



# Code for Sustainable Homes

**Technical guide**

**October 2008**





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Department for Communities and Local Government

# Changes to the Technical Guidance

A list of changes between this version (October 2008) and the previous version (April 2008) of the Code for Sustainable Homes Technical Guidance is published as a separate document. All changes have been back highlighted in grey within the text of this document

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# Foreword

Environmental issues are becoming increasingly important and there is an associated increase in public awareness. There is generally less awareness of the contribution that good building design can make to reducing pollution and improving the environment.

Scientific evidence shows that climate change resulting from carbon dioxide emissions associated with energy use is both real and already underway. At the same time we need to build much more housing to accommodate an increasing population, and changing lifestyles. If all the necessary housing were to be built by 2050, experts predict that up to one-third of the total housing stock is still yet to be built.

The UK Government is committed to addressing both the causes and consequences of climate change and to that end is bringing forward proposals for a Climate Change Bill<sup>1</sup>. The Bill will introduce a clear, credible, long-term framework for the UK to achieve its goals of reducing carbon dioxide emissions and ensure steps are taken towards adapting to the impacts of climate change.

Building sustainable homes requires us to minimise all sorts of environmental impacts in addition to carbon dioxide emissions, such as water use, waste generated, and materials for building.

The Code for Sustainable Homes provides a comprehensive measure of the sustainability of new homes, ensuring that sustainable homes deliver real improvements in key areas such as carbon dioxide emissions and water use. The Government's ambition for the Code is that it becomes the single national standard for the design and construction of sustainable homes, and that it drives improvements in home building practice.

This technical guidance sets out the requirements for the Code, and the process for achieving a Code assessment. It aims to make gaining a Code assessment as simple, transparent and rigorous as possible, inspiring confidence in Code assessors, home builders, product manufacturers and consumers.

<sup>1</sup> Department for Environment, Food and Rural Affairs. *Summary of responses to the consultation on the draft climate change bill from 13 March 2007 to 12 June 2007*. DEFRA, London. October 2007.

# Acknowledgements

The Code for Sustainable Homes Technical Guide has been drafted by the BREEAM Centre at the Building Research Establishment (BRE) under contract to the Department for Communities and Local Government.

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# Preface

The Code for Sustainable Homes (the Code) is an environmental assessment method for rating and certifying the performance of new homes. It is a national standard for use in the design and construction of new homes with a view to encouraging continuous improvement in sustainable home building. The Code is based on EcoHomes<sup>®</sup> (Yates et al, 2004). It was launched in December 2006 with the publication of *Code for Sustainable Homes: A step-change in sustainable home building practice* (Communities and Local Government, 2006). The Code became operational in April 2007 in England<sup>2</sup>, and having a Code rating for new build homes mandatory, from 1st May 2008. This mandatory requirement came into effect for all developments where a local authority received the building notice, initial notice or full plans application after 1st May 2008. Developments where a local authority had received these stages on or before 30 April 2008 are exempt.

Where Building Regulations apply, compliance is necessary at all times.

The implementation of the Code is managed by BRE Global (formerly BRE Certification Ltd) under contract to the Department for Communities and Local Government under arrangements based on the EcoHomes<sup>®</sup> operating systems. BRE Global is the main license holder. Under the terms of its agreement with Communities and Local Government, BRE Global issues licenses to both assessors and other Code service providers. BRE Global provides training, licensing and registration of Code assessors to standards ISO 14001 and ISO 9001, within a UKAS registered 'competent persons scheme'.

Code service providers are licensed organisations offering all or part of the range of Code services including assessor training; registration and monitoring; quality assurance of assessments; certification; investigation and resolution of complaints; and maintenance of records (BRE Global, 2007). At the time of publishing Stroma Ltd is the only other organisation licensed to provide all Code services although several others are in discussions with BRE Global. For further information about Code service providers can be found at [www.communities.gov.uk/thecode](http://www.communities.gov.uk/thecode).

The Code for sustainable homes covers nine categories of sustainable design including:

- Energy and CO<sub>2</sub> Emissions
- Water
- Materials
- Surface Water Run-off
- Waste
- Pollution
- Heath and Wellbeing

<sup>2</sup> The Code does not apply in Scotland. From 1 May 2008 a minimum of Code level 3 is required for all new housing promoted or supported by the Welsh Assembly Government or Assembly Government Sponsored Bodies. From 2nd June 2008 Code Level 3 is required for all new self-contained social housing in Northern Ireland.

- Management
- Ecology.

Each category includes a number of environmental issues, see Table 3.1. Each issue is a source of impact on the environment which can be assessed against a performance target and awarded one or more credits. Performance targets are more demanding than the minimum standard needed to satisfy Building Regulations or other legislation. They represent good or best practice, are technically feasible, and can be delivered by the building industry. Homes have already been built to Code level 4 and above by the industry.

The Code differs from EcoHomes<sup>®</sup> by:

- Rating dwellings on a scale from Level 1 to level 6, where level 6 is the highest
- Assessing individual dwellings instead of groups of dwellings
- Establishing minimum mandatory standards for CO<sub>2</sub> emission rates, indoor water use, materials, waste and surface water run-off, for achieving even the lowest level of the Code
- Demanding higher minimum mandatory standards for CO<sub>2</sub> emission rates and indoor water use, to achieve Levels 2 to 6 of the Code
- Requiring compliance with the Lifetime Homes criteria to achieve Level 6 of the Code
- Assessing dwellings at both the design (DS) and post construction (PCS) stage
- Awarding final Code certificates after the post construction assessment has been carried out
- For dwellings which do not achieve the minimum Code rating, a certificate is issued which shows a summary of the performance achieved, but does not show a rating from 1 to 6
- For dwellings which are not assessed, a nil-rated certificate is issued.

In addition to the mandatory standards, each design category scores a number of percentage points. The total number of percentage points establishes the Level or Rating for the dwelling. The certificate illustrates the rating achieved with a row of stars. A blue star is awarded for each level achieved. Where an assessment has taken place by where no rating is achieved, the certificate states that zero stars have been awarded.

From 1<sup>st</sup> May 2008 it is mandatory for a Code sustainability certificate or a nil rated Certificate (where an assessment has not taken place) to be included in the Home Information Pack as information to prospective purchasers of properties in England. This applies to all new homes that are marketed for sale, although a nil rated certificate of non-assessment can be downloaded from [www.bre.co.uk](http://www.bre.co.uk), [www.stroma.com](http://www.stroma.com) or [www.homeinformationpacks.gov.uk](http://www.homeinformationpacks.gov.uk).

Figure 1.1: Final Code Certificate

**THE CODE FOR SUSTAINABLE HOMES**

**FINAL CERTIFICATE**  
(Issued at the Post-Construction Stage)

**ISSUED TO:**  
Test House, 1 Test Street,  
Test Town, Test Country  
TE1 ST1

The sustainability of this home has been independently assessed at the Post Construction Stage and has achieved a Code rating of 5 out of 6 stars under the April 2007 version.

★ ★ ★ ★ ★ ☆  
None Regulatory Standards    Current Best Practice    Highly Sustainable and Zero Carbon

The next page sets out how this home achieved its rating in the nine categories.

Licensed Assessor <b>M L Assessor</b>	Assessor Organisation <b>The Assessors</b>
Client <b>CLient Ltd</b>	Developer <b>D E Valoper Inc</b>
Architect <b>Arct Facts</b>	Certificate Number <b>TEST - Certificate No 1</b>
Date <b>12 Nover 2006</b>	Signed for and on behalf of EPC Global Ltd

**Communities and Environment** Code Service Provider Logo

Front

**THE CODE FOR SUSTAINABLE HOMES**

**FINAL CERTIFICATE**  
(Issued at the Post-Construction Stage)

Certificate Number: EPC-9999999-PC-999-99-9999    Score: XXX

**What Your Code Star Rating Means**

Continued Score	24-37	40-54	57-67	69-63	64-69	80-100
Stars	1	2	3	4	5	6

The Code for Sustainable Homes considers the effects on the environment caused by the development and occupation of a home. To achieve a star rating a home must perform better than a new home built to minimum legal standards, and much better than an average existing home.

**How this home scored**

Category	Percentage of Category Score attained											What is covered in the category	
	0	10	20	30	40	50	60	70	80	90	100		
Energy	100	[Bar chart showing 100% attainment]											Energy efficiency and CO <sub>2</sub> saving measures
Water	75	[Bar chart showing 75% attainment]											Internal and external water saving measures
Materials	60	[Bar chart showing 60% attainment]											The sourcing and environmental impact of materials used to build the home
Surface Water Run-off	45	[Bar chart showing 45% attainment]											Measures to reduce the risk of flooding and surface water runoff, which can pollute rivers
Waste	100	[Bar chart showing 100% attainment]											Storage for recyclable waste and compost, and provision to reduce, reuse and recycle construction materials
Pollution	77	[Bar chart showing 77% attainment]											The use of insulation materials and heating systems that do not add to global warming
Health & Wellbeing	58	[Bar chart showing 58% attainment]											Provision of good daylight, quality sound insulation, private space, accessibility and suitability
Management	10	[Bar chart showing 10% attainment]											A Home User Guide, designed to educate, and retaining the impact of construction
Ecology	37	[Bar chart showing 37% attainment]											Protection and enhancement of the ecology of the area and efficient use of building land

Further detailed information regarding The Code for Sustainable Homes can be found at [www.communities.gov.uk/the-code](http://www.communities.gov.uk/the-code)

**CO<sub>2</sub> Rating**

Any environmental benefit, energy efficiency, emissions, this rating is shown on your Energy Performance Certificate as the Environmental Impact Rating. This Certificate is available from the assessor, and also includes information on how you can improve the home's performance.

The Code measures the sustainability of a home as a complete package, and takes into account other aspects of energy use as well as water sustainability factors, such as water and waste.

The CO<sub>2</sub> Environmental Impact Rating is a score between 0 and 100, and is not part of the Code for Sustainable Homes rating. Code of the assessment operation is available for the assessor of the code.

The certificate remains the property of EPC Global Ltd and is issued valid in some circumstances. It is provided here also subject to the license conditions in relation to copyright and other intellectual property. To view the conditions of the certificate please contact EPC Global Ltd.

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Back

Figure 1.2: Nil-rated Code Certificate

**THE CODE FOR SUSTAINABLE HOMES**

**THE CODE FOR SUSTAINABLE HOMES**

This Home

This home is designed to meet the requirements of current building regulations.

It is not assessed against the Code for Sustainable Homes. The Code sets higher standards for a range of environmental sustainability features, than current Building Regulations. It covers issues such as energy/carbon dioxide emissions, water efficiency and the use of materials.

As this home is not assessed against the Code for Sustainable Homes it can not be certified to meet the enhanced environmental performance standards set out in the Code.

The energy performance of this home will be shown on the Energy Performance Certificate.

**NIL RATED**

Developer \_\_\_\_\_ Date \_\_\_\_\_

**Rating system:**  
Nil rating: A home that has not been designed and built to meet the standards set out in the Code for Sustainable Homes. It has therefore not been formally assessed against the Code and has a 'Nil rating'.  
1-6 star rating: A home that has been designed and built to the sustainability standards set out in the Code for Sustainable Homes. A 1 star home is entry level and a 6 star home being a highly sustainable, zero carbon home.

More information can be found at [www.communities.gov.uk/the-code](http://www.communities.gov.uk/the-code)

# 1 Purpose of the Technical Guide

The purpose of this technical guide is to enable Code for Sustainable Homes (the Code) service providers and licensed assessors to deliver environmental assessments of new dwellings on the basis of the Code for Sustainable Homes. The guide includes a list of issues associated with the building process which are known to impact on the environment, and for which performance measures reducing impacts can be objectively assessed, evaluated and delivered in a practical and cost effective way by the construction industry. Results of the Code assessment are recorded on a certificate assigned to the dwelling. The process of gaining a Code assessment rating and certificate is described in Section 3. The guide includes a comprehensive list of definitions relevant to each section and reference material for everyone involved in the process. The system of evaluating environmental performance in the Code is both transparent and open to scrutiny. A Technical Group consisting of industry representatives, sustainability specialists and government advise on the content of the guidance and any necessary updates. Significant future changes will be subject to consultation.

This technical guide includes:

## **Part One**

- The Code for sustainable homes assessment procedure
- The scoring system.

## **Part Two**

- The environmental issues to be assessed
- Performance requirements and their evaluation
- Evidence required to confirm performance evaluation
- Calculation algorithms, checklists and other tools used in the assessment method.

## 1.1 Summary of the assessment system

The Code for Sustainable Homes is an environmental assessment rating method for new homes which assesses environmental performance in a two stage process (Design stage and Post-construction) using objective criteria and verification. The results of the Code assessment are recorded on a certificate assigned to the dwelling.

The report *Code for Sustainable Homes: A Step-change in sustainable home building practice* (Communities and Local Government, 2006) defined a set of nine categories of environmental impact, see Table 1.1.

Table 1.1: Summary of Environmental Categories and Issues	
Categories	Issue
Energy and CO <sub>2</sub> emissions	Dwelling emission rate (M) Building fabric Internal lighting Drying space Energy labelled white goods External lighting Low or zero carbon (LZC) technologies Cycle storage Home office
Water	Indoor water use (M) External water use
Materials	Environmental impact of materials (M) Responsible sourcing of materials – basic building elements Responsible sourcing of materials – finishing elements
Surface Water Run-off	Management of Surface Water Runoff from developments (M) Flood risk
Waste	Storage of non-recyclable waste and recyclable household waste (M) Construction waste management (M) Composting
Pollution	Global warming potential (GWP) of insulants NO <sub>x</sub> emissions
Health and Well-being	Daylighting Sound insulation Private space Lifetime homes (M)
Management	Home user guide Considerate constructors scheme Construction site impacts Security
Ecology	Ecological value of site Ecological enhancement Protection of ecological features Change in ecological value of site Building footprint

(M) denotes issues with mandatory elements.

The Code assigns one or more performance requirements (assessment criteria) to all of the environmental issues. When each performance requirement is achieved, a credit is awarded (**except** the four mandatory requirements with no associated credits). The total number of credits available to a Category is the sum of credits available for all the issues within it.

Mandatory minimum performance standards are set for some issues. For four of these, a single mandatory requirement is set which must be met, whatever Code level rating is sought. Credits are not awarded for these issues. Confirmation that the performance requirements are met for all four is a minimum entry requirement for achieving a level 1 rating. The four un-credited issues are:

- Environmental impacts of materials
- Management of Surface Water Runoff from developments
- Storage of non-recyclable waste and recyclable household waste
- Construction site waste management.

If the mandatory minimum performance standard is met for the four un-credited issues, three further mandatory issues need to be considered. These are agreed to be such important issues that separate government policies are being pursued to mitigate their effects. For two of these, credits are awarded for every level of achievement recognised within the Code, and minimum mandatory standards increase with increasing rating levels.

The two issues with increasing mandatory minimum standards are:

- Dwelling emission rate
- Indoor water use.

The final issue with a mandatory requirement for Level 6 of the Code is:

- Lifetime Homes.

Tables 1.2 and 1.3 below illustrate how for the creditable mandatory issues the minimum mandatory standards increase with increasing rating levels. For CO<sub>2</sub> emissions there are increased mandatory minimum standards for each increase in Code Level.

Table 1.2 : Code Levels for Mandatory Minimum Standards in CO <sub>2</sub> Emissions	
Code Level	Minimum percentage reduction in dwelling emission rate over target emission rate
Level 1 (★)	10
Level 2 (★★)	18
Level 3 (★★★)	25
Level 4 (★★★★)	44
Level 5 (★★★★★)	100
Level 6 (★★★★★★)	'Zero Carbon Home'

For Indoor water use there are increased mandatory minimum standards at Code levels 1, 3 and 5.

Table 1.3: Code Levels for Mandatory Maximum Standards in Indoor Water Consumption	
Code Level	Maximum indoor water consumption in litres per person per day
Level 1 (★)	120
Level 2 (★★)	120
Level 3 (★★★)	105
Level 4 (★★★★)	105
Level 5 (★★★★★)	80
Level 6 (★★★★★★)	80

Further credits are available on a free-choice or tradable basis from other issues so that the developer may choose how to add performance credits (converted through weighting to percentage points) achieve the rating which they are aiming for.

The environmental impact categories within the Code are not of equal importance. Their relative value is conveyed by applying a consensus-based environmental weighting factor (see details below) to the sum of all the raw credit scores in a category, resulting in a score expressed as percentage points. The points for each category add up to 100, see Table 1.4.

## 1.2 Weightings, credits and percentage points

The weighting factors used in the Code have been derived from extensive studies involving a wide range of stakeholders who were asked to rank (in order of importance) a range of environmental impacts (BRE, work

in progress). Stakeholders included international experts and industry representatives.

The results take account of:

- the contribution of new housing in the UK to each Code category of environmental impact; and
- the potential to mitigate environmental impacts at both the design and construction stages.

Table 1.4 shows how weightings are applied across all Code categories of environmental impact to adjust the relative values of credits within different categories. Within each category, credits are awarded for achieving specified degrees of performance. The weighting factors show the contribution made by each category to the total performance recognised and rewarded by the Code. The total available contribution is expressed as 100 per cent. The weighting of each category is expressed as a fraction of this, such that the sum of all the category contributions equals 100 per cent.

As an example, the 29 credits available for Energy and CO<sub>2</sub> emissions contribute to 36.4 per cent of the total available performance. Similarly, the four credits available for pollution contribute to 2.8 per cent of the total available performance. By dividing the weighting factor by the number of credits for each category, we arrive at an approximate weighted value for each credit. For instance within the Energy and CO<sub>2</sub> category, 36.4 per cent contribution to the total, divided by the 29 credits available, means that each credit in this category is worth about 1.26. Similarly, for the Pollution category, 2.8 per cent contribution to the total, divided by the four credits available, means that each credit in this category is worth about 0.70.

It is very important to note that weightings apply at the category level and not for individual credits to avoid rounding errors. For instance for the Energy and CO<sub>2</sub> emissions category, 36.4 per cent weighted contribution divided by 29 credits equals 1.2551724 expressed to seven decimal places, but 1.26 when expressed to two decimal places.

It is also important to note that achieving a high performance in **one** category of environmental impact can sometimes result in a lower level of performance for another. For instance, if biomass is used to meet heating demand, credits will be available for performance in respect of energy supplied from a renewable source, but credits cannot be awarded for low NO<sub>x</sub> emission. It is therefore impossible to achieve a total percentage points score of 100.



Table 1.4: Total Credits available, Weighting Factors and Points			
Categories of Environmental Impact	Total credits in each category	Weighting factor (% points contribution)	Approximate weighted value of each credit
<b>Category 1</b> Energy and CO <sub>2</sub> Emissions	29	36.4%	1.26
<b>Category 2</b> Water	6	9.0%	1.50
<b>Category 3</b> Materials	24	7.2%	0.30
<b>Category 4</b> Surface Water Run-off	4	2.2%	0.55
<b>Category 5</b> Waste	7	6.4%	0.91
<b>Category 6</b> Pollution	4	2.8%	0.70
<b>Category 7</b> Health and Wellbeing	12	14.0%	1.17
<b>Category 8</b> Management	9	10.0%	1.11
<b>Category 9</b> Ecology	9	12.0%	1.33
<b>Total</b>	–	<b>100.0%</b>	–

Table 1.5 summarises the environmental impact categories, issues, credits and weighting factors.

Table 1.5: Summary of environmental impact categories, issues, credits and weighting		
Code Categories	Available Credits	Category Weighting Factor
<b>Energy and CO<sub>2</sub> Emissions</b>		
Dwelling Emission Rate	15	
Building Fabric	2	
Internal Lighting	2	
Drying Space	1	
Energy Labelled White Goods	2	
External Lighting	2	
Low or Zero Carbon (LZC) Technologies	2	
Cycle Storage	2	
Home Office	1	
<b>Category Total</b>	<b>29</b>	<b>36.40</b>

*continued*

**Table 1.5: Summary of environmental impact categories, issues, credits and weighting**

Code Categories	Available Credits	Category Weighting Factor
<b>Water</b>		
Indoor Water Use	5	
External Water Use	1	
<b>Category Total</b>	<b>6</b>	<b>9.00</b>
<b>Materials</b>		
Environmental Impact of Materials	15	
Responsible Sourcing of Materials – Basic Building Elements	6	
Responsible Sourcing of Materials -Finishing Elements	3	
<b>Category Total</b>	<b>24</b>	<b>7.20</b>
<b>Surface Water Run-off</b>		
Management of Surface Water Run-off from developments	2	
Flood Risk	2	
<b>Category Total</b>	<b>4</b>	<b>2.20</b>
<b>Waste</b>		
Storage of non-recyclable waste and recyclable household waste	4	
Construction Site Waste Management	2	
Composting	1	
<b>Category Total</b>	<b>7</b>	<b>6.40</b>
<b>Pollution</b>		
Global Warming Potential of Insulants	1	
NOx Emissions	3	
<b>Category Total</b>	<b>4</b>	<b>2.80</b>
<b>Health &amp; Wellbeing</b>		
Daylighting	3	
Sound Insulation	4	
Private Space	1	
Lifetime Homes	4	
<b>Category Total</b>	<b>12</b>	<b>14.00</b>
<b>Management</b>		
Home User Guide	3	
Considerate Constructors Scheme	2	
Construction Site Impacts	2	
Security	2	
<b>Category Total</b>	<b>9</b>	<b>10.00</b>

*continued*

**Table 1.5: Summary of environmental impact categories, issues, credits and weighting**

Code Categories	Available Credits	Category Weighting Factor
<b>Ecology</b>		
Ecological value of site	1	
Ecological enhancement	1	
Protection of ecological features	1	
Change in ecological value of site	4	
Building footprint	2	
<b>Category Total</b>	<b>9</b>	<b>12.00</b>
<b>Total</b>	<b>104</b>	<b>100.00</b>

### 1.3 Calculating an assessment score

The assessment process should proceed in a logical order through the environmental impact categories and issues, summarised in Figure 1.3 below:

- It should begin with a check that the four mandatory issues for which no credits are awarded have been achieved
- The mandatory credits for CO<sub>2</sub> emissions and for internal water use should be checked and confirmed at the minimum values required to meet the Code level sought
- The remaining tradable credits should be checked and confirmed so that they too contribute to the required Code level.

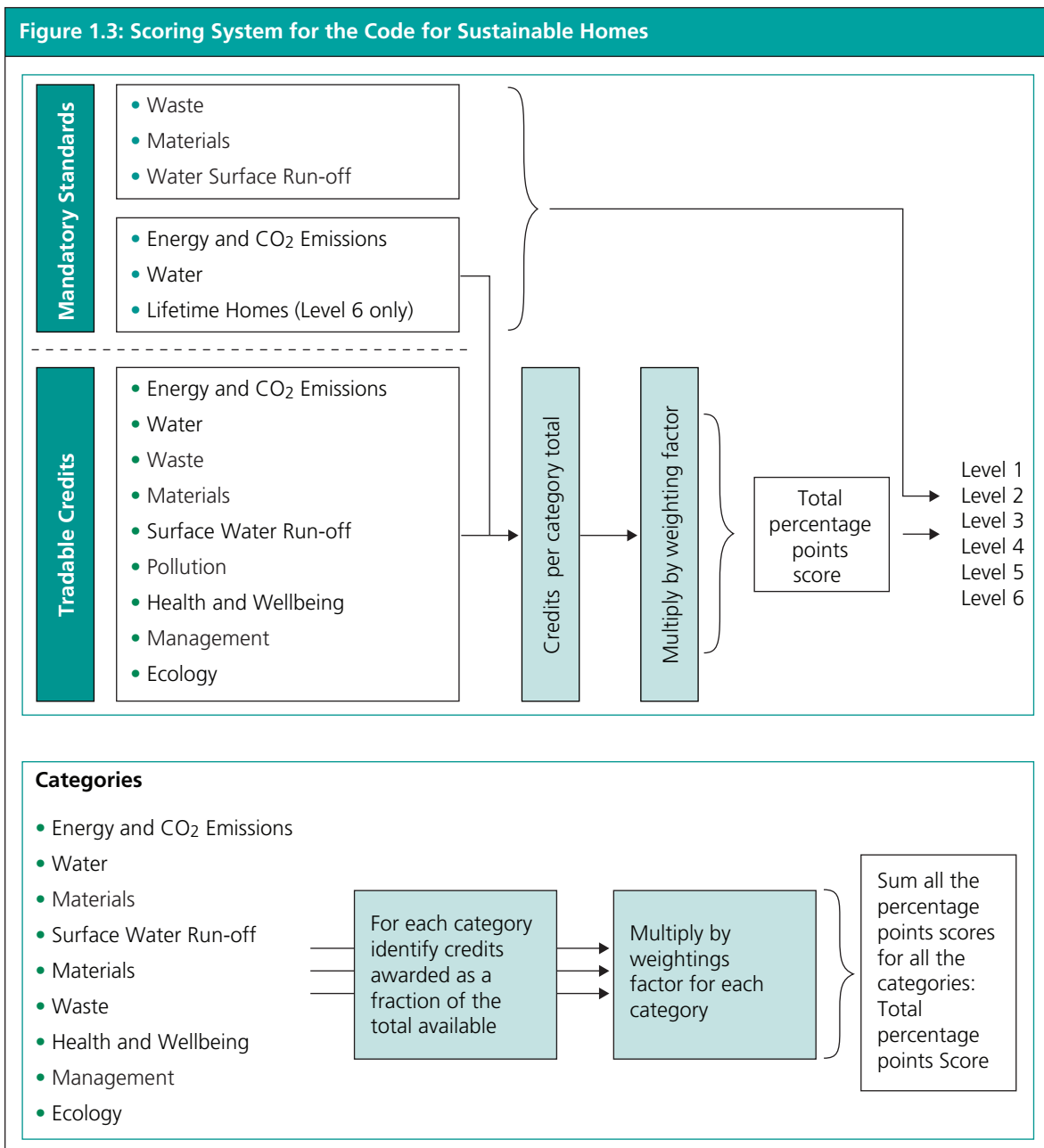
If any of the standards for the four non-creditable issues are not met, then a zero rating will result, regardless of the other credits achieved, including the creditable mandatory issues.

If all the non-creditable mandatory standards are met, but one or other of the creditable mandatory issues fails to reach the minimum for a higher required level, the rating achieved will be determined by the lowest level which all the mandatory issues meet. Achieving a high performance in one category of environmental impact can sometimes result in a lower level of performance for another. It is therefore impossible to achieve a Total percentage points score of 100.

## 1.4 Total percentage points score and resulting Code Level

Figure 1.3 illustrates the calculation method to obtain a total percentage points score. For every category, the number of credits achieved is divided by the total available and multiplied by the category weighting factor to give a percentage points score for the category. **This number should be rounded down to two decimal places before the next step.**

The rounded percentage points scores for each category are then summed to arrive at the Total percentage points score for the dwelling. The total percentage point score must be rounded down to the nearest whole number.



The Code Level is then derived from the total percentage points according to Table 4.4. Each Code Level is represented on the certificate by an equivalent number of Stars from 1 to 6.

Total percentage points score (equal to or greater than)	Code Levels
36 Points	Level 1 (★)
48 Points	Level 2 (★★)
57 Points	Level 3 (★★★)
68 Points	Level 4 (★★★★)
84 Points	Level 5 (★★★★★)
90 Points	Level 6 (★★★★★★)

Figure 1.3 summarises the process of arriving at a Total percentage points score and then converting that to a Code Level.

It is important to note that the total percentage points scores set out in the document '*Code for Sustainable Homes – A step-change in sustainable home building practice*' (Department for Communities and Local Government, December 2006) are rounded to one decimal place. The Report Submission Tool (available for assessors from the Code service provider) must be used to determine an accurate score for an assessment.

## 1.5 Setting Code levels in context

The six performance levels recognised by the Code are compared with regulations, BRE EcoHomes and the Energy Saving Trust energy efficiency standard as follows:

Code Level	Comparison with other standards
1	Above regulatory standards A similar standard to BRE's EcoHomes <sup>®</sup> PASS level* A similar standard to EST's Good Practice Standard for energy efficiency
2	A similar standard to BRE's EcoHomes <sup>®</sup> GOOD level*
3	Broadly similar standard to BRE's EcoHomes <sup>®</sup> VERY GOOD level* Similar to EST's Best Practice Standard for energy efficiency
4	Current exemplary performance
5	Exemplary performance with high standards of energy and water efficiency
6	Aspirational standard based on zero carbon emissions for the dwelling and high performance across all environmental categories

\*Note: Although the Code is closely related to the EcoHomes<sup>®</sup> standard, it is not possible to make a direct comparison between the two. This is due to the mandatory standards in the Code and to varying performance standards in some areas.

A Code Level is awarded on the basis of achieving both a set of mandatory minimum standards and a minimum overall score. For most of the issues within the Code assessment, developers and designers can choose standards to suit a given site and development. This offers flexibility in achieving the standards, but it is less flexible than EcoHomes<sup>®</sup>.

## 2 Organisations delivering the Code for Sustainable Homes

The Code for Sustainable Homes is being managed by BRE Global under contract to Communities and Local Government using arrangements based on BRE Global's EcoHomes operating systems. Under these arrangements all Code assessments are carried out under licence by a wide range of organisations. BRE Global's role is to ensure that Communities and Local Government's requirements are met through the provision of:

- Assessor training
- Registration and monitoring
- Quality assurance of assessments
- Certification
- Investigation and resolution of complaints
- Maintenance of records.

BRE Global operating systems are accredited by UKAS under EN 45011 (General Requirements for Bodies Operating Product Certification Schemes) and ISO 17024 (General Requirements for Bodies operating Certification of Persons) to ensure independence, competence, impartiality and confidentiality with transparency in records, complaints procedures, documentation and maintenance of certification.

BRE Global currently does not carry out assessments and provides clear separation between the roles of training and assessor qualifications to avoid potential conflicts of interest. Under the terms of its agreement with Community and Local Government, BRE Global will licence:

- Assessors on the BRE Global training programme; and
- Other organisations to provide training and accreditation services.

For further information see:

[www.breeam.org/filelibrary/CSH\\_Guidance\\_Notes\\_for\\_Pro prospective\\_Service\\_Providers.pdf](http://www.breeam.org/filelibrary/CSH_Guidance_Notes_for_Pro prospective_Service_Providers.pdf)

This document sets out the basic requirements for organisations wishing to carry out these activities. Any organisation wishing to offer these services would have to operate to the same high standards that BRE Global are required to do under its contract with Communities and Local Government and with mechanisms that clearly demonstrate the avoidance of conflicts of interest.

There are two options for organisations wishing to offer some or all of these services:

- A sub-licence agreement to provide an independent certification service covering assessor training and testing; assessor registration; quality assurance, technical support and certification of assessments; or
- A sub-contract agreement for partial services working within the parameters of BRE Global's existing accredited services.

BRE Global will maintain a central database in which all the assessed dwellings will be registered, regardless of the organisation providing the Code assessment. This will allow statistics to be reported to Community and Local Government. Sub-licensees will be supplied with the necessary formatting and access rights to lodge their registrations. The precise nature of this database and its controls are under development. Where necessary interfaces with databases in other organisations can be developed. A fee will be charged at BRE Global commercial rates for time spent on this activity.

Code assessors must be members of an organisation which pays fees covering:

- Management of the system
- Free telephone helpline
- Regular updates
- Access to a private extranet
- Certification of the assessment.



## 3 Obtaining a Code Rating – The process

### 3.1 Registering a site (before detailed designs are finished)

The client for the assessment chooses a Service provider for the Code from the register at [www.communities.gov.uk](http://www.communities.gov.uk). The Service provider will offer a register of licensed and trained Code assessors for the client to choose and appoint an assessor.

The appointed Code assessor registers the development formally with the Service provider as early as possible. This registration is valid for a maximum of five years between expiry of the Technical Guide version at registration and submission of the Design stage report. So far there is no time limit on the delivery of the associated Post construction stage or Final certificates for the development. This enables the version of the Code to be set such that even if the Code is updated (say every six months), the Code version used will remain the same across the site.

It is only possible to register developments/dwellings against the current version of the Code for Sustainable Homes. The only exception is where there is a documented contractual or legal requirement to meet a specific level of the Code against a previous version. Documentary evidence would need to be provided to the Code service provider in order to have this exception approved prior to assessment taking place. Sites already registered under a previous version can be re-registered under the current version of the Code.

Once a site is registered by the assessor on the Service Provider database, it is given a unique registration number.

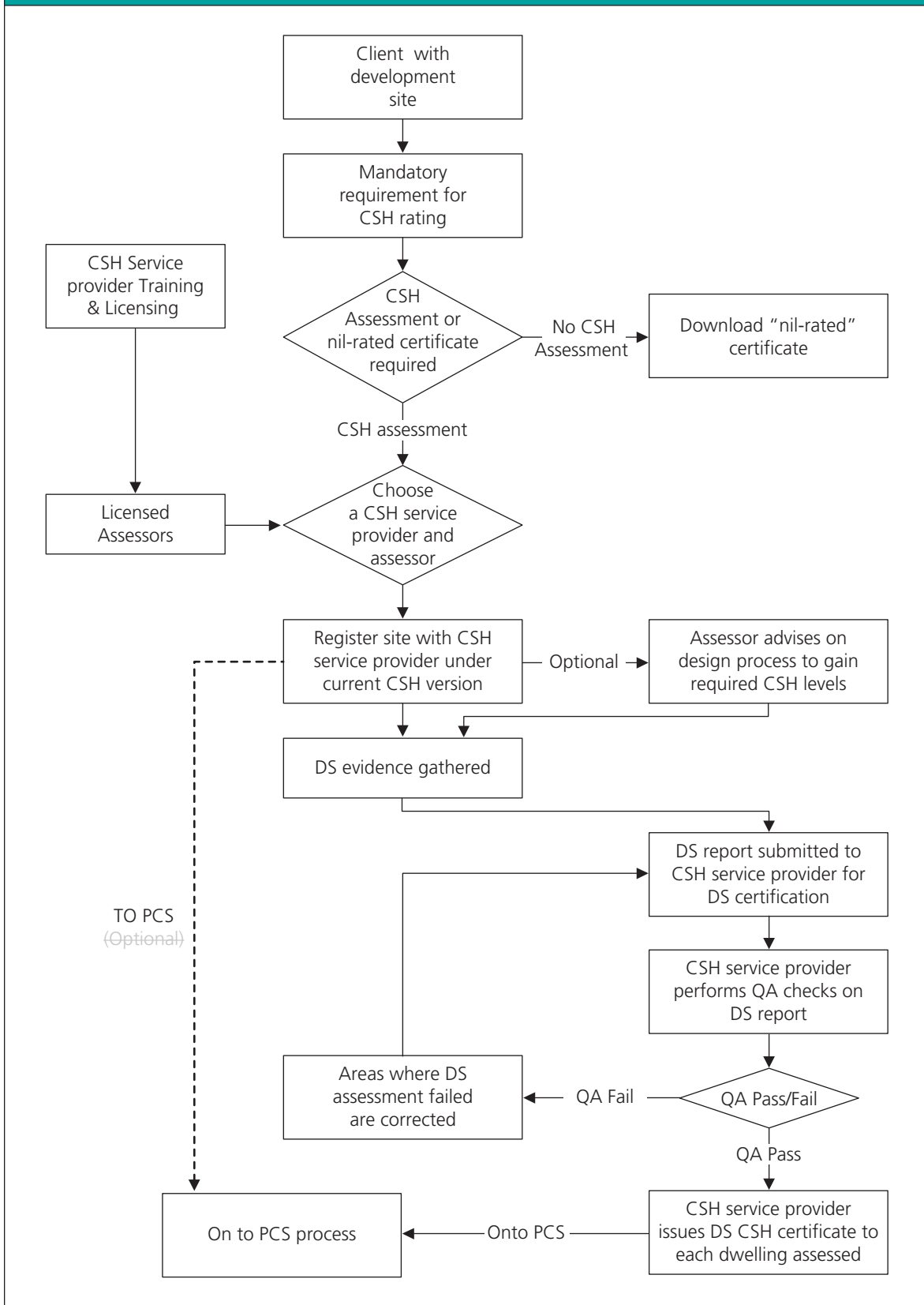
### 3.2 Performing Code Assessments

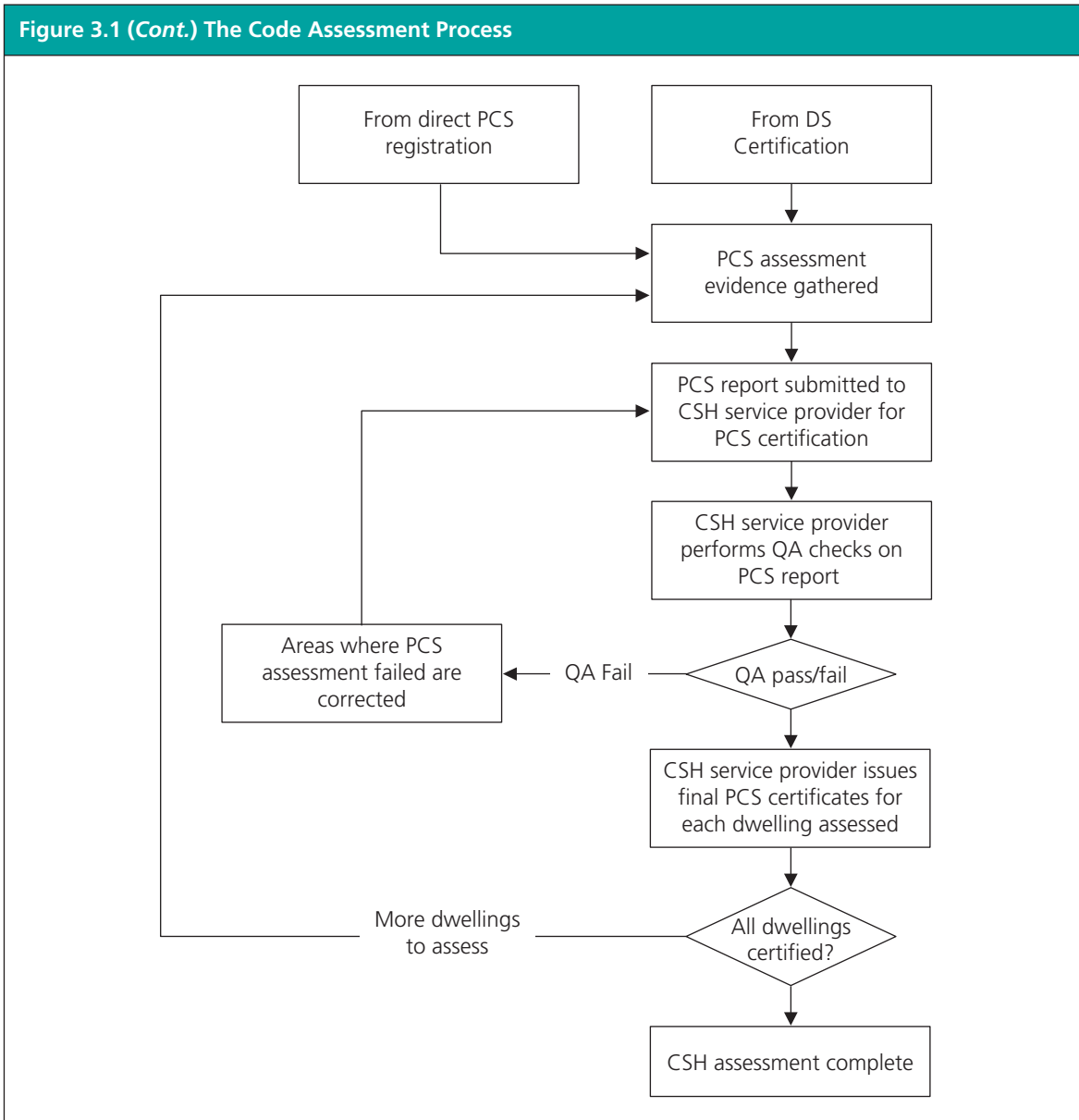
Code assessments are normally carried out in two stages:

- Design Stage (DS), leading to an Interim certificate
- Post Construction Stage (PCS), leading to a Final certificate.

The assessment process for these two stages is very similar. Evidence is collated and used as the basis for the assessor to determine how many credits are to be awarded for each issue. A summary report is submitted to the Code service provider for quality assurance and certification.

Figure 3.1: The Code Assessment Process





The licensed organisation has responsibility for the assessment and the Code assessor has responsibility for producing the report. It is possible for different licensed organisations to undertake the DS and PCS assessments for a particular site. Code assessors are required to make DS assessment evidence available to the Post Construction assessor where this is the case.

Licensed organisations are required to keep full supporting documentation of all assessments carried out. Assessors are required to retain this information for a period of 10 years from submission of the report. Each licensed organisation is required to establish and maintain internal quality management procedures relating to record keeping.

### 3.2.1 **Design Stage Assessment**

The aim of the Design Stage assessment is:

- To assess the design specifications (i.e. before construction begins) for each individual dwelling to determine the Design stage or Interim rating
- To award (subject to quality assurance) a Design stage or Interim certificate.

The DS assessment is carried out on the detailed design of each dwelling in the period up to the issue of tender documents, sometimes referred to as RIBA Stages A-G (Royal Institute of British Architects, 1991). A Code assessment requires a more detailed specification than Building Regulations compliance because the Code covers many more aspects of the performance of the dwelling. For instance, specification details of all the sanitary fittings are required to calculate the score for the Code Indoor Water issue.

The assessor will also be able to calculate, at this initial design stage assessment, any site related credits. Therefore details of final landscaping and ecological enhancement measures will also need to be known.

The assessor should work closely with the design team to:

- Demonstrate that performance requirements set for each of the four un-credited mandatory issues of environmental impact are met for each dwelling
- Demonstrate that the performance requirements set for each of the credited mandatory issues of environmental impact (Dwelling emission rate and Indoor water use and Lifetime homes) are met for the desired rating for each dwelling
- Choose the remaining tradable issues which will be needed to achieve the overall desired rating
- Evaluate the performance of each dwelling against the requirements set for each of the chosen issues to confirm that the required standards are met for the desired rating
- Assemble and check the evidence required for the developer, design team and other consultants to show the intended performance will be met.

When the assessor is satisfied with the performance under the Code, they shall submit the assessment report to the Service provider for quality assurance and to receive Design stage or Interim Code certification. The report shall contain documentary evidence that performance requirements are being met, with a clear audit trail linking such evidence to all specification clauses, drawings, reports and other evidence. The Service provider may issue a standard report format for the assessor to complete.

### 3.2.2 **Post Construction Stage Assessment**

The aim of the PCS assessment is to assess each individual dwelling As Built to determine the final score for the dwelling and its Code Level.

If a DS assessment has been undertaken, this can be used as the starting point for the PCS assessment. The PCS assessment is carried out to confirm that dwellings are either, built to the DS specifications, or if there are variances from the DS, these are documented, reassessed, and a new score and Code Level calculated for each dwelling that is affected. The assessor organisation shall be satisfied that commitments made have been achieved and should carry out an appropriate level of checking to achieve this.

If there has been no prior DS assessment then the full assessment shall be completed against the As Built dwelling(s).

Licensed organisations are required to set-up robust and auditable Post Construction Stage assessment procedures. This is to include:

- An appropriate number of site visits for each development site (at least once per site). The appropriate number of site visits is dependent on the particular situation. It is the assessor's responsibility to determine the necessary number of site visits required to satisfy themselves that the assessment properly reflects the dwelling
- Every different specification for each issue shall be reviewed and evidence recorded to confirm that it complies with the requirements for PCS assessment
- Where dwellings of identical construction type are planned to be released in phases, the assessment evidence must show that the same specifications have been incorporated into dwellings completed following the initial release. If there are variances to the specification in subsequent releases, the assessor shall reassess the dwellings based on the new specifications.

The number of PCS assessment reports is likely to be based on the phased completion of dwellings within a development. The number of PCS assessment reports submitted to cover a particular development is entirely at the discretion of the assessor (and developer).

For a large or phased development, there are some issues that will not be complete when a Post Construction Stage Assessment for the first dwelling(s) is submitted to the Service provider. These could include some ecology credits or community based facilities for instance. It is possible to certify the first dwellings without certain issues actually being complete. The details of these exceptions are contained within the relevant issues, but are also highlighted in Table 3.1 below. This is not meant to be a comprehensive list. Its purpose is to provide guidance to assessors for the sort of exceptions that are acceptable.

