportunity to increase the resilience of the development in the event of future temperature extremes, and to limit its contribution to the urban heat island effect.

Development-specific Policy Requirements

Householder developments, changes of use, alterations to non-residential buildings and new non-residential buildings

9.2. Development proposals involving the creation, refurbishment, or change of use of more than 100 square metres of internal floorspace should detail their response to this objective in their Sustainability Statement. The level of detail provided should be proportionate to the scale of the proposal. As a guideline, the council would expect proposals for the creation of more than 5,000 square metres of floorspace to be supported by detailed modelling of the risk of overheating, taking into account predicted climate change.

Useful Information:
The Building Regulations requirements for new non-residential buildings (approved document L2A) include a requirement for the limitation of solar gains during summer. This is intended to reduce demand for mechanical cooling, but since it assesses solar heat gains rather than actual temperatures and the various factors which contribute to them it provides no guarantee that the internal environment of the building will be satisfactory.

New dwellings

9.3. Development proposals for new dwellings should detail their response to this objective in their Sustainability Statement. The level of detail provided should be proportionate to the scale of the proposal. As a guideline, the council would expect proposals for the creation of more than 50 dwellings to be supported by detailed modelling of the risk of overheating, taking into account predicted climate change.

Useful Information:
A minimum standard for reducing summer heat gains is set by the Building Regulations (approved document L1A). This requires that new dwellings should not have a high risk of high temperatures during the summer. In order to encourage passive design measures the methodology used (detailed in Appendix P of SAP 2012) does not take account of mechanical cooling. Neither, on the other hand, does it take account of the magnitude of peaks in external temperature, the length of warm spells, or the impact of anticipated climate change.

Best Practice Guidance

All Developments

9.4. There are many measures that can be taken to reduce the vulnerability of developments to temperature extremes and to reduce their contribution to heatwave events via the ‘urban heat island’ effect. As in the case of reducing energy demand, discussed in Chapter 3, ‘passive’ measures which do not consume energy are to be preferred to ‘active’ solutions, such mechanical ventilation, especially where the latter have the added disadvantage of expelling excess heat into the surrounding air. Indeed, many of the passive measures discussed in Chapter 3 also help reduce overheating risk. Since their applicability to different types of development is likely to vary they are outlined in the development specific guidance below.

9.5. The effects of solar gain can be made worse by internal heat gains from pipework associated with hot water systems or from other building services and appliances. These internal gains can be reduced in the following ways:

- Insulation of internal pipework associated with heating/hot water systems to beyond Building Regulations standards;
- Use of energy-efficient lighting and other electrical equipment to minimize unwanted heat gains;
- Other 'active' measures described in Chapter 3 (see pp.15-16).

Development-specific Best Practice Guidance

Householder developments, changes of use and alterations to non-residential buildings

9.6. Alterations to existing buildings will often afford limited opportunities for measures aimed at reducing overheating risks. At the same time it will often be feasible to undertake the following measures in some form:

- Use of high-quality insulation on walls, roofs and floors;
- Draft-proofing;
- Use of windows with high g-values where exposed to direct summer sun.

For further information see Chapter 3, pp.15-19.

New dwellings and non-residential buildings

CBC Recommends: Developments with roofing and/or hard landscaping covering 1,000sqm or more should ensure that at least 75% of roofing uses 'cool' materials with high solar reflection and emissivity, or is covered in vegetation; and that at least 50% of all hard landscaping (roads, pavements, courtyards, car parks etc.) is either constructed of 'cool' materials or shaded by vegetation or 'cool' structures.

9.7. Where new buildings are proposed there will be considerable opportunity to diminish the risk of overheating and exacerbating the 'urban heat island' effect and this should be fully exploited. The relevant measures are likely to include the following, which have already been described in more detail in Chapters 3 and 7 on account of their role in climate change mitigation

- Orientation and shading to reduce summer solar gain in parts of a building inhabited during the day;
- Design features enabling natural ventilation;
- Careful location of materials with high thermal mass;
- Green roofs;
- Solar panels (these provide solar shading to roof space as well as being a renewable energy source).

9.8. In addition, the following measures can help reduce overheating and diminish the development's contribution to the 'urban heat island' effect:

- The use of 'cool' (light coloured or highly reflective) materials for roofing and hard landscaping, where this would not create adverse glare effects;
- The use of aquifers or surface water for cooling (e.g. as part of SuDS);
- The reinforcement and/or provision of green infrastructure to provide evaporative cooling (see the Green Infrastructure SPD for further guidance).

Best Practice Example: Bewbush Centre, Dorsten Square, Bewbush, Crawley

The Bewbush Centre, comprising halls, fitness centre, café, youth centre, police neighbourhood office and voluntary services office, was built in 2010 by Crawley Borough Council as part of a programme of improvements to the Bewbush Neighbourhood Centre. It incorporates a number of sustainable passive design features, including:

- Ventilation cowls and louvres (to reduce demand for air conditioning and cope with future temperature increases)
- A green roof (providing additional insulation in winter and shade in summer, assisting with surface water drainage, and absorbing CO_2)
- Solar PV panels (reflecting sunlight away from the roof as well as generating electricity from solar energy)

9. ENV6 Objective 7: Coping with future temperature extremes

Further Information: (see also information regarding energy efficiency in Chapter 3)

London Climate Change Partnership

- 'A good practice guide for sustainable communities' http://climatelondon.org.uk/publications/a-good-practice-guide-for-sustainable-communities/