Table 3.1: Post Construction Stage Assessment		
Categories	Issues	Exception
Energy and CO <sub>2</sub> emissions	Ene 1: Dwelling emission rate	As Built Part L1A compliance checklist for each energy type. Only checklists relating to energy types covered by the PCS assessment are required. There may be different energy types in a later phase of the development.
		Renewables that form part of the energy requirement that are located in a different phase of the development, these may not be commissioned in the first phase but should be operational before more than 60 per cent of the dwellings are completed/certified.
	Ene 2: Building fabric	As Built Part L1A compliance checklist for each energy type. Only checklists relating to energy types covered by the PCS assessment are required. There may be different energy types in a later phase of the development.
	Ene 4: Drying space	Provision of external drying fittings or footings for later parts of the development, as this would form part of the "externals" and would be one of the last finishes.
	Ene 5: Energy labelled white goods	White goods may not be fitted due to security risk until just prior to handover to new residents. Orders must be in place.
	Ene 6: External lighting	External light fittings may be in place but may not have bulbs until handover. This is acceptable.
	Ene 7: Low or zero carbon (LZC) technologies	If MACRO Renewables are being used they may not be completed until later in the development, especially if they are only producing a percentage of the load demand requirement. They should be operational before more than 60 per cent of the dwellings are completed/certified.
	Ene 8: Cycle storage	Some cycle storage may not be in place in later stages of the development as this would form part of the "externals" and be the last of the finishes installed.
Water	Wat 1: Indoor water use	Communal grey or rainwater systems may not be installed yet but should be operational before more than 60 per cent of the dwellings are completed/certified.
	Wat 2: External water use	Communal rainwater collection systems may not be installed yet but should be operational before more than 60 per cent of the dwellings are completed/certified. (Water butts should be installed although often left till last minute.)
Surface Water Run-off	Sur 1: Management of Surface Water Runoff from developments	Specific infiltration measures, such as soakaways and permeable paving, may not be fully installed when initial phases are released, but evidence of the devices to be used and any relevant calculations need to be available. They need to be operational before more than 60 per cent of the dwellings are completed/certified.
	Sur 2: Flood risk	All of the flood protection measures should be planned and a programme for their construction finalised which indicates that they will be operational before more than 60 per cent of the dwellings are completed/certified.

*continued*

Table 3.1: Post Construction Stage Assessment		
Categories	Issues	Exception
Waste	Was 1: Storage of non-recyclable waste and recyclable household waste	Local authority collection schemes, kitchen waste collection schemes and private recycling scheme operators will need to be operational by the time 60 per cent of the development is complete.
	Was 3: Composting	Communal/community composting service will need to be operational within 18 months of completion.
Pollution	Pol 2: NOx emissions	A communal heating system (e.g. CHP, District Heating etc.) intended as the primary heating energy source for the dwelling may not be complete. The facility should be planned and a programme for its installation finalised which indicates that it will be operational before more than 60 per cent of the dwellings are completed/certified. Alternatively where the facility is designed to serve off site users it must be fully operational within a period of 18 months of assessment.
Ecology	Eco 1: Ecological value of site	It will not be possible to check that all features outside of the construction zone have been undisturbed until construction complete.
	Eco 2: Ecological enhancement	Features are often not in place until the whole site is complete or until the appropriate planting season. A design and programme is required demonstrating that all such enhancement works will be completed normally within a single annual cycle from completion of construction works on the final dwellings on the site.
	Eco 3: Protection of ecological feature	It will not be possible to confirm that the credit has been achieved for an individual plot being assessed until the entire development site has been assessed to confirm all features have been protected. The assessor should check that features relating to areas of the site where construction has been completed have been protected. For areas where construction is not yet complete, it should be checked that protection measures are in place to protect features during construction works as detailed at design stage.
	Eco 4: Change in ecological value of site	Planting is often not done until whole site is complete. A design and programme is required demonstrating that all such enhancement works will be completed normally within a single annual cycle from completion of construction works on the final dwellings on the site.

### 3.3 Certifying Code for Sustainable Homes Assessments

All requests for certification (both Design stage or **Interim**, and Post construction stage, or **Final**) are logged on the Service provider database under the site registration number. Certificates are issued on behalf of the Department of Communities and Local Government. BRE Global's UKAS Accredited Competent Persons Scheme requires that suitable procedures are in place for all Service providers to monitor the quality of reports.

Currently this involves:

- Basic administrative check on every report submitted for certification
- Technical audit of assessments and assessors on a regular basis.

## 4 Keeping this guide up to date

This technical guide will be updated at intervals if standards change or are introduced, if technologies change, and if processes change.

The Department for Communities and Local Government website will always contain the latest version at [www.communities.gov.uk](http://www.communities.gov.uk).



## 5 Generic Definitions

<b>Approximate weighted value of a credit</b>	The adjusted value of each credit according to the weighting assigned to the category which it belongs to. By dividing the weighting (expressed as a percentage contribution) by the number of credits for each category, we arrive at an adjusted value (Point) for each credit. For instance within the Energy and CO <sub>2</sub> category, 36.4 per cent contribution to the total, divided by the 29 credits available, means that each credit in this category is worth 1.26 points. Assessors must avoid using adjusted credit values in calculating Code rating levels because they generate errors due to rounding.
<b>Assessor</b>	See Code Assessor and Licensed Assessor
<b>BRE</b>	Building Research Establishment
<b>BRE Global Ltd.</b>	BRE Global Limited (part of the BRE Group) is an independent third party approvals body offering certification of fire, security and sustainability products and services to an international market. For more information see <a href="http://www.bre.co.uk/global">http://www.bre.co.uk/global</a> .
<b>BREEAM</b>	Building Research Establishment Environmental Assessment Method. A suite of environmental assessment rating tools designed, operated and owned by BRE, first launched in 1990.
<b>Carbon dioxide</b>	An invisible odourless gas which is the by product of energy generated from fossil fuels including gas, oil and coal. It is a significant contributor to global warming and climate change.
<b>Category</b>	Headline name for a group of related environmental issues for assessment against defined performance requirements in the code for sustainable homes.
<b>Communities and Local Government</b>	UK Government Department responsible for Communities and Local Government; owners of the CSH.
<b>Code</b>	See Code for Sustainable Homes
<b>Code Assessor</b>	See Licensed Assessor
<b>Code calculator tools</b>	A suite of tools made available for use by the Service provider to enable assessors to calculate performance levels and credits for award under various issues.
<b>Code for Sustainable Homes</b>	Government owned environmental assessment method for certifying and rating new homes in England. It was launched in December 2006.

<b>Code Service Provider</b>	See Service provider
<b>Competent Person</b>	Personnel performing work affecting product quality must be competent, based on their education, training, skills and previous experience. A competent person can perform satisfactorily with minimum supervision. BRE is accredited by UKAS under ISO 17024 to operate a competent persons scheme for CSH to ensure competence, accuracy and professional service in offering CSH to clients.
<b>Credit</b>	Awarded for specific environmental performance within the CSH. Credits are aggregated within issues and categories, and weighted to calculate a points score. Points are then added together to produce an overall rating.
<b>CSH</b>	Code for Sustainable Homes (see Code for Sustainable Homes)
<b>CSH service provider</b>	An organisation offering part or all of the CSH services including assessor training; registration and monitoring; quality assurance of assessments; certification; investigation and resolution of complaints; and maintenance of records. (BRE Global, 2007)
<b>CSH system</b>	A web based tool allowing assessors to complete and process registrations and reports, and request the issue of certificates for individual dwellings at DS and PCS.
<b>D&amp;P</b>	Design and procurement assessment, see DS assessment
<b>DS assessment</b>	Design stage assessment made against the CSH standard on the basis of the detailed design of one or more dwellings (typically between RIBA stages A-G) resulting in a DS certificate.
<b>DS certificate</b>	Certificate of performance against the CSH based on the design of a dwelling, including site related issues
<b>DS registration</b>	Registration of forthcoming post construction assessment on the CSH system
<b>DS report</b>	Design stage report containing details of all categories and issues assessed, all credits achieved
<b>Dwelling</b>	A building, or part of a building in which a household lives; houses and flats are included
<b>EcoHomes</b>	BREEAM Version for new homes, first launched in 2000 and now replaced in England for new dwellings by the Code. EcoHomes remains in operation for refurbished homes in the UK, and all dwellings in Scotland.

<b>EPC</b>	The Energy Performance Certificate records a home's energy and CO <sub>2</sub> emission performance rating which is calculated using SAP for dwellings. Energy Performance Certificates display the energy efficiency of a home on a scale of A-G. The most efficient homes – which should have the lowest fuel bills – are in band A. The Certificate also shows, on a scale of A-G, the environmental impact of the home. Further information available from <a href="http://www.homeinformationpacks.gov.uk">www.homeinformationpacks.gov.uk</a> .
<b>EST</b>	The Energy Savings Trust was established by the UK government in 1993 following the Earth Summit in Rio de Janeiro. EST provides independent evidence-based policy analysis on energy efficiency, small-scale renewable technologies such as Solar PV, Small Scale Wind and Ground Source Heat Pumps and clean, low carbon transport, covering both the UK and Europe. Further information available from <a href="http://www.energysavingtrust.org.uk">www.energysavingtrust.org.uk</a>
<b>Final Certificate</b>	Certificate of performance against the CSH based on the completed dwelling
<b>Finished</b>	Refers to the time when a post construction assessment can be done. Finished is the point at which the construction of a property is sufficiently advanced so as to make a post construction assessment possible. (Community and Local Government legal definition)
<b>HIP</b>	Home Information Packs. In August 2007 the government introduced the requirement for Home Information Packs at the point of sale of a property. Further information available from <a href="http://www.homeinformationpacks.gov.uk">www.homeinformationpacks.gov.uk</a>
<b>Home</b>	See dwelling
<b>HCR</b>	Home Condition Report. Without the provision of adequate information and guidance it is likely that the home may be used inappropriately, leading to the dissatisfaction of occupants and the waste of resources. Further information available from <a href="http://www.homeinformationpacks.gov.uk">www.homeinformationpacks.gov.uk</a> .
<b>Household</b>	One or more people sharing a dwelling
<b>Interim Certificate</b>	See DS certificate
<b>ISO</b>	International Organization of Standardisation
<b>ISO 14001</b>	Independently audited environmental management scheme operated by the British accreditation bureau, <a href="http://www.british-accreditation.co.uk">www.british-accreditation.co.uk</a>
<b>ISO 9001</b>	Independently audited quality management scheme operated by the British accreditation bureau, <a href="http://www.british-accreditation.co.uk">www.british-accreditation.co.uk</a>

<b>Issue</b>	A source of impact on the environment which can be assessed against a performance requirement and awarded one or more credits
<b>Level</b>	Results of CSH assessments are expressed as a Rating, or Level from 1 to 6, with 6 being the lowest environmental impact, or the highest environmental performance
<b>Licensed assessor</b>	A competent person trained, examined and licensed by a Service provider (see Service provider) to carry out CSH assessments and recorded on the Service provider register of licensed assessors. Assessors may provide guidance on meeting the standard and may be a member of the design team. Where this is the case, the assessor shall advise the Service Provider of their position within the design team (e.g. Architect, Design Engineer, Energy Consultant, etc.) They shall also identify, document, review and manage all possible conflicts of interests so that these are eliminated. The Service provider reserves the right to audit such documentation and processes.
<b>Licensed CSH assessment organisation</b>	An organisation which employs one or more competent persons with respect to the Code, and also pays a licence fee to BRE Global or a sub-licensee to BRE Global to cover provision of support services including: management of the system; free telephone helpline; regular updates, and access to a private extranet.
<b>Mandatory</b>	A compulsory minimum entry performance requirement for achieving a Code rating
<b>PCR</b>	Post construction review, now known as Post construction stage assessment
<b>PCS</b>	Post construction stage
<b>PCS assessment</b>	Assessment of finished dwellings leading to a post construction Code certificate. (See definition of Finished)
<b>PCS certificate</b>	Certificate of performance against the CSH based on the built dwelling, including site related issues
<b>PCS registration</b>	Registration of forthcoming post construction assessment on the CSH system
<b>PCS report</b>	Report resulting from post construction stage assessment by licensed assessor
<b>Performance requirement</b>	The Code assigns one or more performance requirements to all of the environmental issues (except four), which when achieved, will result in the award of a Credit. Credits for each issue are summed to give a total number of available credits for each Category.
<b>Pre-development</b>	The state of a site immediately before the development under assessment

<b>Percentage points</b>	The weighted value of a category expressed as a percentage contribution to the whole. For instance the Energy and CO <sub>2</sub> emissions category is 36.4 per cent of the total. (See Table 4.3). (See also Total percentage points)
<b>Plot</b>	Used synonymously in the guide with “dwelling”
<b>Points Score</b>	See Total percentage points score
<b>Rating</b>	See Level
<b>Service provider</b>	A Service provider is any organisation licensed by (and including) BRE Global which offers training and accreditation services to Code assessors. All Service providers have to operate to the same high standards that BRE Global are required to do under its contract with Communities and Local Government and with mechanisms that clearly demonstrate the avoidance of conflicts of interest. For further information see <a href="http://www.breeam.org/filelibrary/CSH_Guidance_Notes_for_Prospective_Service_Providers.pdf">www.breeam.org/filelibrary/CSH_Guidance_Notes_for_Prospective_Service_Providers.pdf</a> which sets out the basic requirements for organisations carrying out these activities.
<b>Total percentage points score</b>	Sometimes referred to as Points score. For every category, the number of credits achieved is divided by the total available and multiplied by the category weighting factor to give a percentage points score. The percentage points scores are then summed over all the categories to arrive at a total percentage points score for the dwelling. Figure 2 illustrates the calculation method to obtain a total percentage points score.
<b>UKAS</b>	The United Kingdom Accreditation Service is the sole national accreditation body recognised by government to assess, against internationally agreed standards, organisations that provide certification, testing, and inspection and calibration services. Accreditation by UKAS demonstrates the competence, impartiality and performance capability of these evaluators
<b>Weighting factor</b>	The weighting factor shows the contribution made by each category to the total performance recognised and rewarded by the Code. The total available contribution from all the categories is expressed as 100 per cent. Raw credit scores for environmental performance are multiplied by the weighting factor assigned to each Category resulting in an overall points score which can then be summed to result in an overall rating.

# Acronyms

<b>AC</b>	Alternating Current
<b>ACoP</b>	Approved Code of Practice
<b>ACPO</b>	Association of Chief Police Officers
<b>AD L1A</b>	Approved Document L1A
<b>ADE</b>	Approved Document E
<b>ALO</b>	Architectural Liaison Officer
<b>ANC</b>	Association of Noise Consultants
<b>AWTC</b>	Association of Wildlife Trust Consultancies
<b>BERR</b>	Business Enterprise and Regulatory Reform
<b>BRE</b>	Building Research Establishment
<b>BREEAM</b>	Building Research Establishment Environment Assessment Method
<b>BS</b>	British Standard
<b>BSRIA</b>	Building Services Research and Information Association
<b>CABE</b>	Commission for Architecture and the Built Environment
<b>CCS</b>	Considerate Constructors Scheme
<b>CEH</b>	Centre for Ecology and Hydrology
<b>CFL</b>	Compact Fluorescent Lamp
<b>CH<sub>4</sub></b>	Methane
<b>CHP</b>	Combined Heat and Power
<b>CIBSE</b>	Chartered Institution of Building Services Engineers
<b>CIE</b>	Commission Internationale de l'Eclairage
<b>CIRIA</b>	Construction Industry Research and Information Association
<b>CITES</b>	Convention on International Trade in Endangered Species of Wild Fauna and Flora
<b>CIWEM</b>	Chartered Institution of Water and Environmental Management
<b>CO<sub>2</sub></b>	Carbon Dioxide
<b>CoC</b>	Chain of Custody
<b>Code</b>	Code for Sustainable Homes
<b>CPDA</b>	Crime Prevention Design Advisor
<b>CPET</b>	Central Point of Expertise on Timber
<b>CSA</b>	Canadian Standards Association
<b>CSH</b>	Code for Sustainable Homes
<b>DC</b>	Direct Current
<b>DEFRA</b>	Department of Environment, Food and Rural Affairs
<b>DER</b>	Dwelling Emission Rate

<b>DF</b>	Average Daylight Factor
<b>DfT</b>	Department for Transport
<b>DIY</b>	Do It Yourself
<b>DS</b>	Design Stage
<b>DTI</b>	Department of Trade and Industry
<b>Eco</b>	Ecology
<b>EMAS</b>	Eco Management and Audit Scheme
<b>EMS</b>	Environmental Management System
<b>EN</b>	European Normalization
<b>Ene</b>	Energy and CO <sub>2</sub> Emissions
<b>EPC</b>	Energy Performance Certificate
<b>EPDM</b>	Ethylene propylene Diene Monomer
<b>EPIs</b>	Environmental Performance Indicators
<b>ESCO</b>	Energy Services Company
<b>EST</b>	Energy Savings Trust
<b>EU</b>	European Union
<b>FEH</b>	Flood Estimation Handbook
<b>FRA</b>	Flood Risk Assessment
<b>FSC</b>	Forest Stewardship Council
<b>GLS</b>	General Lighting Services
<b>GRP</b>	Glass Reinforced Plastic
<b>GSHP</b>	Ground Source Heat Pumps
<b>GWP</b>	Global Warming Potential
<b>HCR</b>	Home Condition Report
<b>HFCs</b>	Hydrofluorocarbons
<b>HIP</b>	Home Information Pack
<b>HLP</b>	Heat Loss Parameter
<b>HMSO</b>	Her Majesty's Stationery Office
<b>HSE</b>	Health and Safety Executive
<b>ICoP</b>	Interim Code of Practice
<b>IEEM</b>	Institute of Ecology and Environmental Management
<b>IEMA</b>	Institute of Environmental Management and Assessment
<b>IPCC</b>	Intergovernmental Panel on Climate Change
<b>ISO</b>	International Organization of Standardisation
<b>KPI</b>	Key Performance Indicators
<b>LCA</b>	Life Cycle Assessment
<b>LED</b>	Light Emitting Diode
<b>LI</b>	Landscape Institute

<b>LZC</b>	Low or Zero Carbon
<b>Man</b>	Management
<b>Mat</b>	Materials
<b>MCS</b>	Microgeneration Certification Scheme
<b>MDF</b>	Medium Density Fibreboard
<b>MTCC</b>	The Malaysian Timber Certification Council
<b>MVHR</b>	Mechanical Ventilation with Heat Recovery
<b>NAEI</b>	National Atmospheric Emissions Inventory
<b>NAFRA</b>	National Flood Risk Assessment
<b>NIFA</b>	Net Internal Floor Area
<b>NOx</b>	Nitrogen Oxides
<b>O<sub>2</sub></b>	Oxygen
<b>ODPM</b>	Office of the Deputy Prime Minister
<b>OSB</b>	Oriented Strand Board
<b>PCS</b>	Post Construction Stage
<b>PEFC</b>	Programme of Endorsement of Forest Certification Schemes
<b>PFCs</b>	Perfluorocarbons
<b>PIR</b>	Passive Infra Red (Movement Detecting Devices)
<b>PoI</b>	Pollution
<b>PPG</b>	Planning Policy Guidance
<b>PPS</b>	Planning Policy Statement
<b>PU</b>	Polyurethane
<b>PV</b>	Photovoltaic
<b>PVC</b>	Poly Vinyl Chloride
<b>QA</b>	Quality Assurance
<b>RDL</b>	Robust Details Limited
<b>REGO</b>	Renewable Energy Guarantee of Origin
<b>RIBA</b>	Royal Institute of British Architects
<b>SAP</b>	Standard Assessment Procedure
<b>SBD</b>	Secured by Design
<b>SDLT</b>	Stamp Duty Land Tax
<b>SF<sub>6</sub></b>	Sulphur Hexafluoride
<b>SFI</b>	Sustainable Forestry Initiative
<b>SGS</b>	Société Générale de Surveillance.
<b>SMP</b>	Shoreline management plan
<b>SON or HPS</b>	High Pressure Sodium Lamp
<b>SQE</b>	Suitably Qualified Ecologist
<b>SSSI</b>	Site of Special scientific interest



<b>SUDS</b>	Sustainable Drainage systems
<b>Sur</b>	Surface Water Run
<b>SWMP</b>	Site Waste Management Plan
<b>TER</b>	Target Emission Rate
<b>TFL</b>	Tubular Fluorescent Lamp
<b>TFT</b>	Tropical Forest Trust
<b>TPO</b>	Thermo Plastic Olefin
<b>UK</b>	United Kingdom
<b>UKAS</b>	United Kingdom Accreditation Service
<b>UKPIA</b>	United Kingdom Petroleum Industry Association
<b>UNEP</b>	United Nations Environmental Programme
<b>VET</b>	Vinyl Ethylene Terpolymer
<b>VOC</b>	Volatile Organic Compound
<b>Was</b>	Waste
<b>Wat</b>	Water
<b>WMO</b>	World Meteorological Organization
<b>WRAP</b>	Waste & Resources Action Programme

# Category 1: Energy and Carbon Dioxide Emissions

Issue ID	Description	No. of credits available	Mandatory Elements
Ene 1	Dwelling Emission Rate	15	Yes

## Aim

To limit emissions of carbon dioxide (CO<sub>2</sub>) to the atmosphere arising from the operation of a dwelling and its services.

## Assessment Criteria

Credits are awarded based on the percentage improvement in the Dwelling Emission Rate (*DER*), (estimated carbon dioxide emissions in kg per m<sup>2</sup> per annum arising from energy use for heating, hot water and lighting for the actual dwelling), over the Target Emission Rate (*TER*) (the maximum emission rate permitted by Building Regulations), for the dwelling where DER and TER are as defined in AD L1A 2006 Edition of the Building Regulations. Credits are awarded in accordance with the table below. Note that to reach Level 6 (zero carbon) there are additional requirements.

Criteria		
% Improvement of DER over TER	Credits	Mandatory Levels
≥10%	1	Level 1
≥14%	2	
≥18%	3	Level 2
≥22%	4	
≥25%	5	Level 3
≥31%	6	
≥37%	7	
≥44%	8	Level 4
≥52%	9	
≥60%	10	
≥69%	11	
≥79%	12	
≥89%	13	
≥100%	14	Level 5
'Zero Carbon Home' as defined below	15	Level 6
<b>Default Cases</b>		
None		

## Information required to demonstrate compliance

<b>Schedule of Evidence Required</b> To be read in conjunction with the <i>Definitions, Glossary and Calculations Sections</i> . The following requirements are all required to demonstrate compliance with any of the mandatory levels, for both assessment stages.	
Design Stage	Post Construction Stage
<p>Design Stage – SAP 2005 Worksheet* for each Energy Type and accompanying list of specifications from an <b>accredited energy assessor</b></p> <p>*Full worksheet, dated with <i>energy assessor</i> name, registration number and address of development, prepared at plans approval stage</p> <p>Copy of plans, elevations and sections as designed and construction details sufficient to check building details</p> <p>Where Design and Build contracts or similar contractual arrangements mean SAP calculations cannot be produced at this stage, the specification can be allowed as evidence of intent.</p>	<p>As Built Stage – SAP 2005 Worksheet* for each Energy Type and accompanying list of specifications from an <b>accredited energy assessor</b> different from design stage</p> <p>*Full amended worksheet, dated with <i>energy assessor</i> name, registration number and dwelling address, prepared at construction completion stage, if different from Design Stage</p> <p>Evidence that the build form is as described in the As Built SAP worksheet. This will cover the final construction materials and accompanying list of specifications (including heating, hot water service and ventilation systems) and be in the form of purchase orders, photographs or specification clauses with letter of conformity.</p> <p>OR</p> <p>Code Assessor Site Inspection Report</p>
<p>A copy of the Design Stage Part L1A Building Regulations Compliance Checklist showing full compliance for each Energy Type. This evidence must be provided by an <b>accredited energy assessor</b></p> <p>Where Design and Build contracts or similar contractual arrangements mean SAP calculations cannot be produced at this stage, the specification can be allowed as evidence of intent.</p>	<p>Confirmation that the dwelling has been constructed in accordance with the specifications which accompanied the SAP 2005 Worksheet* in line with regulations 17C and 20D for each Energy Type, as supplied to Building Control Acceptable confirmation is;</p> <ul style="list-style-type: none"> <li>• A letter of conformity to specification</li> <li>• Site Inspection Report</li> </ul>

	<p>A copy of the As Built Part L1A Building Regulations Compliance Checklist showing full compliance for each Energy Type. This evidence must be provided by an <i>accredited energy assessor</i>.</p> <p>*In circumstances where it has been agreed with Building Control that the dwelling will pass AD L1A despite full compliance not being indicated on the As Built Part L1A Building Regulations Compliance Checklist, additional documentary evidence from a Building Control Officer confirming full AD L1A compliance must be provided.</p>
<p>Copy of outputs of any calculator tools used (e.g. Stamp Duty Land Tax relief tools and Code Energy Calculator Tool), showing:</p> <ul style="list-style-type: none"> <li>• Where averaging used: the weighted average percentage improvement of the Dwelling Emission Rate below the Target Emission Rate for each Energy Group, based on Design Stage SAP 2005 data</li> <li>• Where Level 6 is sought: Additional calculation sheets are required to include the appliances and cooking element. Each home must provide an amount of renewable electricity equal to a specified amount of kWh per m<sup>2</sup> of floor space in addition to that required to meet zero carbon in SAP 2005, in order to offset the CO<sub>2</sub> due to appliances and cooking</li> </ul>	<p>As design stage</p>

## Definitions

### **Accredited Energy Assessor**

Accredited Energy Assessor: A person registered with an accredited energy assessment scheme. The scheme provider will be licensed by Communities and Local Government in respect of the calculation of CO<sub>2</sub> emission rates of buildings.

### **AD L1A**

The Building Regulations for England and Wales Approved Document L1A: Conservation of Fuel and Power in New Dwellings (2006).

### **As- Built SAP 2005 Worksheet**

An output of SAP 2005 software summarising all relevant As Built construction data and the emissions calculated by SAP 2005 for the dwelling As Built.

### **Assessor Site Inspection Report**

This is a report prepared by the Code assessor during a Post Construction Stage Assessment and issued as evidence with the assessment.

### **Building Regulations Compliance Checklist**

Checklist illustrated in AD L1A Appendix A. This is also provided as an output of SAP 2005 software detailing a dwelling's performance against a set of key criteria. Assessed on a 'PASS' or 'FAIL' basis, all criteria must be met for the dwelling to meet full AD L1A compliance. This document may be sent to Building Control at design stage to demonstrate L1A compliance and again at completion. The DER that is to be used for Code levels 1 to 5 and the TER that is to be used for all Code Levels should be taken from this Checklist.

### **DER**

The Dwelling Emission Rate is the estimated carbon dioxide emissions per m<sup>2</sup> for the building, as designed, for energy in use for heating, hot water and lighting. This is calculated using the SAP method, and is defined in AD L1A of the Building Regulations. The DER is shown on the Building Regulations Compliance Checklist.

N.B. The DER is determined by using the assumed amount of dedicated energy efficiency lighting of 30 per cent. This means that the DER should be used for all Code Levels from 1 to 5. However, for Code Level 6, the Design Stage SAP 2005 Worksheet, CO<sub>2</sub> emissions figure, (SAP Line 109), should be used as this accounts for the actual number of dedicated energy efficient lighting that will be installed.

### **Design Stage SAP 2005 Worksheet \***

An output of SAP 2005 software summarising all relevant design stage construction data and the emissions calculated by SAP 2005 for the dwelling as designed.

## Energy Averaging/ Energy Groups

Energy Groups only apply when a building contains multiple flats/apartments within the same building envelope. The DER, TER and HLP results can be averaged across the whole building as defined in AD L1A provided that the same building services strategy is adopted throughout. These dwellings are defined as an Energy Group. Note this averaging rule cannot be applied to terraced housing or maisonettes and is subject to the additional criteria set out below.

Where varying servicing strategies (including the provision of renewable energy systems) are adopted in the building, dwellings should be grouped by strategy. Each group set will be treated as a separate Energy Group for the purposes of assessment and an average DER and TER used to calculate the percentage improvement.

It is the Code Assessor's choice whether or not the averaging method is used.

The average of SAP results over two similar buildings cannot be used.

All dwellings averaged within Energy Group must be contained within the same envelope.

Note: This is a different requirement to that described in Clause 23 of AD L1A.

## Energy Type

A set of dwellings on a development site are of the same 'Energy Type' if they have the same SAP output for DER, TER and HLP. They will exhibit each of the following:

- The same dwelling size, built form and construction details;
- The same space heating, hot-water system and controls;
- The same orientation and level of over-shading/sheltering; and
- The same assumed/actual air permeability and ventilation system.

## Inverter

An inverter is an electronic device that produces alternating current (AC) from direct current (DC).

## Onsite Renewable/Low Carbon Installations

The installation of Low or Zero Carbon technologies which directly supply the dwelling with heat and/or electricity through a direct connection to the property or through a private wire arrangement.

These installations can be located on/in the dwelling, its curtilage or elsewhere on/off site provided that there is a direct connection to the dwelling.

**Private Wire Arrangement**

A Private Wire Arrangement when used in the context of the Code for Sustainable Homes for Low or Zero Carbon technology installations is an arrangement where, any electricity generated on or in the vicinity of the site is fed directly to the dwellings being assessed, by dedicated power supplies.

If electricity is generated which is surplus to the instantaneous demand of the dwelling, this electricity may be fed back to the National Grid. The carbon benefit associated with any electricity fed into the grid in this manner can only be allocated against an individual installation or dwelling. In cases where a dwelling is supplied by a communal installation, no carbon benefit can be allocated to dwellings which are not connected to the communal installation.

**RIBA Outline plan of work**

The Royal Institute of British Architects publishes an Outline Plan of Work (Royal Institute of British Architects, 1991) which describes the UK traditional approach to the project delivery process in twelve well defined steps, labelled A to M. The RIBA process begins at the project Inception (A), where a general outline of requirements and a plan of action are produced by an architect and the commissioning client, and it ends at Feedback (M) following the completion and hand over of the building to the client.

**SAP**

The Government's Standard Assessment Procedure. This is the approved methodology for rating the energy performance of dwellings. The indicators are used to demonstrate compliance with AD L1A of the Building Regulations and for Energy Performance Certificates for new homes. The current version is SAP 2005.

The SAP computation takes into account energy used for space heating, fixed lighting and hot water provision. Heat and power for this element must be generated either in the home or on the development or through other local community arrangements (including district heat and power).

For an up-to-date list of SAP 2005 approved software visit: [www.bre.co.uk/sap2005](http://www.bre.co.uk/sap2005).

**Stamp Duty Land Tax (SDLT) relief**

This is the relief from Stamp Taxes which are payable on land and property for homes which are classified as zero carbon.

Calculation tools to assist in the calculation of zero carbon and the output from LZC technologies are available from the SAP 2005 website.

<http://projects.bre.co.uk/sap2005/>

**TER**

The Target Emission Rate is the maximum allowable carbon dioxide emissions per m<sup>2</sup> for energy use in heating, hot water and lighting which would meet the Building Regulations. This is calculated using the SAP 2005 method, and is defined in AD L1A of the Building Regulations and is as shown on the Building Regulations Compliance Checklist.

**Zero Carbon Home**

Where net carbon dioxide emissions resulting from ALL energy used in the dwelling are zero or better. This includes the energy consumed in the operation of the space heating/cooling and hot-water systems, ventilation, all internal lighting cooking and all electrical appliances, these are now dealt with under Section 14 SAP 2005 extension for SDLT. The calculation can take account of contributions from onsite renewable/low carbon installations. Zero Carbon homes with the Code can also take advantage of the allowance with Section 14 to omit the requirement for secondary heating where applicable.

Off-site renewable contributions can only be used where these are directly supplied to the dwellings by private wire arrangement.

Dwellings must meet the minimum mandatory energy requirements for Level 5. This means that emissions as calculated by SAP, including the contribution from any special cases, should be zero or better.

A 'zero carbon home' is also required to have a Heat Loss Parameter (covering walls, windows, air tightness and other building design issues) of 0.8 W/m<sup>2</sup>K or less, and net zero carbon dioxide emissions from use of appliances and cooking in the homes (i.e. on average over a year). SAP does not contain any provision for energy consumption of appliances but is likely to be updated to do so in due course. Until SAP is updated, the appliances and cooking element of the qualification will be calculated using the formula in the calculation procedures to approximate the average appliance and cooking energy consumption. This additional power must be renewable power produced either within the area of the building and its grounds, elsewhere in the development, or elsewhere as long as the supply is via a private wire arrangement with robust contractual agreements in place to ensure continued supply over time.



## Assessment Methodology

### **Design Stage**

- Confirm that the SAP 2005 Worksheets and Building Regulation Compliance Checklist are from an *accredited energy assessor*.
- Documentation provided by a non-authorized SAP 2005 *energy assessor* must have been verified by Building Control and evidence of this must be supplied before any assessment can take place.
- Confirm that each *Energy Type* or *Group* meets full Building Regulations compliance using the relevant Compliance Checklist: Design Stage. Note: All criteria must 'PASS'.
- Calculate the percentage improvement in DER over TER for each *Energy Type*, using the methodology detailed in the *Calculation Procedures* section below.
- Where buildings contain multiple flats/apartments, averaging may be carried out in accordance with the criteria in the *Definitions* section.
- For dwellings with energy systems not currently covered under SAP 2005 such as large scale wind power and / or systems please refer to *Special Cases*.
- Level 6: Where the dwelling exceeds the percentage improvement of DER over TER of 100 per cent, calculate the total carbon emissions (including that required for appliances and cooking), as for 'zero carbon home' below (see Calculation Procedures). Confirm that all renewables comply with the definitions above. Confirm that the heat loss parameter requirements are not exceeded.

### **Post Construction Stage**

- Verify that the evidence provided at the Design Stage is still valid and that no changes have occurred during construction.
- Compare Design stage and As Built SAP 2005 Worksheets (as submitted for Building Control purposes) and confirm that there have been no changes. Where changes have occurred, the assessor should reassess the dwelling as set out above.
- For Design and Build contracts, compare the As Built SAP 2005 Worksheets (as submitted for Building Control purposes), with the specification produced as evidence at Design Stage.
- Verify that each *Energy Type* or *Group* meets full building regulations compliance using the relevant Compliance Checklist: As Built. Note: All criteria must 'PASS'.

## Calculation Procedures

All of the SAP line number references stated in the following calculation procedures refer to the actual SAP line numbers as detailed in SAP 2005: The Governments Standard Assessment Procedure for energy rating of dwellings. The SAP 2005 document can be found at <http://projects.bre.co.uk/sap2005/>

There are a number of spreadsheet tools provided which will assist in the calculation of the emissions from the dwelling and percentage improvement of DER over TER. These will be distributed from Code Service Providers and can also be found at <http://projects.bre.co.uk/sap2005/stamp-duty-land-tax.html>. However the calculation can be carried out manually as set out in this section, Calculation Procedures.

Use the Code Energy Calculation Tool to enter the floor area, DER, TER and HLP for each *Energy Type*. Where a building contains multiple dwellings and the averaging option has been selected, state which *Energy Types* belong to the same *Energy Group*.

Use *Table 1.2* in Checklists and Tables to calculate the total predicted CO<sub>2</sub> emissions for Code Levels 1–5 and use *Table 1.3* in Checklists and Tables to calculate the total predicted CO<sub>2</sub> emissions for Code Level 6 dwellings.

Figures used for the calculations of the total predicted CO<sub>2</sub> emissions are based on the output from SAP 2005 worksheets.

$$\% \text{ reduction} = (1 - \text{DER/TER}) \times 100$$

The percentage reduction is truncated (not rounded down) to an integer percentage. Thus 99.8750 per cent becomes 99 per cent. The Level is obtained from the truncated percentage reduction according to Table Cat:1.1.

Table : Cat 1.1 Percentage improvement (reduction) of the DER over TER associated to each Code Level	
% reduction	Level
≥10	1
≥18	2
≥25	3
≥44	4
≥100	5

If the percentage reduction is ≥100 and in addition the criteria for zero carbon homes are met, Level 6 is awarded for Ene 1.

**Note.** A dwelling cannot be described as attaining a particular Level of the Code solely on the basis of the above table; there are numerous other issues that are considered in determining the Level.

Table : Cat 1.2 Total Dwelling CO <sub>2</sub> Emissions for Code Levels 1 – 5				
Code Levels 1–5 <i>All values to be taken from box numbers described within The Government’s Standard Assessment Procedure for the Energy Rating of Dwellings 2005 edition, revision 1, January 2009.</i>		Energy kWh/year	Carbon Emissions Factor (from SAP 2005)	Emissions Kg CO <sub>2</sub> /year
		a	b	c = a × b
1	DER from SAP box (113) or (120*) OR DER from Building Regulations Compliance Checklist See Note [1]			
2	CO <sub>2</sub> emissions from mechanical cooling See note [3],[4]		× 0.422	
3	Sub Total CO <sub>2</sub> emissions (1+2) = (3)			
4	CO <sub>2</sub> reduction from additional allowable electricity generation considered in section 14 of SAP 2005 v9.81 (–1) × SAP box ZC7 See note [5] and [6]			
5	Residual CO <sub>2</sub> emissions offset from biomass CHP (where applicable). (–1) × (SAP box 115*) / (SAP box 5) OR (–1) × [Σ(SAP boxes 108* to 113*)/SAP box 5], if SAP box 114* or 115* is set to “0”			
6	Total CO <sub>2</sub> reduction from LZC technologies (4+5) = (6)			
7	Total predicted CO <sub>2</sub> emissions (3)–(6)			

Table : Cat 1.3 Total Dwelling CO <sub>2</sub> Emissions for Code Level 6				
Code Level 6 <i>All values to be taken from box numbers described within the worksheets set out within The Government’s Standard Assessment Procedure for the Energy Ratings of Dwellings 2005 edition, Revision 1, January 2008.</i>		Energy kWh/year	Carbon Emissions Factor (from SAP 2005)	Emissions Kg CO <sub>2</sub> /year
		a	b	c = a × b
1	Please follow the procedure set out in SAP Section 14 to obtain the dwellings Net CO <sub>2</sub> emissions. (SAP box ZC 8) See note [2]			
2	CO <sub>2</sub> emissions from mechanical cooling See note [3],[4]		× 0.422	
3	Total predicted CO <sub>2</sub> emissions (1+2)			

## Notes to Tables Cat 1.2 and 1.3

- [1]. For Code levels 1–5 (Table : Cat 1.2); The DER will be used as the combined figure for the heating, hot water, lighting, pumps and fans
- [2]. For Code Level 6 (Table: Cat 1.3); Please follow the procedure set out in SAP 2005 Version 9.81 Section 14 to obtain the dwellings Net CO<sub>2</sub> emissions. This can be found at:

<http://projects.bre.co.uk/sap2005/stamp-duty-land-tax.html>

The calculation of the additional kg CO<sub>2</sub>/year emissions generated by appliances and cooking for zero carbon homes (Code Level 6) follows;

$$99.9 \times (\text{TFA} \times \text{N})^{0.4714} - (3.267 \times \text{TFA}) + (32.23 \times \text{N}) + 72.6$$

Where TFA is the Total Floor Area and N is the Number of Occupants

For  $\text{TFA} < 43\text{m}^2$ ;  $\text{N} = 1.46$

$\text{TFA} \geq 43\text{m}^2$ ;  $\text{N} = 2.844 \times (1 - \exp(-0.000391 \times \text{TFA}^2))$

- [3]. Mechanical cooling is currently not dealt with under SAP 2005 Version 9.81. If mechanical cooling is specified, it will need to be estimated separately. Contact your Code Service Provider for further guidance.
- [4]. Carbon emissions factor from SAP 2005 Version 9.81 to be used. The most common are listed below. Please see SAP table 12 for further details.

Grid electricity = 0.422Kg CO<sub>2</sub>/kWh

Electricity displaced = 0.568 Kg CO<sub>2</sub>/kWh

Gas = 0.194 Kg CO<sub>2</sub>/kWh

Heating oil = 0.265 KG CO<sub>2</sub>/kWh

- [5]. Where energy and LZC technologies service other users (e.g. mixed use developments), both the thermal and electrical output should be allocated between all users in relation to their proportional net floor area.
- [6]. As determined in a separate feasibility study. The common LZC technologies not yet considered in SAP 2005 include:
- Wind Turbines over 50kW
- Large scale Hydro
- Fuel Cells using hydrogen generated from a 'renewable' source

## Checklists and Tables

None

## Common Cases of Non-Compliance

Green tariffs cannot be used to discount CO<sub>2</sub> emissions as these do not guarantee an increased renewable capacity and are not legally binding on occupiers.

It is not possible to achieve a higher Code levels by offsetting emissions from the dwelling with improved efficiency in non-SAP energy consumption such as appliances.

Only off-site renewables connected to the dwellings by a private wire arrangement can be included within this calculation. Some off-site renewables not connected by private wire can be taken into account under Ene 7 under certain circumstances.

## Special Cases

### ***Photovoltaic (PV) panels in buildings with multiple dwellings***

In the case of a building containing more than one dwelling, eg a block of flats, then:

- a) if the PV output goes to particular individual flats, the annual output is credited to the flats concerned
- b) otherwise, the total electricity generated is divided amongst all the flats in the block in proportion to their net floor area including cases where the PV arrays serve only communal areas.

In case a) an inverter is needed for each flat with a PV electricity supply.

In case b) there will usually be a single inverter for the total PV array and the electricity generated will be fed to the landlord supply and/or the distribution system for the flats (with provision for the export of electricity generated in excess of instantaneous demand).

### ***Renewable systems, technologies and fuels not currently covered by SAP 2005***

Large-scale wind turbines over 50 kW and some other more unusual renewable systems are not currently dealt with under SAP 2005.

For wind power, it is suggested that the calculation method which can be found on the GreenSpec website (<http://www.greenspec.co.uk/html/energy/windturbines.html>) should be used. However, the wind speed should be replaced by the one calculated using the standard that has been developed for the Microgeneration Certification Scheme. This guidance can be found in document MIS3003 (Appendix B) and can be accessed via the website [www.ukmicrogeneration.org](http://www.ukmicrogeneration.org).

The SAP Appendix Q website (<http://www.sap-appendixq.org.uk>) provides guidance on how to incorporate new technologies and advanced versions of existing technologies into SAP assessments.

## Background

CO<sub>2</sub> has a direct environmental impact and is a major greenhouse gas, contributing to climate change. The credit scale relates to the operational energy requirements of the home under standard occupancy assumptions – rather than actual energy use. It should be noted that the actual energy consumption may be markedly different, as a range of user-specific issues will affect it, such as the hours of operation of space heating, type and size of household, use of white goods, etc.

The following Energy Saving Trust standards can give an indication of what is required to meet certain Mandatory Levels for this Issue.

- Level 1: Good Practice Standard – 10 per cent improvement of DER over TER
- Level 3: Best Practice Standard – 25 per cent improvement of DER over TER.

The assessment criteria for the Ene 1 is the percentage improvement of the dwelling emission rate (DER) over the target emission rate (TER). The calculation for TER is based on the methodology used within SAP2005 and Building Regulations AD L1A. The approach allows a weighted fuel factor for carbon emissions from different fuels and does not reflect the absolute carbon emission targets; it therefore enables some technologies based on a particular fuel to achieve a higher TER than others. This increase in the TER allows the technology to secure a large percentage improvement over the DER, but may result in increased emissions from the property compared with a standard gas primary heating system on which the DER is based in SAP2005. The fuel factors used within the SAP calculation methodology are to be redefined subject to a consultation in 2009 on Part L of the Building Regulations to map out new requirements for introduction in 2010 and 2013.

The Code for Sustainable Homes does not intend to reward technologies that work against the objectives of the scheme. Hence, the future revisions to the Code will be aligned with revisions to Part L of the Building Regulations; minimum standards of fabric performance and air tightness are also likely to be introduced.

Issue ID	Description	No. of credits available	Mandatory Elements
Ene 2	Building Fabric	2	No

## Aim

To future proof the energy efficiency of dwellings over their whole life by limiting heat losses across the building envelope.

## Assessment Criteria

Credits are awarded based on the Heat Loss Parameter (HLP) for each dwelling, in accordance with the table below:

Criteria	
Heat Loss Parameter (HLP)	Credits
≤1.30	1
≤1.10	2
<b>Default Cases</b>	
None	

## Information required to demonstrate compliance

Schedule of Evidence Required	
To be read in conjunction with the <i>Definitions</i> and <i>Calculations</i> Sections	
Design Stage	Post Construction Stage
<p>Design Stage – SAP 2005 Worksheet* for each <i>Energy Type</i> and accompanying list of specifications from an <i>accredited energy assessor</i></p> <p>*Full SAP worksheet, dated with <i>energy assessor</i> name, registration number where appropriate and address of development, prepared at plans approval stage</p>	<p>As Built – SAP 2005 Worksheet* for each <i>Energy Type</i> and accompanying list of specifications from an <i>accredited energy assessor</i>, if different from design stage</p> <p>*Full, amended SAP worksheet, dated with <i>energy assessor</i> name, registration number where appropriate and dwelling address, prepared at construction completion stage if different from Design Stage</p>

<p><b>AND</b></p> <p>Copy of plans, elevations and sections as designed and construction details to check building details</p> <p><b>AND</b></p> <p>A copy of the 'Design Stage' Part L1A Building Regulations Compliance Checklist, showing full compliance for each <i>Energy Type</i></p>	<p><b>AND</b></p> <p>Evidence of final construction materials, built form and accompanying list of specifications (including boiler) in the form of photographs or purchase orders or assessor site inspection report</p> <p><b>AND</b></p> <p>As Built Part L1A Building Regulations Compliance Checklist, showing full compliance for each <i>Energy Type</i> from an <i>Accredited Energy Assessor</i></p> <p><b>AND</b></p> <p>Confirmation that the dwelling has been constructed in accordance with the specifications used for the – 'Design Stage' SAP 2005 Worksheet* for each <i>Energy Type</i>, as supplied to Building Control in the form of:</p>
<p>Where Design and Build or similar contractual arrangements mean SAP calculations cannot be produced at this stage, the specification can be allowed as evidence of intent.</p>	<p><b>EITHER</b></p> <p>A letter of conformity to specification</p> <p><b>OR</b></p> <p>Assessor Site Inspection Report</p> <p><b>OR</b></p> <p>Documentary evidence from Building Control Officer confirming full AD L1A compliance</p>

## Definitions

<b>Accredited Energy Assessor</b>	Refer to Ene 1
<b>AD L1A</b>	Refer to Ene 1



<b>As Built SAP 2005 Worksheet</b>	Refer to Ene 1
<b>Design Stage SAP 2005 Worksheet</b>	Refer to Ene 1
<b>Energy Averaging/ Energy Groups</b>	Refer to Ene 1
<b>Energy Type</b>	Refer to Ene 1
<b>Heat Loss Parameter (HLP)</b>	The total fabric and ventilation heat losses from the dwelling divided by the total floor area (W/m <sup>2</sup> K).
<b>SAP</b>	Refer to Ene 1

## Assessment Methodology

### ***Design Stage***

- Confirm that the Design Stage SAP 2005 Worksheets and Building Regulation Compliance Checklist are from an Accredited Energy Assessor.
- Documentation provided by a *Non-Accredited Energy Assessor* must be verified by Building Control. Evidence of this must be supplied before any assessment can take place.
- Confirm that the SAP 2005 Worksheets are the correct version, i.e. Design Stage.
- Take the relevant HLP figure(s) from box 38 of the SAP 2005 Worksheet for each *Energy Type* and award credits accordingly.
- Where buildings contain multiple flats/apartments, the Code Energy Calculator Tool or other appropriate calculations can be used to carry out averaging of HLP figures in accordance with the Energy Averaging criteria stated in the Definitions section.

### ***Post Construction Stage***

- Verify that the evidence provided at the Design Stage is still valid and that no changes have occurred during construction.
- Compare Design Stage and As Built SAP 2005 Worksheets (as submitted for Building Control purposes) and confirm there have been no changes. If there are changes between the Design Stage and As Built SAP 2005 Worksheets then the As Built SAP 2005 Worksheets will have to be updated to take account of any changes that have been made. Please then reassess the updated As Built SAP 2005 Worksheets based on the Assessment Criteria

## Calculation Procedures

See Ene 1

## Checklists and Tables

None

## Common Cases of Non-Compliance

None

## Special Cases

None

## Background

This credit assesses the thermal performance of the building envelope on its own. Although innovative systems for provision of services to the building may reduce the energy consumption, it is the building envelope that can have the most significant long-term effect, as the envelope is unlikely to be radically altered during its life, other than where extensions are added.

The Heat Loss Parameter is a statistic that combines the impact of both external surface area, insulation value of construction and airtightness. Rewarding a lower value for Heat Loss Parameter encourages the design of efficient built form such as flats and terraces as well as increased levels of insulation and airtightness.

Further information on reducing the energy use in buildings to the point at which almost no energy is used in heating, known as the 'PassivHaus' concept can be found in the References and Other Sources of Information sections.

Issue ID	Description	No. of credits available	Mandatory Elements
Ene 3	Internal Lighting	2	No

## Aim

To encourage the provision of energy efficient internal lighting, thus reducing the CO<sub>2</sub> emissions from the dwelling.

## Assessment Criteria

Credits are awarded for the provision of fixed dedicated energy efficient internal light fittings as follows:

Criteria	
	Credits
Where $\geq 40\%$ of fixed internal fittings are dedicated and energy efficient.	1
Where $\geq 75\%$ of fixed internal fittings are dedicated and energy efficient.	2
<b>Default Cases</b>	
None	

## Information required to demonstrate compliance

Schedule of Evidence Required	
To be read in conjunction with the <i>Definitions</i> and <i>Calculations</i> Sections	
Design Stage	Post Construction Stage
<p>Text in specification* or relevant design stage drawings clearly showing the location of all light fittings in all rooms</p> <p>*or a letter of instruction to a contractor/supplier or a formal letter from the developer to the Code assessor giving the specific undertaking</p> <p><b>AND</b></p> <p>Calculation of the percentage of dedicated energy efficient light fittings in all habitable rooms</p>	<p>As Built drawings and specifications, OR written confirmation that the dwelling has been constructed in accordance with the design stage drawings/specifications</p> <p><b>AND</b></p> <p>Calculation showing the percentage of dedicated energy efficient light fittings in all rooms <b>AND</b></p> <p>Manufacturer's information confirming types of light fittings and efficacy, in lumens per circuit watt, for all lamps. Note: For CFL and TFL fittings, confirmation of efficacy is not required.</p> <p><b>AND EITHER</b></p> <p>Assessor Site Inspection Report</p> <p><b>OR</b></p> <p>Copies of purchase orders/receipts for lighting in all rooms</p> <p><b>OR</b></p> <p>Photographic evidence for each dwelling with a different specification accompanied by notes confirming the date and applicable plot numbers</p>
<p>Where Design and Build contracts or similar contractual arrangements mean detailed drawings are not available at this stage, the specification can be allowed as evidence of intent</p>	

## Definitions

### **Dedicated Energy Efficient Light Fittings**

Fittings that comprise the lamp, base, control gear, and an appropriate housing, reflector, shade or diffuser. The fitting must be dedicated in that it must be capable of only accepting lamps having a luminous efficacy greater than 40 lumens per circuit Watt. The fixing must be permanently fixed to the ceiling or wall. A light fitting may contain one or more lamps.

Tubular fluorescent and compact fluorescent lighting fittings would typically meet this requirement. Lighting fittings for GLS tungsten lamps with bayonet cap or Edison screw bases, or tungsten halogen lamps would not comply.

Note: SAP 2005 assumes 30 per cent dedicated energy efficient lighting.

### **Habitable Rooms**

For the purpose of this issue the following should be considered habitable rooms:

- Living rooms, dining rooms, kitchens, bedrooms, hallways, studies, bathrooms, WC's and utility rooms.

The following rooms/areas must be excluded:

- Garages, walk-in wardrobes, cupboards, external areas.

### **Pin Based Compact Fluorescent Lamp (CFL)**

A type of fluorescent lamp that plugs into a small dedicated lighting fixture. CFLs have a longer rated life and use less electricity than conventional incandescent light bulbs. Conventional Bayonet or Screw (Edison) CFL fittings are not acceptable under the Code.

### **Tubular Fluorescent Lamp (TFL)**

A type of fluorescent lamp that is named after its shape. These lamps have their own range of dedicated fittings and have a longer rated life and use less electricity than conventional incandescent light bulbs.

## Assessment Methodology

### **Design Stage**

- Check that the energy efficient light fittings to be supplied are dedicated fittings and that the luminous efficacy is greater than 40 lumens per circuit Watt
- Express the quantity of fixed dedicated energy efficient light fittings within habitable rooms as a percentage of the total number of fixed light fittings within habitable rooms.

### **Post Construction Stage**

- Verify that the evidence provided at the Design Stage is still valid and that no changes have occurred during construction
- Where changes have occurred, reassess as required.

## Calculation Procedures

None

## Checklists and Tables

None

## Common Cases of Non-Compliance

Fixed light fittings that can accept both CFL and tungsten filament lamps.

## Special Cases

Any fitting that consumes less than 5 W may be excluded from this issue. This is to allow for the specification of innovative light sources, such as LEDs.

## Background

The Building Regulations England and Wales, Part L1A requires fixed dedicated energy efficient light fittings to be installed in the most frequented locations in the dwelling to a number not less than one per 25m<sup>2</sup> floor area or one per four fixed light fittings.

Under SAP 2005, 30 per cent of the internal lighting is assumed to be low energy by default. The Code for Sustainable Homes requires a greater amount of fixed low energy light fittings to be installed for additional credits to be awarded. All internal fixed light fittings are assessed in this Issue.

The requirement is to provide energy efficient lighting to minimise energy consumption. In most homes, lighting accounts for around 10–15 per cent of an electricity bill. Traditional bulbs waste a lot of their energy in heat. Each energy-saving bulb can reduce a household electricity bill by up to £7 a year. This equates to a reduction in CO<sub>2</sub> emissions of approximately 26 kg/yr. Compact fluorescent light bulbs (CFLs) use around 75–80 per cent less electricity than traditional incandescent lights, while lasting ten to twelve times as long. Their long life means they need replacing less often and so are particularly suitable for use in inaccessible fixtures.

Issue ID	Description	No. of credits available	Mandatory Elements
Ene 4	Drying Space	1	No

## Aim

To provide a reduced energy means of drying clothes.

## Assessment Criteria

Credits are awarded based on the provision for drying space for each dwelling type in accordance with the table below:

Criteria	
	Credits
Where space with posts and footings or fixings capable of holding 4m+ of drying line for 1–2 bed dwellings, and 6m+ of drying line for 3+ bed dwellings, is provided for drying clothes. The space (internal or external) should be secure.	1
<b>Default Cases</b>	
None	



## Information required to demonstrate compliance

Schedule of Evidence Required	
To be read in conjunction with the Definitions and Calculations Sections	
Design Stage	Post Construction Stage
<p>Relevant design stage drawings clearly showing:</p> <p>For internal drying space:</p> <ul style="list-style-type: none"> <li>• Location of drying fixings</li> <li>• Details/location of ventilation provided</li> </ul> <p>For external drying space:</p> <ul style="list-style-type: none"> <li>• Location of fixings/footings or posts</li> </ul> <p><b>AND</b></p> <p>Text describing (on drawings or specification*):</p> <ul style="list-style-type: none"> <li>• Location and type of internal or external drying fixings/footings or posts</li> <li>• Confirmation of the minimum length of drying line</li> </ul> <p>*or a letter of instruction to a contractor/supplier or a formal letter from the developer to the Code assessor giving the specific undertaking</p>	<p>As design stage</p> <p><b>AND EITHER</b></p> <p>Copies of purchase orders/receipts of internal or external drying devices</p> <p><b>OR</b></p> <p>Photographic evidence for each dwelling with a different specification accompanied by notes confirming the date and applicable plot numbers</p> <p><b>OR</b></p> <p>Assessor Site Inspection Report</p>
<p>Where Design and Build contracts or similar contractual arrangements mean detailed drawings are not available at this stage, the specification can be allowed as evidence of intent</p>	

## Definitions

### **Internal Drying Space**

A heated space with adequate, controlled ventilation, complying with Building Regulations Approved Document F Ventilation 2006.

Note: Rooms that commonly meet these requirements are a bathroom or utility room.

### **OR**

An unheated outbuilding may also be acceptable, where calculations by an appropriate Chartered Institute of Building Services Engineer (CIBSE, or equivalent professional) confirms that ventilation is adequate to allow drying in normal climatic conditions and to prevent condensation/mould growth.

The fixing/fitting needs to be a permanent feature of the room.

For flats with communal dedicated internal drying spaces, access should be restricted to residents.

### **Secure Space**

For individual dwellings: An enclosed space only accessible to the residents of the dwelling.

For dwellings with communal drying space: An enclosed space with a secure entrance lock, only accessible to the residents of the dwellings.

## Assessment Methodology

### ***Design Stage***

- Check that internal or external drying spaces are to be provided and are of adequate and secure provision.
- Confirm the location and type of the drying fixings/footings or posts.

### ***Post Construction Stage***

- Verify that the evidence provided at design stage is still valid and that no changes have occurred during construction.

## Calculation Procedures

None

## Checklists and Tables

None

## Common Cases of Non-Compliance

Internal drying spaces are not allowed in the following rooms:

- Living rooms, kitchens, dining rooms, main halls or bedrooms.

## Special Cases

None

## Background

This credit Issue was introduced to encourage the drying of clothes 'naturally' rather than using a tumble dryer. It has become increasingly common practice to include a place for a tumble dryer without necessarily attempting to design in a space for natural drying. This Issue is especially important for those dwellings without a large garden.

Ventilation for indoor spaces supplied with drying fixings should conform to the recommendations of Energy Savings Trust and will depend on the air tightness strategy.

Issue ID	Description	No. of credits available	Mandatory Elements
Ene 5	Energy Labelled White Goods	2	No

## Aim

To encourage the provision or purchase of energy efficient white goods, thus reducing the CO<sub>2</sub> emissions from appliance use in the dwelling.

## Assessment Criteria

Credits are awarded where information is provided relating to the provision of energy efficient white goods, or where energy efficient white goods are supplied in accordance with the criteria in the table below for each dwelling:

Criteria	
	Credits
Where the following appliances are provided and have an A+ rating under the EU Energy Efficiency Labelling Scheme: <ul style="list-style-type: none"> <li>• Fridges and freezers or fridge-freezers</li> </ul>	1
Where the following appliances are provided and have an A rating under the EU Energy Efficiency Labelling Scheme: <ul style="list-style-type: none"> <li>• Washing machines and dishwashers</li> </ul> <p><b>AND EITHER</b></p> <ul style="list-style-type: none"> <li>• Washer-dryers or tumble dryers have a B rating</li> </ul> <p><b>OR</b></p> <ul style="list-style-type: none"> <li>• Where washer-dryers or tumble dryers are not provided, information on the EU Energy Labelling Scheme is provided to each dwelling where this is the case</li> </ul> <p>Note: Where washer dryers are provided it is not necessary to provide a washing machine to obtain this credit</p>	1
If <b>no (or not all) white goods are provided</b> but information on the EU Energy Efficiency Labelling Scheme of efficient white goods is provided to each dwelling where this is the case	1
<b>Default Cases</b>	
None	

## Information required to demonstrate compliance

<b>Schedule of Evidence Required</b> <b>To be read in conjunction with the <i>Definitions and Calculations</i> Sections</b>	
Design Stage	Post Construction Stage
<p>If white goods are to be provided:</p> <p>Text describing (on drawings or in the specification*):</p> <ul style="list-style-type: none"> <li>• Make and model of all white goods to be provided</li> <li>• A copy of the EU Energy Efficiency Labelling Scheme energy rating for all white goods to be provided</li> <li>• Where washer dryers or tumble dryers will not be provided, a copy of the EU Energy Efficiency Labelling Scheme leaflet</li> </ul> <p>* or a letter of instruction to a contractor/supplier or a formal letter from the developer to the Code assessor giving the specific undertaking</p>	<p>If white goods are provided:</p> <p>Manufacturer's literature confirming the EU Energy Efficiency Labelling Scheme energy rating for all white goods installed</p> <p><b>AND EITHER</b></p> <p>Assessor Site Inspection Report</p> <p><b>OR</b></p> <p>Copies of purchase orders/receipts for all white goods provided and confirmation of installation referring to specific dwellings</p>
<p>If no white goods are provided:</p> <ul style="list-style-type: none"> <li>• A copy of a leaflet describing the EU Energy Efficiency Labelling Scheme. The information should clearly explain what the EU Energy Efficiency Labelling Scheme is and how it works</li> <li>• Text on drawings or in the specification* confirming that leaflets are going to be provided to all dwellings</li> </ul> <p>* or a letter of instruction to a contractor/supplier or a formal letter from the developer to the Code assessor giving the specific undertaking</p>	<p>If no white goods are provided:</p> <p>As at design stage</p> <p><b>AND EITHER</b></p> <p>Written confirmation of information provided referring to specific dwellings (if this is included as part of a Home User Guide, refer to this)</p> <p><b>OR</b></p> <p>Assessor Site Inspection Report</p>

## Definitions

### **EU Energy Efficiency Labelling Scheme**

The EU energy label rates products from A (the most efficient/least energy used) to G (the least efficient/most energy used). For refrigeration, the scale now goes up to A++. By law, the label must be shown on all refrigeration and laundry appliances, dishwashers, electric ovens and light-bulb packaging at point of sale.

## Assessment Methodology

### ***Design Stage***

- Check that the specification for white goods meets the credit requirements or that information as detailed is to be provided.

### ***Post Construction Stage***

- Verify via site inspection or audit of written confirmation that the appliances provided are as specified at the Design Stage, or that information describing appliance labelling has been provided.

## Calculation Procedures

None

## Checklists and Tables

None

## Common Cases of Non-Compliance

None

## Special Cases

None

## Background

For a typical new (Part L 2006) semi-detached dwelling, the CO<sub>2</sub> emissions from lights and appliances will make up about 43 per cent of the total CO<sub>2</sub> emissions. Emissions from lights and appliances (including cooking) are now higher than both space and water heating emissions. In such a typical semi, space heating would account for 26 per cent of the CO<sub>2</sub> emissions, water heating 22 per cent and cooking 9 per cent.

The choice of appliances will therefore play an important role in terms of reducing total CO<sub>2</sub> emissions. Up to 190kg per year of CO<sub>2</sub> can be saved by each household for choosing an energy efficient fridge freezer compared to a more 'traditional' model. This equates to a monetary saving of around £35 a year.

Lights and appliances represent the area of greatest growth in residential energy use. Over the past 30 years energy use for lights and appliances has increased at around 2 per cent per annum.

There is increasing likelihood that when occupants choose their own white goods they will consider the energy consumed during use, especially for products of equal cost. To encourage them to do so, the developer must provide information to help the occupier to select the most energy-efficient and cost-effective appliances, where no white goods are provided.

Issue ID	Description	No. of credits available	Mandatory Elements
Ene 6	External Lighting	2	No

## Aim

To encourage the provision of energy efficient external lighting, thus reducing CO<sub>2</sub> emissions associated with the dwelling.

## Assessment Criteria

Where all external lighting within the development is provided by dedicated energy efficient fittings, as follows:

Criteria		Credits
<p><b>Space Lighting</b></p> <p>Where all external space lighting, including lighting in the common areas, is provided by dedicated energy efficient fittings.</p> <p>Note: Statutory safety lighting is not covered by this requirement</p>	1	
<p><b>Security Lighting</b></p> <p>Where all security light fittings are designed for energy efficiency and are adequately controlled such that:</p> <p>All burglar security lights have:</p> <ul style="list-style-type: none"> <li>• A maximum wattage of 150 W</li> </ul> <p><b>AND</b></p> <ul style="list-style-type: none"> <li>• Movement detecting control devices (PIR)</li> </ul> <p><b>AND</b></p> <ul style="list-style-type: none"> <li>• Daylight cut-off sensors</li> </ul> <p>All other security lighting:</p> <ul style="list-style-type: none"> <li>• Has dedicated energy efficient fittings</li> </ul> <p><b>AND</b></p> <ul style="list-style-type: none"> <li>• Is fitted with daylight cut-off sensors <b>OR</b> timers</li> </ul>	1	
<p><b>Default Cases</b></p> <p>If no security lighting is installed, then the security lighting credit can be awarded by default, provided all the conditions of the first issue covering space lighting have been met.</p> <p>Dual lamp luminaires with both space and security lamps can be awarded both credits provided they meet the above criteria for energy efficiency</p>	1 2	



## Information Required to Demonstrate Compliance

Schedule of Evidence Required	
To be read in conjunction with the <i>Definitions</i> and <i>Calculations</i> Sections	
Design Stage	Post Construction Stage
<p>Relevant drawings clearly showing location of all external light fittings</p> <p><b>AND</b></p> <p>Text describing (on drawings or in specification*) location and type of all external light fittings</p> <p>*or a letter of instruction to a contractor/supplier or a formal letter from the developer to the Code Assessor giving the specific undertaking</p> <p>Where Design and Build contracts or similar contractual arrangements mean detailed drawings are not available at this stage, the specification can be allowed as evidence of intent</p>	<p>As design stage, but As Built drawings, specifications or confirmation, that the dwellings have been constructed in accordance with the design stage drawings/specifications</p> <p><b>AND</b></p> <p>Manufacturers' literature confirming the specification of:</p> <ul style="list-style-type: none"> <li>• Dedicated energy efficient light fitting</li> <li>• Control systems for the space and security lighting</li> </ul> <p><b>AND EITHER</b></p> <p>Copies of purchase orders/receipts, for all external lighting</p> <p><b>OR</b></p> <p>Photographic evidence for each dwelling with a different specification accompanied by notes confirming the date and applicable plot numbers</p> <p><b>OR</b></p> <p>Assessor Site Inspection Report</p>

## Definitions

### Control systems

A method for controlling the external lighting to ensure that it will not operate unnecessarily during daylight hours or when a space is unoccupied.

Control systems that can be considered are Passive Infra Red (PIR), 'Dusk to Dawn' daylight sensors and time switches.

<b>Daylight Sensors (Dusk to Dawn)</b>	A type of sensor that detects daylight and switches lighting on at dusk and off at dawn.
<b>Dedicated energy efficient light fittings</b>	<p>Fittings that comprise of the lamp, base, control gear and an appropriate housing, reflector, shade or diffuser. The fitting must be dedicated in that it must be capable of only accepting lamps having a luminous efficacy greater than 40 lumens per circuit Watt.</p> <p>Tubular fluorescent and compact fluorescent lighting fittings (CFLs) would typically meet this requirement. Light fittings for GLS tungsten lamps with bayonet cap or Edison screw bases, or tungsten halogen lamps would not comply.</p>
<b>Metal Halide Lamp</b>	Metal halide lamps are a type of high intensity discharge lamp. They can be specified in varied environments. These lamps combine good colour rendering with high luminous efficacy and long life.
<b>Movement Detecting Devices (PIR)</b>	A type of motion detector that uses infra red radiation to detect movement and switches lighting on.
<b>Pin Based Compact Fluorescent Lamp (CFL)</b>	A type of fluorescent lamp that fits into a dedicated lighting fixture. CFL's have a longer rated life and use less electricity than conventional incandescent light bulbs. Conventional Bayonet or Screw (Edison) fitting CFLs are not acceptable under the Code.
<b>Security lighting</b>	Security lighting is provided to deter burglars or intruders and to protect property. There are two types of security lighting commonly used in dwellings – high wattage intruder lights that are operated via PIR sensors which only switch on for a short time, and low wattage lighting that is controlled by time switches and daylight sensors.
<b>SON</b>	High Pressure Sodium Lamp (SON or HPS). A type of high intensity discharge lamp primarily used for street lighting purposes. These lamps have a very good luminous efficacy (up to 150 lumens per circuit Watt).
<b>Space lighting</b>	The normal lighting required to illuminate a space when in use. It can be used outside the entrance to the home, in outbuildings such as garages and external spaces such as paths, patios, decks, porches, steps and verandas. Space lighting should usually be designed to be switched off when the space is uninhabited and during daylight hours. It is acceptable that some lighting remains switched on outside of daylight hours for safety reasons. Situations where this may be acceptable include: main external entrances, external steps, pathways and car parks.

<b>Statutory safety lighting</b>	Safety lighting is usually provided in multi-residential buildings such as blocks of flats to illuminate stairwells and exit routes when the main lighting system fails. Its design is specified by regulation (BS 5266) and is therefore outside the scope of the Code.
<b>Time switch</b>	A switch with an inbuilt clock which will allow lighting to be switched on and off at programmed times.
<b>Tubular Fluorescent Lamp (TFL)</b>	A type of fluorescent lamp that is named after its shape. These lamps have their own range of dedicated fittings and have a longer rated life and use less electricity than conventional incandescent light bulbs.

## Assessment Methodology

### *Design Stage*

- For houses, fittings serving the following areas should be included in the assessment of space and security lighting:  
External door, front porch, steps/pathways, patio, garage, garden, carports and any other outbuildings.
- For flats, fittings serving the following areas should be included in the assessment of space lighting:  
Communal lobbies, main external entrances, internal entrance porches, external steps and pathways.  
These areas should be equipped with dedicated fluorescent fittings (or other efficient luminaires like SON or metal halide) and should be controlled by a time clock or daylight sensor.
- Hallways, landings, stairwells, internal corridors and garages should be equipped with dedicated fluorescent fittings that are controlled by push button time switches/PIR sensors or equivalent.
- Specific communal rooms (laundries, cycle and other storage spaces etc) should be equipped with dedicated fluorescent fittings and manual switching or occupant sensors.

### *Post Construction Stage*

- Verify that the evidence provided at the Design Stage is still valid and that no changes have occurred during construction.

## Calculation Procedures

None

## Checklists and Tables

None

## Common Cases of Non-Compliance

Credits cannot be awarded by default if no space lighting is installed, even though the Issue requirements for security lighting are met.

## Special Cases

On a privately managed site, external lighting managed by a Local Authority may be excluded from this issue.

Where a site is redeveloped and existing external lighting remains, the lighting that is retained has to comply with the requirements of the issue. Replacement of the fittings may be necessary.

Any fitting that consumes less than 5 W may be excluded from this issue. This is to allow for the specification of innovative light sources, such as LEDs.

## Background

The requirement is to provide energy efficient lighting that is adequately controlled to minimise energy consumption.

Intruder security lighting for domestic use is normally fitted with halogen or bright tungsten luminaires. Whilst these are not particularly energy efficient, there are few alternatives. In view of this, the main objective is to ensure that appropriate wattage fittings are installed to avoid over-specification.

The current Building Regulations in England and Wales, Part L1A 2006, requires fixed external lighting i.e. lighting fixed to an external surface of the dwelling, to be either fixed low energy light fittings or, for security lighting, max 150 W with PIR and daylight cut off sensors. However, garage lighting, lighting on outbuildings, security lighting, feature lighting or lighting in communal areas in blocks of flats is not covered. In addition, this type of lighting is not included in the SAP calculation and associated DER, which is why this component of external lighting is covered under by the Code for Sustainable Homes.

Issue ID	Description	No. of credits available	Mandatory Elements
Ene 7	Low or Zero Carbon (LZC) Technologies	2	No

## Aim

To reduce carbon emissions and atmospheric pollution by encouraging local energy generation from renewable sources to supply a significant proportion of the energy demand.

## Assessment Criteria

Credits are awarded based on the percentage reduction in total carbon emissions that result from using Low or Zero Carbon (LZC) Energy Technologies for each *dwelling* using the calculation method detailed in *Calculation Procedures*, with credits awarded as detailed below:

Criteria	
	Credits
Where energy is supplied from local renewable or low carbon energy sources funded under the Low Carbon Building Programme (or similar), or is designed and installed in a manner endorsed by a feasibility study prepared by an independent energy specialist	
<b>AND</b>	
There is a 10 per cent reduction in carbon emissions as a result of this method of supply.	1
<b>OR</b>	
There is a 15 per cent reduction in carbon emissions as a result of this method of supply.	2
<b>Default Cases</b>	
None	

## Information required to demonstrate compliance

Schedule of Evidence Required	
To be read in conjunction with the <i>Definitions</i> and <i>Calculations</i> Sections.	
Design Stage	Post Construction Stage
<p><b>EITHER</b></p> <p>Offer letter under Low Carbon Buildings Programme (or Similar),</p> <p><b>OR</b></p> <p>Confirmation that a feasibility study has been carried out by an independent energy specialist to determine the appropriate LZC energy source(s) for the building/development</p> <p><b>OR</b></p> <p>Confirmation that the specified LZC energy source(s) will be funded by the Low Carbon Buildings Programme (or similar)</p> <p><b>AND</b></p> <p>Design Stage – SAP 2005 Worksheet* for each <i>Energy Type</i> and accompanying list of specifications from an <i>accredited energy assessor</i> showing the carbon emissions arising from energy demand with and without LZC technologies</p> <p>*Full worksheet, dated, SAP assessor name, registration number where appropriate and dwelling address, prepared at plans approval stage</p>	<p>Confirmation that the design has been carried out by an independent energy specialist</p> <p><b>OR</b></p> <p>Confirmation that the specified LZC energy source(s) has been funded under the Low Carbon Buildings Programme (or similar).</p> <p><b>AND EITHER</b></p> <p>If there have been no changes from Design Stage then only Design Stage – SAP 2005 Worksheets and supporting information need to be prepared</p> <p><b>OR</b></p> <p>If there have been changes from design stage then As Built – SAP 2005 Worksheet* for each <i>Energy Type</i> and accompanying list of specifications from an <i>accredited energy assessor</i> showing the carbon emissions arising from energy demand with and without LZC technologies</p> <p>*Full amended worksheet, dated with SAP assessor name, registration number where appropriate and dwelling address, prepared at construction completion stage</p>
<p><b>AND</b></p> <p>Drawings showing location of LZC equipment in the dwelling, its curtilage and offsite where appropriate.</p>	<p><b>AND</b></p> <p>Drawings showing location of LZC equipment in the dwelling, its curtilage and offsite where appropriate.</p>

<p><b>AND</b></p> <p>Text describing (on drawings or in the specification):</p> <ul style="list-style-type: none"> <li>• type and location of LZC equipment in the dwelling</li> <li>• type of appliances that use an output from the LZC equipment in the dwelling</li> </ul>	<p><b>AND EITHER</b></p> <ul style="list-style-type: none"> <li>• Assessor Site Inspection Report</li> </ul> <p><b>OR</b></p> <ul style="list-style-type: none"> <li>• Photographic evidence for each dwelling with a different specification accompanied by notes</li> </ul>
<p>For LZC technologies and fuels not currently covered by SAP 2005 and Land Duty Stamp Tax relief tools:</p> <ul style="list-style-type: none"> <li>• Manufacturer’s technical data and details or calculations stating:</li> <li>• the estimated heat or electricity output of the LZC system</li> <li>• the carbon dioxide emissions resulting both with and without the LZC technology</li> </ul>	<p>For LZC technologies and fuels not currently covered by SAP 2005 and <i>Land Duty Stamp Tax</i> relief tools:</p> <ul style="list-style-type: none"> <li>• As design stage</li> </ul>
<p>Where Design and Build contracts or similar contractual arrangements mean detailed drawings are not available at this stage, the specification can be allowed as evidence of intent.</p>	

## Definitions

### **Accredited external renewables**

These are renewable energy schemes located offsite which:

- Are accredited renewables (as defined by the Energy Act 2004). These will be Renewable Energy Guarantee of Origin (REGO) certified
- Create new installed generation capacity, designed to meet the loads of the dwelling (i.e. not just units of carbon)
- Are additional to capacity already required under the Renewables Obligation

Note: Some *ESCO*’s achieve these requirements.

<b>Biomass</b>	<p>Biomass, also known as biofuels or bioenergy, is obtained from organic matter, either directly from plants or indirectly from industrial, commercial, domestic or agricultural products.</p> <p>Biomass can be converted into heat and electricity in several ways. Depending on the source of the biomass, these processes include;</p> <ul style="list-style-type: none"> <li>• burning, (the decomposition or transformation of a compound caused by heat)</li> <li>• gasification (the conversion of solid biomass into a gaseous fuel)</li> <li>• anaerobic digestion (the decomposition of an organic biodegradable material by bacterial action in the absence of air, and in warm, moist conditions) or fermentation.</li> </ul>
<b>Energy Group</b>	Refer to Ene 1
<b>Energy Type</b>	Refer to Ene 1
<b>ESCO</b>	An Energy Services Company
<b>Design Stage SAP 2005 Worksheet</b>	Refer to Ene1
<b>As-Built SAP 2005 Worksheet</b>	Refer to Ene1
<b>Feasibility Study</b>	<p>A study carried out by an independent energy specialist to establish the most appropriate LZC energy source for a building or development.</p> <p>The feasibility study must cover as a minimum:</p> <ul style="list-style-type: none"> <li>• Energy generated from LZC energy source per year</li> <li>• Payback</li> <li>• Land use</li> <li>• Local planning requirements</li> <li>• Noise</li> <li>• Whole life cost and lifecycle impact of the potential specification in terms of carbon emissions</li> <li>• Any available grants</li> <li>• All technologies appropriate to the site and energy demand of the development.</li> </ul>



- Reasons for excluding other technologies.

It is recommended that the feasibility study must be carried out at the outline proposal stage, Royal Institute of British Architects (RIBA) stage C. The feasibility study may be carried out at later stages but the options available to benefit from LZC energy sources may be significantly restricted. When undertaking a feasibility study at a later stage than RIBA C, an additional element will need to be included in the report to highlight the LZC energy sources which have been discounted due to the constraints placed on the project by the late consideration, and the reason for their omission.

**Independent energy specialist:**

An individual who:

- has acquired substantial expertise or a recognised qualification for undertaking assessments, designs and installations of low or zero carbon solutions, in the residential sector;
- is not professionally connected to a single low or zero carbon technology or manufacturer.

**Inverter**

Refer to Ene1

**Life cycle impact**

This is the requirement to look at the carbon balance of each technology over its whole life. This encourages people to not just consider the savings or emissions over its operational life but also the savings or emissions over the whole life of the technology (from 'cradle to grave'), therefore reflecting the fact that different technologies have different life spans.

**Low Carbon Buildings Programme**

Department for Business Enterprise and Regulatory Reform (BERR) Low Carbon Buildings Programme provides grants for microgeneration technologies to householders and is managed by the Energy Saving Trust.

**Low or Zero Carbon Technologies**

Technologies recognised by the Department for Business Enterprise and Regulatory Reform (BERR) Low Carbon Buildings Programme (LCBP) may be considered as part of a low or zero carbon emissions solution. The following list details the technologies recognised by the BERR, LCBP at the time of going to print:

- Solar:
  - Solar Hot Water
  - Photovoltaics

- Water:  
Small scale hydro power
- Wind:  
Wind turbines
- Biomass:  
Biomass single room heaters/stoves  
Biomass boilers  
Biomass community heating schemes ~~where the majority of heating comes from biomass~~
- Combined Heat and Power (CHP) and micro CHP for use with the following fuels:  
natural gas  
biomass  
sewerage gas and other biogases
- Community heating, including utilising waste heat from processes such as large scale power generation where the majority of heating comes from waste heat
- Heat Pumps:  
Air source heat pumps (ASHPs)  
Ground source heat pumps (GSHP)  
Geothermal heating systems
- Other:  
Fuel cells using hydrogen generated from any of the above 'renewable' sources.

For heat pumps to comply the heat source must be from a renewable source, for example soil, ground water or water courses.

~~For recently developed LZC technologies or LZC technologies that are not mentioned here, please contact a service provider to ensure compliance.~~

The Department for Business Enterprise and Regulatory Reform (BERR) have recently launched The Microgeneration Certification Scheme (MCS). This scheme will approve microgeneration equipment and installers.

It is a UKAS (United Kingdom Accreditation Service) accredited certification scheme covering products, installers and manufacturers. It provides consumers with an independent indication of reliability of products, assurance that the installation will be carried out to an appropriate standard, and a route for complaints should something go wrong.

This scheme is currently being managed by the Building Research Establishment (BRE) on behalf of Government.

Where technologies are covered by the MCS, all equipment and installers will need to comply with the scheme in order to satisfy the requirement for credits.

The Low or Zero Carbon (LZC) Energy Technologies can be situated either on site or off site. If the LZC technologies are located off-site the source of the electricity should be an “accredited external renewable”. The electricity from both off-site LZC technologies and accredited external renewable are often delivered via an Energy Services Company (ESCO).

### **Microgeneration**

Microgeneration is the production of heat and/or electricity on a small-scale from a low carbon source.

### **Payback period**

The period of time needed for the return on an investment to equal the sum of the original investment

### **Stamp Duty Land Tax (SDLT) relief**

Refer to Ene1

### **‘Standard’ case SAP worksheet**

The Ene 7 credit makes use of a ‘Standard’ case SAP worksheet based on a fixed servicing solution to calculate a percentage contribution of LZC’s to total energy use in the home. The ‘Standard’ case represents the common scenario where a gas boiler is used to supply space heating and hot water to individual dwellings. This approach is taken to ensure a level playing field from which to measure the contribution from LZC’s regardless of fuel choice. **This ‘Standard’ case is not used in any other parts of the Code for Sustainable Homes.**

Please note that the ‘Standard’ case SAP worksheet is to be produced separately to the ‘Actual’ SAP worksheet.

In order to facilitate the production of a ‘Standard’ case SAP worksheet, the ‘Standard’ case worksheet can be submitted as a document with a Draft status from commercially available SAP software.

The ‘Standard’ case includes the minimum space and water heating services as set out in the Domestic Heating Compliance Guide, and are as follows:

- Primary Heating Fuel (space & water) – Mains Gas

- Boiler: SEDBUK 86 per cent, room-sealed, fanned flue
- Secondary space heating: Electric heater assumed
- Cylinder volume: 150 litres
- Maximum permitted cylinder loss: 2.62kWh/day
- Primary Pipework: Insulated
- Space Heating Control: Programmer, roomstat, and TRV's
- Hot water Control: Boiler interlock, cylinder thermostat, separate water control

All other input values for the Standard case SAP calculation will be the same as for the actual dwelling.

The standard case's emissions (i.e. the DER) shall equal the Target Emissions Rate (TER) for the actual dwelling.

### **Whole life cost**

The whole-life costs of a facility are the costs of acquiring it

(including consultancy, design and construction costs, and equipment), the costs of operating it and the costs of maintaining it over its whole life through to its disposal; i.e. the total ownership costs.

These costs include internal resources and departmental overheads, where relevant; they also include risk allowances as required; flexibility (predicted alterations for known change in business requirements, for example), refurbishment costs and the costs relating to sustainability and health and safety aspects.

## Assessment Methodology

### ***Design Stage***

- Calculate the total reduction in carbon emissions resulting from using LZC technologies using Table Cat:1.4.
- Provided that there is a direct supply to the dwelling when there is a demand, any surplus electricity from a local LZC source may be exported to the National Grid. The exported electricity may be included in this calculation as if it were consumed within the dwelling/development.
- Confirm that renewables are accredited.

### ***Post Construction Stage***

- Verify that the evidence provided at the Design Stage is still valid and that no changes have occurred during construction.

For Design and Build contracts, compare the As Built SAP 2005 Worksheets (as submitted for Building Control purposes), with the specification produced as evidence at Design Stage.

## Calculation Procedures

Use Table Cat 1.4 in Checklists and Tables to calculate the percentage reduction in CO<sub>2</sub> emissions.

Figures used for the calculations of the percentage of energy provided by LZC technologies are based on the output from SAP 2005 worksheets.

## Checklists and Tables

Table 1.4 can be used for calculating the contribution of LZC Technologies and the CO<sub>2</sub> savings. Alternatively, the Code Energy Calculation Tool is available for assessors from the Code Service Provider to assist with this calculation.

Table Cat 1.4: LZC Contribution and CO <sub>2</sub> Savings					
<i>All values to be taken from box numbers described within the worksheets set out within The Government's Standard Assessment Procedure for the Energy Ratings of Dwellings 2005 edition, revision 2, June 2008.</i>			KWh/year supplied	Carbon emissions factor (from SAP 2005)	Emissions Kg CO <sub>2</sub> /year
Systems assessed with Section 12a of SAP		Systems assessed with Section 12b of SAP	(A)	(B)	(C)=(A)×(B)
<ul style="list-style-type: none"> <li>– individual heating systems</li> <li>– community heating without CHP</li> </ul>		<ul style="list-style-type: none"> <li>– community heating systems with CHP</li> <li>– heat recovered from power stations</li> </ul>			
Emissions from STANDARD system specification					
1	CO <sub>2</sub> emissions from space heating and hot water from Standard case SAP 2005 DER Worksheet [SAP box 107] See note [1]				
2	CO <sub>2</sub> emissions for fans and pumps from Standard case SAP 2005 DER Worksheet [SAP box 108] See note [1]				
3	CO <sub>2</sub> emissions from lighting from Standard case SAP 2005 DER Worksheet [SAP box 109] See note [1]				
4	CO <sub>2</sub> emissions from mechanical cooling See note [2]			× 0.422	
5	CO <sub>2</sub> emissions from appliances and cooking See note [3]				
6	Total CO <sub>2</sub> emissions from Standard case SAP System (1+2+3+4+5)				
Emissions from ACTUAL system specification					
7	CO <sub>2</sub> emissions for fans and pumps from SAP 2005 DER Worksheet [SAP box 108] See note [1]	CO <sub>2</sub> emissions for fans and pumps from SAP 2005 DER Worksheet [SAP box 114*] See note [1]			
8	Reduction in CO <sub>2</sub> emissions for pumps and fans from LZC systems in actual dwelling (2–7) See note [4]				
9	CO <sub>2</sub> emissions from space heating & hot water from SAP 2005 DER worksheet (where applicable) (SAP box 107)				
10	CO <sub>2</sub> reduction for space heating and hot water from LZC technologies covered by SAP (1 – 9)				

<b>Table Cat 1.4: LZC Contribution and CO<sub>2</sub> Savings</b>					
<i>All values to be taken from box numbers described within the worksheets set out within The Government's Standard Assessment Procedure for the Energy Ratings of Dwellings 2005 edition, revision 2, June 2008.</i>		KWh/year supplied	Carbon emissions factor (from SAP 2005)	Emissions Kg CO <sub>2</sub> /year	
<b>Systems assessed with Section 12a of SAP</b> – individual heating systems – community heating without CHP	<b>Systems assessed with Section 12b of SAP</b> – community heating systems with CHP – heat recovered from power stations				
11	CO <sub>2</sub> reduction from Electricity generated by LZC technologies considered in SAP 2005 [SAP box 110 – SAP box 111] See notes [5] and [6]	CO <sub>2</sub> reduction from Electricity generated by LZC technologies considered in SAP 2005 [SAP box 117* – SAP box 118*] See notes [5] and [6]			
12	CO <sub>2</sub> reduction from additional allowable electricity generation considered in section 14 of SAP 2005 v9.82 (-1) × [SAP box ZC 7 × SAP box 5] See notes [6] and [7]				
13	CO <sub>2</sub> emissions offset for systems assessed under section 12b of SAP (where applicable) (-1) × [SAP box 115* – 114*] OR where SAP box 115* is set to "0" (-1) × [(SAP boxes 108* + 110* + 111* +112* + 113*)]				
14	CO <sub>2</sub> reduction from LZC Electricity generation (11+12)				
15	CO <sub>2</sub> reduction from LZC Thermal generation (10+13)				
16	Total CO <sub>2</sub> reduction from specified LZC technologies (8+14+15)				
<b>Calculation of Percentage CO<sub>2</sub> saving as a result of using LZC systems</b>					
17	CO <sub>2</sub> saving as a percentage of Standard case CO <sub>2</sub> emissions [(16 / 6) × 100%]	% Reduction in CO <sub>2</sub> Emissions			

## Notes to Table Cat 1.4

[1] Space heating, hot water, lighting, pumps and fans from SAP 2005 v9.82 DER worksheet. Please note that to demonstrate compliance with this issue, the SAP output including the assumptions made for calculation of the DER must be used. The name of this output may vary from one software package to another.

[2] Mechanical cooling is not currently dealt with under SAP 2005 v9.82. If mechanical cooling is specified, the emissions arising from its use will need to be estimated separately. Contact your Code service provider for further guidance.

[3] Kg CO<sub>2</sub>/year from appliances and cooking. See Ene 1:

$$99.9 \times (\text{TFA} \times \text{N})^{0.4714} - (3.267 \times \text{TFA}) + (32.23 \times \text{N}) + 72.6$$

Where TFA = Total Floor area and N = Number of Occupants

For TFA < 43 m<sup>2</sup>; N = 1.46

TFA ≥ 43 m<sup>2</sup>; N = 2.844 × (1 – exp(–0.000391 × TFA<sup>2</sup>))

[4] This value is often negative

[5] If the value displayed in SAP boxes 110 or 117\* is negative, consider the value positive when entering it into table Cat 1.4.

e.g. if –250 is displayed, enter 250 into table Cat 1.4.

[6] Where LZC technologies service other users (e.g. mixed used developments), both the thermal and electrical output should be allocated between all users in relation to their proportional net floor area.

[7] SAP now considers additional allowable electricity generation to enable net CO<sub>2</sub> emissions to be calculated. The input of this generation is allowed across all Code levels.

Please see SAP Appendix M and SAP section 14 for acceptable technologies and configurations.

Step 12 of table Cat 1.4 refers to SAP box ZC7. It is necessary to refer to the Stamp Duty Land Tax (SDLT) exemption calculator to obtain the figure from box ZC7, where additional allowable electricity is being considered for the Ene 7 assessment.

<http://projects.bre.co.uk/sap2005/stamp-duty-land-tax.html>

Please note that for the purposes of the Ene 7 calculation it is only necessary to refer to box ZC7. The other outputs from the SDLT calculator do not impact on the outcome of the Ene 7 assessment.



## Common Cases of Non-Compliance

Energy supplied from remote sources through the National Grid will not be eligible for any credits in this Issue. This includes electricity procured through 'Green Tariffs'.

The energy generated from any renewable energy must first of all be made available to all of the dwellings. For example, where electricity is generated from LZC technologies the energy requirements of the dwelling, dwellings or communal areas must first be satisfied before any surplus generation can be exported to the national grid.

The excess CO<sub>2</sub> savings generated from the energy supply from an initial or earlier phase of the development cannot be used to contribute towards the emissions of a later phase of the development.

## Special Cases

### ***Photovoltaics in buildings with multiple dwellings***

In the case of a building containing more than one dwelling, eg a block of flats, then:

- a) if the PV output goes to particular individual flats, the annual output is credited to the flats concerned
- b) otherwise, the total electricity generated is divided amongst all the flats in the block in proportion to their net floor area.