Town and Country Planning Association

- 'climate change adaptation by design: a guide for sustainable communities' http://www.tcpa.org.uk/pages/climate-change-adaptation-by-design.html

Chartered Institution of Building Services Engineers (CIBSE)

- TM52: Limits of Thermal Comfort: Avoiding Overheating (membership or fee required) http://www.cibse.org/knowledge/cibse-tm/tm52-limits-of-thermal-comfort-avoiding-overheatin
- KS03 Sustainable Low Energy Cooling: an Overview (membership or fee required) http://www.cibse.org/knowledge/cibse-ks/ks03-sustainable-low-energy-cooling-an-overview
- KS16 How to Manage Overheating in Buildings (membership or fee required) http://www.cibse.org/knowledge/cibse-ks/ks16-how-to-manage-overheating-in-buildings

UK Climate Impacts Programme

http://www.ukcip.org.uk/

Zero Carbon Hub (agency now defunct but website to be retained)

- Tackling Overheating in Buildings http://www.zerocarbonhub.org/current-projects/tackling-overheating-buildings

United States Environmental Protection Agency

- Heat Island Effect http://www.epa.gov/heat-islands

10. ENV8: Flood Risk Management

This chapter provides guidance on requirements regarding Flood Risk Management and Sustainable Drainage which are set out in Policy ENV8.

Crawley Context

Flood risk has long been an important planning consideration. Climate change is expected to cause an increase in the frequency and severity of flood events, ensuring that this issue will become a still more significant concern in future decades.

In Crawley, surface water flooding, river flooding, and sewer and groundwater flooding are all significant considerations. Crawley's position in the upper reaches of the River Mole catchment also mean that the local water environment can have implications for downstream areas to the north, including Gatwick Airport and neighbouring authorities such as Reigate and Banstead.

It is vital that development is planned sustainably, taking into account flood risk from all sources, considering both current and future users of development, and ensuring that proposals do not increase flood risk elsewhere.

Relevant Local Plan Policy Text

Policy ENV8: Development and Flood Risk

Development proposals must avoid areas which are exposed to an unacceptable risk from flooding, and must not increase the risk of flooding elsewhere. To achieve this development will:

i. be directed to areas of lowest flood risk, having regard to its compatibility with the proposed location in flood risk terms, and demonstrating (where required) that the sequential and exceptions tests are satisfied;

ii. refer to the Environment Agency Flood Map for Planning and Crawley Strategic Flood Risk Assessment to identify whether the development location is situated in an area identified as being at risk of flooding;

iii. where identified in the SFRA, demonstrate through a Flood Risk Assessment how appropriate mitigation measures will be implemented as part of the development to ensure risk is made acceptable on site, and is not increased elsewhere as a result of the development;

iv. ensure that proposals on all sites of 1 hectare or greater are accompanied by a Flood Risk Assessment, to include detail of mitigation demonstrating how surface water drainage from the site will be addressed;

v. reduce peak surface water run-off rates and annual volumes of run-off for development through the effective implementation, use and maintenance of SuDS, unless it can be demonstrated that these are not technically feasible or financially viable. Further guidance of how to achieve these objectives will be provided in the Planning and Climate Change SPD.

Policy Requirements

All Developments

10.1. National policy establishes the treatment of flood risk as a planning consideration[24]. This requires that Local Plans are supported by a Strategic Flood Risk Assessment (SFRA). The SFRA identifies the current and future risk arising from all forms of flooding, taking into account the impact of climate change, and classifies areas accordingly. On this basis sites allocated for development and individual development proposals are assessed using a range of criteria, including clearly defined 'sequential' and 'exception' tests, to ensure that as far as possible development is directed to areas of lowest risk, and that where this is not possible the development in question is made safe for its lifetime without increasing the risk of flooding elsewhere.

10.2. Policy ENV8 builds on the national requirements along with the findings of the Crawley SFRA to describe how development proposals in Crawley will be assessed in relation to flood risk[25]. In order to establish the information and measures required to satisfy the Policy, this guidance should be read in conjunction with the NPPF, PPG and the Crawley SFRA (see links in the Further Information section, p.61).

10.3. In general, the requirements arising from ENV8 will vary according to the type of development proposed, as well as the size and location of the site. Before applying for planning permission developers should consult the Environment Agency Flood Map for Planning, Risk of Flooding from Surface Water Map, and the Crawley SFRA to identify whether the development location is situated in an area identified as being at risk of flooding (see links in 'Further Information' section below).

10.4. Depending on the flood zone or zones in which the site lies, additional information may be required when applying for planning permission. The requirements for different types of application are set out in Table 10.1[26]. One important factor to consider in interpreting these requirements is the relative vulnerability of different types of development to flooding, as set out in Table 2 of the PPG. This will have a bearing on whether the proposal needs to satisfy the exception test, or whether indeed the proposal is likely to be unacceptable in principle (see Table 3 of the PPG). Another relevant factor is the risk from non-fluvial forms of flooding (e.g. surface water, sewers, reservoirs, ground water, overland flows and consequences of infrastructure failure). Further information on this is provided in the SFRA and on the Environment Agency web pages (see 'Further Information' section below).

Site Specific Flood Risk Assessment

10.5. As detailed in Table 10.1, proposals for developments in Flood Zones 2, 3a and 3b, as well as some developments in Flood Zone 1 will need to be supported by a site-specific Flood Risk Assessment (FRA). This should do the following:

- Assess whether the development is likely to be affected by current or future flooding from any source;
- Assess whether it will increase flood risk elsewhere;
- Demonstrate how appropriate measures are proposed to deal with these risks over the lifetime of the development, taking into account the potential effects of climate change and the relative vulnerability of the site's users[27].

[24] As set out in the NPPF (paras. 99-108), and Planning Practice Guidance: Flood Risk and Coastal Change, DCLG: 2015 (last update).
[25] 'Level 1 Strategic Flood Risk Assessment', CBC: 2014.
[26] Based on Table 3.1 and the requirements set out in paragraphs 99 to 104 of the NPPF.
[27] The Environment Agency has recently published new guidance on taking future climate change into account when assessing flood risk for the purposes of a Strategic or Site Specific FRA. See https://www.gov.uk/guidance/flood-risk-assessments-climate-change-allowances.

Table 10.1: Flood Risk Requirements (based on NPPF paras. 99-104 & PPG)

Flood Zone	Type of Development	Site-specific FRA required?	Sequential Test applicable?	Exception Test (possibly) applicable?
1	Any, site 1 ha. or smaller	N†	N	N
	Any, site larger than 1 ha.	Y	N	N
2	Major	Y	Y‡	Y
	Minor/CoU*	Y	N	N
3a	Major	Y	Y‡	Y
	Minor/CoU*	Y	N	N
3b	Major	Y	Y‡	Y
	Minor/CoU*	Y	N	N

*For the purposes of the table these categories do not include proposals involving a change of use to a caravan, camping or chalet site, or to a mobile home or park home site.
†A site-specific flood risk assessment is required in Flood Zone 1 where development or a change to a more vulnerable use may be subject to other forms of flooding.
‡Not required where the sequential test has already been passed as part of the process of allocation in the Local Plan.

10.6. The extent of detail required in a site-specific FRA will depend in part on the scale, nature and location of the proposed development. Those developments which are larger in scale, more vulnerable, and/or have a higher risk of flooding or causing flooding elsewhere will need to be supported by a more comprehensive and detailed FRA. On the other hand a less detailed FRA will generally be acceptable for extensions and other minor physical changes. Regardless of development specifics, all site-specific FRAs should be credible and fit for purpose. Further guidance on producing a site-specific FRA and on managing flood risk to sites is available within the PPG on 'Flood Risk and Coastal Change' and in the Crawley SFRA.

10.7. Where the sequential test needs to be applied (as shown in Table 10.1) the site-specific FRA must demonstrate that there are no reasonably available alternative sites for the development in those Flood Zones (Flood Zone 1 and potentially also Flood Zone 2) which are less at risk from flooding. The area over which the test is applied and the precise definition of 'reasonably available' will depend in part on the nature of the proposed development. Further guidance is provided in the PPG on 'Flood Risk and Coastal Change' and in the Crawley SFRA.

10.8. Where the location and vulnerability level of the development mean that the exception test is also applicable, the site-specific FRA will further need to demonstrate that the proposed development will provide wider sustainability benefits to the community which outweigh flood risk, and that it will be safe for its lifetime, without increasing flood risk elsewhere. Further guidance is provided in the PPG on 'Flood Risk and Coastal Change' and in the Crawley SFRA.

Sustainable Drainage Systems

10.9. In addition to the requirements regarding site-specific Flood Risk Assessments, Policy ENV8 includes a general requirement that new developments address the issue of surface water run-off through the use of Sustainable Drainage Systems

(SuDS). SuDS use various approaches to slow, divert and disperse the flow of surface water, thereby preventing the rapid discharge of surface water into mains sewers and reducing the risk of surface water flooding. Crawley is known to experience surface water flooding, so SuDS have the potential to offer real benefit to the borough. Many SuDS approaches mimic the way in which natural environments deal with surface water. They include the following:

- **Rainwater Storage:** Water is collected and stored in a tank above or below ground. This can then be used for 'greywater' uses such toilet flushing and watering plants, thereby achieving a higher level of water efficiency in line with policy ENV9. The limited space demands involved are an advantage in the urban context of the borough.
- **Infiltration** (i.e. absorption of water into the ground)**:** This is not suitable on some poorly draining soils (e.g. clays, which cover much of the borough), so site geology should be checked before pursuing this solution (see link to Geology of Britain viewer in 'Further Information' section below). Infiltration methods used in SuDS include the following:
  - Soakaways: underground pits filled with gravel or rubble;
  - Permeable paving: paving with porous blocks or gaps between blocks;
  - Bioretention areas: areas of vegetation supported by underlying gravel and sand layers.
- **Attenuation** (storing and slowly releasing runoff)**:** this can be achieved at or near surface level by a wide range of methods, including:
  - Green roofs/walls: in addition to the sustainability benefits mentioned in Chapters 3 and 9 these act to store and absorb water, without a large additional space requirement;
  - Water/soft landscaping features such as ponds, basins, wetlands and swales (shallow vegetated depressions);
  - Hardscape water features;
  - Underground tanks or crates.
- **Discharge:** where surface runoff is discharged, the following hierarchy is to be followed, proceeding from the most desirable to the least desirable options.
  - Discharge to a watercourse;
  - Discharge to a surface water drain;
  - Discharge to the combined sewer.

  (It should be noted that attenuation before discharge to a watercourse or piped system is likely to be required.)