In case a) an inverter is needed for each flat with a PV electricity supply.

In case b) there will usually be a single inverter for the total PV array and the electricity generated will be fed to the landlord supply and/or the distribution system for the flats (with provision for the export of electricity generated in excess of instantaneous demand).

## Background

The use of zero and low emission energy sources will not only lead to reduced emissions of greenhouse gases and other pollutants, but will also help to conserve the finite global fossil fuel resources and develop a market for such technologies.

The government has set a target that 20 per cent of energy in the UK should be generated from renewable sources by 2020. The greater the number of individual buildings that obtain 10 per cent or more of their energy from renewable sources, the easier this target will be to achieve.

This credit rewards energy efficient design in addition to the inclusion of renewable energy technology. Supplying energy efficient buildings with 10 per cent of their energy demand from zero or low carbon sources will be easier than for less energy efficient buildings since their total demand is lower.

Issue ID	Description	No. of credits available	Mandatory Elements
Ene 8	Cycle Storage	2	No

## Aim

To encourage the wider use of bicycles as transport by providing adequate and secure cycle storage facilities, thus reducing the need for short car journeys.

## Assessment Criteria

Credits are awarded where adequately sized, safe, secure, convenient and weather-proof cycle storage is provided for each dwelling in accordance with the following criteria:

Criteria	
	Credits
<p>Where either individual or communal cycle storage is provided that is adequate, safe, secure, convenient and weather-proof (as defined in <i>Relevant Definitions</i> below) for the following number of cycles:</p> <p><b>Studios or 1 bedroom dwellings – storage for 1 cycle for every two dwellings</b>            2 and 3 bedroom dwellings – storage for 1 cycle per dwelling            4 bedrooms and above – storage for 2 cycles per dwelling</p> <p><b>OR</b></p> <p><b>Studios or 1 bedroom dwellings – storage for 1 cycle per dwelling</b>            2 and 3 bedroom dwellings – storage for 2 cycles per dwelling            4 bedrooms and above – storage for 4 cycles per dwelling</p>	<p>1</p> <p>2</p>
<p><b>Default Cases</b> None</p>	

## Information required to demonstrate compliance

Schedule of Evidence Required	
To be read in conjunction with the <i>Definitions</i> and <i>Calculations</i> Sections	
Design Stage	Post Construction Stage
<p>Drawings* showing:</p> <ul style="list-style-type: none"> <li>• Location, type and size of storage</li> <li>• Access to cycle storage</li> <li>• Any security measures</li> <li>• Details of the proprietary system (if applicable)</li> </ul> <p><b>AND</b></p> <p>Text describing (on drawings or in the specification*):</p> <ul style="list-style-type: none"> <li>• Location, type and size of storage</li> <li>• Access to cycle storage</li> <li>• Security measures</li> <li>• Details of the proprietary system (if applicable)</li> </ul> <p><b>AND</b></p> <p>Notes and calculations showing the bedrooms served by the cycle storage and referring to credits awarded</p> <p>* or a letter of instruction to a contractor/supplier or a formal letter from the developer to the Code assessor giving the specific undertaking</p>	<p>Confirmation that design stage solution was implemented or full details (drawings and specifications) provided of As Built specification, including the number of bedrooms served by the storage, in the form of:</p> <p>Assessor Site Inspection Report</p> <p><b>OR</b></p> <p>Copies of purchase orders/receipts containing information on the capacity of storage</p> <p><b>OR</b></p> <p>Photographic evidence for each dwelling with a different specification accompanied by notes confirming the date and applicable plot numbers</p>

## Definitions

### **Adequately sized Cycle storage**

The minimum storage area required to store cycles on the floor, defined by the *New Metric Handbook* which includes space to allow the cycles to be moved independently.

- 1 cycle: 2m long × 0.75m wide
- 2 cycles: 2m long × 1.5m wide
- 4 cycles: 2m long × 2.5m wide

#### **OR**

Where a proprietary storage or hanging system is provided, the space requirements are flexible but the system must allow each cycle to be removed independently and meet all other criteria.

Where cycle storage is provided in a shed a minimum of 1m<sup>2</sup> is required for garden tools (in addition to the above dimensions). The shed should be set on a concrete foundation and secure fixing needs to be provided.

Where cycle storage is provided in a garage, adequate space must be provided to store both the bicycle(s) and the car(s) at the same time.

For double garages, it must be assumed that each garage space is occupied by a car. Storage areas above should be added to the typical minimum garage sizes below:

- 2.4m × 4.9m for a single garage; and
- 5m × 5.2m for a double garage

### **Convenient access**

Easy and direct access from/to the dwelling(s) and from/to the cycle store to a public right of way.

Access from the store to public right of way through the dwelling is not acceptable i.e. where cycles are stored in a shed in the back garden in a mid-terraced home and there is no back garden gate.

Communal cycle store(s) should be located within 100m (from the front door or the main entrance to a block of flats).

If for strategic reasons outside the control of the developer the store cannot be located within the required distance, exceptions to the rule may be allowed. Full details must be provided and the Code Service Provider consulted prior to awarding credits.

<b>Cycle storage</b>	<p>Cycles may be stored in any of the following:</p> <ul style="list-style-type: none"> <li>• garage or shed</li> <li>• external or internal communal cycle store</li> <li>• proprietary system</li> </ul>
<b>Secure entrance lock</b>	<p>It needs to be a permanent lock, (not a padlock), that conforms to BS 3621:2004.</p>
<b>Secure Fixing</b>	<p>A steel fixing set in concrete (or similar solid foundations/ hardstanding) to manufacturer's instructions, which allows both the wheel and frame to be locked securely. An example of a secure fixing would be the 'Sheffield' type frame.</p>
<b>Secure Storage</b>	<p>Secure storage is defined as the provision of a fully enclosed solid structure with a <i>secure entrance lock</i> and/ or <i>secure fixings</i> depending the situation and solution.</p> <p>In individual dwellings:</p> <ul style="list-style-type: none"> <li>– for solid enclosed structures: entrance lock or secure fixing(s)</li> <li>– for non solid structures: entrance lock and secure fixing(s)</li> <li>– for non fully enclosed structures (just three walls and a roof) secure fixing(s) are required</li> </ul> <p>Blocks of flats and multi dwellings, with communal areas:</p> <ul style="list-style-type: none"> <li>– communal halls and solid enclosed structures: secure entrance lock and secure fixing(s), to enable all cycle(s) to be locked</li> <li>– for non solid structures: entrance lock and secure fixing(s)</li> <li>– for non fully enclosed structures (just three walls and a roof) a secure fixing(s)</li> </ul>
<b>Weather-proof</b>	<p>Adequate protection from the elements. This would normally mean at least a roof and three walls.</p>

## Assessment Methodology

### ***Design Stage***

- Check that the proposed cycle store provided is of sufficient size, convenient, secure and weather-proof.

### ***Post Construction Stage***

- Confirm that proposals made at design stage are implemented.

## Calculation Procedures

None

## Checklists and Tables

None

## Common Cases of Non-Compliance

Where cycles are to be stored inside the dwelling, the credit cannot be achieved (unless within a porch of adequate space as defined above).

The provision of for folding cycles stored within the dwelling, would not achieve the credit. Folding cycles would be a temporary provision whereas the provision of cycle storage is a permanent feature.

## Special Cases

None

## Background

The majority of all car journeys made are less than five miles. One viable alternative for those journeys is the bicycle. This will not only reduce air/noise pollution and provide more space on the streets, but also improve the health and fitness of the cyclist. In order to make cycling a practical alternative, people need somewhere convenient and safe to store their bicycles when they are at home. The Code therefore encourages the developer to provide such a space.

Issue ID	Description	No. of credits available	Mandatory Elements
Ene 9	Home Office	1	No

## Aim

To reduce the need to commute to work by providing residents with the necessary space and services to be able to work from home.

## Assessment Criteria

Credits are awarded on the basis of the provision of space and services that enable a room to be used effectively as a home office.

Criteria	
	Credits
Where sufficient space and services (as defined below) have been provided which allow the occupants to set up a home office in a suitable quiet room.	1
<b>Default Cases</b>	
None	

## Information required to demonstrate compliance

Schedule of Evidence Required To be read in conjunction with the <i>Definitions</i> and <i>Calculations</i> Sections	
Design Stage	Post Construction Review Stage
<p>Drawings or specification text* detailing:</p> <ul style="list-style-type: none"> <li>– Location of and sufficient space for the home office</li> <li>– Location of sockets</li> <li>– Location of telephone points</li> <li>– That adequate ventilation will be provided</li> <li>– Confirmation of cable connection or that broadband is available at each address</li> </ul> <p>* or a letter of instruction to a contractor / supplier or a formal letter from the developer to the Code assessor giving the specific undertaking.</p>	<p>Confirmation that the Design stage solution was implemented or full details (drawings and specifications) provided of As-Built specification. This could be provided by:</p> <p>Assessor Site Inspection Report</p> <p><b>OR</b></p> <p>Drawings showing location of and sufficient space for the home office and required services</p> <p><b>OR</b></p> <p>Photographic evidence for each dwelling with a different specification accompanied by notes confirming the date and applicable plot numbers</p>

## Definitions

### Adequate Ventilation

In all cases the room must have an openable window with an openable casement of a minimum of 0.5m<sup>2</sup>. A room with only an external door will not meet the minimum requirements for adequate ventilation.

### Sufficient services

The following services must be provided in the *suitable room* intended as a home office:

- Two double power sockets
- Two telephone points (or double telephone point) or one telephone point where the dwelling is connected to cable or broadband is available at the address
- Window (Note: The room chosen to be the nominated home office must have a daylight factor of at least 1.5%)



- *adequate ventilation*, either through an openable window or with alternative ventilation such as passive stack, etc.

### **Sufficient space**

This is defined as the minimum size (1.8m wall length) to allow a desk, chair and filing cabinet or bookshelf to be installed, with space to move around the front and side of the desk, use the chair appropriately and operate the filing cabinet safely, (the 1.8m wall size requirement can, in some circumstances, be altered if drawings can prove that a desk can be fitted in any other type of arrangement, i.e. alcove or similar, fulfilling all the above criteria).

### **Suitable room**

For dwellings with three or more bedrooms, a suitable room is a room other than the kitchen, living room or, master bedroom or bathroom.

For dwellings with one or two bedrooms or studio homes, a suitable room may be in the living room, one of the bedrooms or any other suitable area in the home such as a large hall or dining area (provided the minimum service requirements defined above are met).

In all cases, the room must be large enough not to prevent the intended use of that room i.e. if a home office is to be set up in the main bedroom that room also needs to be able to fit in a double bed and other necessary furnishing.

## Assessment Methodology

### ***Design Stage***

- Check that the drawings and specification provide the required services described above.

### ***Post Construction Review Stage***

- Verify that the evidence provided at the Design Stage is still valid and that no changes have occurred during construction.
- Where there are changes re-assess as necessary.

## Calculation Procedures

None

## Checklists and Tables

None

## Common Cases of Non-Compliance

None

## Special Cases

None

## Background

The number of self-employed people is increasing, as is the number of people who work from home. Many job functions can readily be performed remotely, so it is quite feasible for individuals to work from home (or elsewhere) on either a full or part time basis. Currently there are 1.1 million people in the UK who have such non-traditional work patterns. Information from social trends indicates that 29 per cent and 24 per cent of employed men and women respectively have, at some time, worked from home. The benefits of working from home include reductions in transport movements, increased time available for the home worker and greater opportunity to participate within community activities.

Working from home for many people requires a telephone line as well as a connection to the internet for data transference and even video conferencing. Two telephone points or broadband will enable residents to use the telephone and the computer at the same time.

## Category 2: Water

Issue ID	Description	No. of credits available	Mandatory Elements
Wat 1	Indoor water use	5	Yes

### Aim

To reduce the consumption of potable water in the home from all sources, including borehole well water, through the use of water efficient fittings, appliances and water recycling systems.

### Assessment Criteria

Up to 5 credits are available for performance which reduces the amount of potable water used in the dwelling. There are minimum mandatory performance requirements for achieving all levels of the Code. The minimum mandatory requirements begin at level 1 increasing at level 3 and again at level 5. Credits are available for all the indoor potable water performance levels required in the Code. They are awarded according to the predicted average water consumption calculated using the Code Water Calculator (see *Calculation Procedures*). The table below gives the details.

Criteria		
Water consumption (litres/person/day)	Credits	Mandatory Levels
≤120 l/p/day	1	Levels 1 and 2
≤110 l/p/day	2	
≤105 l/p/day	3	Levels 3 and 4
≤90 l/p/day	4	
≤80 l/p/day	5	Levels 5 and 6
<b>Default Cases</b>		
None		

## Information required to demonstrate compliance

<b>Schedule of Evidence Required</b> <b>To be read in conjunction with the <i>Definitions</i> and <i>Calculations</i> Sections.</b> <b>The following requirements are required to demonstrate compliance with any of the mandatory levels, for both stages.</b>	
Design Stage	Post Construction Stage
<p>Drawings or specification text* detailing:</p> <ul style="list-style-type: none"> <li>• Location, details and type of appliances / fittings that use water in the dwelling including any specific water reduction equipment with the capacity / flow rate of equipment. This should include confirmation that the hot and cold water system will be designed to avoid the risk of microbial contamination in line with best practice.</li> <li>• Location, size and details of any rainwater and greywater collection systems in the dwelling</li> </ul> <p>* or a letter of instruction to a contractor/ supplier or a formal letter from the developer to the assessor giving a specific undertaking</p>	<p><b>EITHER</b></p> <p>As design stage, but As Built versions of drawings and specifications including confirmation action was taken to avoid microbial contamination.</p> <p><b>OR</b></p> <p>A letter from the developer confirming the installed fittings and equipment, detailing their flow rates (including whether flow restrictors have been installed), capacity and other technical specifications including confirmation action was taken to avoid microbial contamination.</p> <p><b>AND</b></p> <p>Manufacturers' literature confirming:</p> <ul style="list-style-type: none"> <li>• The technical specifications of all installed equipment and fittings including any greywater or rainwater collection systems. All figures quoted in the calculator tool should be backed up by this evidence. A covering note should be provided with the manufacturer's literature providing references to page numbers and model numbers of the installed equipment and fittings.</li> </ul> <p><b>AND EITHER</b></p> <p>Assessor Site Inspection Report</p>

	<p><b>OR</b></p> <p>Photographic evidence for a representative dwelling and for each dwelling with a different specification accompanied by notes confirming the date and applicable plot numbers</p>
<p>Completed Code Water Calculator Tool* from assessor showing internal potable water use for each dwelling which has a different specification</p> <p>*Provided by the Code Service Provider</p>	<p>As for design stage</p>

## Definitions

<b>Potable water</b>	Drinking quality water that is taken from a connection to the main water supply in the dwelling, which may be from the public water supply or from a private supply such as from groundwater via a borehole.
<b>Code Water Calculator</b>	A software tool which calculates the average water consumption in litres per person per day from average use factors based on WRC (Water Research Centre) report, CP187, P6832, March 2005. This enables a comparison to be made between a range of different water fittings and appliances.
<b>Rainwater recycling</b>	The appropriate collection and storage of rain from hard outdoor surfaces for use instead of potable water in WCs and/or washing machines. In some cases rainwater could also be used to contribute towards Wat 2 for irrigation and possibly large water consuming fittings such as hot tubs or swimming pools. In such cases, reference should be made to the relevant definition for sufficient size, as set out in Wat 2.
<b>Greywater recycling</b>	The appropriate collection, treatment and storage of used shower, bath and tap water for use, instead of potable water, in WCs and/or washing machines. Greywater recycling systems normally collect used shower, bath and tap water and recycle this for toilet flushing.
<b>Water reduction equipment</b>	Fittings such as flow restrictors may be fitted in taps, showers and delayed inlet valves may be fitted in WCs.

**Low Flush WCs**

Low flush WCs are specifically designed to reduce the volume of water consumed during flushing. There are various systems that can be specified to achieve a reduction in flush volume, such as low single flush cisterns, delayed action water inlet valves and dual flush cisterns, which provide a part flush for liquids and a full flush for solids. Such systems must be matched to suitable WC pans and should pass the discharge performance requirements of BS EN 997:2003 for Class 2 WC suites.

**Flow Restrictors**

Flow restrictors contain precision-made holes or filters to restrict flow and reduce the outlet flow and pressure. They are typically fitted within the console of the tap or shower heads, to pipework or at the mains inlet to the dwelling.

**Delayed Inlet Valves**

Delayed inlet valves prevent water entering the WC cistern until it has completely emptied enabling a precise volume of water to be discharged independent of water pressure.

**Ion Exchange Water Softeners**

Ion exchange water softeners remove the agents causing hard water by passing water from the mains through a resin. The resin must be regenerated regularly. Regeneration may occur either at set time intervals, or when a given volume of water has passed through the resin. The water consumed during regeneration depends on both hardness of the water (this varies geographically) and the efficiency of the water softener.

## Assessment Methodology

### ***Design Stage***

The following list covers the main steps a Code assessor needs to address when assessing internal water use.

- Calculate the water consumption for each dwelling using the water calculation tables in *Calculation Procedures* or the Code Water Calculation Tool, available from the Code service provider.

Note: Water consumption per person per day is highly variable. The water use per person per day depends on the variation in the performance of appliances and fittings. The Code Water Calculation Tool assumes a standard usage pattern for each person (WRc, CP187, P6832, March 2005) determined by typical water consumption by specified appliances and fittings.

- Where an appliance or fitting is not specified, assume the following building regulations (Water Supply (Water Fittings) Regulations 1999) or default fittings:
  - Regular taps for kitchen sink and wash hand basins (12 litres/minute)
  - High flow shower (14 litres/minute)
  - Standard bath (225 litre capacity to overflow)
  - Typical use washing machine (49 litre/use)
  - Typical use dishwasher (13 litre/use)
  - WC (6 litre cistern).

Assume no water softener or bidet unless the specification states otherwise. It should be noted that if all default values above are used achievement of a Code rating will be difficult. It is preferable to specify all fittings to be used. If all default values above are used a total consumption figure of 212.05 litres per person per day will be given. This figure does not consider the input from rainwater or greywater systems.

- If more than one type of any given fitting is installed this can be included in the calculation by following the note relating to Column 5 of Table 2.1 in Calculation Procedures below.
- Where both a shower and bath are installed, use the given approximate number of uses per day, i.e. 0.6 and 0.4 respectively. If there is either a shower or a bath, assume one use of the installed fitting. Wall-mounted showers (above baths) and hand-held showers (mounted on the bath) are both considered to be shower and bath installations.
- When entering flow rates for wash hand basin and kitchen sink taps into the Code Water Calculation Tool, the flow rate should be taken as 2/3 of the maximum flow rate quoted by the manufacturer. The maximum flow rate can be the flow rate achieved with a flow restrictor i.e. where flow restrictors are specified, 2/3 of the flow rate with the restrictor installed should be taken.
- Where specified taps have a water break at the mid range of the flow (often referred to as 'click taps' or two stage mixer taps), the flow rate can be taken as the maximum flow rate of the lower range before the water break. This is typically 50 per cent of the flow rate, however this should not be assumed and manufacturers' information must always be used.
- Ensure that the specified shower/tap flow rates are correct for a water pressure of 0.3MPa. For showers, the flow rate should be calculated assuming a delivered water temperature of 37°C. This ensures that the flow rate of fittings is measured in a consistent way. Where the shower head delivers a range of flow rates, the average flow rate can be assumed.

Note: This is based on EN200:1992, (Sanitary tapware. general technical specifications) Normal mains pressure in the UK ranges from between 0.1–0.2MPa.

- Where a flow restrictor is specified for the mains supply into the dwelling, the reduced flow achieved from the flow restrictor can be used for the flow rate of taps and showers provided the taps and showers are mains fed. The flow rate will need to be determined from manufacturers' information.

- The use of washing machines and dishwashers must always be assumed, even where the developer is providing neither the space, the plumbing or the appliance itself. Assume typical practice as defined in Table 2.1 in the Calculation Procedures unless best practice machines are to be supplied.
- If washing machines and dishwashers of known water usage are being provided, actual consumption figures can be used, provided these are supported by manufacturers' information (Design Stage) from the figure quoted on the energy label. Photographic/site visit evidence is required for the Post Construction Stage.
- Communal washing machines should also be included in the calculations by assuming that each home has a washing machine installed, (i.e. 0.34 uses per day per person). Exact water usage figures can be used in the Code Water Calculation Tool, provided they are supported by the manufacturer's information (Design Stage) or photographic evidence (Post Construction Stage) otherwise typical domestic figures can be used.
- Where an ion exchange water softener is specified, the water consumption can be entered as zero provided the volume of water consumed per regeneration cycle does not exceed 4 per cent of the total capacity of the water softener. The volume of water consumed per regeneration cycle must be specific to the region of the UK in which the development is located. Where the water consumed per regeneration cycle does exceed 4 per cent, the equivalent additional water consumed per day must be entered into the calculation tool. This should be calculated using the calculation procedures under the notes for column 7 of Table : Cat 2.1.
- If greywater or rainwater is used, refer to Table : Cat 2.2 in the Calculation Procedures to calculate the volume of water collected. The volume collected is then deducted from where it is to be used to calculate the consumption of those fittings using grey or rainwater and the volume of water saved from grey or rainwater use. In the case of grey and rainwater, the amount that can be saved is limited to the consumption of the fittings where grey or rainwater is to be used. Where a combination of grey and rainwater is to be used for one type of fitting (i.e. a combination of grey and rainwater for WC's), the savings are limited to the consumption of those fittings and the calculations needs to ensure that no double counting has occurred.
- Communal greywater or rainwater collection systems can be recognised in the Code. The rain and greywater savings cannot, however, be averaged for an entire block of flats unless all the dwellings are provided with the same fittings and the same volumes of rainwater or greywater. Where a greywater or rainwater system is to be used only in a sub-group of all the flats (eg just the ground floor), the total volume of greywater and/or rainwater must be subtracted from the internal water consumption of the sub-group of flats to be using grey water or rainwater alone. It cannot be averaged for the entire block.
- Where greywater is to supply only a fraction of fittings in a dwelling, for example, one WC in a dwelling fitted with several WCs, the greywater savings must be calculated for the fraction of fittings that are to be supplied with greywater.



- As an alternative to the estimated mean annual rainfall from *Checklists and Tables*, location specific figures can be obtained from the met-office ([www.metoffice.gov.uk](http://www.metoffice.gov.uk)) which will provide more specific average rainfall data for the site's location.
- In all cases, a risk assessment of microbial contamination (ie Legionella) must be carried out on the hot and cold water system. Action must be taken to avoid any risks of contamination (eg through location and labelling of pipes). This is particularly important where rainwater and greywater are to be used. The risk assessment and action taken should be in accordance with guidance from HSE ACoP and/or CIBSE TM13. While these guidance documents refer to non-domestic situations, similar principles apply to domestic use.
- If water is extracted locally from a borehole, it should be treated as potable water from the mains supply because using water from a borehole well will not reduce the burden on drainage and treatment systems.
- Swimming pools or other large water consuming features, whether internal or external are assessed in the following issue, Wat2. An internal hot-tub should be assessed as a bath. Where an external hot-tub is provided, this would be assessed in Wat2.

### ***Post Construction Stage***

- Confirm which specifications and evidence provided at the Design Stage are still valid.
- Assess all the new specifications and evidence provided at post construction stage.

## Calculation Procedures

Calculate the water consumption for each type of dwelling in accordance with the tables and guidance below.

Table : Cat 2.1 Calculation of Indoor Water Use						
Installation type	Unit of measure	Capacity/ flow rate	Use Factor	Proportion in dwelling max=1	No of uses/ person/Day	Litres water used/ person/Day
[1]	[2]	[3]	[4]	[5]	[6]	[7]
WC (fixed flush)	Flush		1.00		4.80	
WC (dual flush)	Full flush		0.33		4.80	
	Part flush		0.67		4.80	
Bidet <sup>1</sup>	Litre per use	2.64	1.00		2.00	
Wash hand basin taps <sup>2</sup>	Litres/minute		0.67		7.90	
Shower <sup>3</sup>	Litres/minute		5.00		0.60	
Bath <sup>3</sup>	Capacity to overflow		0.40		0.40	
Kitchen sink taps <sup>2</sup>	Litres/minute		0.67		7.90	
Washing machine	Typical Practice; or Actual Litres/use	49	1.00		0.34	
Dishwasher	Typical Practice; or Actual Litres/use	13	1.00		0.30	
Water softener <sup>4</sup>	Litres per use		1.00		1.00	
<b>Total Internal Use</b>						

<sup>1</sup> Where no bidet is specified the proportion should be entered as zero.

<sup>2</sup> Note the flow rate figure used in the calculation is either:

- 2/3 of the full flow rate declared by the manufacturer for each individual tap, or the full flow rate to the break point for taps such as two-stage mixer taps
- Where the shower head delivers a range of flow rates, the average flow rate can be assumed

<sup>3</sup> The number of uses per day for the bath and shower is set at the default of both a shower and bath being provided at 0.6 uses for the shower and 0.4 uses for the bath. The number of uses per day can be amended in the table where only either the bath or shower is provided with 1.0 use per day for the respective fitting provided.

<sup>4</sup> Please refer to the details below the notes for column 7 of the calculation procedure for details of how to calculate the litres per use of the water softener. Where no water softener is provided, the proportion should be entered as zero.

**Table : Cat 2.1 Notes**

The water calculation table above is divided into 7 columns [1] – [7]. In all cases, the following formula applies:

$$[3] \times [4] \times [5] \times [6] = [7]$$

Figures highlighted are those which remain fixed.

**Column [1]** details the type of installation.

**Column [2]** details the unit or flow rate of the installation type from manufacturers’ information or from default figures.

**Column [3]** relates to the capacity or flow rate of the installation type from manufacturers’ information or from default figures where fittings have not been specified.

For dual flush WC’s, the capacity of the cistern for both full and part flush should be entered and then combined to predict the consumption (per person per day) for that fitting. For example, a 6/4 dual flush WC would be calculated as follows:

Installation type [1]	Unit of measure [2]	Capacity/flow rate [3]	Use Factor [4]	Proportion in dwelling max=1 [5]	No of uses/person/Day [6]	Litres water used/person/Day [7]
WC (dual flush)	Full Flush	6 litre	0.33	1	4.80	9.50
	Part Flush	4 litre	0.67	1	4.80	12.86
					<b>Total</b>	<b>22.36</b>

Where manufacturers’ information from the energy labels for specified dishwashers and washing machines indicates lower water consumption than the ‘typical’ figure (given in the table), the actual consumption can be entered.

**Column [4]** relates to the ratio per use and is based on the following:

WC: For dual flush WCs a flushing ratio of 1(full flush):2(part flush) is assumed. (This equates to an average of 0.33 full flushes and 0.67 partial flushes per use).

Wash Hand Basin and Kitchen Sink Taps: The 0.67 factor for wash hand basin taps and kitchen sink taps assumes the average time the taps are used is 40 seconds.

Shower: The factor 5.0 assumes an average shower lasts for five minutes.

Bath: The factor of 0.40 assumes that a typical bath involves filling a bath to 40 per cent of its overflow capacity taking account of displacement and average use.

Washing Machine, Dishwasher, Bidet and Water Softener: A factor of 1.0 is used for these fittings as there is no volume or capacity per use factor required.

**Column [5]** refers to the proportion of each type of fitting supplied. For example, if only one type of toilet is installed, the proportion of fittings throughout the house should be 1 (100%). If two types of toilet are supplied (in a home with a total of two WCs), the proportion for each type of toilet is 0.5 (representing 50 per cent each). In this instance an additional row would need to be added to the above table.

Similarly, for wash hand basin or kitchen sink taps where there is a separate hot and cold tap, the proportion of each tap is 0.5 with the total consumption for the wash hand basin or kitchen sink taps assumed as 50 per cent from each tap. For example where there is a 6 litre/minute and 4 litre/minute tap (maximum flow rate) provided on a wash hand basin, here is how the consumption is calculated, including taking into consideration the 2/3 of flow rate rule as detailed in the assessment procedure:

Installation type [1]	Unit of measure [2]	Capacity/flow rate [3]	Use Factor [4]	Proportion in dwelling max=1 [5]	No of uses/person/Day [6]	Litres water used/person/Day [7]
Kitchen Sink Taps	Litres/minute	4.00	0.67	0.5	7.9	10.59
		2.67	0.67	0.5	7.9	7.07
						<b>17.66</b>

**Column [6]** number of times the fitting is used per person per day (a constant).

**Column [7]** by multiplying together the capacity/flow rate (in litres or litres/minute), the use factor, the proportion, and the number of uses per day, the total use for each fitting per person per day is given in column [7] as follows:

$$\text{Capacity or Flow rate [3]} \times \text{Use Factor [4]} \times \text{proportion [5]} \times \text{number of uses per day [6]} = [7]$$

The water consumption figures for each fitting (litres/person/day) are then added together to give the total predicted water consumption in (litres/person/day).

This final predicted water consumption is an estimate of how much water would typically be used (per occupant per day), given the flow rates and capacities of the water consuming devices specified. This is unlikely to equal actual consumption, which is highly dependent on personal behaviour.

Calculation of water consumed using an Ion Exchange Water Softener

$$\text{Litres of water consumed per day beyond 4\%} = \frac{[1 - (4)] \times (\text{RL} \times \text{RD})}{S}$$

- S = % of total capacity used per regeneration
- RL = Litres of water consumed per regeneration
- RD = Average number of regeneration cycles per day

Table : Cat 2.2 Calculation of total potable water needed from the mains, for internal use, taking into account any grey – or rainwater recycling				
Total Potable Water Used:				Total potable water used (l/person/day) → <input style="width: 50px;" type="text"/>
(f)				
Collection of greywater for WC flushing and Washing Machines:	<b>Bath, shower and hand-washing basin usage [1] (l/person/day)</b> <input style="width: 100%; height: 20px;" type="text"/>	<b>Percentage of used water (normally bath, shower and taps) to be recycled [2] (%)</b> <input style="width: 100%; height: 20px;" type="text"/>	Greywater used [3] (l/person/day) → <input style="width: 50px;" type="text"/>	
	(a)	(b)	$a - \left(\frac{b}{100}\right)$	(g)
Collection of Rainwater for WC, Bidet and Washing Machine [4]	<b>Collection Area [5] (m<sup>2</sup>)</b> <input style="width: 100%; height: 20px;" type="text"/>	<b>Rainfall [6] (average m/year)</b> <input style="width: 100%; height: 20px;" type="text"/>	<b>Rainfall Collected per person [7] (%)</b> <input style="width: 100%; height: 20px;" type="text"/>	Rainwater collected [8] (l/person/day) → <input style="width: 50px;" type="text"/>
	(c)	(d)	(e)	$\frac{c \times d \times \left(\frac{e}{100}\right) \times 1000}{365}$ (h)
Total Water required from the mains:				Final Water Consumption (l/person/day) → <input style="width: 50px;" type="text"/>
(f) - (g) - (h)				

**Table 2 Notes**

- 11) Include only usage of these fittings from which water will be recycled. If other sources, please amend as appropriate.
- 12) The manufacturer / designer of the greywater recycling system should be able to provide this figure. In most cases this will be 100 per cent, but it depends on the collection tank volume, the volume of greywater available and where the greywater will be used.

- l3l The amount of greywater claimed for re-use must be equal to or less than the amount of water required by the fittings using greywater. In some cases additional capacity may be required from mains supply and this will be indicated in the Code Water Calculation Tool.
- l4l This is predominantly for rainwater recycling systems providing water for internal use. Where the volume of rainwater collected is sufficiently in excess of the internal demand, this may also be considered for Wat 2 – External Potable Water Use. In this case reference should be made to the relevant definition of sufficient size set out in Wat 2.
- l5l The rainwater collection area is the area the rainwater is collected from. If the water is collected from the roof, the collection area = the effective roof area (BS EN 12056-3:2000).
- l6l For the average rainfall in the UK see the map of Mean Annual Rainfall in the UK in *Checklist and Tables*. It is recommended that site specific rainfall figures should be used based on the average rainfall for the site. Site specific figures can be obtained by contacting the Met Office.
- l7l If no exact figures for the collection of rainwater can be provided, assume 60 per cent of the rainwater is collected for re-use. The following formula should be used to determine the percentage of rainwater collected per person. The number of occupants is determined by the number of bedrooms in a dwelling with 2 occupants assumed for the master bedroom and 1 occupant for each additional bedroom.

$$\text{\% of rainwater collected per person} = \frac{\text{Percentage collection (60\%)*}}{\text{Total number of occupants}}$$

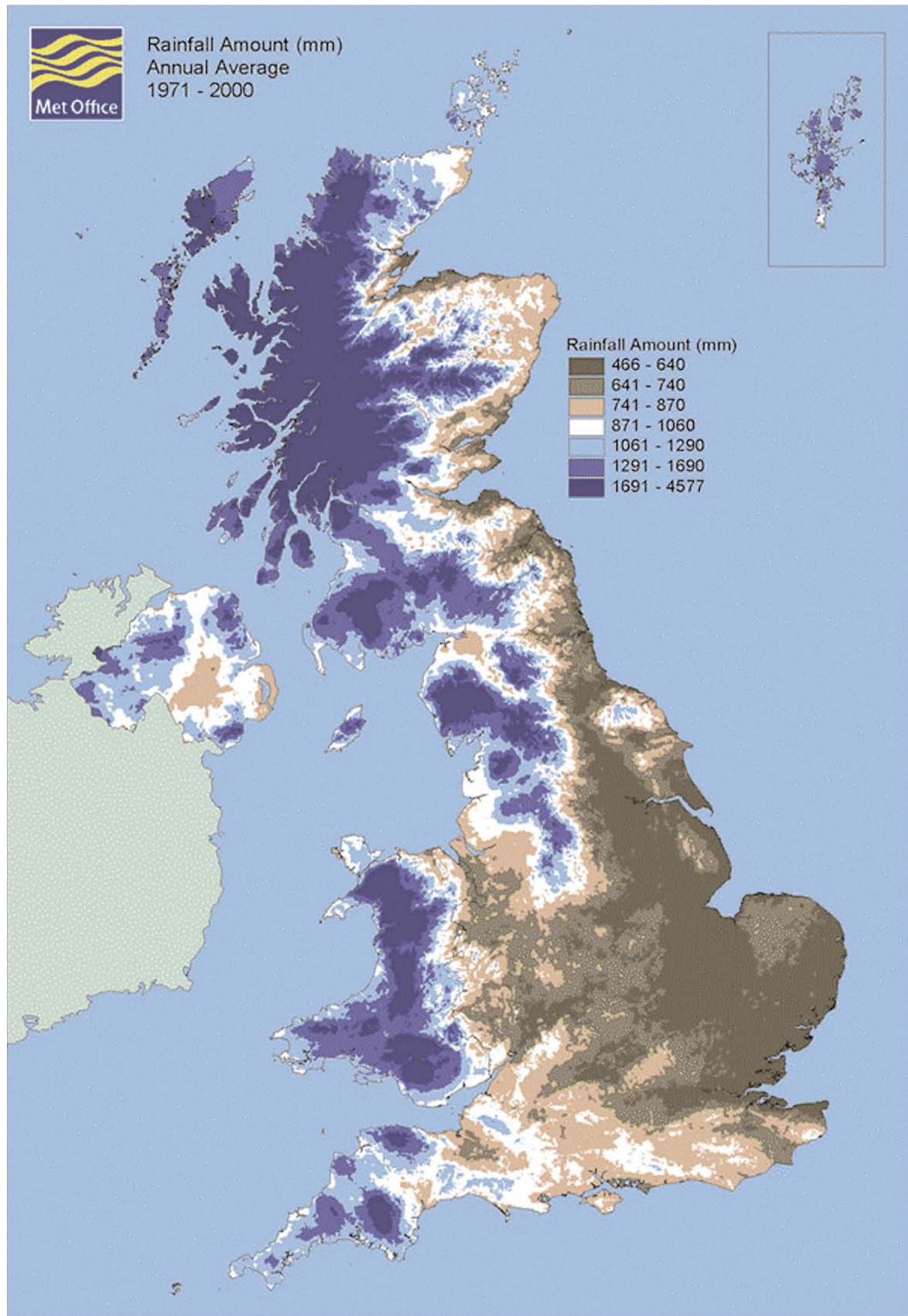
\* Where exact figures are to be used for the percentage collected, these should be calculated in accordance with Guidance from BSRIA Technical Note TN 7/2001 and CIRIA C539 Best Practice Guidance. The percentage collected is dependent on the volume of tank, run-off coefficient, evaporation and also losses due to filtration and overflow. Further guidance on the sizing of rainwater systems is due to be published in BS8515 due in December 2008.

- l8l The volume of rainwater collected per person per day is calculated from the volume collected in m<sup>3</sup> per year  $(c) \times (d) \times (e/100)$  which is then converted into litres/person/day by multiplying by 1000 to convert to litres and dividing by 365 to convert to days.

This volume collected per person per day is then deducted from the total predicted use of the fittings to use rainwater which cannot be greater than the volume required by these fittings. In some cases, the volume of rainwater collected may be less than the demand of the fittings supplied which may require additional top-up from mains. In other cases the volume collected for internal use may be greater than the demand which may indicate that excess water is available for other fittings or for external use to contribute to Wat 2. These cases will be indicated in the Code Water Calculation Tool.

## Checklists and Tables

Figure : Cat 2.1 Mean Annual Rainfall in the UK (Source: Met Office, 2006, Map of average annual rainfall 1971–2000)



## Common Cases of Non-Compliance

- The credit will not be awarded where requirements for provision of better than typical practice white goods have only been set within tenancy agreements. It is unlikely such a requirement would be enforced.
- The Code recognises only fixed fittings and fixtures such as low flush WCs and flow restrictors. Devices which can be retrofitted to WCs such as cistern displacement and flushing reduction are not recognised by the Code. Such devices may provide reduced water use in existing dwellings, but they can be easily removed.

## Special Cases

Where an instantaneous water heater is specified / intended, problems may occur when low flow rate taps are fitted as such systems vary in their trigger flow rates. In such cases, confirmation should be sought that the specified fittings are compatible.

## Background

Climate change may result in increased variability in weather patterns increasing both the risk of flooding and extended dry spells. Water consumption is likely to become an increasing national problem. Water is becoming more scarce at the same time as population and demand for water is increasing., the development of practical ways to reduce water demand is very important.

In the South East of England, water demand exceeds the volume licensed for abstraction, with the shortfall being met from ground water. 20 per cent of the UK's water is used domestically with over 50 per cent of this used for flushing WC's and washing (source: Environment Agency). Most of which comes from drinking quality standard or potable water.

The amount of potable water used within the dwelling can be reduced by using fixed fittings which reduce water use in WC's, taps and showers. Further reductions could be achieved by installing greywater or rainwater collection and treatment systems.

Government has announced its intention to regulate on water efficiency in homes following a similar calculation methodology to that in the Code. Further details can be found on <http://www.communities.gov.uk/publications/planningandbuilding/mandatingwaterefficiency>.



Issue ID	Description	No. of credits available	Mandatory Elements
Wat 2	External Water Use	1	No

## Aim

To encourage the recycling of rainwater and reduce the amount of mains potable water used for external water uses.

## Assessment Criteria

One credit is awarded for providing a system to collect rainwater for use in irrigation as follows:

Criteria	
	Credits
Where a correctly specified and sufficient sized system to collect rainwater for external/internal irrigation use has been provided to a dwelling with a garden, patio or communal garden space (examples of such systems include rainwater butts and central rainwater collection systems)	1
<p><b>Default Cases</b></p> <p>If no individual or communal garden spaces are specified or if only balconies are provided, the credit can be awarded by default</p>	1

## Information required to demonstrate compliance

<b>Schedule of Evidence Required</b> <b>To be read in conjunction with the <i>Definitions</i> and <i>Calculations</i> Sections.</b>	
Design Stage	Post Construction stage
<p>Drawings or specification text* detailing:</p> <ul style="list-style-type: none"> <li>• Type, size and location of any rainwater collection systems</li> </ul> <p>* or a letter of instruction to a contractor / supplier or a formal letter from the developer to the assessor giving a specific undertaking</p>	<p>Confirmation that the dwellings have been constructed in accordance with the design stage drawings or specifications by:</p> <p><b>EITHER</b></p> <p>A letter from the developer confirming the installed systems, detailing their capacity and other technical specifications.</p> <p><b>OR</b></p> <p>As Built drawings or specifications. (Where there have been no or only minor changes to the design stage drawings, amendments can be added to a copy of the design stage drawings and marked 'As built'.)</p> <p><b>AND</b></p> <p>Manufacturer's details of all installed systems</p> <p><b>AND EITHER</b></p> <p style="padding-left: 20px;">Assessor Site Inspection Report</p> <p><b>OR</b></p> <p>Photographic evidence for each dwelling with a different specification accompanied by notes confirming the date and applicable plot numbers</p>

## Definitions

<b>Garden</b>	An area where irrigation is required, normally an external space but may be an internal atrium. This may be a private or communal space.
<b>Mains potable water</b>	Drinking quality water that is taken from a connection to the main water supply in the dwelling.
<b>System to collect rainwater</b>	The collection and storage of rain from hard surfaces (typically roofs) in order to replace the use of potable mains water for external irrigation/watering.
<b>Rainwater butt</b>	A large cask or barrel which is set up on end to collect and store rainwater for irrigation purposes.
<b>Central rainwater collection system</b>	A system which will collect and store rainwater for use across the development. This could be a large storage tank or other form of surface water system.
<b>Sufficient Size</b>	<p>Water butt volume requirements for homes with individual gardens, patios and terraces:</p> <ul style="list-style-type: none"> <li>• terraces and patios – 100 litres minimum</li> <li>• 1–2 bedroom home with private garden – 150 litres minimum</li> <li>• 3+ bedroom home with private garden – 200 litres minimum</li> </ul> <p>The above volume requirements can be halved if there is no planting provided and the whole of the external space is covered by a hard surface.</p> <p>For houses with a front and a rear garden a water butt is required only in the main (i.e. larger) garden but should meet the capacity requirements above.</p> <p>Size requirements for communal gardens:</p> <ul style="list-style-type: none"> <li>• 1 litre/m<sup>2</sup> of land allocated to the dwelling with a minimum of 200 litres per communal garden. Where the communal garden is allocated to more than 6 dwellings, a maximum of 30 litres per dwelling can be applied. The allocated land can either be planted (including grass) or left as unplanted soil and can be either split into plots or communally maintained.</li> <li>• Where planting requiring little water has been specified (following the recommendations from a Suitably Qualified Ecologist, see Eco 1 and 2), the above requirements can be halved subject to written</li> </ul>

confirmation from the Suitably Qualified Ecologist being provided stating that this is acceptable.

Where the rainwater collection system is providing internal demand for Wat 1 and also for irrigation to achieve credit under this issue, the system can only qualify for external use where:

- The Code Water Calculation Tool indicates that the demands of those internal fittings specified to be supplied with rainwater are being met and where an excess volume of water is being collected to meet external water use of 9 litres per person per day\* (based on Environment Agency data on average UK water consumption).

\*Where gardens are covered entirely by hard landscaping, the above requirement can be halved.

Where a swimming pool or other large water consuming feature is present, this must be provided with 100 per cent rainwater or greywater. The water must comply with appropriate EU bathing water standards.

### **Correctly specified**

The specification of the rainwater collector should meet the following criteria:

- no open access at the top of the collector (a childproof lid is allowed)
- provision of a tap or other arrangement for drawing off water
- connection to the rainwater downpipes with an automatic overflow into the conventional rainwater drainage system
- a means of detaching the rainwater downpipe and access provision to enable cleaning of the interior
- where the collection system is to be sited outside, and not buried, it must be stable and adequately supported; the material used for the container shall be durable and opaque to sunlight
- where the system is part of a rainwater collection system providing internal water, water for external use may be provided in a separate tank to water required for internal water. This could be an overflow pipe leading from the main tank to a correctly specified water butt for external water use.

## Assessment Methodology

### **Design stage**

- Check that the specifications and capacity of storage complies with the assessment Criteria.

### **Post Construction Stage**

- Confirm which specifications and evidence provided at the Design Stage are still valid.
- Assess all the new specifications and evidence provided at post construction stage.

## Calculation Procedures

1. Where rainwater is collected for irrigation for individual gardens, the size requirements are calculated based on the number of bedrooms as defined above in the definition of sufficient size. Once this has been determined, it should then be confirmed whether the garden provided is made up entirely of hard spaces or is provided as a terrace or patio. The size required may then be adjusted and this should be in compliance with the definition of sufficient size defined above.
2. Where rainwater is collected for irrigation in communal gardens, the size requirements are based on the size of communal garden provided in m<sup>2</sup> as detailed in the definition of sufficient size above. The size requirements can be adjusted where the garden comprises of hard landscaping or where the planting requires minimal water as defined in the definition of sufficient size.
3. Where rainwater is collected for internal use and external use, the Code Water Calculator or calculation procedures of Wat 1 must be used to determine whether there is sufficient volume collected for external use. Sufficient volume to meet the requirements of this issue can be demonstrated where the demand of internal fittings which are to be using rainwater are met and where the excess water collected for external use of sufficient volume as defined in the definition of sufficient size.