10.10. Where carefully designed and appropriately used, the SuDS features outlined above can play a key role in allowing development to proceed while managing the risk of flooding from surface water. As in the case of green roofs and rainwater harvesting, most also contribute to the achievement of additional sustainability and policy objectives:

- Ponds, wetlands and swales contribute to green infrastructure and biodiversity, which are key concerns of Policies ENV1 and ENV2, as discussed more fully in the Green Infrastructure SPD.
- Many SuDS techniques have the additional benefit of protecting water quality by removing pollutants from surface water before it enters watercourses or sewers. Such benefits to water quality help support the River Basin District Management Plans produced by the Environment Agency for the areas around Crawley.

10.11. An important consideration is the impact of SuDS schemes on bird movements, which should be considered from the perspective of aerodrome safeguarding. Early consultation with aerodrome safeguarding at Gatwick (gal.safeguarding@gatwickairport.com) is advisable in relation to large schemes

involving the creation of attenuating ponds, swales or wetlands at surface level, or large expanses of green roof.

10.12. Subject to viability and technical feasibility, the requirement for SuDS in Policy ENV8 will be imposed by the council in proportion to the likely impact of the proposed development on the risk of flooding from surface water. The risk of flooding from other sources is also relevant, as follows:

- National guidance is clear that new development should only be considered appropriate in areas at risk of flooding where priority has been given to the use of SuDS.
- The functional flood plain (i.e. Flood Zone 3b) should not be used for SuDS designed to store surface water runoff, as they will flood naturally during heavy rainfall.

10.13. The Department of the Environment, Food and Rural Affairs published non-statutory technical standards for SuDS, accompanied by updated Planning Practice Guidance[28]. The standards are not mandatory, but are intended to illustrate a 'reasonably practicable' level of performance. Where the inclusion of SuDS is being considered as part of a development proposal both documents should be consulted. Additional guidance on SuDS techniques is provided by the CIRIA SuDS manual. For these standards and guidance see the 'Further Information' section below.

10.14. The details and rationale of proposed SuDS, including arrangements for their maintenance and operation, should be set out in a site-specific FRA and described as appropriate in other submission documents, such as drawings. Where required additional details may be secured by condition.

Best Practice Guidance

All Developments

10.15. Development proposals should be informed at the outset by an overall awareness of their potential impacts on, and exposure to, the surrounding water environment, taking into account the full range of sources of flood risk.

10.16. It is the responsibility of a developer to make proper provision for surface water drainage into the ground, water courses or surface water sewers. It must not be allowed to drain to the foul sewer, as this is the major contributor to sewer flooding.

10.17. In addition to managing the flood risk faced by buildings and other vulnerable land uses, development proposals should, as far as possible, avoid any interference in existing watercourses which is likely to increase the risk of blockage, erosion, or other disruption of their natural flow pattern, including the following:

- Culverting
- Pipe crossings
- Encroachment into watercourses

Certain types of work on or near watercourses would require the prior permission of either the Environment Agency or the Lead Local Flood Authority (West Sussex County Council). If it is unclear whether this is required, either of those bodies or Crawley Borough Council should be contacted for further advice before proceeding. For further guidance on works to or near watercourses see the Environment Agency guide 'Living on the Edge' (link provided in 'Further Information' section below), as well as the council's Green Infrastructure SPD.

[28] Updated on 23 March 2015.

Development-specific Best Practice Guidance

Householder developments, changes of use and alterations to non-residential buildings

CBC Recommends: identify any likely impact of the proposal on peak rates and volumes of surface water run-off and consider how any increases could be cost-effectively mitigated.

10.18. Taken individually, proposals of these kinds are unlikely to have a significant impact on the risk of flooding from surface water. Cumulatively, however, they can have a material impact, for example through the overall expansion in the area covered by buildings and hardstanding. In order to keep this cumulative impact as small as reasonably possible, cost-effective opportunities to offset increases in runoff rates and volumes should be exploited where practicable and economically viable. The following SuDS features may be particularly suitable for use on a small scale:

- Rainwater harvesting
- Green roofs or walls
- Micro wetlands

New dwellings and non-residential buildings

CBC Recommends: where feasible and viable use SuDS in accordance with the DEFRA Non-statutory technical standards.

10.19. In order to reduce peak surface water run-off rates and run-off volumes most effectively, SuDS techniques should be designed into the development from an early stage, taking account of the following:

- Site geology and water table levels
- Space constraints
- Potential synergies between SuDS techniques and other development/policy objectives, including:
  - Public realm/open space landscaping;
  - Public art/development entrance features;
  - Passive cooling/shading;
  - Water efficiency.

Further Information:

Department of Communities and Local Government (DCLG)

- National Planning Policy Framework (NPPF) https://www.gov.uk/government/publications/national-planning-policy-framework--2
- Planning Practice Guidance: Flood Risk and Coastal Change https://www.gov.uk/guidance/flood-risk-and-coastal-change

Department of the Environment, Food and Rural Affairs (DEFRA)

- Sustainable Drainage Systems: non-statutory technical standards https://www.gov.uk/government/publications/sustainable-drainage-systems-non-statutory-technical-standards

West Sussex County Council

- Flood risk management web pages https://www.westsussex.gov.uk/fire-emergencies-and-crime/dealing-with-extreme-weather/dealing-with-flooding/flood-risk-management/

Lead Local Flood Authorities of the South East of England

- 'Water. People. Places. A guide for master planning sustainable drainage into developments' (via the West Sussex County Council website) https://www.westsussex.gov.uk/fire-emergencies-and-crime/dealing-with-extreme-weather/dealing-with-flooding/flood-risk-management/sustainable-drainage-systems/

Crawley Borough Council

- Strategic Flood Risk Assessment (2014) and Local Flood Risk Management Strategy 2013-18 (on Local Plan evidence base page – scroll down to documents LP103 and LP104) http://www.crawley.gov.uk/pw/Planning_and_Development/Planning_Policy/Crawley2029/INT196738

Environment Agency

- Flood Map for Planning http://apps.environment-agency.gov.uk/wiyby/37837.aspx
- Further flood risk maps https://www.gov.uk/prepare-for-a-flood
- Flood risk assessments: climate change allowances https://www.gov.uk/guidance/flood-risk-assessments-climate-change-allowances
- 'Living on the edge' https://www.gov.uk/government/publications/riverside-ownership-rights-and-responsibilities

susdrain (SuDS resources and news) http://www.susdrain.org/

CIRIA

- The SuDS Manual http://www.ciria.org/Memberships/The_SuDs_Manual_C753_Chapters.aspx

British Geological Survey

- Geology of Britain viewer http://www.bgs.ac.uk/discoveringGeology/geologyOfBritain/viewer.html

11. IN3: Sustainable Transport

This chapter provides guidance to requirements regarding Sustainable Transport which are set out in Policy IN3.

Crawley Context

In 2013, transport accounted for 28% of Crawley's energy use[29]. Less energy was used per person (6.22MWh) than across the South East (7.82MWh) and UK (6.87MWh).

This picture probably reflects in part the borough's compact, urban form, and relatively high take-up of public transport. These trends illustrate the basic sustainability of the New Town concept, and have been further strengthened by initiatives such as the Fastway service and the borough's network of cycling and pedestrian routes. There, nonetheless, remains substantial potential for further significant improvements to this picture.

Transport emissions arise from the movement of people and goods, rather than from their immediate functional needs, and so are highly sensitive to the need to travel and the modes used. The careful location of developments with high access needs and efforts to maximise the use of sustainable modes can thus generate further significant reductions in transport-related energy consumption and emissions.

Other sustainability considerations which sit alongside the climate change agenda, such as the promotion of healthy lifestyles and the mitigation of congestion and local air pollution, underline the importance of such measures.

Relevant Local Plan Policy Text

IN3: Development and Requirements for Sustainable Transport

Development should be concentrated in locations where sustainable travel patterns can be achieved through the use of the existing transport network, including public transport routes and the cycling and walking network.

Developments should meet the access needs they generate and not cause an unacceptable impact in terms of increased traffic congestion and highway safety. Developments will be permitted unless the cumulative impact on the transport network is severe and cannot be satisfactorily mitigated.

In order to consider such impacts, developments that generate a significant amount of movements (thresholds as outlined in the Local List) should be supported by a:

a) Transport Statement, which assesses the impact of a development with relatively small transport implications; or a

b) Transport Assessment, which assesses the impact of a development when there are significant transport implications, and a Travel Plan, which identifies how the development will maximise the usage of sustainable modes of transport as opposed to the private motor vehicle.

[29] 'Sub-national total final energy consumption statistics: 2005-2014', DECC: 2015 (UK Census 2011 population). These figures do not include the aviation sector, whose energy consumption is not measured on a local basis.

The applicant should view the Local List of Planning Requirements (or any subsequent document) to ensure that they submit an appropriate Transport Statement or Transport Assessment with their planning application.

Policy Requirements

All Developments

11.1. Policy IN3 builds on the NPPF, which establishes the promotion of sustainable transport as a key planning objective. Its importance lies partly in the need to mitigate CO_2 emissions, but also reflects other concerns such as traffic congestion, road safety, the local environmental impact of vehicle emissions on air quality, and the imperative of promoting healthier modes such as cycling and walking.

11.2. When considering how to respond to Policy IN3 applicants should consult the NPPF (paras. 29-41) and supporting Planning Practice Guidance (PPG) as well as the relevant supporting text from the Local Plan.

11.3. At an early stage in forming proposals, applicants should establish whether the proposed development will generate significant amounts of movement. This will not be the case for almost all householder applications, but could be an issue for extensions or changes of use of non-residential buildings, as well as for proposals for new domestic or non-domestic buildings. Thresholds for determining this will be set out in the council's Local List. Until the adoption of these the council will consider proposals on a case-by-case basis, taking into account the following considerations in accordance with the PPG:

- The scale of the proposed development and its potential for additional trip generation;
- Existing intensity of transport use and the availability of public transport;
- Proximity to nearby environmental designations or sensitive areas;
- Impact on other priorities strategies (such as promoting walking and cycling);
- The cumulative impact of multiple developments within a particular area;
- Whether there are particular types of impacts around which to focus the Transport Assessment or Statement (e.g. assessing traffic generated at peak times).

11.4. Where a proposed development is judged to generate significant amounts of movement it will need to be further considered whether a Transport Assessment would be sufficient, or whether a Transport Statement supported by a Travel Plan is required. The key characteristics of these documents are as follows:

- A Transport Statement is defined by PPG as 'a 'lighter touch' evaluation to be used for developments whose anticipated transport impacts are more limited;
- A Transport Assessment is a more thorough and comprehensive assessment of the transport implications of development;
- A Travel Plan serves to identify opportunities to promote sustainable transport modes (walking, cycling, public transport, car-sharing and tele-commuting), and to set out measures, targets, and management/monitoring arrangements relating to them. Where a Travel Plan is provided this should be informed by the information provided in the Transport Assessment/Statement. By the same token the Transport Assessment/Statement may take into account any reductions likely to result from the implementation of a Travel Plan.