## Checklists and Tables

None

## Common Cases of Non-Compliance

Pools, hot tubs or other large water-using features which are fed by mains water will automatically mean that credits cannot be awarded for this issue. This rule applies whether it is an internal or external feature, with exception of internal hot tubs

which should be assessed as a bath under the previous issue, Wat 1. Where such water features are present, credits can be awarded only where they use appropriately treated water from 100% rainwater or 100% greywater and all other criteria for this issue are met.

## Special Cases

None

## Background

Water is an increasingly scarce resource and more and more homes have metered water supplies with householders having to pay for any water they use.

Rainwater could be collected to reduce:

- the amount of water being discharged into drains and watercourses
- the risk of localised flooding
- overall water bills for householders.

The simplest and most cost-effective system for rainwater collection is the water butt. More complex central collection communal systems (using the same principles as the water butt) are available for all sizes of home or development.

Collection of rainwater for use in the dwelling, e.g. for WC flushing, is covered in Category 2: Wat 1 – Potable Water.

# Category 3: Materials

Issue ID	Description	No. of credits available	Mandatory Elements
Mat 1	Environmental Impact of Materials	15	Yes

## Aim

To encourage the use of materials with lower environmental impacts over their lifecycle.

## Assessment Criteria

There is a mandatory requirement with no available credits to achieve a Green Guide rating of between A+ and D for at least three of the following five elements of the building envelope:

- Roof
- External Walls
- Internal Walls (including separating walls)
- Upper and Ground Floors (including separating floors)
- Windows

Between 1 and 15 credits are available depending on the Green Guide ratings and relative distributions of different materials across the five main elements of the building envelope. The method for determining the credits to award for any given situation is described in the calculation procedure below.

Assessment Criteria		
	Mandatory	Credits
Where at least three of the following five key elements achieve a relevant Green Guide rating from the 2008 version of <i>The Green Guide</i> of A+ to D: <ul style="list-style-type: none"> <li>• Roof</li> <li>• External Walls</li> <li>• Internal Walls (including separating walls)</li> <li>• Upper and Ground Floors (including separating floors)</li> <li>• Windows</li> </ul>	All Levels	
Where the <i>Code Mat 1 Calculator Tool</i> is used to assess the number of credits awarded for the five key elements described above		1 – 15
<b>Default Cases</b>		
None		

## Information required to demonstrate compliance

<b>Schedule of Evidence Required</b> <b>To be read in conjunction with the <i>Definitions</i> and <i>Calculations</i> Sections.</b>	
Design Stage	Post Construction Stage
<p>Drawings or specification text* detailing:</p> <ul style="list-style-type: none"> <li>• Location and area of the elements</li> <li>• Details of the materials used within the elements</li> </ul> <p>* or a letter of instruction to a contractor /supplier or a formal letter from the developer to the Code assessor giving the specific undertaking</p>	<p><b>EITHER</b></p> <p>Letter from the developer confirming that the dwellings have been constructed in accordance with the design stage drawings/specifications</p> <p><b>OR</b></p> <p>As Built drawings or specifications stating:</p> <ul style="list-style-type: none"> <li>• The area and location of elements;</li> <li>• The type of product/materials used within the elements</li> <li>• The location of product/materials used.</li> </ul> <p><b>OR</b></p> <p>Assessor site inspection report</p> <p><b>OR</b></p> <p>Documentary evidence such as purchase orders or receipts for materials</p>
<p>Completed Code Mat 1 Calculator Tool, showing building elements at the design stage</p>	<p>Completed Code Mat 1 Calculator Tool, showing elements As Built</p>
<p>The assessor should keep a note in the project file to explain why a bespoke element is used instead of the available rating stated within the Green Guide</p> <p>Bespoke Green Guide ratings and their associated reference numbers must be provided</p>	<p>As Design Stage</p>



## Definitions

### **Building Envelope**

For the purpose of this issue, building envelope is defined as the overall superstructure of the particular building. Each building envelope may contain single or multiple dwellings.

Where multiple dwellings are contained within a single envelope, Green Guide specifications do not need to be applied to the individual dwellings. In this case, the percentages of all individual Green Guide specifications throughout the entire building must be included, even where significantly differing construction methods are used for different parts of the building.

The same specification may also be applied in the case where there are several identical buildings with identical building envelopes. In this case, there is no need to assess the identical buildings separately. For the building envelopes to be identical, they must be of the same size and share the same percentages of elements with the same Green Guide specifications.

### **Code Mat 1 Calculator Tool**

This is a tool developed for calculating the credit score for this issue.

### **The Green Guide**

This is a rating system for the embodied environmental impacts of construction products and materials. It is based on extensive quantitative data for materials, which has been translated into simple environmental profiles for building elements. An A+ to E rating represents the assessed life cycle environmental impact, with A+ rated specifications having the lowest overall environmental impact. It is used to assess the major building elements. The Green Guide will soon be available in book form and on line.

## Assessment Methodology

### **Design Stage**

The assessor must begin by confirming that for each building envelope; at least three mandatory building elements have achieved a rating of A+ to D. This applies to 100% of the area for each element.

The Green Guide indicates ratings for a number of building element specifications and gives guidance on the appropriate section to use, depending on the building type. Where an exact match to a specification cannot be found in the Green Guide, the assessor is likely to be able to find a similar specification. For specifications that address a function which is not typical for the element e.g. security, severe exposure, unusual loading or structural conditions, refer to the Code Service Provider. If in doubt, or if no similar specification is available, the assessor should contact the Code Service Provider for a bespoke rating.

The number of credits to be awarded for each building envelope must be calculated using the method described in the Calculation Procedure.

### **Post Construction Stage**

Verify that the evidence provided at the Design Stage is still valid and that no changes have occurred during construction. Where changes have occurred, the assessor should re-assess the issue as set out above.

## Calculation Procedure

### **Design Stage**

Credits are awarded on the basis of the rating in the Green Guide as follows:

Green Guide Rating	Credits
A+ Rating	3
A Rating	2
B Rating	1
C Rating	0.5
D Rating	0.25
E Rating	0

Where there is more than one specification for an element (e.g. more than one type of external wall), the credits are awarded for that element, depending on the area weighted Green Guide rating of each specification. For the purpose of this issue any doors with a large expanse of glazing, such as patio doors, should be assessed as windows. Similarly glazed areas of conservatories and rooflights should be assessed as windows.

The Code Mat 1 Calculator Tool allows up to four different specification types per element.

Where there is a close match to a specification in the Green Guide details should be entered for the specification and Green Guide Rating in the appropriate columns.

Where a specification does not have a close Green Guide match, the assessor should contact their Code Service Provider for a bespoke rating. A description of the specification and the bespoke rating must then be entered into the Code Mat 1 Calculator Tool and a note made in the assessment report to indicate the source of the bespoke rating.

The percentage area of each specification type for each element should be calculated and entered in the 'Percentage' column. This will calculate the total credits to be awarded. The Green Guide rating for each assessed element must be input to the Code Mat 1 Calculator Tool.

### ***Post Construction Stage***

Confirm that the final building construction matches that specified at design stage. Where any design changes have occurred, re-assess the element.

Ensure that the documentary evidence provided meets the requirements as stated in the post construction section of Information Required to Demonstrate Compliance.

## Checklists and Tables

None

## Common Cases of Non-Compliance

None

## Special Cases

For Mixed Use developments, contact the Code Service Provider for advice on how to proceed. The following principles will form the basis of guidance given:

- Where dwellings are located over non-domestic accommodation (eg retail or car parking), the lowest residential floor should be assessed as the 'ground floor' using the 'upper floor' ratings in the Green Guide.
- If the external walls, internal walls and/or windows are located over non-domestic accommodation, only those that relate to the dwellings need to be included in the assessment.

- Where non-domestic accommodation is located between the dwellings and the roof, the roof must be assessed as it is protecting the dwellings below. If the roof is directly above a commercial use (e.g. a restaurant or office) the equivalent commercial rating for the roof must be used as opposed to the ratings for domestic roofs. Roof areas to parts of the building not containing dwellings can be omitted from the assessment.

## Background

The production, use and disposal of building materials accounts for significant quantities of energy and resources, both internationally and within the UK. The Green Guide provides a simple tool to aid specifiers in considering the environmental implications of their choices. The Green Guide and the publication *BRE methodology for environmental profiles of construction materials, components and buildings* (Howard et al, 1999), are based on life cycle assessment (LCA), an approach which measures and assesses a range of environmental impacts from “cradle to grave”. The Green Guide uses LCA data gathered from the majority of UK construction products’ trade associations.

The Green Guide applies a weighting system to calculate a summary score on a scale from A+ to E, with A+ rated specifications having the lowest overall environmental impact. It is these summary Green Guide ratings that the Code considers for the five key elements above. Building Materials and components are presented in their typical, As Built elemental form. They are compared on a like-for-like basis, as specifications that fulfil similar functions. The specifications are compared over a 60-year environmental profiling study period. Included in this is any repair and maintenance over the 60-year study period, and impacts relating to an assumed dismantling/demolition of the building at the end of its life which may occur at any point after 60 years.

Issue ID	Description	No. of credits available	Mandatory Elements
Mat 2	Responsible Sourcing of Materials – Basic Building Elements	6	No

## Aim

To recognise and encourage the specification of responsibly sourced materials for the basic building elements.

## Assessment criteria

Points are awarded where materials used in key building elements are responsibly sourced according to the following criteria:

Criteria	
	Credits
Where 80% of the <i>assessed materials</i> in the following <i>Building Elements</i> are responsibly sourced: <ul style="list-style-type: none"> <li>a) Frame</li> <li>b) Ground floor</li> <li>c) Upper floors (including separating floors)</li> <li>d) Roof</li> <li>e) External walls</li> <li>f) Internal walls (including separating walls)</li> <li>g) Foundation/substructure (excluding sub-base materials)</li> <li>h) Staircase</li> </ul> Additionally, 100% of any timber in these elements must be legally sourced	1–6
<b>Default Cases</b> None	

Note: These criteria are assessed at the building envelope level

## Information required to demonstrate compliance

<b>Schedule of Evidence Required</b> <b>To be read in conjunction with the <i>Definitions</i> and <i>Calculations</i> Sections.</b>	
Design Stage	Post Construction Stage
<p>Drawings or specification text* detailing:</p> <ul style="list-style-type: none"> <li>• The location of elements and materials specified</li> <li>• Details of the materials specified</li> </ul> <p>* or a letter of instruction to a contractor/supplier or a formal letter from the developer to the Code assessor giving the specific undertaking</p>	<p><b>EITHER</b></p> <p>Letter from the developer confirming that the dwellings have been constructed in accordance with the design stage drawings and specifications provided.</p> <p><b>OR</b></p> <p>As Built drawings and specifications and evidence* confirming:</p> <ul style="list-style-type: none"> <li>• The area and location of elements</li> <li>• The type of product/materials used within the elements</li> <li>• The location of product/materials used</li> </ul> <p>*such as purchase orders or similar or an assessor site inspection report</p> <p><b>AND</b></p> <p>Copies of purchase orders or receipts or certificates/letters of conformity for all applicable materials, including those recycled or re-used</p>
<p>Completed Code Mat 2 Calculator Tool or relevant calculations showing elements at the design stage</p>	<p>Completed Code Mat 2 Calculator Tool or relevant calculations, if different from the design stage</p>
<p>For Re-used Materials:</p> <p>Documentation stating which particular materials within the development will be from re-used materials</p> <p>Trade information or a letter from the developer is acceptable</p>	<p>For Re-used Materials:</p> <p>Documentation demonstrating which materials within the development have been re-used from other sources</p> <p>A receipt or letter from the supplier, which includes material quantities, is acceptable</p>

<p>For Recycled Materials:</p> <p>Documentation stating the particular elements within the development that will be using recycled materials</p> <p>A letter of intent to use suppliers who can provide an EMS certificate (or equivalent) for the recycling process must be provided</p>	<p>For Recycled Materials:</p> <p>Documentation stating the particular elements within the development that have used recycled materials</p> <p>For materials certified through the EMS route, Key Process stage evidence must also be provided</p>
<p>For materials certified through the EMS route, a letter of intent to use suppliers who can provide an EMS certificate (or equivalent) for the key process and/or extraction stages of their product must be provided.</p>	<p>For materials certified through the EMS route, any one of the following must be provided as appropriate:</p> <ul style="list-style-type: none"> <li>• Copy of the ISO 14001 certificate</li> <li>• Copy of the EMAS certificate</li> <li>• For <i>small</i> companies confirmation that the company EMS is structured in compliance with BS 8555:2003 (or equivalent) and the EMS has completed phase audits one to four as outlined in BS 8555. This can be found in company documentation demonstrating the process and typical outputs from phase four audits such as an EMS manual/ paperwork and guidance to staff. Where independent certification exists to demonstrate these phases, it can be used as evidence</li> </ul>
<p>Certified timber requires a letter of intent to use suppliers capable of providing certification to the level required for the particular tier claimed. This could be demonstrated by a commitment to use a specific scheme(s)</p>	<p>Certified timber requires a copy of the certification document or Chain of Custody (CoC) certificate (as appropriate)</p> <p>Where any non-certified timber is used, written confirmation from the supplier/s confirming that:</p> <ul style="list-style-type: none"> <li>• All timber comes from a legal source</li> <li>• All timber species and sources used in the development are not listed on any of the CITES appendices for endangered or threatened species (Appendix I, II, or III)</li> </ul> <p>One of the following statements (or similar) must be provided, signed by the</p>

timber supplier(s) and included in the assessment report:

“I confirm that none of the timber species used within this development are identified on the CITES list (Appendices I, II and III)”

**OR**

“I confirm that none of the timber species used within this development are identified on the CITES list (Appendices I and II) and where a timber species used in the development is listed in Appendix III of the CITES list, I confirm that it has not been sourced from the country seeking to protect this species as listed in Appendix III”

## Definitions

### Assessed Materials

The following materials are assessed in the calculation of points:

Brick (including clay tiles and other ceramics)

Resin based composite materials (including GRP and polymeric render, but excluding composite which incorporates timber).

Concrete (including in situ and pre cast concrete, blocks, tiles, mortars, cementitious renders,etc)

Glass

Plastics and rubbers (including EPDM, TPO, PVC, VET Roofing membranes and polymeric render)

Metals (steel, aluminium etc.)

Dressed or building stone including slate

Timber, wood panel products and wood based composites (including cement bonded particle board, laminated veneered lumber, glulam)

Plasterboard and plaster

Bituminous materials, such as roofing membranes and asphalt



Other mineral based materials, including fibre cement and calcium silicate

Products with recycled content

Note: Insulation materials, fixings, adhesives, and additives are excluded from the assessment. For any other materials which do not fit into the Assessed materials or the exclusions, please refer to the Code Service Provider who will identify the relevant key Processes and Supply Chain Process or Processes.

### **Building Elements**

For the purpose of this issue, the assessed Building Elements are defined below:

- a) Frame
- b) Ground floor
- c) Upper floors (including separating floors)
- d) Roof (structure and cladding, including any loft boarding)
- e) External walls (including external cladding)
- f) Internal walls (including internal partitions and separating walls)
- g) Foundation/substructure
- h) Staircase (includes the tread, rises and stringers)

### **Building Envelope**

See Mat 1

### **CPET**

Central Point of Expertise on Timber

### **Chain of Custody (CoC)**

This is a process used to maintain and document the chronological history of the evidence/path for products from forests to consumers. Wood must be tracked from the certified forest to the finished product. All the steps, from the transporting wood from the forest to a sawmill until it reaches the customer must maintain adequate inventory control systems that allow for separation and identification of the certified product. Chain of custody certification ensures that a facility has procedures in place to track wood from certified forests and avoid confusing it with non certified wood. Chain of custody is established and audited according to relevant forest certification systems rules.

### **CITES**

The Convention on International Trade in Endangered Species of Wild Fauna and Flora

**Code Mat 2 Calculator Tool**

A spreadsheet-based tool designed to simplify assessment of this issue. Available to assessors from the Code Service Provider

**Composite Materials**

Composite material can be defined as an engineered material made from two or more constituent materials with significantly different physical or chemical properties and which remain separate and distinct on a macroscopic level within the finished structure. Resin based composites (such as GRP and polymeric render) and timber composites (such as Chipboard/ Particleboard, MDF, OSB, plywood, hardboard, laminated veneered lumber, glulam and cement bonded particleboard) are all required to be assessed for responsible sourcing within the Code for Sustainable Homes

**CSA**

Canadian Standards Association

**EMS**

Environmental Management System

**EMAS**

Eco-Management and Audit Scheme

**EPDM**

Ethylene propylene Diene Monomer

**FSC**

Forest Stewardship Council

**Key Processes**

These are the final major aspects of processing that are carried out. There may be a single process or multiple processes requiring assessment, depending on the end product. The requirements for each of the assessed materials are detailed in Table 3.2: EMS Requirements.

**Legally Sourced Timber**

All timber must come from a legal source. Legally sourced means that harvesting and all relevant activities are carried out in line with relevant forest management laws and codes of practice in the product's country of origin, and also throughout its subsequent supply chain. Relevant documentation demonstrating the above should either be provided or made available on request subject to the availability of such materials in the country concerned. See Information Required to Demonstrate Compliance for further details.

**MTCC**

The Malaysian Timber Certification Council

**MDF**

Medium Density Fibreboard

<b>OSB</b>	Oriented Strand Board
<b>PEFC</b>	Programme of Endorsement of Forest Certification Schemes
<b>Pre-consumer Waste Stream:</b>	Waste material generated during manufacturing processes. Excluded is reutilisation of materials such as rework, regrind or scrap generated in a process and capable of being reclaimed within the same process that generated it.
<b>Post-consumer Waste Stream</b>	Waste material generated by households or by commercial, industrial and institutional facilities in their role as end-users of the product, which can no longer be used for its intended purpose. This includes returns of material from the distribution chain.
<b>PVC</b>	Poly Vinyl Chloride
<b>Recycled Material</b>	Materials diverted from the pre-consumer and/or post-consumer waste streams that require significant processing before they can be used again. For further information please see <i>Calculating and declaring recycled content in construction products, "Rules of Thumb" Guide</i> (WRAP, 2008)
<b>Responsible Sourcing</b>	This is demonstrated through auditable third party certification schemes.
<b>Re-used Materials</b>	Materials diverted from the waste stream and used again without further processing, or with minor processing that does not alter the nature of the material (e.g. cleaning, cutting, fixing to other materials).
<b>Small Company</b>	<p>A company is defined as 'small' if it satisfies at least two of the following criteria:</p> <ul style="list-style-type: none"> <li>a. A turnover of not more than £5.6 million</li> <li>b. A balance sheet total of not more than £2.8 million</li> <li>c. 50 employees or less</li> </ul> <p>This is based on the definition stated in the Companies Act of 1985.</p>
<b>SGS</b>	Société Générale de Surveillance. A Swiss based private monitoring company

<b>SFI</b>	Sustainable Forestry Initiative
<b>Supply Chain EMS</b>	This covers all of the major aspects of processing and extraction involved in the supply chain for the end product.  Note: Recycled materials are not required to demonstrate a Supply Chain EMS. If EMS certification is provided for the Key Processes for recycled materials, this is assumed by default.
<b>Tier levels</b>	The Tier levels are graded in a scale to reflect the rigour of the certification scheme used to demonstrate responsible sourcing, forming the basis for awarding Points (all as detailed in Table Cat 3.1).
<b>TPO</b>	Thermo Plastic Olefin
<b>TFT</b>	Tropical Forest Trust
<b>Verified</b>	“Verified” is a scheme produced by SmartWood
<b>VET</b>	Vinyl Ethylene Terpolymer

## Assessment Methodology

### ***Design Stage***

- Where a construction make-up is not specified within the Code Mat 2 Calculator Tool, confirm construction details of elements using the specification and drawings, or similar (see Information Required to Demonstrate Compliance). Obtain a breakdown of volumes and/or percentages of materials for each element present.
- Obtain the relevant confirmation of tier certification for design stage (see Information Required to Demonstrate Compliance) for all\* materials, from all sources/suppliers.

\* The following exclusions apply:

Material groups not included in the list in Definitions (e.g. insulation materials, fixings, adhesives, additives)

Materials that account for less than 10% by volume of an element may also be excluded (e.g. screws). However, if certification has been provided for materials in this category, it may be beneficial to include them in the calculation (e.g. if a material type accounting for 9% is placed in a higher tier than other materials used to make up the element).

- Assign a tier level to each material based on the level of certification provided (see Table : Cat 3.1: Tier Levels and Compliance and Information Required to Demonstrate Compliance).
- Follow the Calculation Procedure outlined below. It is recommended that the Code Mat 2 Calculator Tool is used to assess the number of points and credits to be awarded.
- Ensure all timber is legally sourced and that none of the species to be used are identified on the CITES list.

#### Notes:

1. For any other materials which do not fit into the assessed materials or the exclusion, please refer back to the Code Service Provider who will identify the relevant key processes and supply chain process/processes.
2. MDF, chipboard, OSB and cement bonded particle are all considered as timber and therefore must be assessed based as timber material.
3. Where a mix of virgin and recycled timber is used, only the virgin timber needs to be assessed. Credits can then be awarded based on the certification schemes they are under. Slate is classed as stone and is therefore considered as an assessed material.

#### **Post Construction Stage**

- Check that the As Built construction matches the construction proposed at design stage (see Information Required to Demonstrate Compliance). Where there are any differences obtain the relevant volumes and/or percentages of materials for each element that differs.
- Obtain the relevant confirmation of tier certification for Post Construction Stage (see Information Required to Demonstrate Compliance) for all materials, from all sources/suppliers.
- Confirm and/or re-assign a tier level to each material based on the level of certification provided (see Table: Cat 3.1: Tier Levels and Compliance and Information Required to Demonstrate Compliance).
- Adjust the design stage Code Mat 2 Calculator Tool accordingly to include any revised information following the calculation procedure used at design stage.
- Ensure there is evidence to demonstrate that the timber is legally sourced and that none of the species to be used are identified on the CITES list.

## Calculation Procedures

Points and Credits for this issue should be calculated using the Code Mat 2 Calculator Tool. The tool will calculate the total number of points taking into account the scenarios mentioned above. It will also state the associated number of credits. A copy of the output from the tool should be included with the assessment report.

Elements should be entered as present or not present and the tool will calculate the range of points required to achieve a number of credits in accordance with Table: Cat 3.3. **A minimum of 5 elements must be assessed.** This is the minimum number of elements assumed by the calculator tool. Where fewer are indicated the calculator will award **zero** credits and flag an error message as it does at other stages if there is non-compliance with any of the criteria.

A minimum of 80% of each element assessed must comply with Tiers 1 to 4 (excluding materials not assessed).

If 80% of an assessed element is compliant with a single tier, the full score available for that Tier will apply.

If 80% of an element is compliant over a number of tiers, the calculator will first review the percentage compliant with the highest tier and apportion a score to that. If less than 80% is compliant, it will review the percentage of the element in the next highest tier and apportion a score to that. This will continue until the 80% requirement has been met.

As a result of this methodology, it may be beneficial to include even small percentages of materials that are in the higher tiers if the majority of the rest of the element would otherwise be allocated a lower tier level.

## Checklists and Tables

Table: Cat 3.1 Tier Levels				
Tier Level	Issue Assessed	Points Available per Element	Evidence/ Measure Assessed	Examples of Compliant Schemes
1	Legality & responsible sourcing	3	Certification scheme	FSC, CSA, SFI with CoC, PEFC, Re-used Materials
2	Legality & responsible sourcing	2	Certification scheme	There are currently no schemes allocated to this tier
3	Legality & responsible sourcing	1.5	Certification scheme/EMS	Timber: MTCC, Verified, SGS, TFT
				Other materials: Certified EMS for the Key Process and <i>Supply Chain</i>
				Recycled Materials with certified EMS for the <i>Key Process</i>
4	Legality & responsible sourcing	1	Certification scheme/EMS	Certified EMS for the <i>Key Processes</i>
<p>Note:</p> <p>Where any timber is used, it must be legally sourced. Where evidence cannot be provided to demonstrate legal sourcing for any element, no points can be awarded for the Responsible Sourcing Issue.</p> <p>Where in situ concrete is used, certification of the manufacture of the cement as the primary process, extraction of the aggregate and limestone used to make the cement as well as supply chain processes to be provided.</p>				

\**Verified* is the name of a scheme

Table : Cat 3.2 Environmental Management System (EMS) Requirements		
Material	Key Process	Supply chain processes
Brick (including clay tiles and other ceramics)	Product Manufacture	Clay Extraction
Resin based composite materials (including GRP and polymeric render, but excluding composite using timber)	Composite product manufacture	<ul style="list-style-type: none"> <li>• Glass fibre production (or other principal matrix material if used)</li> <li>• Polymer production (or other principal reinforcement material if used)</li> </ul>
In situ Concrete (including ready mix and cementitious mortars and renders)	Ready mixed concrete plant	<ul style="list-style-type: none"> <li>• Cement production</li> <li>• Aggregate extraction and production</li> </ul>
Precast concrete and other concrete products (including blocks, cladding, precast flooring, concrete or cementitious roof tiles)	Concrete product manufacture	<ul style="list-style-type: none"> <li>• Cement production</li> <li>• Aggregate extraction and production</li> </ul>
<i>continued</i>		

Table : Cat 3.2 Environmental Management System (EMS) Requirements		
Material	Key Process	Supply chain processes
Glass	Glass production	<ul style="list-style-type: none"> <li>• Sand extraction</li> <li>• Soda Ash production or extraction</li> </ul>
Plastics and rubbers (including polymeric renders, EPDM, TPO, PVC and VET roofing membranes)	Plastic/rubber product manufacture	Main polymer production
Metals (steel, aluminium etc)	Metal Product manufacture – e.g. cladding production, steel section production	<p>Metal production:</p> <ul style="list-style-type: none"> <li>• Steel: Electric arc furnace or Basic oxygen furnace process,</li> <li>• Aluminium, ingot production,</li> <li>• Copper: ingot or cathode production.</li> </ul>
Dressed or building stone (including slate)	Stone product manufacture	Stone extraction
Plasterboard and plaster	Plasterboard or plaster manufacture	<ul style="list-style-type: none"> <li>• Gypsum extraction</li> <li>• Synthetic gypsum (from flue gas desulphurisation) by default (recycled content)</li> </ul>
Virgin timber and timber products such as laminated veneered lumber, glulam etc	Timber from certified sources	<ul style="list-style-type: none"> <li>• Timber from certified sources</li> </ul>
Cement Bonded Particle Board	Due to the significant cement content, in addition to requiring timber certification, the key supply chain process must also be considered to obtain the relevant tier for timber certification. Production of Cement Bonded Particleboard	<ul style="list-style-type: none"> <li>• Cement production</li> <li>• Timber from certified sources</li> </ul>
Wood panel products such as Oriented Strand Board, plywood, chipboard/particle board, etc.)	Wood panel products, including those with recycled content, can only use the Timber Certification route	
Bituminous materials, such as roofing membranes and asphalt	Product manufacture	<ul style="list-style-type: none"> <li>• Bitumen production</li> <li>• Aggregate extraction and production</li> </ul>
Other mineral based materials, including fibre cement and calcium silicate	Product manufacture	<ul style="list-style-type: none"> <li>• Cement production</li> <li>• lime production</li> <li>• other mineral extraction and production</li> </ul>
Products with 100% recycled content	Product manufacture	Recycled input by default
<i>continued</i>		



Table : Cat 3.2 Environmental Management System (EMS) Requirements		
Material	Key Process	Supply chain processes
Products with lower % of recycled content	Product manufacture	<ul style="list-style-type: none"> <li>Supply chain process(es) for any virgin material in the relevant product type above.</li> <li>Recycled input by default</li> </ul>
Any other product	Key processes is likely to be product manufacture	1 or 2 main inputs with significant production or extraction impacts should be identified
Excluded products: insulation materials, fixings, adhesives, additives	N/A	N/A

Table : Cat 3.3 Credit Structure				
	Credits available			
	6	4	3	2
Number of elements	Range of Points			
8	≥18	≥12	≥9	≥6
7	≥15.75	≥10.25	≥7.87	≥5.25
6	≥13.5	≥9	≥6.75	≥4.5
5	≥11.25	≥7.5	≥5.625	≥3.75

## Common Cases of Non-Compliance

### ***Timber and Environmental Management Schemes (EMS)***

Where an Environmental management scheme is used to assess products made from recycled timber, 100% of the timber content must be recycled or sourced from one of the recognised timber certification schemes in Table : Cat 3.1. A timber product with 50% recycled timber and 50% legally sourced timber will not comply with the criteria and will not be awarded any points.

Using an EMS for new timber does not demonstrate timber certification and therefore does not qualify for points.

A statement of intent from a product manufacturer and/or supplier does not meet the requirements for this issue.

## Special Cases

If an element is made up primarily of a material not specified in this issue (e.g. straw bales), please contact the Code Service Provider for guidance on how to proceed.

For mixed use buildings, please refer to special cases in Mat 1.

## Background

Credits are awarded for responsible sourcing of materials through auditable third party certification schemes.

Responsible sourcing of materials is based on the fundamental principles of life cycle stewardship which is at the heart of the Brundtland definition (Brundtland, 1987) of sustainable development as “development which meets the needs of the present without compromising the ability of future generations to meet their own needs”

This means that the consequences and impacts of using materials must be considered from the point at which they are mined or harvested in their raw state, through manufacture and processing, through use, reuse and recycling, until their final disposal as waste with no further value.

Responsible sourcing of materials has environmental social and economic dimensions. Supply chain management and material stewardship are essential elements of responsible sourcing. Certification by independent, licensed competent bodies confirms compliance with the required standards.

Issue ID	Description	No. of credits available	Mandatory Elements
Mat 3	Responsible Sourcing of Materials – Finishing Elements	3	No

## Aim

To recognise and encourage the specification of responsibly sourced materials for the finishing elements.

## Assessment criteria

Credits are awarded on the basis of the requirements in the table below:

Criteria	
	Credits
Where 80% of the assessed materials in the following <i>Finishing Elements</i> are responsibly sourced: <ul style="list-style-type: none"> <li>a) Stair</li> <li>b) Window</li> <li>c) External &amp; internal door</li> <li>d) Skirting</li> <li>e) Panelling</li> <li>f) Furniture</li> <li>g) Fascias</li> <li>h) Any other significant use</li> </ul> Additionally, 100% of any timber in these elements must be legally sourced	1–3
<b>Default Cases</b> None	

## Information required to demonstrate compliance

<b>Schedule of Evidence Required</b> <b>To be read in conjunction with the <i>Definitions</i> and <i>Calculations</i> Sections</b>	
Design Stage	Post Construction Stage
<p>Drawings or specification text* detailing:</p> <ul style="list-style-type: none"> <li>• The location of elements and materials specified</li> <li>• Details of the materials specified</li> </ul> <p>* or a letter of instruction to a contractor/supplier or a formal letter from the developer to the Code assessor giving the specific undertaking</p>	<p><b>EITHER</b></p> <p>Letter from the developer confirming that the dwellings have been constructed in accordance with the design stage drawings and specifications provided.</p> <p><b>OR</b></p> <p>As Built drawings and specifications and evidence* confirming:</p> <ul style="list-style-type: none"> <li>• The area and location of elements</li> <li>• The type of product/materials used within the elements</li> <li>• The location of product/materials used</li> </ul> <p>*such as purchase orders or similar or an assessor site inspection report</p> <p><b>AND</b></p> <p>Copies of purchase orders or receipts or certificates/letters of conformity for all applicable materials, including those recycled or re-used</p>
Completed Code Mat 3 Calculator Tool or relevant calculations showing elements at the design stage	Completed Code Mat 3 Calculator Tool or relevant calculations, if different from the design stage
<p>For Re-used Materials:</p> <p>Documentation stating which particular materials within the development will be of re-used materials</p> <p>Trade information or a letter from the developer is acceptable</p>	<p>For Re-used Materials:</p> <p>Documentation demonstrating which materials within the development has been re-used from other sources</p> <p>A receipt or letter from the supplier, which includes material quantities, is acceptable</p>

<p>For Recycled Materials:</p> <p>Documentation stating the particular elements within the development that will be using recycled materials</p> <p>A letter of intent to use suppliers who can provide an EMS certificate (or equivalent) for the recycling process must be provided</p>	<p>For Recycled Materials:</p> <p>Documentation stating the particular elements within the development that have used recycled materials</p> <p>For materials certified through the EMS route, Key Process stage evidence must also be provided</p>
<p>For materials certified through the EMS route, a letter of intent to use suppliers who can provide an EMS certificate (or equivalent) for the process and/or extraction stages of their product must be provided.</p>	<p>For materials certified through the EMS route, any one of the following must be provided as appropriate:</p> <ul style="list-style-type: none"> <li>• Copy of the ISO 14001 certificate</li> <li>• Copy of the EMAS certificate</li> <li>• For <i>small</i> companies confirmation that the company EMS is structured in compliance with BS 8555:2003 (or equivalent) and the EMS has completed phase audits one to four as outlined in BS 8555. This can be found in company documentation demonstrating the process and typical outputs from phase four audits such as an EMS manual/paperwork and guidance to staff. Where independent certification exists to demonstrate these phases, it can be used as evidence</li> </ul>
<p>Certified timber requires a letter of intent to use suppliers capable of providing certification to the level required for the particular tier claimed. This could be demonstrated by a commitment to use a specific scheme(s)</p>	<p>Certified timber requires a copy of the certification document or Chain of Custody (CoC) certificate (as appropriate).</p> <p>Where any non-certified timber is used, written confirmation from the supplier/s confirming that:</p> <ul style="list-style-type: none"> <li>• All timber comes from a legal source</li> <li>• All timber species and sources used in the development are not listed on any of the CITES appendices for endangered or threatened species (Appendix I, II, or III)</li> </ul>

	<p>One of the following statements (or similar) must be provided, signed by the timber supplier(s) and included in the assessment report:</p> <p>“I confirm that none of the timber species used within this development are identified on the CITES list (Appendices I, II and III)”</p> <p><b>OR</b></p> <p>“I confirm that none of the timber species used within this development are identified on the CITES list (Appendices I and II) and where a timber species used in the development is listed in Appendix III of the CITES list, I confirm that it has not been sourced from the country seeking to protect this species as listed in Appendix III”</p>
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## Definitions

### Finishing Elements

For the purpose of this issue, the assessed Finishing Elements are defined below:

- a) Stair (including handrails, balustrades, banisters, other guarding/rails, excluding staircase)
- b) Window (including sub-frames, boards, sills)
- c) External & internal door (including sub-frames, frames, linings, door)
- d) Skirting (including architrave, skirting board and rails)
- e) Panelling (including any other trim)
- f) Furniture (including fitted kitchen, bedroom and bathroom units)
- g) Fascias (soffit boars, bargeboards, gutter boards, others)
- h) Any other significant use

**For all other definitions please see Mat 2**

## Assessment Methodology

### **Design Stage**

- Where a construction make-up is not specified within the Code Mat 2 Calculator Tool, confirm construction details of elements using the specification and drawings, or similar (see Information Required to Demonstrate Compliance). Obtain a breakdown of volumes and/or percentages of materials for each element present.
- Obtain the relevant confirmation of tier certification for design stage (see Information Required to Demonstrate Compliance) for all\* materials, from all sources/suppliers.

\* The following exclusions apply:

Material groups not included in the list in Definitions (e.g. insulation materials, fixings, adhesives, additives)

Materials that account for less than 10% by volume of an element may also be excluded (e.g. screws). However, if certification has been provided for materials in this category, it may be beneficial to include them in the calculation (e.g. if a material type accounting for 9% is placed in a higher tier than other materials used to make up the element).

- Assign a tier level to each material based on the level of certification provided (see Table : Cat 3.1: Tier Levels and Compliance and Information Required to Demonstrate Compliance).
- Follow the Calculation Procedure outlined below.
- Ensure all timber legally sourced and that none of the species to be used are identified on the CITES list.

Notes:

1. For any other materials which do not fit into the assessed materials or the exclusion, please refer back to the Code Service Provider who will identify the relevant key processes and supply chain process/processes.
2. MDF, chipboard, OSB and cement bonded particle are all considered as timber and therefore must be assessed based as timber material.
3. Where a mix of virgin and recycled timber is used, only the virgin timber needs to be assessed. Credits can then be awarded based on the certification schemes they are under. Slate is classed as stone and is therefore considered as an assessed material.

### **Post Construction Stage**

- Check that the As Built construction matches the construction proposed at design stage (see Information Required to Demonstrate Compliance). Where there are any differences obtain the relevant volumes and/or percentages of materials for each element that differs.

- Obtain the relevant confirmation of tier certification for Post Construction Stage (see Information Required to Demonstrate Compliance) for all materials, from all sources/suppliers.
- Confirm and/or re-assign a tier level to each material based on the level of certification provided (see Table : Cat 3.1: Tier Levels and Compliance and Information Required to Demonstrate Compliance).
- Adjust the design stage Mat 3 Calculator Tool accordingly to include any revised information following the calculation procedure used at design stage.
- Ensure there is evidence to demonstrate that the timber is legally sourced and that none of the species to be used are identified on the CITES list.

## Calculation Procedures

Credits for this issue should be calculated using the Code Mat 3 Calculator Tool. The tool will calculate the total number of points taking into account the scenarios mentioned above. It will also state the associated number of credits. A copy of the tool should be included with the assessment report.

Elements should be entered as present or not present and the tool will calculate the range of points required to achieve a number of credits in accordance with Table 3.3. The calculator is programmed to flag up error messages at stages where there is non compliance with the criteria which should assist with assessing this issue.

A minimum of 80% of each element assessed must comply with Tiers 1 to 4 (excluding materials not assessed).

If 80% of an assessed element is compliant with a single tier, the full score available for that Tier will apply.

If 80% of an element is compliant over a number of tiers, the calculator will first review the percentage compliant with the highest tier and apportion a score to that. If less than 80% is compliant, it will review the percentage of the element in the next highest tier and apportion a score to that. This will continue until the 80% requirement has been met.

As a result of this methodology, it may be beneficial to include even small percentages of materials that are in the higher tiers if the majority of the rest of the element would otherwise be allocated a lower tier level.



## Checklists and Tables

Refer to Mat 2 for Tier Levels and EMS Requirements.

Table : Cat 3.4: Credit Structure			
	Credits available		
	3	2	1
No. of elements present	Points range		
8	≥18	≥12	≥6
7	≥15.75	≥10.25	≥5.25
6	≥13.5	≥9	≥4.5
5	≥11.25	≥7.5	≥3.75

## Common Cases of Non-Compliance

### **Timber and EMS Schemes**

Where an EMS scheme is used to assess products made from recycled timber, 100% of the timber content must be recycled or sourced from one of the recognised timber certification schemes in Table : Cat 3.1. A timber product with 50% recycled timber and 50% legally sourced timber will not comply with the criteria and will not be awarded any points.

Using an EMS scheme for new timber does not demonstrate timber certification and therefore does not qualify for any points.

A Statement of Intent from a product manufacturer and/or supplier does not meet the requirements for this issue.

## Special Cases

If an element being considered is made up primarily of a material not specified in this issue, please contact the Code Service Provider for further guidance.

For mixed use buildings refer to special cases in Mat 1.

## Background

Credits are awarded for responsible sourcing of materials through auditable third party certification schemes.

Responsible sourcing of materials is based on the fundamental principles of life cycle stewardship which is at the heart of the Brundtland definition (Brundtland, 1987)

of sustainable development as “development which meets the needs of the present without compromising the ability of future generations to meet their own needs”

This means that the consequences and impacts of using materials must be considered from the point at which they are mined or harvested in their raw state, through manufacture and processing, through use, reuse and recycling, until their final disposal as waste with no further value.

Responsible sourcing of materials has environmental social and economic dimensions. Supply chain management and material stewardship are essential elements of responsible sourcing. Certification by independent, licensed competent bodies confirms compliance with the required standards.

# Category 4: Surface Water Run-off

Issue ID	Description	No. of credits available	Mandatory Elements
Sur 1	Management of Surface Water Run-off from developments	2	Yes

## Aim

To design housing developments which avoid, reduce and delay the discharge of rainfall to public sewers and watercourses. This will protect watercourses and reduce the risk of localised flooding, pollution and other environmental damage.

## Assessment Criteria

Mandatory Elements must be achieved. Up to 2 credits are available for further improving management of rainfall runoff.

Criteria		
	Credits	Mandatory Elements
<p><b>Peak Rate of Runoff</b></p> <p>Ensure that the peak rate of runoff into watercourses is no greater for the developed site than it was for the pre-development site (see definition). This should comply with the Interim Code of Practice for Sustainable Drainage systems (SUDS) (CIRIA, 2004), or for at least the 1 year and 100 year return period events.</p> <p>For sites of <b>less than 200ha</b>, the calculation of Greenfield runoff rates should be in accordance with Flood estimation for small catchments (Marshall and Bayliss, 1994) and any subsequent updates.</p> <p>For sites of <b>200ha and more</b>, the calculation of Greenfield runoff rates should be in accordance with the Flood estimation handbook (Centre for ecology and hydrology, 1999) and any subsequent updates.</p> <p>An <b>allowance for climate change</b> should be made in accordance with current best practice (PPS25, 2006).</p> <p><b>Volume of Runoff</b></p> <p>Ensure that the additional predicted volume of rainwater discharge caused by the new development, for a 1 in 100 year event of 6 hour duration including an allowance for climate change (PPS25, 2006), should be reduced using infiltration and/or made available for use in the dwelling as a replacement for potable water use in non-potable applications such as WC flushing or washing machine operation.</p>	None	All Levels

<p>Where this additional rainwater volume cannot be prevented from being discharged for any reason, for all events up to the 100-year return period, the peak discharge rate from the site should be reduced to:</p> <ul style="list-style-type: none"> <li>• the pre-development site's estimated mean annual flood flow rate (Qbar); or</li> <li>• 2l/s/ha; or</li> <li>• a minimum flow rate (litres per second), based on good practice guidelines to prevent easy blockage, by ensuring the outlet throttle is not too small.</li> </ul> <p>If rainwater is discharged to a public sewer or adopted surface water sewer, flow rate requirements will be defined by the Sewerage undertaker.</p>		
<p>2 credits are available for using SUDS to improve water quality of the rainwater discharged or for protecting the quality of the receiving waters by:</p> <ol style="list-style-type: none"> <li>1. Ensuring no discharge to the watercourse for rainfall depths up to 5mm (follow guidance in the Interim Code of Practice for Sustainable Drainage systems (SUDS) (CIRIA, 2004).</li> </ol> <p>or</p> <ol style="list-style-type: none"> <li>2. Establish agreements for the ownership, long term operation and maintenance of all sustainable drainage elements used</li> </ol>	2	
<p><b>Default Cases:</b></p> <p>Credits can be awarded by default if the site discharges rainwater directly to a tidal estuary or the sea, because compliance with discharge flow rate requirements will not be required.</p>		

## Information required to demonstrate compliance

<b>Schedule of Evidence Required</b> <b>To be read in conjunction with the <i>Definitions</i> and <i>Calculations</i> Sections</b>	
<b>Design Stage</b>	<b>Post Construction Stage</b>
<p>Mandatory Elements</p> <p>Confirmation of the appointment of an appropriately qualified engineer or consultant to carry out the calculations and provide design criteria for all relevant elements.</p> <p>Copy of the consultant's or engineer's report and Flood Risk Assessment (see definition), containing all information necessary to meet the mandatory requirements.</p> <p>Copies of any drawings and specification text necessary to support the claims made.</p>	<p>Mandatory Elements</p> <p>Confirmation that the solutions designed have been implemented;</p> <p>Or provision of As Built drawings, specifications, designs and calculations.</p> <p>Significant time may have passed since the flood risk assessment was carried out, so where necessary, confirm that the basis of the Flood Risk Assessment has not changed.</p> <p><i>For information: Where SUDS have been implemented, the location and brief explanation of their purpose should</i></p>

	<i>be included in the Home User Guide (in Code Category 8: Man 1) where supplied.</i>
<p>Where credits are sought:</p> <p>Copy of the consultant's report detailing the design specifications, calculations and drawings to support the additional credits.</p> <p>Where detailed designs are not available at this stage, the specifications need to clearly state the essential design criteria.</p> <p>Proposed operation and maintenance plans. (Agreements do not need to be complete at this stage).</p>	<p>Where credits are sought:</p> <p>Confirmation from the consultant that the requirements of this credit have been achieved.</p> <p>Where different from the Design stage: copies of as-built designs and calculations and drawings to support the credits.</p> <p>Manufacturers' data covering details of any devices used.</p> <p>Where this credit is sought, copies of SUDS agreements established for on going operation and maintenance.</p>

## Definitions

### **Annual flood probability**

The estimated probability of a flood of given magnitude occurring or being exceeded in any year. Expressed as a chance of 1-in-100 or 1 per cent.

### **Annual flow rate probability**

The estimated probability of a flow rate of a given magnitude occurring or; being exceeded in any year. Expressed as, for example a chance of 1-in-100, or 1 per cent.

### **Appropriately qualified consultant or engineer**

A hydrological consultant or engineer.