11.5. These documents will be required at the planning application stage, so it is important to discuss requirements early during pre-application discussions. In general their scope will vary according to the nature of the proposal and the scale of the anticipated impacts. Further guidance on the content of these documents, the

approach to be taken, and the evidence used, is provided in the PPG (see link in the 'Further Information' section below).

11.6. Where necessary in order to make a development acceptable in planning terms, additional mitigation of transport-related impacts will be sought by means of a legally binding planning obligation. For further guidance, see the council's Guidance Note on developer contributions.

11.7. Developments which propose to include on-site car and cycling parking provision should also consult the Urban Design SPD, including the Parking Standards, for guidance on the extent and layout of parking provision.

Best Practice Guidance

All Developments

11.8. Applicants considering development proposals likely to have significant transport implications are strongly advised to consult the council at the pre-application stage in order to assess the need for Transport Statements/Assessments and Travel Plans, and to establish key requirements for these documents. Depending on the scale of anticipated impacts, early consultation and collaboration with West Sussex County Council (the Highways Authority), transport operators, Rail Network Operators, the Highways Agency, and community and business groups may also be appropriate.

11.9. In order to enable the easy integration of Travel Plans into the design and occupation of the site, they should be developed early and in parallel with development proposals, rather than retrofitted at later stage.

Best Practice Example: Interim Travel Plan for Elekta at Cornerstone, Manor Royal, Crawley

The new Elekta development, currently under construction, will comprise 2 office buildings with a combined floorspace of 16,173sqm. The development is supported by an interim travel plan including a target of reducing the proportion of two-way trips taken by single occupancy vehicle from an estimated baseline of 55% to 50% over five years. A wide range of measures are identified as means of managing and promoting the travel plan and increasing walking, cycling, car sharing and use of public transport. The targets and proposed measures in the plan will be subject to monitoring and review following the occupation of the site.

Further Information:

Department of Communities and Local Government (DCLG)

- National Planning Policy Framework (NPPF) https://www.gov.uk/government/publications/national-planning-policy-framework--2
- Planning Practice Guidance: Travel Plans, transport assessments and statements in decision-taking http://planningguidance.communities.gov.uk/blog/guidance/travel-plans-transport-assessments-and-statements-in-decision-taking/

Department for Transport

https://www.gov.uk/government/organisations/department-for-transport

Crawley Borough Council

- Streets, Roads and Transport http://www.crawley.gov.uk/pw/Streets__Roads_and_Transport/index.htm

West Sussex County Council

- Travelwise – Sustainable Transport https://www.westsussex.gov.uk/roads-and-travel/travel-and-public-transport/travelwise-sustainable-transport/

sustrans (charity promoting sustainable transport)

http://www.sustrans.org.uk/

Glossary of Key Terms and Acronyms

A/GSHP	Air/Ground Source Heat Pump
AQMA	Air Quality Management Area
BCB	Building Control Body
BEIS	Department of Business, Energy and Industrial Strategy
Building/Thermal Envelope	The total area of all walls, floors and ceilings bordering the internal area of a building whose environment is to be controlled in line with the Building Regulations (e.g. not including some conservatories and porches)
BREEAM	Building Regulations Establishment Environmental Assessment Methodology
BRUKL report	Building Regulations UK (part) L report: this details energy efficiency calculations obtained for a non-residential development design using Simplified Building Energy Method (SBEM) as part of the Building Regulations Process
CBC	Crawley Borough Council
CHP	Combined Heat and Power
CO_2	Carbon Dioxide
Communal Heating/Cooling	The supply of heating and cooling to different parts of a development from a shared source
Controlled fittings	Windows, roof windows, roof lights and doors whose thermal performance is controlled by the Building Regulations
Controlled services	Building services subject to Building Regulations requirements, including heating and hot water systems, mechanical ventilation and cooling, and fixed lighting.
COP	Co-efficient of Performance (the ratio of heat produced by a device, such as a heat pump, to electricity consumed)
CoU	Change of Use from one development type to another
DECC	Department of Energy and Climate Change (in July 2016 the responsibilities of this department were transferred to the new Department of Business, Energy and Industrial Strategy)
DEN	District Energy Network: a network through which energy is generated and supplied to different buildings or developments within a given local area
Decentralised Energy	The generation and supply of energy on a localised basis
EA	Environment Agency
EIA	Environmental Impact Assessment

Embedded Carbon	A notional quantity of carbon, representing the amount of CO_2 already emitted in order to manufacture or assemble any given construction material(s) and transport it to the site
ESCo	Energy Services Company
EU	European Union
GPDO	The Town and Country Planning (General Permitted Development) Order 2015
Green Infrastructure	A network of multi-functional green space, urban and rural, which is capable of delivering a wide range of environmental and quality of life benefits for local communities.
Network Ready	The state of (a development) being optimally designed for connection to a District Energy Network. Further guidance is provided in Appendix 3.
NPPF	National Planning Policy Framework
Planning Obligation	Legal commitment by a landowner or developer to undertake certain actions (including the payment of stated monetary sums) in order to make a development acceptable in planning terms. Planning Obligations can take the form of agreements with the Local Planning Authority (often known as 'Section 106' agreements) or Unilateral Undertakings.
PPG	Planning Practice Guidance
PV	Photovoltaic
SA	Sustainability Appraisal
SAP	Standard Assessment Procedure: the approved methodology for assessing compliance of new dwellings with the requirements of Building Regulations approved document L. (At time of writing SAP 2012 applies.)
SBEM	Simplified Building Energy Method: the government approved method of assessing the compliance of a non-residential development with Building Regulations energy efficiency requirements.
SEA	Strategic Environmental Assessment
SFRA	Strategic Flood Risk Assessment
sqm	square metres (references in the SPD are to Gross Internal Area unless otherwise specified)
SuDS	Sustainable Drainage System
Thermal Elements	Walls, floors or roofs enclosing the thermally conditioned part of a building
WSCC	West Sussex County Council

Appendix 1: Summary of Legislation

The **Climate Change Act 2008** introduced a statutory target of reducing carbon emissions by 80% below 1990 levels by 2050, with a 50% reduction by 2025.