The appropriate level of qualification required will depend on the complexity, size and density of build on the site

### **Catchment**

The area contributing surface water flow to a point on a drainage or water course. It can be divided into sub-catchments.

### **Flood probability**

The estimated probability of a flood of given magnitude occurring or being exceeded in any specified time period. For example, the 100-year flood has a 1% chance of occurring in any given year.

<b>Flood risk</b>	An expression of the combination of the flood probability and the magnitude of the potential consequences of the flood. For developments of less than 1ha (10 000m <sup>2</sup> ) the level of detail required in an acceptable FRA (for Sur 1) will depend on the size and density of build. This will range from a brief report for small, low density developments, to a more detailed assessment for a high density development 2000–10 000m <sup>2</sup> in size. For example: For very small developments (2000m <sup>2</sup> and less), an acceptable FRA could be a brief report done by the contractor's engineer, including information obtained from; the environment agency, water company/sewerage undertaker, other relevant statutory authorities, site investigation and local knowledge.
<b>Flood risk Assessment (FRA)</b>	A study to assess the risk of a site flooding, and to assess the impact that any changes or development on the site will have on flood risk on the site and elsewhere.
<b>Flood risk management Hierarchy</b>	The hierarchy of flood risk management measures and the role of the planning process in reducing flood risk. (see Practice guide Companion to PPS25).
<b>Flood storage</b>	The temporary storage of excess runoff or river flow in ponds, basins, reservoirs or on the flood plain during a flood.
<b>Flood Zones</b>	<p>These zones relate to flooding from the sea and rivers only and do not take into account flood defences. These are defined in PPS25.</p> <p>Zone 1 Low annual probability of flooding</p> <p>Zone 2 Medium probability of flooding</p> <p>Zone 3a High probability of flooding</p> <p>Zone 3b Functional Flood plain (water is stored here in times of flooding)</p>
<b>Greenfield</b>	A site which has either never been built on, or one which has lain undisturbed for five years or more.
<b>Greenfield runoff rate</b>	The rate of runoff that would occur from the site in its undeveloped (and therefore undisturbed) state.
<b>Groundwater flooding</b>	Flooding caused by groundwater escaping from the ground when the water table rises to or above ground level.

<b>ICoP (SUDS)</b>	The Interim Code of Practice for Sustainable Drainage Systems (SUDS) aims to facilitate the implementation of sustainable drainage in developments in England and Wales by providing model maintenance agreements and advice on their use. It provides a set of agreements between those public organisations with statutory or regulatory responsibilities relating to SUDS. Available to download from <a href="http://www.ciria.org.uk/suds/icop.htm">www.ciria.org.uk/suds/icop.htm</a>
<b>Impervious surfaces</b>	Often referred to as impermeable or hard surfaces, are surfaces which do not allow water to pass through.
<b>Infiltration</b>	The passage of water into a permeable surface, such as soil, permeable paving, soakaways and so on.
<b>NaFRA</b>	National flood risk assessment – This was completed in 2005 and used ground levels, predicted flood levels, information on flood defences, and local knowledge. The likelihood of flooding is described in one of three categories, low, moderate or significant, as used by the insurance industry. When clicking on the EA flood map (more information) these categories are used and explained further
<b>Peak runoff rate</b>	Referred to as $Q_p$ [ $m^3/sec$ ]  is the highest rate of flow from a defined catchment area assuming that rainfall is uniformly distributed over the drainage area, considering the entire drainage area as a single unit and estimation of flow at the most downstream point only
<b>Pervious surfaces</b>	Surfaces which allow water to pass through and include some surfaces which are thought of as 'hard' such as pervious asphalt on roads, block paving (the gaps between the blocks are pervious).
<b>Percentage runoff</b>	The proportion of rainfall that runs off a surface.
<b>Pre-development</b>	The state of a site immediately before the development under assessment i.e. brownfield or greenfield.
<b>Probability of flooding – Low – Zone 1</b>	This does not take into account other sources of flooding or defences. These are defined in PPS25.  Low annual probability of flooding is an area where the chance of both river and sea flooding each year is <0.1% (1 in 1000) or less.
<b>Probability of flooding – Medium – Zone 2</b>	An area where the chance of river flooding in any year is 1% (1 in 100) or less but greater than 0.1% (1 in 1000) and between a 1 in 200 and 1 in 1000 chance of sea flooding (0.5% – 0.1%).

<b>Probability of flooding – High – Zone 3a</b>	An area where the chance of river flooding in any year is > 1% (1 in 100) and a 1 in 200 or greater chance of flooding from the sea (>0.5%).
<b>Qbar</b>	An estimation of the mean annual flood flow rate from a catchment. (see Report IH124 Flood Estimations for small catchments)
<b>Rainfall intensity</b>	Depth of rain falling in unit or specified time, i.e. volume of rain falling in unit or specified time per unit area.
<b>Rainwater discharge</b>	Rainwater discharge is the rain water which flows from the development site to watercourses and sewers. It is also referred to as runoff.
<b>Relevant Statutory Body</b>	This will, in most cases, be the Environment Agency.
<b>Runoff</b>	This is usually rainwater, but can also be groundwater or overspill from sewers and other sources.
<b>Runoff rate</b>	The rate of discharge of water from a surface.
<b>Section 102 or 104</b>	A section within the Water Industry Act 1991 permitting the adoption of a sewer, lateral drain or sewage disposal works by a sewerage undertaker. Sometimes referred to as S102 or S104.
<b>Section 106 TCPA 1990</b>	A section within the Town and Country Planning Act 1990 that allows a planning obligation to a local planning authority to be legally binding.
<b>Section 106 WIA 1991</b>	A key section of the Water Industry Act 1991, relating to the right of connection to a public sewer.
<b>Sewerage undertaker.</b>	This is a water company with statutory responsibility for provision of sewerage for disposal of sewage and also surface water from roofs and yards of premises.
<b>Sewers for adoption</b>	A guide agreed between sewerage undertakers and developers (through the House Builders Federation) specifying the standards to which private sewers need to be constructed to facilitate adoption.
<b>Shoreline management plan (SMP)</b>	An <b>SMP</b> is a high level document that forms an important element of the strategy for flood and coastal erosion risk management.



**Sources of flooding and flood risk**

Fluvial (Rivers):

Tidal:

Groundwater: (most common in low-lying areas underlain by permeable rock (aquifers))

Sewers: combined, foul or surface water sewers

Surface water: sheet runoff from adjacent land (urban or rural)

Infrastructure failure: Canals, reservoirs, Industrial processes, burst water mains, blocked sewers or failed pumping stations

**SSSI**

Site of Special scientific interest

**SUDS**

Sustainable drainage systems or sustainable (urban) drainage systems: a sequence of management practices and control structures designed to drain surface water in a more sustainable fashion than some conventional techniques (may also be referred to as SUDS).

**SUDS devices**

Include:

- holding ponds
- swales
- reed beds
- permeable paving – in areas where local geological and

hydrological conditions allow this to function, e.g. block paved surface on permeable sub-base over gravel bed to store the water and allow it to seep into the soil. For less permeable soils the gravel layer might be deeper and the water taken to a soakaway although this is not an option in some areas.

- Local or centralised soakaways either as full systems or as 'overflow' or 'holding' systems, in areas where local geological and hydrological conditions allow them to function.
- Run-off from roofs collected as a part of a rainwater harvesting system (see additional guidance on water butts below).
- Run-off from hard surfaces directed to a local soakaway or other holding facility such as tanks, ponds, swales etc.
- Green roofs.

## **SUDS management train**

The staged management of rainwater as it discharges from a site. The SUDS management train starts with prevention, or good housekeeping measures, for individual premises; and progresses through local source controls to larger downstream site and regional controls. Runoff need not pass through all the stages in the management train. It could flow straight to a site control, but as a general principle it is better to deal with runoff locally, returning the water to the natural drainage system as near to the source as possible. Only if the water cannot be managed on site should it be conveyed elsewhere. This may be due to the water requiring additional treatment before disposal or the quantities of runoff generated being greater than the capacity of the natural drainage system at that point. Excess flows would therefore need to be routed off site. Further details available from [www.ciria.org.uk/suds](http://www.ciria.org.uk/suds)

## **SUDS model agreements**

A legal document that can be completed to form the basis of an agreement between two or more parties regarding the maintenance and operation of sustainable water management systems.

ICoP SUDS MA1

Planning obligation – incorporating SUDS provisions

Implementation and maintenance of SUDS either as a planning obligation under Section 106 of the Town and Country Planning Act, 1990 or as a condition attached to planning permission.

ICoP SUDS MA2

Legal framework that defines which body takes over and maintains the SUDS.

ICoP SUDS MA3

Model discharge agreement

A model deed in relation to owners of SUDS facilities granting sewerage undertakers rights in perpetuity to discharge, flood and maintain in default

## **SUDS Operations manual**

A manual describing the design of a particular device and how it should be operated and maintained over its lifecycle.

<b>Surface Water Runoff</b>	Water flow over the ground surface to a drainage system. This occurs if the ground is impermeable, is saturated or if the rainfall is particularly intense.
<b>Functional Floodplain – Zone 3b</b>	This land is where water flows or is stored in times of flood.
<b>Treatment</b>	Improving the quality of water by physical, chemical and/or biological means.
<b>Watercourses</b>	A term including rivers, streams, ditches, drains, cuts, culverts, dykes, sluices, sewers and passages through which water flows.

## Assessment Methodology

### *Design Stage*

- Check that an appropriately qualified consultant or engineer has been appointed
- Check that an appropriate Flood Risk Assessment (FRA) has been carried out (see definition) and that the consultant's or engineer's report contains all information necessary to satisfy the mandatory requirements.
- Where credits are sought: Check that the FRA and consultants reports contain all information needed to comply with either 1. Ensuring there is no discharge to the watercourse for rainfall depths up to 5mm; or 2. Treating rainwater using SUDS to improve its quality before discharge, and establish agreements for the ownership, long term operation and maintenance of all the sustainable drainage elements.
- Where design and build or similar contracts are used, detailed designs may not be available at this stage. Due to the nature of this issue, it is critical in all cases that the design criteria are clearly stated at this stage and that either the specification reflects this or other written confirmation is provided to show intent.
- The assessor is not required to perform any calculations as these will be provided by the design team.

### *Post Construction Stage*

- Check that the design stage solutions have been implemented or that all evidence has been supplied showing the As Built design and construction. The exact evidence required will vary according to the site.
- It is not feasible to list specific evidence requirements for all variations of solutions, so a site specific approach needs to be adopted.
- Check the time elapsed since the FRA was carried out. Where this is significant for example, more than five years, (unless major SWR changes have occurred

during this period) or it doesn't include an allowance for climate change, ask the consultant to confirm that the design basis has not changed.

- Check that the agreements for any SUDS elements present include all necessary devices and are completed.

## Calculation Procedures

None

## Common Cases of Non-Compliance

None of the credits can be awarded where the assessed development has proceeded against the recommendation of the Environment Agency on the basis that the flooding implications are too great.

## Special Cases

For derelict sites which have no runoff to sewers or watercourses, provided the site has derelict for five years or less, the pre-development discharge can be calculated for the previous site's use.

If the site has been derelict for over five years, then the undeveloped site must be treated as a greenfield site in order to award credits. ~~For sites of less than 200ha, the calculation of Greenfield runoff rates should be in accordance with Flood estimation for small catchments (Marshall and Bayliss, 1994) and any subsequent updates.~~

~~For sites of 200ha and more, the calculation of Greenfield runoff rates should be in accordance with the Flood estimation handbook (Centre for ecology and hydrology, 1999) and any subsequent updates.~~

~~An allowance for climate change should be made in accordance with current best practice (PPS25, 2006).~~

## Background

Around five million people, in two million properties, live in flood risk areas in England and Wales. The Government's Foresight report estimated that currently 80,000 properties also have a very high likelihood of flooding from surface water runoff (10% annual chance), causing on average £270 million of damage each year. Changes in climate, such as more severe storms will increase these risks (Environment Agency website [www.environment-agency.gov.uk/yourenv/eff](http://www.environment-agency.gov.uk/yourenv/eff)) meaning the associated costs could increase to several billion.

The main intention of this issue is to reduce the overall discharge of rainwater from impervious hard landscaped surfaces and roofs within the development. In housing developments, this can be usually be done by designing Sustainable Drainage Systems (SUDS), which might include specifying rainwater recycling, pervious paving for all hard surfaces in the development, the use of green roofs, soakaways or other systems that help reduce surface water loads.

Issue ID	Description	No. of credits available	Mandatory Elements
Sur 2	Flood Risk	2	No

## Aim

To encourage housing development in low flood risk areas, or to take measures to reduce the impact of flooding on houses built in areas with a medium or high risk of flooding.

## Assessment Criteria

Up to 2 credits are awarded where the assessed dwelling is located either in an area of low annual probability of flooding, or where a Flood Risk Assessment (FRA) shows that appropriate measures have been taken to ensure safe access and escape routes and flood resilient and resistant construction.

Criteria	
	Credits
<p><b>EITHER</b></p> <p>2 credits are available for developments situated in Zone 1 – low annual probability of flooding (as defined in PPS25 – ‘Planning and Flood Risk’) and where the site specific Flood Risk Assessment (FRA) indicates that there is low risk of flooding from all sources.</p>	2
<p><b>OR</b></p> <p>1 credit is available for developments situated in Zones 2 and 3a – medium and high annual probability of flooding where the finished ground floor level of all habitable parts of dwellings and access routes to the ground level and the site, are placed at least 600mm above the design flood level of the flood zone.</p> <p>The Flood Risk Assessment (FRA) accompanying the planning application must demonstrate to the satisfaction of the local planning authority and statutory body that the development is appropriately flood resilient and resistant, including safe access and escape routes where required, and that any residual risk can be safely managed.</p>	1
<p><b>Default Cases</b></p> <p>None</p>	

## Information required to demonstrate compliance

<b>Schedule of Evidence Required</b> <b>To be read in conjunction with the <i>Definitions and Calculations</i> Sections</b>	
Design Stage	Post Construction Stage
<p><b>For developments situated in Zone 1</b></p> <p>A Flood Risk Assessment (prepared according to good practice guidance as outlined in Development and Flood Risk: A practice guide companion to PPS25) which shows that there is a low risk of flooding from all sources.</p> <p><b>For medium (Zone 2) or high (Zone 3) flood risk areas:</b></p> <p>A Flood Risk Assessment (prepared according to good practice guidance as outlined in Development and Flood Risk: A practice guide companion to PPS25)</p> <p>Where applicable</p> <p>written confirmation from the Environment Agency of the reduction in flood risk category of the site if under the protection of existing/maintained flood defences*.</p> <p>supporting manufacturer’s data covering details of any flood protection measures for the dwelling.</p> <p>AND EITHER</p> <p>Site plans indicating the design flood level, the range of ground levels of the dwellings, car parking areas and site access (lowest to highest), showing that the criteria (finished floor levels of all habitable rooms and access routes being at least 600mm above the design flood level) are met, along with any notes required to explain the function of any areas lying below the design flood level.</p>	<p><b>For developments situated in Zone 1</b></p> <p>For low flood risk areas, no further evidence is needed, provided the basis on which the Flood Risk Assessment provided at design stage has not changed. This should be confirmed by the developer, or As Built details need to be supplied.</p> <p><b>For medium (Zone 2) or high (Zone 3) flood risk areas:</b></p> <p>As for design stage and if significant time has passed since the Flood Risk Assessment was carried out, confirmation that the basis of the Flood Risk Assessment has not changed.</p> <p>Confirmation that no changes have occurred to the specifications or plans, or As Built details need to be supplied.</p>

OR

Drawings showing the location and details of any flood protection measures for the dwelling or assessment of risk and specification of flood resilient construction.

\*Note: There are many defences, owned by third parties, which due to their location act as a defence by default. E.g. motorway and railway embankments, walls. Confirmation that these defences will remain in place for the lifetime of the development is required if a significant risk is predicted.

## Definitions

Also see definitions in SUR 1

<b>Design flood level</b>	The maximum estimated water level during the design storm event. The design flood level for a site can be determined through either known historical data or modelled for the specific site.
<b>Flood probability</b>	The estimated probability of a flood of given magnitude occurring or being exceeded in any specified time period. For example, the 100-year flood has a 1% chance of occurring in any given year.
<b>Flood protection measures</b>	This covers the range of flood protection measures which can be employed to protect individual dwellings and developments from the effects of flooding.
<b>Flood resilient construction</b>	Buildings that are designed to reduce the consequences of flooding and facilitate recovery from the effects of flooding sooner than conventional buildings.
<b>Flood resistant construction</b>	Buildings that prevent the entry of water or minimise the amount of water that may enter a building where there is flooding outside.
<b>Flood risk assessment</b>	A Flood Risk Assessment should be prepared according to good practice guidance as outlined in Development and Flood Risk: A practice guide companion to PPS 25. Available from <a href="http://www.communities.gov.uk">www.communities.gov.uk</a>



<b>High annual probability of flooding (Zone 3a)</b>	An area where the chance of river flooding in any year is > 1% (1 in 100) and a 1 in 200 or greater chance of flooding from the sea (>0.5%).
<b>Low annual probability of flooding (Zone 1)</b>	Low annual probability of flooding is an area where the chance of both river and sea flooding each year is <0.1% (1 in 1000) or less.
<b>Medium annual probability of flooding (Zone 2)</b>	An area where the chance of river flooding in any year is 1% (1 in 100) or less but greater than 0.1% (1 in 1000) and between a 1 in 200 and 1 in 1000 chance of sea flooding (0.5% – 0.1%).
<b>Residual Risk</b>	The risk which remains after all risk avoidance, reduction and mitigation measures have been implemented.

## Assessment Methodology

### *Design Stage*

- The assessor should confirm that a Flood Risk Assessment has been carried out. This is necessary to ensure that other sources of flooding (other than river and sea) are also a low risk. For small developments in low flood risk areas, this will be a relatively brief report.
- If the development is in Zone 1 and the Flood Risk Assessment shows low risk overall, 2 credits can be awarded. It should be noted that the Flood map accessible from the Environment Agency website only gives a rough estimation of flood risk and isn't used for planning submission. A Flood Risk Assessment requires contact with the local planning authority to discuss the site and benefit from information available.
- If the development is in Zone 2 or 3, the assessor should check that the Flood Risk Assessment submitted with the planning application has demonstrated to the relevant authorities that the development is appropriately designed as detailed in the criteria. If the evidence shows the finished floor levels and all access routes comply with the criteria and that any residual risks can be safely managed, one credit can be awarded.

### *Post Construction Stage*

- For developments in Zone 1, the assessor should simply check that the Flood Risk Assessment submitted at design stage (or if no design stage report completed, the Flood Risk Assessment used to gain planning consent) still represents an accurate assessment of flood risk. Whilst this can be assumed in most cases, some sites can take 10 years to build out and during this time many factors can change. In the case where the time lapse since the original report is greater than say 5 years, or doesn't include an allowance for climate change, ask for confirmation from the consultant that the basis on which the design was done has not changed.

- For developments in Zones 2 and 3, the assessor should check the Flood Risk Assessment as above and check to see that the As Built plans confirm the correct levels of the floors and access routes above the design flood levels.
- Where applicable, check that the specified flood protection measures have been designed and built according to the recommendations of the consultant.

## Calculation Procedures

None

## Common Cases of Non-Compliance

None of the credits can be awarded where the assessed development has proceeded against the recommendation of the Environment Agency on the basis that the flooding implications are too great.

Credits will also be withheld if flood defence schemes considered for this issue would reduce the performance of functional flood plains elsewhere.

## Special Cases

The flood risk for a site may be downgraded to a lower flood risk category as a result of existing flood defence installations. In such circumstances, a credit can be awarded where the following conditions are met:

- [1]. Where new flood defences have to be, or have been constructed to minimise the risk of flooding to the site and its locality.
- [2]. The development is located on a site benefiting from existing maintained flood defences.
- [3]. The Environment Agency confirms that, as a result of such defences, the risk of a flood event occurring is reduced to low or medium risk (as appropriate to the credit levels set in the Code). If firm confirmation is not provided then the credit cannot be awarded.

## Background

Flooding in the United Kingdom is increasing due to development on areas prone to flooding and more extreme weather patterns brought about by global warming. Other reasons have to do with increased rainwater discharge from hard surfaces and from some agricultural land.

Coastal flooding is increasing as sea levels rise as a result of global warming. Other sources of flooding include rivers, land/overland flow, groundwater aquifers and sewers. Sewer flooding is a major cause of flooding in urban areas.

Floods are now on average nearly twice as frequent as they were 100 years ago. Over seven percent of the land area of England and Wales is at risk from flooding and around five million people, in two million properties, live in flood risk areas in England and Wales (Environment Agency website [www.environment-agency.gov.uk/yourenv/eff](http://www.environment-agency.gov.uk/yourenv/eff)).

The Meteorological Office predicts a very significant increase in rainfall over the next century as a result of climate change. This will lead to increased incidences of flooding unless action is taken to reduce the impact. New developments can play a significant role by designing to reduce their own impact on flooding and by going beyond this to assist in reducing the overall flood risk.

The public are becoming increasingly aware of the devastating effects of flooding and so will demand more information from developers about flood risk and protection when purchasing homes.

# Category 5: Waste

Issue ID	Description	No. of credits available	Mandatory Elements
Was 1	Storage of non-recyclable waste and recyclable household waste	4	Yes

## Aim

To recognise and reward the provision of adequate internal and external storage space for non-recyclable waste and recyclable household waste.

## Assessment Criteria

The first issue of **household waste storage** sets a mandatory performance requirement with no available credits. This requirement must be met if a Code rating is to be achieved. Adequate internal space and adequate external space are defined in the definitions section.

Credits are awarded for the provision of storage space for household and recycling waste, in accordance with the criteria below.

Care should be taken to make sure that facilities are accessible to disabled people.

Criteria		
	Credits	Mandatory Elements
<p><b>Storage of household waste</b></p> <p>The space allocated for waste storage should be able to accommodate containers with at least the minimum volume recommended by British Standard 5906 (British Standards, 2005) based on a maximum collection frequency of once per week. This is 100 litres volume for a single bedroom dwelling, with a further 70 litres volume for each additional bedroom.</p> <p>A Local Authority recycling scheme offering containers equal to or greater than this volume would meet the requirement, providing adequate external space is allocated to accommodate them. If the Local Authority provides containers with a smaller volume, or if no Local Authority scheme exists, the developer will need to ensure and demonstrate that the minimum volume according to BS 5906 2005 and defined above, is met.</p> <p>All containers must be accessible to disabled people (checklist Was 1), particularly wheelchair users, and sited on a hard, level surface. To ensure easy access, the containers must not be stacked.</p>	None	All Levels

<p><b>Storage of recyclable household waste</b></p> <p>Dedicated internal storage for recyclable household waste can be credited where there is no (or insufficient) dedicated external storage capacity for recyclable material, no Local Authority collection scheme and where the following criteria are met:</p> <p>At least, three internal storage bins:</p> <ul style="list-style-type: none"> <li>• all located in an adequate internal space</li> <li>• no individual bin smaller than 15 litres</li> <li>• with a minimum total capacity 60 litres</li> </ul>	2	
<p>A combination of internal storage capacity provided in an adequate internal space, with either:</p> <ul style="list-style-type: none"> <li>• a Local Authority collection scheme; or</li> <li>• No Local Authority collection scheme but adequate external storage capacity.</li> </ul> <p><b>Local Authority Collection Scheme</b></p> <p>In addition to a Local Authority Collection Scheme (with a collection frequency of at least fortnightly) at least one of the following requirements must be met:</p> <ul style="list-style-type: none"> <li>• where recyclable household waste is sorted <b>after</b> collection and at least a single 30 litre bin is provided in an adequate internal space.</li> <li>• where materials are sorted <b>before</b> collection and at least three separate bins are provided with 30 litres total capacity. Every bin must have a capacity of at least 7 litres and be located in an adequate internal space.</li> <li>• an automated waste collection system which collects at least 3 different types of recyclable waste.</li> </ul> <p><b>No Local Authority collection scheme but adequate external storage capacity</b></p> <p><b>For houses and flats</b>, there must be at least 3 identifiably different <b>internal</b> storage bins for recyclable waste, located in an adequate internal space:</p> <ul style="list-style-type: none"> <li>• with a minimum total capacity of 30 litres</li> <li>• where every bin has at least 7 litres capacity</li> </ul> <p><b>AND</b></p> <p><b>For houses</b>, an adequate <b>external</b> space must be provided for storing, at least, three external bins for recyclable waste:</p> <ul style="list-style-type: none"> <li>• with a minimum total capacity of 180 litres</li> <li>• with no bin smaller than 40 litres</li> <li>• all bins should be located within 30m<sup>2</sup> of an external door</li> </ul> <p><b>For blocks of flats</b>, a private recycling scheme operator must be appointed to maintain bins and collect recyclable waste regularly. Recycling containers must:</p> <ul style="list-style-type: none"> <li>• be located in an adequate <b>external</b> space</li> <li>• be sized according to the frequency of collection, based on guidance from the recycling scheme operator</li> <li>• store at least 3 types of recyclable waste in identifiably different bins</li> <li>• be located within 30m<sup>2</sup> of an external door</li> </ul> <p>* Where strategic reasons outside the control of the developer make it impossible to meet this requirement, the maximum allowable distance is 50m, and a written justification must be provided to the Code Service Provider.</p>	4	
<p><b>Default Cases</b></p> <p>None</p>		

## Information required to demonstrate compliance

<b>Schedule of Evidence Required</b> <b>To be read in conjunction with the <i>Definitions</i> and <i>Calculations</i> Sections.</b> <b>The following requirements are required to demonstrate compliance with any of the mandatory levels, for both assessment stages.</b>	
<b>Design Stage</b>	<b>Post Construction Stage</b>
<p>Mandatory Element:</p> <p>Provide the supplementary Information Sheet (Table: Cat 5.1 – Supplementary Information Sheet for Was 1) for Storage of non-recyclable waste and Recyclable Waste and compliance for accessibility – Checklist Was 1</p>	<p>Mandatory Element:</p> <p>Provide the supplementary Information Sheet (Table : Cat 5.1 – Supplementary Information Sheet for Was 1) for Storage of non-recyclable waste and Recyclable Waste and compliance for accessibility – Checklist Was 1</p>
<p>Drawings or specification text* detailing:</p> <ul style="list-style-type: none"> <li>• the number of bedrooms</li> <li>• the location of internal and external storage (where applicable)</li> <li>• the types and sizes of internal and external storage</li> <li>• how the storage is accessed</li> <li>• access arrangements conforming to H6 in AD H</li> <li>• written justification where it has not been possible to locate bins within 30m of an external door.</li> </ul> <p>* or a letter of instruction to a contractor/supplier or a formal letter from the developer to the assessor giving a specific undertaking and all the previously required details</p> <p><b>AND EITHER</b></p> <p>A letter or other confirmation from the <i>Local Authority</i> describing the type, volume and dimensions of containers that they provide for refuse collection and recycling (where in operation). In the case of</p>	<p>As Built drawings and/or specifications (where applicable), OR written confirmation that the dwelling has been constructed in accordance with the design stage drawings/specifications</p> <p>Written justification where it has not been possible to locate bins within 30m of an external door.</p> <p>A letter or other confirmation (from Local Authority or Private scheme operator) to maintain and empty the bins or the collection inlets and pipes (where applicable) on a regular basis confirming the:</p> <ul style="list-style-type: none"> <li>• recyclable waste types that will be collected</li> <li>• level of separation of waste types</li> <li>• frequency of collection</li> </ul> <p><b>AND EITHER</b></p> <p>Assessor Site Inspection Report</p> <p><b>OR</b></p> <p>Photographic evidence for each dwelling which has a different</p>

<p>an automated collection system, the Local Authority should confirm the specifications associated with the system: location of inlets, level of separation and extent of the coverage</p> <p><b>OR</b></p> <p>Where a <i>private recycling scheme operator</i> (using either bins or collection inlets, linked together by pipes) is to be appointed to collect <i>recyclable materials</i>, confirmation of this intention and details of the scheme proposed</p>	<p>specification with notes confirming the date and applicable plot numbers</p>
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## Definitions

### **Adequate External Space**

Refers to outdoor space supplied for storing non-recyclable waste and recyclable materials. External recycling bins should be located on level hard standing and must be covered and within a reasonable distance of the external door to the dwelling / block of flats.

### **Adequate Internal Space**

Refers to indoor space supplied for storing non-recyclable waste and recyclable materials. Internal recycling bins should be located in a dedicated non-obstructive position. This should be in a cupboard in the kitchen, close to the non-recyclable waste bin, or located adjacent to the kitchen in a utility room or connected garage.

Free-standing recycling bins placed directly on the floor or in a cupboard do not comply.

### **Automated Waste Collection System**

Some companies now offer a fully automated underground system, for the collection, sorting and transportation of waste. Such systems allow for waste separation at source, for different types of waste and from multiple locations, with enhanced hygienic, occupational health and safety standards. They can also reduce the use of transport by refuse lorries, reducing nuisance and CO<sub>2</sub> emissions.

### **Local Authority Collection Scheme**

The Local Authority is responsible for regular collection of waste from the dwelling. This includes the collection of residual waste (waste not intended for recycling or composting) and in many cases recyclable household waste.

### Private Recycling Scheme Operator

A *private recycling scheme operator* can be appointed to collect recyclable materials where a *Local Authority collection scheme* is not in operation or where a landlord/occupier elects to go private, e.g. in some apartments.

This can either be a scheme that collects from bins or using automated vacuum pipes linked to an automated waste collection system managed by a private operator.

### Recyclable Materials

For the purpose of this issue, the space needs to be compatible with the range of recyclable collection provided by the Local Authority, at least three of the following recyclable materials waste **must** be collected:

- Paper
- Cardboard
- Glass
- Plastics
- Metals (tins and cans)
- Textiles (clothes and shoes)

## Assessment Methodology

### **Design Stage**

- Check the minimum capacity required for internal and external waste and recycling storage based on the criteria set out above.
- Check the types of recyclable waste and level of separation in operation for the locality, now and in the medium term.
- Check if the space available is adequate for storage of these bins and is accessible to disabled people (Checklist Was 1).

### **Post Construction Stage**

- Confirm which specifications and evidence provided at the Design Stage are still valid.
- Assess all the new specifications and evidence provided at post construction stage.

## Calculation Procedures

None



## Checklists and Tables

Calculate the Storage of non-recyclable waste, which should be at least the minimum recommended by British Standard BS 5906 if a Local Authority recycling scheme offering containers equal to or greater than this previous capacity would meet the requirement, providing adequate external space is allocated to accommodate them. If the Local Authority provides less capacity, or if no Local Authority scheme exists, the developer will need to ensure and demonstrate that the minimum recommended capacity is met.

**Table : Cat 5.1: Supplementary Information Sheet for Was 1 – Storage of non-recyclable waste and storage of recyclable household waste**

<b>Development Name:</b>		
<b>Dwelling Reference</b>		
<b>NUMBER OF BEDROOMS:</b>		
<b>MINIMUM REQUIREMENTS OF BS 5906: 2005</b>		
Calculation	TOTAL VOLUME:	
<b>LOCAL AUTHORITY PROVISION</b>		
REFUSE	DIMENSIONS:	VOLUME:
RECYCLING 1	DIMENSIONS:	VOLUME:
RECYCLING 2	DIMENSIONS:	VOLUME:
RECYCLING 3	DIMENSIONS:	VOLUME:
RECYCLING 4	DIMENSIONS:	VOLUME:
TOTAL VOLUME:		
<b>SPACE PROVIDED</b>		
<p>Demonstrate (through the use of drawings) how the space allowed for waste storage has been sized to accommodate the maximum requirements between: volume of storage from the Local Authority or minimum from the BS 5906. Checklist Was 1 below lists some of the more important elements of BS 5906:2005, but it is only an indication of the full requirement. Depending on circumstances, other provisions may also be necessary.</p>		
<b>ACCESSIBILITY</b>		
Assess compliance with Checklist 1		

Checklist Was 1- Accessibility to disabled people*			
Criteria	Evidence Demonstrating How Criteria Will Be Met	Reference	Tick
<p>1) Access routes:</p> <p>Should be direct, free from obstructions and raised thresholds, have a suitable surface (as defined in Approved Document M, section 6.9), and allow easy manoeuvring of a wheelchair.</p> <p>If provision of a raised threshold is unavoidable, it should not be at a height of greater than 15mm, with adequate and timely warning that there is a change in level.</p> <p>Where changes in level are unavoidable, suitable ramps should be specified (as defined in Approved Document M, section 6.15).</p>			
<p>2) A turning circle of at least 1500mm diameter should be provided to allow a wheelchair user to turn and return in the opposite direction.</p>			
<p>3) For communal bin stores, provision of signs and/or illumination and information for visually impaired people, with visual and tactile contrast should be specified according to the following guidance (see point 7 below).</p>			
<p>4) Heights to the centre of switches and controls need to be in accordance with the requirements set out in British Standard 8300 (British Standards, 2001)</p>			
<p>5) Attention needs to be given to the operating requirements of doors and locks.</p>			
<p>6) Existing refuse hoppers** must be located at a suitable height for wheelchair user access and suitably identifiable for visually impaired people</p>			
<p>7) Any situations not considered in the criteria above must meet all requirements set out in the following guidance:</p> <ul style="list-style-type: none"> <li>– British Standard 8300, (British Standards, 2001)</li> </ul>			
<p>*Legislative requirements always supersede this checklist.</p> <p>**A fitting into which refuse is placed and from which it passes into a chute or directly into a refuse container. The fitting consists of a fixed frame and hood unit and a hinged or pivoted combined door and receiving unit, as defined in British Standard 1703 (British Standards, 2005).</p>			

## Common Cases of Non-Compliance

None

## Special Cases

Credits can be awarded for developments in areas not yet covered by the Local Authority recyclable waste collection scheme where a written statement from the Local Authority can be provided stating when the collection will commence (this date must be within one year of the completion date of the dwelling).

## Background

“It has been established that nearly 36 million tonnes of municipal waste was generated in the UK in 2004/05. A total of 30 million tonnes of this was collected from households, which is approximately half a tonne of household waste per person. Waste from homes is generally collected by Local Authorities through regular waste collections or recycling schemes. There must be adequate storage provision for waste to enable its appropriate management.” Cited from [www.wasteonline.com](http://www.wasteonline.com)

The legal requirements are set out in the Household Waste Recycling Act (2003). The size, type and number of containers may be set out by the waste collection authority using their powers in section 46 of the Environmental Protection Act 1991.

With the development and publication of the Waste Strategy for England (2007) “higher national targets, than in 2000, have been set for recycling and composting of household waste – at least 40% by 2010, 45% by 2015 and 50% by 2020”.



## Information Required to Demonstrate Compliance

Schedule of Evidence Required	
To be read in conjunction with the <i>Definitions and Calculations</i> Sections	
Design Stage	Post Construction Stage
<p><b>Mandatory Element</b></p> <p>A copy of the Site Waste Management Plan or the specification* describing what the Site Waste Management Plan will contain. Details must be in accordance with the relevant guidance as detailed in Checklist Was 2a</p> <p>*or a letter of instruction to a contractor/supplier or a formal letter from the developer to the Code assessor giving the specific undertaking</p> <p><b>OR</b></p> <p>For small developments claiming by default, documentary legal evidence confirming the agreed cost of the development</p>	<p><b>Mandatory Element</b></p> <p>A copy of the Site Waste Management Plan and completed final copy of Checklist Was 2a and Checklist Was .2d if different from Design stage</p> <p><b>AND</b></p> <p>Records confirming the monitoring of site waste throughout the whole construction period.</p> <p><b>OR</b></p> <p>Documentary legal evidence confirming the agreed cost of the development</p>
<p>Using completed and reviewed Site Waste Management Plan:</p> <ul style="list-style-type: none"> <li>– where there is a commitment to reduce waste generated on site: a completed copy of Checklist Was.2b and Checklist Was.2d</li> <li>– where there is a commitment to divert construction waste from landfill: a completed copy of Checklist Was.2c and Checklist Was.2d</li> </ul>	<p>Using completed and reviewed Site Waste Management Plan:</p> <ul style="list-style-type: none"> <li>– where there is a commitment to reduce waste generated on site: a completed copy of Checklist Was.2b and Checklist Was.2d (if different from design stage)</li> <li>– where there is a commitment to divert construction waste from landfill: a completed copy of Checklist Was.2c and Checklist Was.2d (if different from Design stage)</li> </ul> <p><b>AND</b></p> <p>A Summary Report (software output or manually produced) outlining the overall performance in terms of waste minimisation and quantities of waste diverted from landfill.</p>

## Definitions

### **Best practice**

Best practice relating to the mandatory element is compliance with DEFRA's guidance on Site Waste Management Plans.

Best practice relating to construction waste minimisation credits is a combination of commitments to:

- reduce waste generated on site (See Checklist 2b)
- develop and implement procedures to sort and recycle construction waste on site (see Checklist 2c)
- follow guidance from:
  - DEFRA (Department of Environment, Food and Rural Affairs)
  - BRE (Building Research Establishment)
  - Envirowise
  - WRAP (Waste & Resources Action Programme)

### **BREMAP**

A geographical information system of waste management facilities. See [www.bremap.co.uk](http://www.bremap.co.uk)

### **Cost of Construction**

Currently this cost includes labour and materials only and refers itself to the contract sum only, excluding VAT.

### **Environmental Performance Indicators (EPIs)**

When operated as part of a measuring to manage programme, environmental performance indicators allow companies to track how well they are doing and to identify opportunities to: save money and increase profits; use resources more efficiently; minimise waste (raw materials, product, energy, water, packaging, etc); and prevent pollution. For more information see [www.envirowise.co.uk](http://www.envirowise.co.uk).

### **Key Performance Indicators (KPI)**

Key Performance Indicators generated by Construction Excellence for the construction industry. See [www.constructingexcellence.org.uk](http://www.constructingexcellence.org.uk)

### **Site Waste Management Plan (SWMP)**

SWMP aims to promote resource efficiency and to prevent illegal waste dumping. Resource efficiency includes minimising waste at source and ensuring that clients, designers and principal contractors assess the use, re-use and recycling of materials and products on and off the site. It applies to all projects.

**Site waste management plans regulations**

Powers were included in the Clean Neighbourhoods and Environment Act 2005 for regulations requiring a site waste management plan (SWMP) for works involving construction or demolition waste. The new regulations which come into force in April 2008 mean that any construction project in England costing over £300k will require a Site Waste Management Plan.

See [www.environment-agency.gov.uk/business](http://www.environment-agency.gov.uk/business) and [www.defra.gov.uk](http://www.defra.gov.uk)

**SMARTWaste**

Software tool for preparing, implementing and reviewing a SWMP. This tool includes an integrated waste measurement tool (SMARTStart which is aligned to defined waste groups). SMARTWaste Plan will manage all aspects of creating SWMPs and measuring waste generated on projects. Linked to online waste measurement, industry waste benchmarks and a recycling site locator tool (BREMAPP). For more information see [www.smartwaste.co.uk](http://www.smartwaste.co.uk).

**Waste groups**

In a site waste management plan, details of the amount of waste produced, reduced, re-used, recycled or otherwise recovered on or off site needs to be monitored and reported according to the following list (see also Checklist 2d):

Bricks (170102\*)

Concrete (170101\*)

Insulation (170604\*)

Packaging (15018\*)

Timber (170201\*)

Electrical and electronic equipment (1602\*)

Canteen/office/adhoc

Oils

Asphalt and tar (1703\*)

Tiles and ceramics (170103\*)

Inert (1705\*)

Metals (1704\*)

Gypsum (170802\*)

Plastics (170203\*)

Floor coverings (soft)

Furniture (200307\*)

Liquids  
 Soils (1705\*)  
 Hazardous  
 Architectural Features  
 Other/Mixed\*\*

\* from the European Waste Catalogue, codes for waste type

\*\* Efforts should be made to categorise waste into the above categories wherever possible

### **Waste Hierarchy**

General guide to the relative environmental benefits of different waste management options. An inverted pyramid from top to bottom): waste prevention, re-use of material, recycling/composting, energy recovery, disposal (see England's Waste Strategy 2007, see [www.defra.gov.uk](http://www.defra.gov.uk))

## Assessment Methodology

### ***Design Stage***

- Complete Checklist 2a, Mandatory Requirements to confirm that a SWMP is being used and that the content of the SWMP is sufficient to meet the mandatory requirements for this issue.
- Use Checklist 2d, to identify all the waste groups to be monitored.
- Complete Checklist 2b to confirm the obligation to reduce site waste.
- Complete Checklist 2c to confirm the obligation to divert waste from landfill (reuse, recycle, compost or otherwise recover)
- Complete Checklist 2d, to identify waste categories for materials to be reduced, sorted and diverted from landfill.

### ***Post Construction Stage***

- Confirm which specifications and evidence provided at the Design Stage are still valid.
- Assess all the new specifications and evidence provided at post construction stage.
- Verify that if the SWMP was revised during the construction phase, any target deviations from the original SWMP have been recorded.



## Calculation Procedures

None

## Checklists and Tables

Checklist Was.2a Mandatory Requirements			
Confirmation that SWMP includes procedures for monitoring site waste and target setting to promote resource efficiency (Adapted from DEFRA, 2008).			
Criteria	Evidence Demonstrating How Criteria Will Be Met	Reference	Tick
1) SWMP implementation of design phase decision(s) taken to minimise on-site waste produced.			
2) Identification of individual responsible for planning and preparing the SWMP and ensuring that it is followed. This must, either be the client or the principal contractor, according to the stage of the project.			
3) Identification of the waste groups (according to Checklist Was 2d) and estimated quantities of waste expected at every stages of the work programme/plan.			
4) Identification of waste management options, for each waste group, including reference to the waste hierarchy (reduce, re-use, recycle), on and off-site options. Highlight arrangements to identify and manage any hazardous waste.			
5) Identify and record waste management sites, transactions and contractors for all wastes that require them. Ensure that the contracts are in place and that wastes are handled efficiently, in compliance with legal requirements such as the Duty of Care and waste carrier registration times.			
6) Set targets and procedures for monitoring progress.			
7) Provide suitable site induction, information and training both for in-house and sub-contracted staff, guaranteeing that everyone knows the requirements of the SWMP and what it is expected of them.			
8) Confirmation that the site construction waste is being monitored.			
9) Measure and record the amount of waste per type produced, using an established system, such as SMARTWaste.			
10) Continuously update the SWMP during the construction phase (according to best practice).			
11) After the project completion, revise the SWMP, noting all deviations from initial targets, including resource and estimate cost changes.			

<b>Checklist Was 2b. Reducing Construction Waste.</b>			
<b>Commitments for reducing waste generated on site</b>			
<b>Complete Checklist Was 2a plus:</b>			
<b>Criteria</b>	<b>Evidence Demonstrating how Criteria Will Be Met</b>	<b>Reference</b>	<b>Tick</b>
<p>1) Confirmation that targets are set to reduce waste generated on site. These should be reported on as part of the SWMP implementation and on completion.</p> <p>Targets for waste minimisation during the construction process can be set using the Construction Excellence’s Environmental performance indicator benchmarks (see <a href="http://www.constructionexcellence.org.uk">www.constructionexcellence.org.uk</a>).</p>			
<p>2) At least three key waste groups have waste reduction potential at Design stage (Checklist Was 2d). These should be reviewed throughout the construction process as part of implementing SWMP, and results reported in the SWMP on completion.</p>			

<b>Checklist Was.2c Commitment to Sorting and diverting from landfill Contribute Waste.</b>			
<b>Procedures and commitments for sorting and diverting from landfill site construction waste.</b>			
<b>Complete Checklist Was 2a and Was 2b plus :</b>			
<b>Criteria</b>	<b>Evidence Demonstrating how Criteria will be met</b>	<b>Reference</b>	<b>Tick</b>
<p>1) At least three key waste groups are identified for diversion from landfill at pre-construction stage SWMP (Checklist Was 2d). This should be quantified and reviewed during the construction phase and reported in the SWMP upon collection.</p>			
<p>2) Waste should either be:</p> <ul style="list-style-type: none"> <li>a. Re-used or recycled on site, or</li> <li>b. Sorted on site and collected for recycling</li> </ul> <p>Where space on site is too limited to allow waste materials to be segregated, a waste contractor may be used to separate and process recyclable materials off site. Similarly manufacturers’ take-back schemes could also be used. Where this is the case, sufficient documentary evidence must be produced which demonstrates that segregation of materials is carried out to the correct standards and that materials are re-used/recycled as appropriate.</p> <p>Hazardous waste should be segregated on site, to avoid contaminating non-hazardous waste streams. This is standard practice and therefore no credit will be awarded for segregating hazardous waste.</p>			

Checklist Was.2d Waste Groups					
Actions identified to monitoring, reduce, sorting and diverting from landfill site construction waste (fill in where applicable, i.e. waste groups arising on housing project)					
Complete Checklists Was 2a, Was 2b and Was 2c					
Codes: (European Waste Catalogue)	Key Group	Examples	All that apply	As specified in SWMP	
			Materials to be monitored	Materials to be reduced	Materials to be diverted from landfill
170102	Bricks	Bricks			
170101	Concrete	pipes, kerb stones, paving slabs, concrete rubble, precast and in situ			
170604	Insulation	Glass fibre, mineral wool, foamed plastic			
15018	Packaging	Paint pots, pallets, cardboard, cable drums, wrapping bands, polythene sheets			
170201	Timber	Softwood, hardwood, boards products such as plywood, chipboard, medium density fibreboard (MDF)			
1602	Electrical and electronic equipment	Electrical & electronic TVs, fridges, air-conditioning units, lamps equipment			
	Canteen/office	Office waste, canteen waste, vegetation			
	Oils	Hydraulic oil, engine oil, lubricating oil			
1703	Asphalt and tar	Bitumen, Coal tars, Asphalt			
170103	Tiles and ceramics	Ceramic tiles, clay roof tiles, ceramic, sanitary ware			
1705	Inert	Mixed rubble/excavation material, glass			
1704	Metals	Radiators, cables, wires, bars, sheet			
170802	Gypsum	Plasterboard, render, plaster, cement, fibre cement sheets, mortar			
170203	Plastics	Pipes, cladding, frames, non packaging sheet			

*continued*

Checklist Was.2d Waste Groups					
Actions identified to monitoring, reduce, sorting and diverting from landfill site construction waste (fill in where applicable, i.e. waste groups arising on housing project)					
Complete Checklists Was 2a, Was 2b and Was 2c					
Codes: (European Waste Catalogue)	Key Group	Examples	All that apply	As specified in SWMP	
			Materials to be monitored	Materials to be reduced	Materials to be diverted from landfill
	Floor coverings (soft)	Carpets, vinyl flooring			
200307	Furniture	Tables, chairs, desks, sofas			
	Liquids	Non hazardous paints, thinners, timber treatments			
1705	Soils	Soils, clays, sand; gravel, natural stone			
	Hazardous	defined in Environment Agency technical guidance (see <a href="http://www.environment-agency.gov.uk/subjects/waste">www.environment-agency.gov.uk/subjects/waste</a> )			
	Architectural Features	Roof tiles, reclaimed bricks, fireplaces			
Other/Mixed		Efforts should be made to categorise waste into the above categories wherever possible			

## Common Cases of Non-Compliance

None

## Special Cases

None

## Background

Waste management on site can have significant impacts especially at a local level. From April 2008, SWMP is a legal requirement for all construction projects exceeding £300,000 (DEFRA, 2008).