The **Energy Act 2008** introduced a number of incentive schemes with the aim of increasing the UK's renewable energy generating capacity.

The **Planning & Energy Act 2008** gave local councils greater powers to set local plan requirements regarding energy efficiency and the use of renewable/low carbon energy sources in new developments.

The **2004 Planning & Compulsory Purchase Act**, as amended by the **Planning Act 2008**, places a duty on local councils to ensure that Local Plan policies contribute to the mitigation of and adaptation to climate change. It also introduced a requirement for Local Plans to be accompanied by a Sustainability Appraisal (SA), assessing how the plan will contribute to sustainable development.

In addition the UK will continue to be subject to European Union (EU) directives which address climate change until it formally leaves the EU. These include:

- the 2001 **Strategic Environmental Assessment (SEA) Directive**, whose requirements are incorporated into the SA process;
- the 2009 **Renewable Energy Directive**, which commits the UK to supplying 15% of its energy requirement from renewable sources by 2020;
- the 2010 **Energy Performance of Buildings Directive**, which requires all new buildings to meet a 'nearly zero energy' standard from 2020 (2018 in the case of public sector buildings).

Appendix 2: Summary of planning process for individual policy requirements

Policy Requirements and the Planning Process (see Table 2.1. on p.7 to see which apply to your proposal)

Policy Driver:	ENV8	IN3	ENV6	ENV6	ENV6; ENV9	ENV6; ENV9	ENV7
Requirement Title:	**Flood Risk**	**Sustainable Transport**	**Sustainability Objectives (without Statement)**	**Sustainability Objectives (with Statement)**	**BREEAM Energy & Water Credits**	**Water efficiency in Dwellings**	**Decentralised Energy**
Page References:	**55-61**	**62-65**	**Guidance Note†**	**11-20, 21-23, 24-27, 28-37, 38-45, 46-49, 50-54**	**14-15, 48**	**47-48**	**28-37, Appendix 3**
Design Stage Requirement / Recommendation*:	Consult EA Flood Map for Planning, Risk of Flooding from Surface Water Map & Crawley SFRA to check compatibility and flood risk management requirements	Assess transport implications of development and if relevant consider how impacts can be mitigated & use of sustainable modes maximised	Identify potential improvements/ economies in CO_2 emissions & energy/water consumption; identify potential means of alleviating summer overheating & urban 'heat island' effect	Identify potential improvements/ economies in CO_2 emissions & energy/water consumption; identify potential means of alleviating summer overheating & urban 'heat island' effect	Assess for viability/feasibility of BREEAM energy/water benchmarks and appoint BREEAM assessor or Sustainability Champion.	Check for viability of 110 litres/person/day water consumption limit	Assess viability/feasibility of hierarchy of options for use of district/communal energy or making energy services 'network ready'
Pre-application Stage Requirement / Recommendation*:	Where relevant outline flood risk management & surface water drainage strategies	Where significant transport movements will be generated consult with CBC, WSCC and other stakeholders as appropriate to identify requirements and opportunities	Outline proposed improvements/ economies in CO_2 emissions & energy/water consumption; identify proposed adaptive measures to address overheating	Outline proposed improvements/ economies in CO_2 emissions & energy/water consumption; identify proposed adaptive measures to address overheating	Identify targeted BREEAM credits, including minimum Energy and Water standards for 'Excellent' where viable/feasible	Commit to tighter water efficiency limit where viable	Outline proposed measures in relation to existing or planned DENs or potential for communal energy
Planning Application Stage Requirement / Recommendation*:	**Where relevant include site-specific flood risk assessment, providing details of SuDS and satisfying sequential and exception tests as appropriate**	**Submit transport statement/ assessment and travel plan as required**	Describe any measures taken to improve/economise on CO_2 emissions & energy/water consumption; describe any measures to address summer overheating and/or urban 'heat island' effect	**Submit Sustainability Statement detailing response to the 7 ENV6 objectives (where a BREEAM pre-assessment report is submitted there is no need to duplicate the contents)**	**Submit BREEAM pre-assessment report detailing target credits (unless claimed to be not viable/feasible)**	**Detail acceptance of 110 litres/person/day water consumption limit in the Sustainability Statement, unless demonstrating non-viability/feasibility**	**Respond within Sustainability Statement to hierarchy of options in ENV7; detail and justify proposed option, demonstrating 'network ready' status where appropriate.**
Post-approval Stage Requirement / Recommendation*:	**Implement drainage strategy and Sustainable Drainage Systems (SuDS), where used, in accordance with planning approval**	**Implement Travel Plan where approved**	Implement proposed energy/CO_2/water efficiency measures or climate change adaptation measures as part of the development	**Implement development in accordance with the strategy set out in the Sustainability Statement**	**Provide final BREEAM certification evidence identifying credits achieved**	**Inform Building Control Body that the 'optional' 110 litre/person/day water efficiency limit is applicable, where imposed by condition**	**Implement approved decentralised/ communal energy solution; provide further details in relation to any outstanding(e.g. technical) matters**

***** **Bold** type indicates **Requirement**

† Guidance Note: Energy and Water Efficiency for Alterations and Extensions to Buildings – published separately by the council

Appendix 3: Technical Requirements for 'Network Ready' Status

'Network ready' status, as referred to in Policy ENV7 and in this SPD should be understood in the following terms:

Space heating should be provided by a wet, communal system. There should be no individual boilers or competing technologies such as electric heaters, including in communal areas.