Over 100 million tonnes of construction and demolition waste is generated in the UK annually and an estimated 13 million tonnes of unused building materials are discarded as waste (see [www.smartwaste.co.uk](http://www.smartwaste.co.uk)). To promote greater construction resource efficiency “the Government is considering in conjunction with the construction industry, a target to halve the amount of construction, demolition and excavation wastes going to landfill by 2012 as a result of waste reduction, re-use and recycling” (DEFRA, 2007).

Guidance on waste minimisation is available from DEFRA, BRE, WRAP, Envirowise and others (referenced below). SMARTWaste plan is a site waste management planning tool (see [www.smartwaste.co.uk](http://www.smartwaste.co.uk)) which monitors construction and demolition waste, including the amount and type generated and segregation/recycling rates. It also calculates Environmental Performance Indicators (EPIs). The system identifies opportunities for re-use and recycling and the location of suitable facilities for this via BREMAP, an online geographical information system.

Significant reductions in waste and better management can be achieved by good design, improved logistics, better on-site construction practices and re-use/recycling wherever possible. Segregation of waste for re-use or recycling will depend on the construction process as waste will vary in type and amount. It will also depend on the amount of space available on-site.

The removal of construction waste from site is subject to legislative requirements. It is not the responsibility of the assessor to ensure compliance with such legislation; however compliance should be apparent within the SWMP.

### **Targets**

Targets are specific to individual projects. For guidance on setting targets, refer to the Construction Industry KPI Pack ([www.constructionexcellence.org.uk](http://www.constructionexcellence.org.uk)).

A Site Waste Management Plan is an important tool for managing site construction waste. Data obtained from monitoring site construction waste can be used to check performance against benchmarks and the effectiveness of any solutions implemented.

Two Environmental performance indicators are typically used for waste generated from the construction process; waste generated in m<sup>3</sup> per 100m<sup>2</sup> of floor area and waste generated in m<sup>3</sup> per £100,000 of project value. Constructing Excellence and SMARTWaste produce annual benchmarks for these KPIs; these are still evolving. Benchmarks are being developed for different types of construction and waste. Details of these are shown on the SMARTWaste website at [www.smartwaste.co.uk](http://www.smartwaste.co.uk). This system automatically calculates the Environmental performance indicators for a project from the waste data collected and input into the system. Environmental performance indicators have been used to benchmark waste minimisation for a number of schemes, including Greenwich Millennium Village and Chiswick Park where waste reduction by 50% was achieved.

Issue ID	Description	No. of credits available	Mandatory Elements
Was 3	Composting	1	No

## Aim

To encourage developers to provide the facilities to compost household waste, reducing the amount of household waste sent to landfill.

## Assessment Criteria

Credits are awarded where home composting facilities are provided in houses with gardens or Local Authority kitchen waste collection/communal/community composting service in other dwelling types. The composting facilities should be suitable for normal domestic, green/garden, food and other compostable household waste, as outlined below. All facilities should be accompanied by information explaining how they work.

Criteria	
	Credits
<ul style="list-style-type: none"> <li>Individual <i>home composting facilities</i>.</li> </ul> <p><b>OR</b></p> <ul style="list-style-type: none"> <li>A local <i>communal or community composting service</i>, which the Local Authority runs or where there is a management plan in place.</li> </ul> <p><b>OR</b></p> <ul style="list-style-type: none"> <li>A Local Authority green/kitchen waste collection system (this can include an automated waste collection system).</li> </ul> <p>All <i>facilities</i> must also:</p> <ul style="list-style-type: none"> <li>be in a dedicated position</li> <li>be accessible to disabled people (Checklist 1)</li> <li>have an information leaflet that is delivered to each dwelling</li> </ul>	1
<p><b>Default Cases</b></p> <p>None</p>	

## Information required to demonstrate compliance

Schedule of Evidence Required	
To be read in conjunction with the <i>Definitions</i> and <i>Calculations</i> Sections.	
Design Stage	Post Construction Stage
<p>Present a completed copy of Checklist 1- Was 1 and text on drawings or in the specification*, describing:</p> <ul style="list-style-type: none"> <li>• the location and size of storage</li> <li>• access to the storage</li> <li>• that an information leaflet will be supplied</li> </ul> <p>* or a letter of instruction to a contractor/supplier, a formal letter from the developer to the Code assessor giving the specific undertaking or the manufacturers information, for all the above required details.</p> <p><b>OR</b>, where applicable:</p> <p>Details of the <i>communal/community composting scheme</i> indicating:</p> <ul style="list-style-type: none"> <li>• distance from dwelling</li> <li>• management arrangements</li> <li>• access, location and size of storage prior to taking the mentioned scheme</li> <li>• details of, the mentioned scheme including opening times and access</li> <li>• that an information leaflet will be supplied</li> </ul> <p><b>OR</b>, where applicable:</p> <p>Details of the Local Authority kitchen waste collection scheme</p> <p><b>OR</b>, where applicable:</p> <p>Details of the automated waste collection system</p>	<p>Confirmation that design stage composting solution was implemented or will be implemented by the time 60% of the development is complete or details of the As Built specification. Demonstrated by:</p> <p><b>EITHER</b></p> <p>Letter from the developer to the assessor</p> <p><b>OR</b></p> <p>Assessor Site Inspection Report</p> <p><b>OR</b></p> <p>Drawings showing location, size, access to composting</p> <p><b>OR</b></p> <p>Photographic evidence for each dwelling which has a different specification with notes confirming the date and applicable plot numbers</p>

## Definitions

### **Automated Waste Collection System**

Some companies now offer a fully automated underground system, for the collection, sort and transport of waste. It allows for waste separation at the source, for different types of waste and from multiple locations, with enhanced hygienic, occupational health and safety standards. It also reduces the use of waste transport by lorries, reducing nuisance and CO<sub>2</sub> emissions, from the fossil fuel consumption.

### **Communal/Community Composting**

*Communal or community composting* is where a group of people share a composting system. The raw materials are provided by all who take part in the scheme, and the compost is then used in the community, either by individuals in their own gardens, or for use on larger projects within the local environment. The distance between the site entrance and the communal / community containers must not usually exceed 30m.

The composting scheme must be registered with the Environment Agency, in England in Wales, to either have a waste management licence, an environmental permit or an exemption from them. Planning permission may also be required.

### **Composting**

Composting is a natural process which converts organic waste into an earth-like mass by means of bacteria and micro-organisms. The composting process is also supported by larvae, wood lice, beetles, worms and other such creatures.

### **Facilities**

All facilities must be in a dedicated position, be *accessible to disabled people* and have an information leaflet that is delivered to each dwelling. The requirements are:

- for home composting: space for a kitchen waste container in the home and for an exterior composter
- community/communal composting: space for a container in home and exterior composter, easy and close access to local scheme, i.e. householder will normally have to deliver the waste
- green/kitchen waste collection scheme: space for container in home, external storage space, with a local green/kitchen waste collection scheme in operation



**Frequency of collection** The frequency of collection is one of the major factors that affect the determination of space required to waste storage. For the case of non-recyclable waste from houses, this normally is specified by the local waste collection authority, varying between them but generally being once a week. For recyclable house waste the frequency of collection is dependent on volume and nature of the material being collected. Therefore it is important for the designer to contact the local authority at an early stage.

**Home Composting facilities** *Home composting facilities* must consist of an external composting container, specifically designed for composting and sited according to the manufacturer's instructions. Such containers should not be sited in close proximity of windows, doors, or ventilation intakes for habitable areas within the dwelling or surrounding dwellings.

**Information Leaflet** The leaflet must provide information on:

- how composting works and why it is important
- the materials that can be composted (e.g. raw vegetable peelings and fruit, shredded paper, teabags etc.)

**AND**

Where *home composting facilities* are provided:

- troubleshooting information (e.g. what to do if the compost gets too dry or too wet)

**AND**

- for communal schemes, details of the operation and management plan for the scheme
- where a green / *kitchen waste collection scheme* is in operation, the information leaflet provided by the Local Authority is sufficient to meet the information leaflet criteria

**Kitchen Waste Collection Scheme**

A kitchen waste collection scheme run by the Local Authority is an acceptable alternative to communal/ community composting facilities.

Many Local Authorities now offer *kitchen waste collection schemes* in addition to garden waste collection schemes.

## Assessment Methodology

### ***Design Stage***

- Confirm the intention to provide composting bins or communal composting service or kitchen waste collection service as appropriate.
- Check the accessibility (fill in Checklist Was 1) and size of the storage.

Note: It is acceptable for the bin to be beside other recycling bins in a communal collection site as long as it is clearly identifiable as being connected to a licensed community scheme.

### ***Post Construction Stage***

- Confirm the provision of composting bins (confirm location, size and access) or communal composting service or kitchen waste collection service (confirm frequency of collection) and information leaflet.

## Calculation Procedures

None

## Checklists and Tables

Please use Checklist Was 1 to assess accessibility for disabled people.

## Common Cases of Non-Compliance

Where the collection scheme does not collect from all dwellings seeking this credit, credits cannot be awarded.

Where a house is serviced by a kitchen waste collection service, has a garden of its own and no individual composting facilities in the garden, credits cannot be awarded.

## Special Cases

Existing and proposed community schemes are acceptable under this issue as long as they comply with all the specifications in the technical guide.

## Background

Composting at home is one of the easiest, most effective and environmentally friendly ways of recycling organic waste. Organic waste in a landfill site degrades to form leachate and methane gas. Leachate is a toxic liquid, which can pollute water and soil. Methane is explosive and is also a green house gas (27 times more powerful than carbon dioxide). Over 30 per cent of household waste can be diverted from landfill by composting, which avoids the production of methane and does not contaminate water supplies.

Compost can be used in the garden as a conditioner and mulch as an alternative to peat-based compost extracted from natural wildlife sites.

Additionally, there can be a community composting system to serve the needs of flats or dwellings which do not have an external area to install a composting bin, or if the local authority does not provide this service. In order to find more guidance on how to set up a community composting scheme see references and further information.

# Category 6: Pollution

Issue ID	Description	No. of credits available	Mandatory Elements
Pol 1	Global Warming Potential (GWP) of Insulants	1	No

## Aim

To reduce global warming from blowing agent emissions that arise from the manufacture, installation, use and disposal of foamed thermal and acoustic insulating materials.

## Assessment Criteria

Criteria	
	Credits
Credits are awarded where all insulating materials in the elements of the dwelling listed below only use substances that have a GWP < 5 (manufacture AND installation): <ul style="list-style-type: none"> <li>• Roofs: including loft access</li> <li>• Walls: internal and external including lintels and all acoustic insulation</li> <li>• Floors: including ground and upper floors</li> <li>• Hot water cylinder: pipe insulation and other thermal stores</li> <li>• Cold water storage tanks: where provided</li> <li>• External doors</li> </ul>	1
<b>Default Cases</b> None	

## Information required to demonstrate compliance

The following section details any relevant documents and calculations required to award credits at both Design Stage and Post Construction Stage:

<b>Schedule of Evidence Required</b> <b>To be read in conjunction with the <i>Definitions</i> and <i>Calculations</i> Sections</b>	
Design Stage	Post Construction Stage
<p>Completed <i>Checklist Pol 1</i> showing the proposed insulation materials (or none) for each element and whether they are foamed, use blowing agents or un-foamed (from Table 6.1)</p> <p><b>AND</b></p> <p>For each element, drawings or specification text* clearly showing the type and location of all insulation materials</p> <p>* or a letter of instruction to a contractor/supplier or a formal letter from the developer to the Code Assessor giving the specific undertaking</p> <p><b>AND</b></p> <p>Where insulation materials have been specified, manufacturer's / installer's literature (internet sourced specifications are acceptable) for any foamed insulation material or materials installed using blowing agents, confirming that all blowing agents used are either 'deemed to satisfy'** from Table 6.2 or have a GWP of less than 5</p> <p><b>OR</b></p> <p>For a <b>Design and Build</b> contract: A specification clause or letter of intent to meet the credit requirements must be provided</p>	<p>For all installed insulation:</p> <ul style="list-style-type: none"> <li>• Manufacturer's or installer's literature (internet sourced specifications are acceptable) for any foamed insulation material or materials installed using blowing agents, confirming that all blowing agents used are either 'deemed to satisfy'* from Table 6.2 or have a GWP of less than 5</li> </ul> <p><b>AND EITHER</b></p> <p>Written confirmation from the developer that the materials proposed in <i>Checklist 6.1 Pol 1</i> are unchanged from design stage</p> <p><b>OR</b></p> <p>Copies of purchase orders or receipts of all installed foamed insulating materials.</p> <p><b>OR</b></p> <p>Relevant As Built drawings or specification text clearly showing the type and location of all insulation materials</p> <p><b>OR</b></p> <p>Assessor Site Inspection Report</p>

\*\* The blowing agents listed in Table 6.2 are deemed to satisfy this credit since their GWP is known to be sufficiently low to justify this. All are currently believed to have a GWP of less than 5.

## Definitions

<b>Blowing agents</b>	Any material used to produce a cellular structure in either a plastic or other foam insulation used in either manufacture or installation.
<b>Deemed to satisfy</b>	The blowing agents listed in Table 6.2 are deemed to satisfy this credit since their GWP is known to be sufficiently low to justify this. <del>All are currently believed to have a GWP of less than 5.</del>
<b>Global Warming Potential (GWP)</b>	Global Warming Potential is defined as the potential for global warming that a chemical has relative to 1 unit of carbon dioxide, the primary greenhouse gas. In determining the GWP of the blowing agent, the Intergovernmental Panel on Climate Change (IPCC) methodology using a 100 year Integrated Time Horizon (or ITH) should be applied.
<b>Intergovernmental Panel on Climate Change (IPCC)</b>	The Intergovernmental Panel on Climate Change (IPCC) was established by the United Nations Environmental Programme (UNEP) and the World Meteorological Organization (WMO) in 1988 to assess the scientific, technical and socio-economic information relevant for the understanding of human induced climate change, its potential impacts and options for mitigation and adaptation. The IPCC has completed three full assessment reports, guidelines and methodologies, special reports and technical papers. For more information on the IPCC, its activities and publications please see <a href="http://www.ipcc-wg2.org">www.ipcc-wg2.org</a>

## Assessment Methodology

### **Design Stage**

- Complete *Checklist Table : Cat 6.1 Pol 1* for all elements.
- Check drawings and specification clauses for all materials identified.
- For foamed materials, or propellants used to spray or inject insulation, provide manufacturer's/installer's documentation confirming that their product either uses blowing agents 'deemed to satisfy' the requirement from Table 6.2 in isolation or uses a blowing agent or blend of blowing agents which can be shown to have a GWP of less than 5.

**Post Construction Stage**

- Confirm which specifications and evidence provided at the Design Stage are still valid.
- Assess all the new specifications and evidence provided at post construction stage.

Calculation Procedures

None

Checklists and Tables

Table : Cat 6.1: Foamed and Non Foamed Insulating Materials	
Foamed Insulation	Non-foamed insulation
Expanded polystyrene	Mineral wool or fibre
Extruded polystyrene	Glass wool or fibre
Polyurethane (PU) insulation	Cork
Cellular glass or foamed glass	Cellulose insulation
Nitrile rubber or elastomeric insulation	Wood fibre board
Phenolic insulation	Wool
Polyisocyanurate foam	Flax
Icynene foam	Recycled newspaper and jute
Tripolymer foam	Straw or strawboard
Foamed polyethylene	

Table : Cat 6.2: Blowing agents deemed to satisfy the issue requirements and/or believed to have a GWP of less than 5
Air
Carbon Dioxide (CO <sub>2</sub> )
Pentane (iso-pentane, cyclopentane, n-pentane)
Isobutene

Checklist Pol 1: GWP of Insulants								
Element	Proposed Insulation Materials	Unfoamed [U]/Foamed [F]/Installed Using Propellants [P]	Manufacturer	Product Name	GWP (if foamed)	Name of Blowing Agent Used (where installed using a propellant)	GWP of Blowing Agent (if present)	Reference to literature confirming GWP (if foamed or installed using a propellant)
<b>Roofs</b>								
Roof Type 1								
Roof Type 2								
Loft Access								
<b>Walls</b>								
External Walls								
Internal Walls								
Doors								
Lintels								
Thermal and Acoustic Insulation								
<b>Floors</b>								
Ground Floor								
Upper Floors								
Basement								
Foundations								
<i>continued</i>								



Checklist Pol 1: GWP of Insulants									
Element	Proposed Insulation Materials	Unfoamed [U]/Foamed [F]/Installed Using Propellants [P]	Manufacturer	Product Name	GWP (if foamed)	Name of Blowing Agent Used (where installed using a propellant)	GWP of Blowing Agent (if present)	Reference to literature confirming GWP (if foamed or installed using a propellant)	
<b>Thermal Stores</b>									
Hot Water Cylinder									
Cold Water Storage Tanks									
Pipe Insulation									
Other Thermal Stores									

Note: The manufacturing process of insulating materials changes regularly. Because of this, this document does not include a complete list of insulating materials that comply and manufacturers should be approached for up-to-date information on their products.

## Common Cases of Non-Compliance

Where any insulation material contains substances which are controlled under the Montreal Protocol or where the release of such substances forms a significant part of the manufacturing process, this credit should be withheld. Such substances are prohibited within the EU and only products manufactured outside the EU are at risk of containing them.

## Special Cases

None

## Background

Global warming potential (GWP) is a relative measure of how effective a gas is at absorbing infra-red radiation compared to CO<sub>2</sub>. The GWP measures the total energy absorbed by 1 kg of released gas over a hundred years, relative to CO<sub>2</sub>, (which is given a GWP of 1.0). The main greenhouse gases being emitted today are carbon dioxide from the burning of fossil fuels, methane (from agriculture) and nitrous oxide (from agriculture). The Kyoto Protocol has set limits on six specific gases that contribute towards global warming. These are carbon dioxide, methane, nitrous oxide, hydrofluorocarbons, perfluorocarbons and sulphur hexafluoride. The table below shows the GWP for each of these gases.

Gas	GWP
Carbon Dioxide – CO <sub>2</sub>	1
Methane – CH <sub>4</sub>	21
Nitrous oxide – NO <sub>x</sub>	310
Hydrofluorocarbons – HFCs	140–11,700
Perfluorocarbons – PFCs	6,500–9,200
Sulphur Hexafluoride – SF <sub>6</sub>	23,900

Reference: *National Atmospheric Emissions Inventory, UK Emissions of Air Pollutants 1970–2003*, DEFRA, UK, (GWP) based on 100 year time horizon.

Issue ID	Description	No. of credits available	Mandatory Elements
Pol 2	NO <sub>x</sub> Emissions	3	No

## Aim

To reduce the emission of nitrogen oxides (NO<sub>x</sub>) into the atmosphere.

## Assessment Criteria

Credits are awarded on the basis of NO<sub>x</sub> emissions arising from the operation of space heating and hot water systems for each dwelling, in accordance with the table below:

Criteria		
Dry NO <sub>x</sub> level (mg/kWh)	Boiler class (BS EN 297: 1994)	Credits
≤100	4	1
≤70	5	2
≤40	–	3
<b>Default Cases</b> Where all space heating and hot water energy requirements are fully met by systems which do not produce NO <sub>x</sub> emissions.		3

## Notes

1. No credits may be awarded for open flue heating or hot water systems.
2. Alternative Approaches:

There are many possible alternative systems which can potentially achieve this credit and are beyond the scope of low NO<sub>x</sub> boiler systems.

An example solution might include the use of Mechanical Ventilation with Heat Recovery (MVHR), super insulation, and Photovoltaic powered electric top up heating.

Whilst Biomass systems are recognised as low carbon systems, they can produce a significant amount of NO<sub>x</sub> and so may not achieve this credit; however they can score highly in the Energy section of the Code. Biomass systems are also recognised as reducing the impact of fossil fuel depletion by employing a renewable combustion fuel source.

## Information required to demonstrate compliance

Schedule of Evidence Required	
To be read in conjunction with the <i>Definitions</i> and <i>Calculations</i> Sections	
Design Stage	Post Construction Stage
<p>Text describing (on drawings or in specification*):</p> <ul style="list-style-type: none"> <li>• Details of the primary and any secondary heating systems and flue type</li> <li>• Dry NO<sub>x</sub> levels and/or boiler class of the primary and any secondary heating systems</li> </ul> <p>Where a system has been specified, manufacturer's literature (internet sourced specifications are acceptable) confirming the dry NO<sub>x</sub> levels and/or boiler class of the primary and any secondary system</p> <p>*or a letter of instruction to a contractor/supplier or a formal letter from the developer to the Code assessor giving the specific undertaking</p>	<p>Manufacturer's literature (internet sourced specifications are acceptable) confirming the dry NO<sub>x</sub> levels and/or boiler class of the primary and any secondary system</p> <p><b>OR</b></p> <p>A dated letter or email from the manufacturer confirming dry NO<sub>x</sub> levels for the specified systems</p> <p><b>AND EITHER</b></p> <p>Copies of purchase orders/receipts of heating system/s</p> <p><b>OR</b></p> <p>Assessor Site Inspection Report</p>
<p>Where NO<sub>x</sub> averaging is required due to multiple heating systems within dwelling:</p> <p>Calculation of dry NO<sub>x</sub> or weighted average NO<sub>x</sub> as in Calculation Procedures below</p> <p>SAP 2005 Worksheets (Design Stage)</p>	<p>Where NO<sub>x</sub> averaging is required due to multiple heating systems within dwelling:</p> <p>Calculation of dry NO<sub>x</sub> or weighted average NO<sub>x</sub> as in Calculation Procedures below</p> <p>As Built SAP 2005 Worksheets if different from design stage SAP.</p>
	<p>Where the heating system is not yet commissioned at post construction stage:</p> <p>A contractual commitment for the heating system to be activated within 18 months of completion.</p>

## Definitions

<b>The As-Built – SAP 2005 Worksheet</b>	As defined in Ene 1
<b>Boiler class</b>	An indication of a boiler's NO <sub>x</sub> emissions. Boilers are classified on a scale of 1 to 5, with 1 indicating high NO <sub>x</sub> emissions through to relatively low NO <sub>x</sub> emissions for a class 5.
<b>Boiler class (BS EN 297: 1994)</b>	The relevant British Standard that defines and classifies boilers based on their NO <sub>x</sub> emissions. Applies to boilers fitted with atmospheric burners of nominal heat input not exceeding 70 kW.
<b>Design Stage – SAP 2005 Worksheet</b>	As defined in Ene 1
<b>Dry NO<sub>x</sub></b>	The NO <sub>x</sub> emissions (mg/kWh) resulting from the combustion of a fuel at 0% excess oxygen levels. If electricity is sourced from the national grid, the emissions are approximately 1200mg/kWh.

## Assessment Methodology

### **Design Stage**

- Use Table : Cat 6.3 to estimate average NO<sub>x</sub> emissions.
- Using the specification document or equivalent, determine the specification and NO<sub>x</sub> emissions of all heating systems in the dwelling. If a secondary space and / or water heating system supplies less than 8% of the dwelling's combined total space heating and hot water demand, it can be ignored.
- Confirm that the emissions stated are those estimated under normal operating conditions, i.e. *dry* NO<sub>x</sub> levels. If the mains electricity, assume 1200mg/KWh supplied.
- If the figures are not stated in *dry* NO<sub>x</sub> and/or in mg/kWh as required, apply any necessary conversion/correction factors required to convert the NO<sub>x</sub> figure(s) stated for the heating system/s accordingly. (See sections A & B in the Calculation Procedures section below for guidance.)
- Where applicable, calculate the average NO<sub>x</sub> emissions using the methodology detailed in section C of the Calculation Procedures section and Table : Cat 6.3 below.

### **Post Construction Stage**

- Confirm which specifications and evidence provided at the Design Stage are still valid.
- Assess all the new specifications and evidence provided at post construction stage.

- Where the heating system has not been commissioned at the time of a Post Construction Stage assessment, a contractual commitment must be in place to ensure that the heating system will be servicing the dwelling within 18 months of the dwelling being completed.

## Calculation Procedures

### **A: Conversion Factors**

Manufacturers should be asked to supply *dry*  $NO_x$  emissions data in mg/kWh. Where this is not possible the assessor may use the following conversion factors to convert figures in  $mg/m^3$ , ppm or wet  $NO_x$ . It should be noted that these conversion factors assume worst-case efficiencies and are likely to give a conservative answer. This could have the effect of lowering the number of credits achieved.

1. Figures in  $mg/m^3$  should be multiplied by 0.857 in order to show emissions in mg/kWh. A conversion may also be necessary for data not calculated at 0% excess oxygen (see B below).
2. Figures in parts per million (ppm) should be multiplied by 1.76 in order to show emissions in mg/kWh. A conversion may also be necessary for data not calculated at 0% excess oxygen (see B below).
3. Figures in mg/MJ should be divided by 3.6 in order to show emissions in mg/kWh (1 kWh = 3.6 MJ). A conversion may also be necessary for data not calculated at 0% excess oxygen (see B below).

This Issue's criteria are based on *dry*  $NO_x$  values – almost all manufacturers will quote emissions in *dry*  $NO_x$ . However if wet  $NO_x$  figures are supplied, these should be converted to *dry*  $NO_x$ . This can be done by multiplying the wet  $NO_x$  figure by 1.75.

### **B: Excess Oxygen Correction**

If a  $NO_x$  emission rate is quoted by the manufacturer in  $mg/m^3$  or ppm, then it should be established at what % oxygen this emission was made.

The greater the amount of excess oxygen in the flue gases at the time of measurement, the more 'diluted' the  $NO_x$ . It is therefore important to convert any emission rate back to 0% excess oxygen. For the purpose of this assessment, use the following conversion factors for the most frequently used rates supplied by manufacturers:

% excess $O_2$	Conversion (c)
3%	× 1.17
6%	× 1.40
15%	× 3.54

Conversion factor  $c = 20.9/(20.9 - x)$

where  $x =$  % excess  $O_2$  (NOT excess air) and 20.9 is the percentage of  $O_2$  in the air.

### **C: Calculating the average NO<sub>x</sub> emissions for dwellings with more than one heating/hot water system**

Where heat and hot water is provided by more than one system in a dwelling (i.e. there is a 'main' and 'secondary' system) it may be necessary to calculate the total NO<sub>x</sub> emissions for the combined systems. For the purposes of this assessment, this is only necessary when the secondary system satisfies more than 8% of the dwelling's combined total space heating and hot water demand. Where this is not the case the secondary system can be discounted; although including a low NO<sub>x</sub> secondary system which supplies under 8% of the demand can in practice lower the average NO<sub>x</sub> figure and in such cases the secondary system can be included. If it supplies over 8%, then its *dry* NO<sub>x</sub> levels must be taken account of by calculating the average NO<sub>x</sub> emissions for both systems running in parallel.

The calculation procedure on how to calculate average *dry* NO<sub>x</sub> levels, is detailed below in Table : Cat 6.3 of the *Checklists and Tables* section below.

If a secondary heating system is specified, it must also be modelled in SAP 2005. Refer to the relevant SAP 2005 Worksheet for the water heating and space heating demand for each house type.

If a solar hot water system is installed then the energy it contributes (SAP box 50) must be added to the total energy demand figures from SAP boxes (85, 86a & 85a) since these figures have the solar input deducted. Adding in this figure to the total demand will reduce the average NO<sub>x</sub> emission figure appropriately for a domestic solar hot water supply.

There is a Pollution Calculator Tool which allows the calculation of average NO<sub>x</sub> emissions for individual dwellings. This simplifies the procedure in Table : Cat 6.3 below by allowing an assessor to enter the data for multiple heating systems including solar hot water, thus producing an average for the dwelling also incorporating the 8% rule discussed above in this section.

### **D: Calculation Method for Combined Heat and Power (CHP)**

Where CHP systems are present or specified, only the heat related NO<sub>x</sub> emissions are considered by this credit, electrical NO<sub>x</sub> is ignored. The NO<sub>x</sub> emissions should be allocated to heat and electricity in line with the respective power outputs using a NO<sub>x</sub> emission rate for the electrical output that is equivalent to the current rate for grid electricity (see *definitions above – dry NO<sub>x</sub> levels*), and allocating the remaining NO<sub>x</sub> to the heat output. The heat-related component only should then be compared to the credit scale. The following formula should be used to determine this:

$$X = (A - B)/C$$

Where:

X = NO<sub>x</sub> emissions per unit of heat supplied (mg/kWh<sub>at</sub>)  
 A = NO<sub>x</sub> emissions per unit of electricity generated (mg/kWh<sub>elec</sub>)

Note: This is the NO<sub>x</sub> emitted by the CHP system per unit of electricity generated and should be obtained from the supplier.

Where data is provided in different units or at a level of excess oxygen above zero, the manufacturer/supplier should be asked to convert this to comply with this Issue’s requirements; alternatively the assessor may correct these using the factors above.

B = NO<sub>x</sub> emissions per unit of electricity supplied from the grid (mg/kWh).

Note: this should be assumed to be 1200mg/kWh<sub>elec</sub>

C = Heat to Electricity Ratio of the CHP scheme

The above methodology determines the net NO<sub>x</sub> emissions from CHP generated electricity compared to central generation of electricity and allocates this amount to the heat production. Where X is calculated to be negative it should be assumed to be zero.

Where the CHP system operates in conjunction with other heat sources, the general approach outlined under the *Checklists and Tables* section below should be used to calculate the average NO<sub>x</sub> emissions.

## Checklists and Tables

Table : Cat 6.3 Calculation of average NOx emissions for a dwelling						
		Heating and Hot Water Demand (kWh/year)	(SAP Box)	NO <sub>x</sub> Emission Rate for each System (mg/kWh)		
Water Heating	[1]		(86a) × [4]		= [7]	
Space Heating (Primary)	[2]		(85) × [5]		= [8]	
Space Heating (Secondary)	[3]		(85a) × [6]		= [9]	
Total NO <sub>x</sub> Emissions (mg) for Dwelling					[7] + [8] + [9] = [10]	
Total Energy Demand (kWh)	[1] + [2] + [3] + [10a] = [11]		Solar Hot Water Input (SAP Box 50)		= [10a]	
Average NO <sub>x</sub> Emissions (mg/kWh) for Dwelling					[10] ÷ [11] =	

## Common Cases of Non-Compliance

None



## Special Cases

See Section C above for domestic solar hot water systems.

In the case of a District Heating System, the dry NO<sub>x</sub> rating figure in mg/kWh for the heating system should be used to assess the credit. In practice, this figure may be very high, therefore preventing achievement of the credit. However, it cannot be scaled down based on the number of dwellings since the same amount of NO<sub>x</sub> will be produced in supplying 1 kWh whether or not the system services one dwelling or 100 dwellings.

Where communal heating systems intended to supply a dwelling under assessment are due to be commissioned within a reasonable period following completion of an individual dwelling, then they should be the heat energy source assessed under this credit for NO<sub>x</sub>, rather than the interim heat energy supply measure (which should also be noted). The communal system (eg CHP, District Heating etc) must be the intended primary heating energy source for the dwelling. Evidence to confirm that future activation of such plant will occur within a reasonable period must be provided in the form of developer commitments and other pertinent technical documentation such as local service strategies; typically, this reasonable period might be up to 18 months from completion of the dwelling.

In the case of heat pump based heating systems, then the electricity used by the pumps and fans specifically for such systems must be included when calculating the average NO<sub>x</sub> emissions for the dwelling. The electricity required for such pumps and fans should be added to the total heating and hot water demand in kWh. If grid electricity is the source, then please use the figure of 1200 mg/kWh, otherwise evidence of the LZC electricity source and relevant NO<sub>x</sub> figure (if any) is required.

Any zero NO<sub>x</sub> emission energy source which directly contributes to the total space heating and hot water energy supply can be added to the total space heating and hot water energy demand from SAP in order to further reduce the average figure for NO<sub>x</sub> emissions. An example of this might include on-site wind power generation directly linked into secondary electrical space heating.

Where wood burning heating systems are employed, please use the manufacturer's NO<sub>x</sub> figures. If these are not available please contact Code Technical Support.

For any other system not covered, or for clarification on how to estimate *dry* NO<sub>x</sub> levels, please contact Code Technical Support.

## Background

Nitrogen oxides (NO<sub>x</sub>) are emitted from the burning of fossil fuels and contribute to both acid rain and to global warming in the upper atmosphere. NO<sub>x</sub> formation, which is highly temperature dependent, arises when combusting natural gas. NO<sub>x</sub> are believed to aggravate asthmatic conditions, react with the oxygen in the air to produce ozone, which is also an irritant and eventually form nitric acid when

dissolved in water. When dissolved in atmospheric moisture the result is acid rain which can damage both trees and entire forest ecosystems.

Burners in domestic heating systems are a significant source of low-level NO<sub>x</sub>, while power stations (and therefore electric heating) are a significant source of NO<sub>x</sub> in the upper atmosphere. The amount of NO<sub>x</sub> emissions varies from product to product. This credit rewards developers who include low-NO<sub>x</sub> boilers, use low NO<sub>x</sub> fuels or other low NO<sub>x</sub> systems, such as renewables, in their schemes.

# Category 7: Health & Wellbeing

Issue ID	Description	No. of credits available	Mandatory Elements
Hea 1	Daylighting	3	No

## Aim

To improve the quality of life in homes through good daylighting and to reduce the need for energy to light the home.

## Assessment Criteria

Credits are awarded for the dwelling meeting the criteria below:

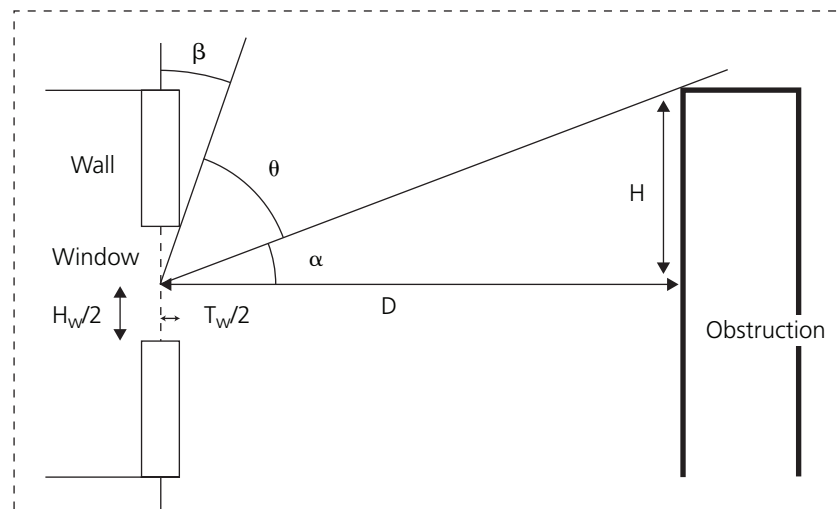
Criteria	
	Credits
Kitchens must achieve a minimum <i>average daylight factor</i> of at least 2%	1
All living rooms, dining rooms and studies (including any room designated as a home office under Ene 9 – Home Office) must achieve a minimum <i>average daylight factor</i> of at least 1.5%	1
80% of the working plane in each kitchen, living room, dining room and study (including any room designated as a home office under Ene 9 – Home Office) must receive direct light from the sky	1
<b>Default Cases</b>	
None	

## Information required to demonstrate compliance

<b>Schedule of Evidence Required</b> <b>To be read in conjunction with the <i>Definitions</i> and <i>Calculations</i> Sections</b>	
Design Stage	Post Construction Stage
<p>Calculations* required:</p> <ul style="list-style-type: none"> <li>• Average daylight factor using the formula provided in the Relevant Definition section (method described in <i>Littlefair (1998)</i> as set out in BS 8206-2) or computer simulation or scale model measurements</li> <li>• Position of the no-sky line and percentage of area of the working plane that receives direct light from the sky</li> </ul> <p>To check these, the following will be necessary:</p> <p>Details of:</p> <ul style="list-style-type: none"> <li>• The angle of visible sky</li> <li>• The window glazing</li> <li>• The room surface areas</li> </ul> <p>Plans and sections showing:</p> <ul style="list-style-type: none"> <li>• Room dimensions</li> <li>• Position and dimensions of windows and other glazed areas</li> <li>• External buildings and other potential obstructions</li> </ul> <p>Ensure the calculations have been signed off by a member of the design team</p>	<p>Calculations for all dwellings As Built must be submitted</p> <p><b>AND EITHER</b></p> <p>Confirmation (provided on the basis of an assessor site inspection or a check of As Built plans) that the input parameters</p> <p>(i.e. size and shape of rooms; type, location and dimensions of windows) used in the daylight calculations are accurate. This can be recorded by the assessor as a note in the project file and can be a selection of dwellings to satisfy the assessor that the inputs are accurate</p> <p><b>OR</b></p> <p>On-site measurements (methodology detailed in BRE IP 23/93) in the same rooms assessed at design stage (required when scale model measurements were carried out at design stage)</p>
<p>Where default values are not used, details from the manufacturer confirming the glass transmission factor and/or room surface reflectance values</p>	
<p>* or a letter of instruction to a contractor/supplier or a formal letter from the developer to the Code assessor giving the specific undertaking</p>	

## Definitions

### Angle of visible sky



The *angle of visible sky*  $\theta$  is the angle subtended, in the vertical plane normal to the window, by the visible sky from the centre of the window.

Where:

$H_w$  is the height of the window

$T_w$  is the thickness of the wall.

$D$  is the distance from the window to the obstruction

$H$  is the height of the obstruction above the mid height of the window

And:  $\theta = 90 - \alpha - \beta$

$$\tan \alpha = \frac{H}{D}$$

With:

$$\tan \beta = \frac{T_w}{H_w}$$

### Average daylight factor

The *average daylight factor* is the average indoor illuminance (from daylight) on the working plane within a room, expressed as a percentage of the simultaneous outdoor illuminance on a horizontal plane under an unobstructed CIE Standard Overcast Sky.

The average daylight factor can be calculated using the following equation:

$$DF = \frac{MW\theta T}{A(1 - R^2)}$$

Where:

$W$  = total glazed area of windows or roof lights

$A$  = total area of all the room surfaces (ceiling, floor, walls and windows)

$R$  = area-weighted average reflectance of the room surfaces

$M$  = a correction factor for dirt

$T$  = glass transmission factor

$\theta$  = angle of visible sky

Guide values for a typical dwelling with light-coloured walls are as follows (for more accurate values, refer to CIBSE Lighting Guide 10):

$R = 0.5$

$M = 1.0$  (vertical glazing that can be cleaned easily)  
 0.8 (sloping glazing)  
 0.7 (horizontal glazing)

$T = 0.7$  (double glazing)  
 0.6 (double glazing with low-emissivity coating)  
 0.6 (triple glazing)

$\theta = 65^\circ$  (vertical glazing)

It is advised that this default figure for the *angle of visible sky* is used with caution; the methodology detailed in the *angle of visible sky* definition should be preferred for more accuracy.

### **Commission Internationale de l'Eclairage CIE**

Commission Internationale de l'Eclairage (CIE) is the international standards body for lighting.

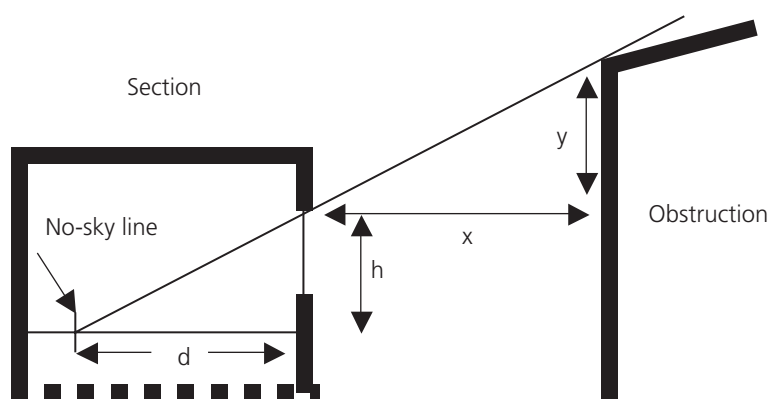
### **Daylight factor**

The *daylight factor* is the ratio between the illuminance (from daylight) at a specific point on the working plane within a room, expressed as a percentage of the illuminance received on an outdoor unobstructed horizontal plane. This is based on an assumed overcast sky, approximated by the 'CIE overcast sky'.

### **No-sky line**

The *no-sky line* divides those areas of the working plane which can receive direct light from the sky, from those which cannot. It is important as it indicates how good the distribution of daylight is in a room. Areas beyond the *no-sky line* will generally look gloomy.

As an approximation, obstructions that are parallel to the window can be considered infinite. The no sky-line will then be parallel to the window at a distance "d" from the window wall. "d" can be calculated as follows:



$$d = \frac{xh}{y}$$

Where:

$h$  = height of the window head above the working plane

$y$  = height of the obstruction above the window head

$x$  = distance from the window to the obstruction

If  $d$  is greater than the room depth, then no part of the room lies beyond this *no-sky line*.

Where results using this methodology do not comply with the requirements, more accurate calculations can be carried out, as detailed in the Calculation Procedures below.

### Reasonableness check

A *reasonableness check* is to be carried out on daylight factor and *no-sky line* calculations. Checks should be performed on one room per dwelling, in 10% of dwellings, up to a maximum of 10 dwellings per development. Different floors and orientations are to be checked. Check that the calculation input details, such as room dimensions, window type, sizes and locations and site layout are consistent with the specification and the drawings.

### Working plane

The *working plane* is a notional surface, typically at about desk or table height, at which *daylight factor* or the '*no-sky line*' is calculated or plotted. For the calculations required here, it is at 0.85m above the floor.

## Assessment Methodology

### Design Stage

- Verify that the evidence provided demonstrates that all the Assessment Criteria have been met.

- Carry out a *reasonableness check* on provided *average daylight factor* and *no-sky line* calculations.

### **Post Construction Stage**

- Confirm which specifications and evidence provided at the Design Stage are still valid.
- Assess all the new specifications and evidence provided at post construction stage.
- Check that the *average daylight factor* and *no-sky line* calculation input details, such as room dimensions, window type, sizes and locations and site layout are correct by site inspection.
- Where any changes have occurred, seek revised calculations and check these as described above. Check the final specification and drawings.

## Calculation Procedures

Calculations are to be supplied by the developer/design team.