The central heating system should be designed to operate at low temperatures and to provide a low return temperature. This will require appropriate operating systems such as underfloor heating or oversized radiators, and/or design for a low flow rate. The best practice target should be 70°C/40°C flow/return.

Domestic hot water (DHW) should be provided by means of an appropriate distribution system, ensuring minimum return temperature.

The room accommodating the operating plant should be sited as close as practicable to the existing or proposed heat network route, preferably at ground or basement level.

The interface of the district network and the site system should be accommodated in one or both of the following ways:

- Space for appropriate interface units (to include heat meters) allocated for each unit and/or:
- Space for heat plate exchanger in the plant room and an identified route to connect this to both the main heating system and main heat network pipework.

In the event that a development is constructed before 'heat on', the development will need to provide interim plant. Where this is the case, it is expected that a connection to the network will be made at the earliest available opportunity, and a route for a pipe run connecting the plant room to the network should be identified and safeguarded for the purpose.

Since the network will be capable of providing 100% of the heat requirement, developers may wish to plan on removing redundant plant once a network is active in order to make a more economical use of the space. Alternatively pre-installed plant can remain on site to meet peak demand and provide back-up. Baseload heat must be taken as a minimum.

Where any of these requirements prove unfeasible applicants should raise this with CBC Planning as soon as possible to assess how technical issues can be addressed and how, if necessary, variations on this specification can be accommodated with minimal cost to the network potential of the development.

Appendix 4: Sustainability Statement Template

Sustainability Statement Template

Part 1: Application details

Name of applicant/agent	
Site Address	
Description of Development	

Part 2: Non-technical executive summary

Use this space to describe the key features and targets which are proposed in relation to the environmental sustainability and energy efficiency of the development.

Part 3: Predicted emissions and thermal performance

Please detail the predicted performance of the development in terms of the following specifications where these are applicable and known

APPLICATION TYPE	MEASURE	VALUE
New dwelling(s)	Target Emission Rate (TER) (tonnes CO_2/m^2/year)	
	Predicted Dwelling Emission Rate (DER) (tonnes CO_2/m^2/year)	
	Target Fabric Energy Efficiency (TFEE) rate (kWh/m^2/year)	
	Predicted Dwelling Fabric Energy Efficiency (DFEE) rate (kWh/m^2/year)	
New non-residential buildings	Target Emission Rate (TER) (tonnes CO_2/m^2/year)	
	Predicted Building Emission Rate (BER) (tonnes CO_2/m^2/year)	
All new buildings	Proposed air permeability ($m^3/(h.m^2)$ at 50 Pa)	
All proposals involving creation, extension, alteration or refurbishment of buildings: proposed u-values for thermal elements and controlled fittings	Wall	
	Roof	
	Floor	
	Party wall	
	Swimming pool basin	
	Windows	
	Rooflights/windows	
	Pedestrian doors	
	Vehicle access and similar large doors	
	High-usage entrance doors	
	Roof windows/lights	
	Roof ventilators	

Part 4: Climate change mitigation measures

Be Lean: use less energy	Policy Driver
What measures have been/will be taken to reduce the energy demand associated with your proposed development?	ENV6 Objective 1
If your development involves improvements or extensions to an existing building what measures have been/will be taken to improve the energy efficiency of the existing building?	ENV6 Objective 3
What measures have been/will be taken to limit the carbon consumed through the implementation and construction processes, e.g. by reusing existing on-site materials or sourcing materials locally?	ENV6 Objective 4

Be Clean: increase efficiency of energy supply

Policy Driver

If your proposal involves major development OR the creation of a new dwelling or 1000sqm of internal floorspace within a District Energy Network priority area, please comment on the potential for your development to incorporate the following measures, submitting extra information separately where appropriate.

ENV6 Objective 5 & ENV7

Even if your proposal does not meet any of these criteria please detail below any proposed measures relating to District Energy Networks.

I – connection to an existing District Energy Network

II – development of a new District Energy Network

III – specification of a site-wide communal energy system

IV – making the development ‘network ready’ and able to connect to a future network (as defined in Appendix 3)

V – other alternative measures which would achieve a similar degree of carbon efficiency

Be Green: use energy from renewable and low carbon sources	**Policy Driver**
What measures have been/will be taken to utilise renewable or low-carbon energy sources?	ENV6 Objective 2

Part 5. Climate change adaptation measures

Tackling water stress

	Policy Driver
What measures have been/will be taken in the development to tackle water stress in the borough? (Where new dwellings are proposed please comment on whether your development will meet the 110 litres/person/day water efficiency and, if not, demonstrate why this is not viable or feasible)	ENV9 & ENV6 Objective 6

Coping with future temperature extremes

What measures have been/will be taken to enable the development to cope with temperature extremes, and to ensure it does not unduly increase the impact of heatwave events?	ENV6 Objective 7