1. Calculation procedure for *daylight factor* and typical values are detailed in *Littlefair (1998)*
  - The *average daylight factor* formula can be used to model daylighting conditions in any simple rectangular room with a continuous external obstruction or none. Where external obstructions are of complex geometry and cannot be approximated by a continuous object, it is advised to use methodology in *Littlefair (1998)*. Individual trees can be ignored.
  - More complex room geometries can be modelled using computer simulation software, physical scale modelling or advanced manual calculations.
  - Where there are two types of room which form part of the same large space, for example, an open plan kitchen-dining room, calculate as one room as there is no solid partition present to block the distribution of the daylight. Credits will then be awarded on the basis of the *average daylight factor* of the whole space. For example, if the space is used as a kitchen, a living room and a dining room, the same *average daylight factor* will be used when assessing all these areas against the levels set out above.
2. Plotting of the *no-sky line* or estimating the percentage of the working plane that receives direct light from the sky can be done using the methodology detailed in the Relevant Definitions section. It must be understood that this methodology will underestimate the actual percentage of the working plane that receives direct light from the sky because obstructions are unlikely to be infinite. Where obstructions are not horizontal, parallel to the window or considered infinite, refer to *Littlefair (1998)* for a more accurate methodology
3. It is acceptable that daylighting calculations are carried out in selected dwellings when the reasoning behind selection of dwellings (or rooms) clearly



demonstrates that the rooms in the dwellings for which the calculations are not provided will perform better than those backed up by the calculations.

4. It is recommended to seek expert advice to carry out daylighting calculations as mentioned above.

## Checklists and Tables

None

## Common Cases of Non-Compliance

None

## Special Cases

**Sun pipes:** As a general rule, sun pipes should be treated as roof lights i.e. if there are no obstructions use a  $\theta$  of  $180^\circ$ . There are a wide range of light pipes on the market, with different reflective linings and some include lenses/mirrors etc. If no transmission factor is stated use  $T = 0.5$  for a 1m length pipe and  $T = 0.25$  for a 2m length pipe.

## Background

In addition to reducing the need for artificial lighting and in some cases contributing to winter heating requirements, research has shown that the main impact of good daylighting design is on human beings. Adequate access to daylight will contribute to the health and wellbeing of dwelling occupants by providing them with a pleasant living environment.

The quality and quantity of natural light in an interior depends both on the design of the interior environment (size and position of windows, depth and shape of rooms, colours of internal surfaces) and the design of the external environment (obstructing buildings and objects).

*BS 8206* describes good practice in daylighting design and presents criteria intended to enhance the wellbeing and satisfaction of people in buildings, recognising that the aims of good lighting go beyond achieving minimum illumination for task performance.

The Code awards credits for meeting the minimum *average daylight factor* suggested by *BS 8206-2*. The British Standard, together with further guidance given in Littlefair (1998), is widely accepted as the authoritative guidance for use in daylighting the UK.

Issue ID	Description	No. of credits available	Mandatory Elements
Hea 2	Sound Insulation	4	No

## Aim

To ensure the provision of improved sound insulation to reduce the likelihood of noise complaints from neighbours.

## Assessment Criteria

Credits are awarded for achieving higher standards of sound insulation than those given in Approved Document E of the Building Regulations and demonstrating it by either using pre-completion testing or Robust Details as follows:

Criteria	
	Credits
<p>Where:</p> <ul style="list-style-type: none"> <li>airborne sound insulation values are at least 3dB higher</li> <li>impact sound insulation values are at least 3dB lower</li> </ul> <p>OR</p> <ul style="list-style-type: none"> <li>airborne sound insulation values are at least 5dB higher</li> <li>impact sound insulation values are at least 5dB lower</li> </ul> <p>OR</p> <ul style="list-style-type: none"> <li>airborne sound insulation values are at least 8dB higher</li> <li>impact sound insulation values are at least 8dB lower</li> </ul> <p>than the performance standards set out in the Building Regulations for England and Wales, Approved Document E (2003 Edition, with amendments 2004).</p> <p>This can be demonstrated through <b>EITHER</b></p> <p>a programme of pre-completion testing based on the <i>Normal programme of testing</i> described in Approved Document E for every group or sub-group of houses or flats that demonstrates that the performance standard or standards above are achieved.</p> <p>OR</p> <p>use of constructions for all relevant building elements that have been assessed and approved by Robust Details Limited (RDL), and found to achieve the performance standards stated above and to register all relevant dwellings with RDL.</p>	<p>1</p> <p>3</p> <p>4</p>
<p><b>Default cases</b></p> <p>Detached dwellings</p> <p>Attached dwellings where separating walls or floors only occur between non habitable rooms</p>	<p>4</p> <p>3</p>

## Information required to demonstrate compliance

<b>Schedule of Evidence Required</b> <b>To be read in conjunction with the <i>Definitions</i> and <i>Calculations</i> Sections</b>	
Design Stage	Post Construction Stage
<p>Text confirming (on drawings or in the specification*) a commitment to meet the relevant sound insulation performance levels (as outlined in the <i>Assessment Criteria</i> above)</p> <p>*or a letter of instruction to a contractor or a formal letter from the developer to the Code assessor giving the specific undertaking</p> <p>Where sound testing will be carried out:</p> <ul style="list-style-type: none"> <li>• Details of the programme of pre-completion testing to be carried out, including the number of groups and sub-groups.</li> <li>• Brief details of separating walls/floors and flanking constructions, with evidence of the potential for the constructions to meet the relevant performance standards, e.g. design statement from an acoustic consultant with appropriate expertise in building acoustics, or reference to text in the specification describing these requirements.</li> <li>• A commitment to carry out remedial works and to re-test to demonstrate the necessary performance standard/s is/are achieved should any of the separating walls or floors fail to meet the required standard for sound insulation when tested for the first time</li> <li>• Confirmation that the Compliant Test Body which will carry out pre-completion testing is accredited by UKAS or is a member of a scheme that is deemed to be equivalent.</li> </ul>	<p>As design stage</p> <p><b>AND EITHER</b></p> <p>Where sound testing has been carried out:</p> <ul style="list-style-type: none"> <li>• Copies of the sound insulation field test results and/or a letter of confirmation that the required sound insulation performance standards as detailed in the assessment criteria have been achieved.</li> <li>• Evidence that the Compliant Test Body is UKAS accredited or covered by another scheme which is deemed to be equivalent</li> </ul> <p><b>OR</b></p> <p>Where Robust Details have been used:</p> <ul style="list-style-type: none"> <li>• Completed Robust Details Ltd checklists for all relevant constructions</li> </ul>

Where Robust Details are used:

- Confirmation that the Robust Details chosen will achieve the required performance standards for sound insulation (as applicable), such as that provided by the Robust Details Limited (RDL) website (see [www.robustdetails.com](http://www.robustdetails.com))
- Confirmation that the site is registered with RDL (the Purchase Statement)

## Definitions

- Approved Document E** The Building Regulations for England and Wales Approved Document E: Resistance to the Passage of Sound, 2003 edition incorporating 2004 amendments.
- Compliant Test Body** Those organisations or individuals having UKAS accreditation or accredited by a European equivalent of UKAS as well as organisations or individuals registered with the Association of Noise Consultants (ANC) Registration Scheme.
- Groups and Sub-groups** As defined in the Building Regulations for England and Wales Approved Document E: Resistance to the Passage of Sound, Section 1 (paragraphs 1.11 – 1.17). In addition to this, where there are steps or staggers greater than 300mm between dwellings, dwellings without steps/staggers should be treated as a different sub-group to those with step/staggers. This is because the presence of steps/staggers is likely to improve performance.
- Habitable room** For the purpose of this issue, habitable rooms include any room where individuals will sit or lie down and require a reasonably quiet environment to concentrate or rest. Such rooms are bedrooms, living rooms, dining rooms, studies as well as kitchen-dining and kitchen-living rooms.
- Non-habitable rooms** For the purpose of this issue, non-habitable rooms include any room that is not considered a habitable room as defined above, such as kitchens, bathrooms, toilets, hallways, garages and laundry rooms

## Robust Details

Robust Details (RDs) are construction solutions that provide an alternative to pre-completion sound insulation testing as a method of complying with Requirement E1 of Approved Document E (2003 Edition) of the Building Regulations (England and Wales). Robust Details must be approved by Robust Details Ltd (RDL) and all development sites must be registered with RDL and built in accordance with the RD specification. To give a reasonable level of assurance that these details will achieve the required minimum standards, RDL carry out random inspections during construction and random sound insulation tests after construction. A Robust Detail is deemed to be approved for Code credits only when it achieves a specified performance level when assessed by RDL according to the following criteria:

1. **Mature robust detail** (published for over 12 months and at least 100 test results) – regular assessment based on the 90<sup>th</sup> percentile of results from the last 100 site tests.
2. **Low use robust detail** (published for over 12 months but fewer than 100 test results) – initial assessment based on the first 30 tests needed to qualify for the robust details scheme and the site tests available, and reviewed regularly as new test results become available, until it becomes a mature robust detail or is rejected.
3. **New robust detail** (published for less than 12 months and fewer than 100 test results) – initial assessment based on the first 30 tests needed to qualify for the robust details scheme, and reviewed regularly as new test results become available, until it becomes a mature robust detail or is rejected.

It should be noted that not all RDs will necessarily achieve the performance levels required for Code credits. If in doubt check the list of currently approved details with RDL directly (0870 240 8210); [www.robustdetails.com](http://www.robustdetails.com)).

## Assessment Methodology

### **Design Stage**

- Verify that the evidence provided demonstrates that all the Assessment Criteria have been met.
- For compliance through sound insulation testing:
  - a). Confirm there is a clear distinction between any groups and sub-groups on the development, and that there is a commitment made to conduct a program of pre-completion testing, as set out in ADE. Identification of specific plots to be tested should be undertaken by the building control body when construction is nearing completion. In addition confirm that there is a commitment to conduct remediation work should any test fail.
  - b). Confirm that the Compliant Test Body that will carry out pre-completion testing is accredited by UKAS (or a European equivalent) or is covered by a 'deemed to satisfy' scheme. If a Compliant Test Body has yet to be appointed, a commitment to employ one that fulfils one of the criteria will be sufficient. Lists of acoustic consultants by geographical location can be found at: [www.ioa.org.uk](http://www.ioa.org.uk) and [www.association-of-noise-consultants.co.uk](http://www.association-of-noise-consultants.co.uk).
  - c). Confirm that evidence of the potential for the construction to meet the relevant performance standards has been provided (e.g. design statement from an acoustic consultant with appropriate experience in building acoustics).
- For compliance using Robust Details:
  - a). Confirm that the Robust Detail(s) specified can achieve the sound insulation levels required for the number of Credits sought (see Table 1 – Credit Summary – Improvements on Approved Document E under *Checklists and Tables* below). This information is available on the Robust Details website ([www.robustdetails.com](http://www.robustdetails.com)).

### **Post Construction Stage**

- Confirm which specifications and evidence provided at the Design Stage are still valid.
- Assess all the new specifications and evidence provided at post construction stage.
- Verify that specific Post Construction Stage evidence provided demonstrates that all the Assessment Criteria have been met.

## Calculation Procedures

None

## Checklists and Tables

A commitment to achieve sound insulation values that are better than the performance standards for sound insulation in Approved Document E (2003 Edition with amendments 2004) by the stated amount in Table : Cat 7.1.

Table 7.1: Credit Summary – Improvement on Approved Document E		
Credits	Improvement on Approved Document E (dB)	
	Airborne sound $D_nT_{w} + C_{tr}$	Impact sound $L'_{nT,w}$
1	+3	-3
3	+5	-5
4	+8	-8

The number of credits awarded to a dwelling is determined by the lowest performing separating wall or floor, regardless of whether the assessment is based on pre-completion testing, use of robust details, or a mixture of both.

The dwellings in a group or sub-group that have been tested are awarded credits appropriate to their measured performance. Other dwellings in the group or sub-group that were not tested are awarded the same number of credits as the lowest performing separating walls or floors in the same group or sub-group that was tested.

For the purposes of the two paragraphs above, the performance of the lowest performing separating wall or floor must be clearly identified by the Compliant Test Body.

## Common Cases of Non-Compliance

None

## Special Cases

Testing should be between habitable rooms on the ground floor and at higher storey levels if applicable. If there are no habitable rooms with separating walls or floors no testing is needed. In such cases 3 credits can be awarded by default, to allow for the small amount of sound nuisance that can occur in such cases. In addition, it is considered good acoustic design not to have habitable rooms on one side of a separating wall or floor and non-habitable rooms on the other side.

Where there are insufficient suitable separating walls or floors in a development to carry out the number of tests specified, all of the available suitable separating walls or floors should be tested. Where all the available suitable separating walls and floors

have been tested this will be considered to be equivalent to the requirements in ADE, and credits will be awarded as appropriate.

Note: No more than two airborne and two impact sound insulation tests should be undertaken between a pair of houses or flats i.e. a maximum of two airborne sound insulation tests should be carried out on any separating wall and a maximum of two airborne and two impact tests on any separating floor. These tests must be carried out between different pairs of rooms.

## Background

One of the most common causes for disputes between neighbours is noise. Environmental Health Officers in England and Wales received nearly 6000 noise complaints per million people in 2003/2004 from domestic premises. This accounts for 75% of all noise complaints received.

The purpose of this credit is to encourage higher standards of sound insulation through a commitment to design and build constructions that exceed the minimum performance standards in Approved Document E of the Building Regulations.

Section 0: Performance, Approved Document E (2003 Edition with amendments 2004) '*Resistance to the passage of sound*' contains performance standards in terms of airborne and impact sound insulation for walls, floors and stairs that have a separating function.

To ensure that the design intent for sound insulation is achieved on site, sound insulation testing is covered by Regulation 20A of the Building Regulations (2000) or Regulation 12A of the Approved Inspector Regulations (2000). The normal way of satisfying Regulation 20A or 12A is to implement a programme of sound insulation testing, called pre-completion testing, according to the guidance set out in Section 1: Pre-completion testing, Approved Document E (2003 Edition with amendments 2004). This guidance describes the normal programme of testing, based on at least one set of tests for every 10 houses, flats or rooms for residential purposes in a group or sub-group.

From 1st July 2004, Robust Details have been introduced as an alternative to pre-completion testing for demonstrating compliance with Part E. Robust details have been developed for separating wall and floor constructions. These have been tested in the field against the performance standards in Approved Document E. The constructions are described in guidance produced by Robust Details Ltd ([www.robustdetails.com](http://www.robustdetails.com)). Not all RDs are able to meet levels of performance above ADE requirements in accordance with the Code criteria. Information on compliance is available from RDL on this issue if in doubt.

BS 8233.1999 – Sound Insulation and Noise Reduction for Buildings – Code of Practice – sets out guidance on good acoustic planning in section 7.6.1.3. The following principles are recommended for minimising disruption from noise in dwellings (see the standard for full details):



1. Keep services away from bedrooms in houses and flats
2. Keep stairs, lifts and circulation areas in apartment buildings away from sensitive rooms such as bedrooms
3. Corridors in apartment buildings should have acoustically absorbent ceilings. Carpets can also help to reduce disturbance, particularly from footsteps, in adjacent apartments
4. Separating walls between bathrooms and sensitive areas should be designed to minimise acoustic transmission
5. Isolate pipework and ductwork from the building structure to avoid vibration being transmitted and all penetrations of services should be sealed.

Issue ID	Description	No. of credits available	Mandatory Elements
Hea 3	Private Space	1	No

## Aim

To improve the occupiers' quality of life by providing an outdoor space for their use, which is at least partially private.

## Assessment Criteria

Criteria	
	Credits
Where outdoor space (private or semi-private) has been provided that is: <ul style="list-style-type: none"> <li>• of a minimum size that allows all occupants to sit outside</li> <li>• allows easy access to all occupants, including wheelchair users</li> <li>• accessible only to occupants of designated dwellings</li> </ul>	1
<b>Default Cases</b> None	

## Information required to demonstrate compliance

<b>Schedule of Evidence Required</b> <b>To be read in conjunction with the <i>Definitions, Glossary and Calculations</i> Sections</b>	
Design Stage	Post Construction Stage
<p>Drawings or specification text* confirming:</p> <ul style="list-style-type: none"> <li>• The number of bedrooms served by the outdoor space</li> <li>• That the outdoor space meets the minimum size requirements and is located adjacent/close to the dwelling</li> <li>• That the outdoor space is accessible to wheelchair users with details shown/described of Low or Level thresholds in accordance with BS8300 “Design of buildings and their approaches to meet the needs of disabled people – Code of practice”</li> </ul> <p>* or a letter of instruction to a contractor/supplier or a formal letter from the developer to the assessor giving a specific undertaking</p> <p><b>AND</b>, where a shared outdoor space is provided:</p> <ul style="list-style-type: none"> <li>• details of the security/control arrangements for access</li> </ul>	<p>As Built drawings and specifications or confirmation that the dwellings have been constructed in accordance with the design stage drawings and specifications.</p>

## Definitions

### **Accessible only to occupants of Designated dwellings**

The space must be designed in a way that makes it clear that the space is only to be used by occupants of designated dwelling(s). This could be achieved by using the buildings themselves, fencing, planting or other barrier to seal off the space.

### **Easy access by all occupants**

Access for wheelchair users should conform to BS8300 Design of buildings and their approaches to meet the needs of disabled people – Code of practice.

### **Minimum Size**

Minimum space requirements :

- Private space: 1.5 m<sup>2</sup>/bedroom
- Shared space: minimum 1m<sup>2</sup>/bedroom

### **Outdoor space**

An outdoor space could be:

- a private garden
- a communal garden or courtyard
- balconies
- roof terraces
- patios

The space should be adjacent or in close proximity to the dwelling.

## Assessment Methodology

### ***Design Stage***

- Measure the area of the outdoor space and check it is of sufficient size for the number of bedrooms.

### ***Post Construction Stage***

- Confirm which specifications and evidence provided at the Design Stage are still valid.
- Assess all the new specifications and evidence provided at post construction stage.

## Calculation Procedures

None

## Checklists and Tables

None

## Common Cases of Non-Compliance

“Juliet” balconies generally do not comply with the criteria as they are normally too small.

Conservatories and other enclosed areas do not comply with the criteria.

## Special Cases

None

## Background

The provision of secure private space is an effective way to improve the quality of the occupier’s life. The adaptability of private space serves as a multi-purpose area and can be utilised by any occupant, for example, as a secure playing space for children, for horticultural purposes, or simply as a convenient place for fresh air.

*‘It seems important that the open space directly connected to dwellings should be demonstrably private, no matter what tenure arrangements apply, and that the territorial rights of the occupiers should be clearly marked.*

*Gardens and balconies are popular but only if they are a reasonable size. A flat located near the centre of a city may be preferred to a house with a garden away from the centre, even for a proportion of families with older children, especially if a usable balcony is available.’*

New Metric Handbook, Section 2.09, p302

*‘Intuitively, we all understand the benefits of open space: a walk, a breath of fresh air, a change of scene. We know we feel better for it and research from Japan goes to show that good neighbourhood green spaces promote longer life expectancy for local people.’*

CABE – The Value of Public Space

Issue ID	Description	No. of credits available	Mandatory Elements
Hea 4	Lifetime Homes	4	Yes (Level 6)

## Aim

To encourage the construction of homes that are accessible and easily adaptable to meet the changing needs of current and future occupants.

## Assessment Criteria

For a Level 6 assessment achievement of the Lifetimes Homes criteria is a mandatory requirement.

Criteria	
	Credits
Where all principles of <i>Lifetime Homes</i> , applicable to the dwelling being assessed, have been complied with.	4
<b>Default Cases</b>	
None	

## Information required to demonstrate compliance

Schedule of Evidence Required To be read in conjunction with the <i>Definitions</i> and <i>Calculations</i> Sections	
Design Stage	Post Construction stage
A completed Lifetime Homes <i>Checklist Hea 4</i> indicating compliance with all applicable points from 1–16, signed by the developer	Completed As Built Lifetime Homes <i>Checklist Hea 4</i> indicating compliance with all applicable points from 1–16. <b>AND EITHER</b> Assessor Site Inspection Report with, where appropriate, supporting photographic evidence with notes confirming the date and plot number <b>OR</b> As Built drawings highlighting each Lifetime Homes feature from completed design stage <i>Checklist Hea 4</i>

## Definitions

### Lifetime Homes

Developed by Habinteg Housing Association, the Helen Hamlyn Foundation and the Joseph Rowntree Foundation in the early 1990's. The scheme involves the incorporation of 16 design features that together create a flexible blueprint for accessible and adaptable housing in any setting.

The criteria covered are listed in Checklist 1 below.

## Assessment Methodology

### Design Stage

- Confirm that the developer/designer has completed the Lifetime Homes checklist and that all the elements will be met.

### Post Construction Stage

- Confirm that an As Built Lifetime Homes checklist has been completed.
- Verify that the Lifetimes Homes criteria have been met, either by a site inspection or as built drawings showing the features.

## Calculation Procedures

None

## Checklists and Tables

The Lifetime Homes checklist should be used (by the developer/designer) to check whether the Assessment Criteria have been met. Additional useful guidance can be found on [www.lifetimehomes.org.uk/codeassessors](http://www.lifetimehomes.org.uk/codeassessors)

Checklist Hea 4 –Lifetime Homes			YES/ NO
Lifetime Home Standard	Stated Specification and dimensions which meet the Lifetime Home standard	Applicability	
1). Where there is car parking adjacent to the home, it should be capable of enlargement to attain 3300mm width	The general provision for a car parking space is 2400mm width. If an additional 900mm width is not provided at the outset, there must be provision (e.g. a grass verge) for enlarging the overall width to 3300mm at a later date	<b>Usually only houses</b> – all dwellings that have a parking space within the designated plot boundary for that particular dwelling	
			<i>continued</i>

Checklist Hea 4 –Lifetime Homes			YES/ NO						
Lifetime Home Standard	Stated Specification and dimensions which meet the Lifetime Home standard	Applicability							
2). The distance from the car parking space to the home should be kept to a minimum and should be level or gently sloping	<p>It is preferable to have a level approach. However, where the topography prevents this, the following table highlights the maximum gradients dependent on the distance*</p> <table border="1"> <tr> <td>&lt;5m</td> <td>1:12</td> </tr> <tr> <td>5–10m</td> <td>1:15</td> </tr> <tr> <td>&gt;10m</td> <td>1:20</td> </tr> </table> <p>Paths should be a minimum of 900mm width</p>	<5m	1:12	5–10m	1:15	>10m	1:20	<b>All forms of dwelling</b> – all parking spaces, for any type of dwelling, whether that space is within the boundary or not	
<5m	1:12								
5–10m	1:15								
>10m	1:20								
3). The approach to all entrances should be level or gently sloping	See specification and dimensional requirements of standard 2 above for the definition of gently sloping	As standard 2 above.							
4). All entrances should: a). be illuminated b). have level access over the threshold and c). have a covered main entrance	The threshold upstand (any vertical change in level at the threshold) should not exceed 15mm	<b>All forms of dwelling –</b> 4a). All entrances to dwellings and all communal entrances to blocks of dwellings 4b). All entrances to dwellings, all communal entrances to blocks of dwellings and all associated communal doors 4c). Main entrances to dwellings and main entrances to blocks of dwellings							
5). Communal stairs should provide easy access and where homes are reached by a lift, it should be fully accessible	<p><i>Minimum dimensions for communal stairs;</i> Uniform rise not more than 170mm Uniform going not less than 250mm Handrails extend 300mm beyond top and bottom step Handrail height 900mm from each nosing</p> <hr/> <p><i>Minimum dimensions for lifts</i> Clear landing entrances 1500mm x 1500mm Minimum internal dimensions 1100mm x 1400mm Lift controls between 900 and 1200mm from the floor and 400mm from the lift's internal front wall</p>	<b>Flats and maisonettes</b> – any dwelling approached via a communal stair and/or a passenger lift. If a lift is provided, the communal stairs must still conform to the requirements stated in the Specification column.							

continued



Checklist Hea 4 –Lifetime Homes			YES/ NO
Lifetime Home Standard	Stated Specification and dimensions which meet the Lifetime Home standard		Applicability
6). The width of the doorways and hallways should conform to the specifications in the next column	Doorway clear opening width (mm)	Corridor/ passageway width (mm) (minimum)	<b>All forms of dwelling</b> – all doorways and hallways/ passageways/ landings on all storeys within all dwellings, whatever form, on whatever storey, and all communal areas within a block of dwellings
	750 or wider	900 (when approach is head-on)	
	750 or wider	1200 (when approach is not head-on)	
	775 or wider	1050 (when approach is not head-on)	
	900 or wider	900 (when approach is not head-on)	
	The clear opening width of the front door should be 800mm		All front doors to all dwellings and communal entrance doors to blocks of dwellings
	There should be 300mm to the side of the leading edge of doors at entrance level		All communal entrance doors to blocks of dwellings, all communal doors within a block of dwellings (on any storey), and all doors on the entrance level of each dwelling (i.e. all doors on the entrance level of houses/maisonettes and every door within a flat)
7). There should be a space for turning a wheelchair in dining areas and living rooms and adequate circulation space for wheelchairs elsewhere	A turning circle of 1500mm diameter or a 1700mm x 1400mm ellipse is required		<b>All forms of dwelling</b>
8). The living room should be at entrance level			<b>All forms of dwelling</b> – Living room/living area
9). In houses of two or more storeys, there should be space on the entrance level that could be used as a convenient bed-space			<b>Houses/maisonettes</b> – dwellings with more than one storey
<i>continued</i>			

Checklist Hea 4 –Lifetime Homes			YES/ NO
Lifetime Home Standard	Stated Specification and dimensions which meet the Lifetime Home standard	Applicability	
10). There should be; a). a wheelchair accessible entrance level WC, with b). drainage provision enabling a shower to be fitted in the future	<p><i>The drainage provision for a future shower should be provided in all dwellings</i></p> <p>-----</p> <p><i>Dwellings of three or more bedrooms or on one level;</i></p> <p>The WC must be fully accessible. A wheelchair user should be able to close the door from within the closet and achieve side transfer from a wheelchair to at least one side of the WC. There must be at least 1100mm clear space from the front of the WC bowl. The shower provision must be within the closet or adjacent to the closet</p> <p>-----</p> <p><i>Dwellings of two or fewer bedrooms;</i></p> <p>In small two-bedroom dwellings where the design has failed to achieve the above fully accessible standard WC, the Part M standard WC will meet this requirement</p>	<p>10a). <b>All dwellings except houses/maisonettes, with two or more storeys, that have 2 or less bedrooms</b></p> <p>(i.e. applicable to all flats regardless of number of bedrooms, and houses / maisonettes with 3 or more bedrooms).</p> <p>10b). <b>All forms of dwelling</b></p> <p>Note: these facilities will be required within the bathroom of all flats if not provided elsewhere in the flat</p>	
11). Walls in bathrooms and toilets should be capable of taking adaptations such as handrails	Wall reinforcements should be located between 300 and 1500mm from the floor	<b>All forms of dwelling</b>	
12). The design should incorporate; a). provision for a future stair lift b). a suitably identified space for a through-the-floor lift from the ground to the first floor, for example to a bedroom next to a bathroom	There must be a minimum of 900mm clear distance between the stair wall (on which the lift would normally be located) and the edge of the opposite handrail/balustrade. Unobstructed 'landings' are needed at the top and bottom of the stairs	<b>All dwellings with 2 or more storeys –</b>  12a). this criterion relates to private stairs within individual dwellings only	
13). The design should provide a reasonable route for a potential hoist from a main bedroom to the bathroom	Most timber trusses today are capable of taking a hoist and tracking. Technological advances in hoist design mean that a straight run is no longer a requirement	<b>All forms of dwelling</b>	
14). The bathroom should be designed to incorporate ease of access to the bath, WC and wash basin	Although there is not a requirement for a turning circle in bathrooms, sufficient space should be provided so that a wheelchair user can use the bathroom	<b>All forms of dwelling</b>	
			<i>continued</i>

Checklist Hea 4 –Lifetime Homes			YES/ NO
Lifetime Home Standard	Stated Specification and dimensions which meet the Lifetime Home standard	Applicability	
15). Living room window glazing should begin at 800mm or lower and windows should be easy to open/operate	People should be able to see out of the window whilst seated. Wheelchair users should be able to operate at least one window in each room	<b>All forms of dwelling</b>	
16). Switches, sockets, ventilation and service controls should be at a height usable by all (i.e. between 450 and 1200mm from the floor)	This applies to all rooms including the kitchen and bathroom	<b>All forms of dwelling</b>	
<b>Developer Confirmation</b>			
By entering a 'YES' against the criteria above, I confirm that all dwellings of this specification type on the <b>ENTER SITE NAME</b> site meet the stated criteria.			
Signature:			
Date:			
Print Name:			

\*Providing there are top, bottom and intermediate landings of not less than 1.2m excluding the swing of doors and gates.

## Common Cases of Non-Compliance

None

## Special Cases

None

## Background

The Lifetime Homes concept was developed by Habinteg Housing Association, the Helen Hamlyn Foundation and the Joseph Rowntree Foundation in the early 1990's. The resultant 16 design criteria aim to produce homes that are accessible to a wide range of occupants and able to be easily adapted to meet the changing needs of a household.

'Lifetime Homes' is currently a voluntary standard. Some elements of the standards were introduced into the Building Regulations Part M in 1999.

Lifetime Homes will be suitable for older people and for the vast majority of disabled people, as well as non-disabled people; they will have a wider market of potential buyers and residents, most likely increasing their value and the ease with which they can be re-sold.

"The Chartered Institute of Housing in Northern Ireland & the Joseph Rowntree Foundation conducted a comparative study into the cost of meeting Building Regulations and Lifetime Home standards. The additional cost of building Lifetime Homes ranged from £165 to a maximum of only £545 per dwelling, depending on the size, layout and specification of the property. In addition, Lifetime Homes bring about many savings and cost benefits in adaptations and flexibility in use as well as increasing the marketability of the property."

# Category 8: Management

Issue ID	Description	No. of credits available	Mandatory Elements
Man 1	Home User Guide	3	No

## Aim

To encourage and reward provision of guidance enabling occupants to understand and operate their home efficiently and make the best use of local facilities.

## Assessment Criteria

Credits are awarded for the provision of a simple user guide which covers information relevant to the 'non-technical' tenant/owner on the operation and environmental performance of their home, as follows:

Criteria	
	Credits
A Home User Guide, compiled using <i>Checklist Man 1 Part 1</i> together with information that the guide is available in alternative accessible formats	2
Where the guide also covers information relating to the site and its surroundings, compiled using <i>Checklist Man 1 Part 2</i>	1
<b>Default Cases</b>	
None	

## Information required to demonstrate compliance

Schedule of Evidence Required	
To be read in conjunction with the <i>Definitions</i> and <i>Calculations</i> Sections	
Design Stage	Post Construction Stage
<p>Where a Home User Guide covering operational issues only will be supplied:</p> <p>Confirmation in the Specification* that the guide will be:</p> <ul style="list-style-type: none"> <li>• Supplied to all dwellings within the development</li> <li>• Be developed to the required standards (as a minimum including a list of contents showing that the guide will cover all of the issues required in <i>Checklist Man 1 Part 1</i>)</li> </ul> <p>* or a letter from the developer to the Code assessor confirming the specific undertaking.</p>	<p>Copies of the Home User Guides for each type of dwelling covering all the issues required in <i>Checklist Man 1 Part 1</i> or <i>Parts 1 and 2</i></p> <p><b>AND EITHER</b></p> <p>Confirmation that the Home User Guide has been supplied to all home(s)</p> <p><b>OR</b>, where Home User Guides are to be provided on the internet or cd:</p> <ul style="list-style-type: none"> <li>• Confirmation is required that all occupants will be given a hard copy of the Home User Guide contents page</li> <li>• A copy of the letter that will be given to occupants</li> </ul>
<p>Where a Home User Guide covering operational issues and issues relating to the site and surroundings will be supplied:</p> <p>As above and including information covered in <i>Checklist Man 1 Part 2</i></p>	

## Definitions

### Alternative formats for home user guide

The home user guide should be provided in an appropriate format for users. This might include translation into foreign languages, braille, large print or audio cassette/CD.

### Home User Guide

A guide to occupants of the dwelling containing necessary details about the everyday use of the home in a form that is easy for users to understand.

### Volatile Organic Compound VOC

Volatile Organic Compound. Emissions from furnishings and some structural materials which may have a deleterious effect on occupants. VOCs are commonly found in the solvents of glues and non water based paints and varnishes, and in some preservative treatments.

## Assessment Methodology

### **Design Stage**

- Check confirmation that the guide assembled with the Checklist Man 1 will be supplied to all homes.
- Check whether additional local information from the Checklist Man 1 will also be provided.

### **Post Construction Stage**

- Confirm that a Home User Guide conforming to all the criteria in Checklists Man 1 parts 1 and 2 has been provided.

## Calculation Procedures

None

## Checklists and Tables

Checklist Man 1-Home User Guide		
Part 1 – Operational Issues		YES/NO
The list below indicates the type of information that should be included		
a. Environmental strategy/design and features	<ul style="list-style-type: none"> <li>• Details of any specific environmental/energy design strategy/features including an overview of the reasons for their use (e.g. environmental and economic savings and restrictions on making alterations) and how they should best be operated (where they are not passive features such as insulation and SUDS). Strategies/features could include passive solar design, super insulation, energy efficient timber windows, heat recovery systems, solar hot water systems, photovoltaics, passive vents or the use of certified timber or SUDS within the boundary of individual properties. (Each dwelling will in any case be issued with a copy of the Code Certificate.)</li> </ul>	
b. Energy	<ul style="list-style-type: none"> <li>• Information as described in the Building Regulations ADL1A (requirement note c) i.e. Sufficient information about the building, the fixed building services (this should include things like the implication of covering heating outlets with bags etc and other hazards) and their maintenance requirements so that the building can be operated in such a manner as to use no more fuel and power than is reasonable in the circumstances</li> <li>• A way of complying would be to provide suitable set of operating and maintenance instructions aimed at achieving economy in the use of fuel and power in a way that householders can understand. The instructions should be directly related to the particular system/s installed in the dwelling</li> <li>• The instructions should explain to the occupier how to operate the system(s) efficiently. These should include: the making of seasonal adjustments to control settings and what routine maintenance is needed to enable operating efficiency to be maintained at a reasonable level through the service live/s of the system/s</li> </ul>	
		<i>continued</i>

Checklist Man 1-Home User Guide		
Part 1 – Operational Issues		YES/NO
The list below indicates the type of information that should be included		
	<ul style="list-style-type: none"> <li>• Details of any renewable system/s and how it/they operate/s</li> <li>• Details of low-energy light fittings, their use and their benefits, e.g. how much energy they save compared to traditional light fittings and what this can mean in terms of reduced energy bills</li> <li>• Details of the EU labelling scheme for white goods</li> <li>• General information on energy efficiency</li> </ul>	
c. Water Use	<ul style="list-style-type: none"> <li>• Details of water-saving measures and tips</li> <li>• External water use and efficiency, e.g. the use of water butts or other type of rainwater recycling systems</li> </ul>	
d. Recycling and Waste	<ul style="list-style-type: none"> <li>• Information about the Local Authority collection scheme (if applicable)</li> <li>• If the home is not covered by a Local Authority collection scheme, details and location of communal recycling bins/skips/facilities</li> <li>• Information on the location and use of any recycling bins</li> <li>• Information on the location and use of any compost bins</li> <li>• Information on WRAP which can offer guidance on recycling and sustainable waste disposal</li> </ul>	
e. Sustainable DIY	<ul style="list-style-type: none"> <li>• Environmental recommendations for consideration in any home improvement works, such as the use of low VOC products or the purchase of certified timber</li> </ul>	
f. Emergency Information	<ul style="list-style-type: none"> <li>• Information on smoke detector/s</li> </ul>	
g. Links, References and Further Information	<ul style="list-style-type: none"> <li>• Include references/links to other information including websites, publications and organisations providing information on how to run the home efficiently and in the best environmentally sound way. As a minimum, this should include links to: <ul style="list-style-type: none"> <li>– The Energy Saving Trust good practice guidance (<a href="http://www.est.org.uk/myhome">www.est.org.uk/myhome</a>)</li> <li>– The Local Authority</li> <li>– The company responsible for the construction of the property</li> <li>– The company responsible for the management of the home (where applicable)</li> </ul> </li> <li>• In all instances both an address/telephone contact number and a web link will need to be provided</li> </ul>	
h. Provision of Information in Alternative Formats	<ul style="list-style-type: none"> <li>• Include details of the procedure for obtaining a copy of the guide in alternative formats, including foreign languages, Braille, large print or audio cassette / CD. It should include the contact details of the person/organisation responsible for producing the guide</li> </ul>	
		<i>continued</i>



Checklist Man 1-Home User Guide		
Part 2 – Site and Surroundings		YES/NO
The list below indicates the type of information that should be included		
a. Recycling and Waste	<ul style="list-style-type: none"> <li>Information on what to do with waste not covered by the standard weekly Local Authority collection scheme for example fridges/freezers, computer equipment, batteries and other potentially hazardous equipment. In some areas the Local Authority will collect these items. If this is the case, details and information of such a collection should be provided</li> <li>Information and location of local recycling facilities and waste tips</li> </ul>	
b. Sustainable (Urban) Drainage Systems (SUDS)	<ul style="list-style-type: none"> <li>Details of SUDS within the site boundary including an overview of the reasons and benefits behind their use (eg prevention of localised flooding) and advice on maintenance and operation</li> </ul>	
c. Public Transport	<ul style="list-style-type: none"> <li>Details of local public transport facilities including maps and timetables and the location of nearby bus stops and/or train/tube stations</li> <li>Details of cycle storage and cycle paths in the area including, if available, cycle path network maps for the whole town/local area</li> <li>Details of car parking and information on available park and ride, car sharing schemes and/or car pools/car hire in the area</li> <li>Details on how to get to local amenities in the area by public transport or cycling</li> </ul>	
d. Local amenities	<ul style="list-style-type: none"> <li>The location of food shops, post boxes, postal facilities, bank/cash points, pharmacies, schools, medical centres, leisure centres, community centres, places of worship, public houses, children’s play areas, outdoor open access public areas</li> <li>Other local amenities such as places of interest/cultural value, areas of beauty / wildlife / conservation / allotments etc.</li> </ul>	
e. Responsible Purchasing	<ul style="list-style-type: none"> <li>Include information about the purchasing of: <ul style="list-style-type: none"> <li>Low energy/low water white goods</li> <li>Electrical equipment, including light fittings and bulbs</li> <li>Timber products from sustainable sources</li> <li>Organic food procurement/food growing/local produce/local food provision, e.g. farmers markets, organic box schemes etc</li> </ul> </li> </ul>	
f. Emergency Information	<ul style="list-style-type: none"> <li>Contact details for emergency services including: <ul style="list-style-type: none"> <li>Location of local minor injuries clinics and A&amp;E departments</li> <li>Location of nearest police/fire station</li> </ul> </li> </ul>	
g. Links, References and Further Information.	<ul style="list-style-type: none"> <li>This should include references/links to other information including websites, publications and organisations providing information on how to reduce the environmental impact in terms of transport, the use of local amenities, responsible purchasing etc. Such links/references may include links to: <ul style="list-style-type: none"> <li>Sustrans (for cycle networks, <a href="http://www.sustrans.org.uk">www.sustrans.org.uk</a>)</li> <li>The local authority (including information about recycling and waste tips)</li> <li>Local transport providers (e.g. bus or train companies)</li> <li>Local amenities</li> </ul> </li> <li>In all instances both an address/telephone contact number and a web link will need to be provided</li> </ul>	

*continued*

Checklist Man 1-Home User Guide	
<b>Developer Confirmation</b>	
By entering a 'YES' against the criteria above, I confirm that all dwellings of this specification type on the <b>ENTER SITE NAME</b> site meet the stated criteria.	
Signature:	
Date:	
Print Name:	

## Common Cases of Non-compliance

None

## Special Cases

It is acceptable for Home User Guides to be provided on the internet or CD. Where this is the case all occupants:

- Must be given a hard copy of the Home User Guide contents page and a letter explaining the benefits of using the guide
- Must be given a contact number and address of where they can get a hard copy of the Home User Guide if they request this. These contact details must remain current for at least 12 months from handover

A system must be in place to provide hard copies of the Home User Guides to occupants on request.

## Background

It is likely that without provision of adequate information and guidance the dwelling may be used inappropriately, leading to the dissatisfaction of occupants and the waste of resources.

Issue ID	Description	No. of credits available	Mandatory Elements
Man 2	Considerate Constructors Scheme	2	No

## Aim

To recognise and encourage construction sites managed in an environmentally and socially considerate and accountable manner.

## Assessment Criteria

Credits are awarded where there is a commitment to comply with best practice site management principles as follows:

Criteria	
	Credits
Where there is a commitment to meet Best Practice under a nationally or locally recognised certification scheme such as the Considerate Constructors Scheme	1
Where there is a commitment to go significantly beyond Best Practice under a nationally or locally recognised certification scheme such as the Considerate Constructors Scheme	2
<b>Default Cases</b>	
None	

## Information required to demonstrate compliance

Schedule of Evidence Required To be read in conjunction with the <i>Definitions</i> and <i>Calculations</i> Sections	
Design Stage	Post Construction Stage
<p>For Considerate Constructors Scheme: Specification clause or other confirmation* of commitment from the contractor or developer to comply with:</p> <ul style="list-style-type: none"> <li>The Considerate Constructors Scheme and achieve formal certification under the scheme with either a pass score or a score of 32 points and above</li> </ul> <p>* a letter of instruction/intent from the developer to a contractor or the Code assessor giving the specific undertaking</p>	<p>For Considerate Constructors Scheme:</p> <ul style="list-style-type: none"> <li>A copy of the Considerate Constructors Certificate</li> <li>The Considerate Constructors Monitors report highlighting the total score and the sub-scores in each section</li> </ul>
<p><b>For an alternative scheme:</b></p> <p>The independent scheme assessor should complete <i>Checklist Man 2</i> and provide the assessor with a copy as evidence</p> <p>NOTE: The Assessor should seek confirmation from the Code Service Provider that an alternative scheme is acceptable prior to formal submission of an assessment</p>	<p><b>For an alternative scheme:</b></p> <p>A copy of the alternative scheme's Certificate of Compliance or equivalent documentary evidence (from an independent third party assessor) confirming that all the mandatory elements items plus 50% or 80% (as applicable) of the optional items have been achieved</p>

## Definitions

### Best practice

Achieving a score of at least 3 in every section, and a total score between 24 and 31.5, of the Considerate Constructors Scheme's Code of Considerate Practice indicates that a site is being managed in accordance with best practice.

Alternative schemes demonstrate this where in addition to meeting all the mandatory requirements, 50% of the optional items in *Checklist Man.2 – Compliance with an Alternative Scheme* are addressed.

### **Considerate Constructors Scheme (CCS)**

The Considerate Constructors Scheme is a UK certification scheme that encourages the considerate management of construction sites. The scheme is operated by the Construction Confederation and points are awarded in increments of 0.5 over the following eight sections:

- Considerate
- Environmentally Aware
- Site Cleanliness
- Good Neighbour
- Respectful
- Safe
- Responsible
- Accountable

To achieve certification under this scheme a score of at least 24 is required.

### **Other locally or nationally recognised schemes**

The use of an alternative scheme may demonstrate compliance by fulfilling the criteria stated in the *Checklist Man.2* for other locally and nationally recognised scheme. Any such scheme must be approved by the Code Service Provider prior to assessment. This can be achieved by submitting a completed *Checklist Man.2 – Compliance with an Alternative Scheme*.

### **Significantly beyond Best Practice**

A total score of between 32 and 40 of the Considerate Constructors Scheme's Code of Considerate Practice indicates that a site is being managed significantly beyond best practice.

Alternative schemes demonstrate this where in addition to meeting all the mandatory requirements, 80% of the optional items in *Checklist Man.2 – Compliance with an Alternative Scheme* are addressed.

## Assessment Methodology

### **Design Stage**

- Where the site is being assessed using the Considerate Constructors Scheme, confirm contractor's commitment as set out in the Assessment Criteria.
- Where the site is being assessed using an alternative scheme, the details of the alternate scheme should be checked to confirm that it covers equivalent items. This is done by completing *Checklist Man.2 – Compliance with an Alternative Scheme* under *Checklists and Tables* (This checklist is 12 pages long and is available from the Code Service Provider). This checklist sets out a number of mandatory items and a wider range of issues equivalent to those in the Considerate Constructors Scheme. In addition to the mandatory issues:
  - For one credit, 50% of these issues must be achieved to demonstrate compliance with best practice standards.
  - For two credits, 80% of these issues must be achieved to demonstrate going significantly beyond best practice standards.

### **Post Construction Stage**

- Where the site has been assessed using the Considerate Constructors Scheme, confirm that certification of compliance has been issued and check the final score on the monitor's report.
- Where the site has been assessed using an alternative scheme, confirm that all the mandatory items and 50% (or 80%) of the optional items (as applicable) have been achieved, using the information given by the third party certifier of the alternative scheme and comparing it to the items in *Checklist Man.2 – Compliance with an Alternative Scheme*.

## Calculation Procedures

None

## Checklists and Tables

*Checklist Man.2 – Compliance with an Alternative Scheme* for the compliance with other locally and nationally recognised schemes is available from the Code Service Provider on request.

## Common Cases of Non-Compliance

None

## Special Cases

None

## Background

The Considerate Constructors Scheme is a UK certification scheme that encourages the considerate management of construction sites. It has been in operation since 1997 and was developed from local schemes in the City of London and City of Westminster. The City of London developed a scheme called Considerate Contractors. It had the same basic layout as CCS does now. ~~Around the same time, Westminster had a similar problem, and developed Considerate Builders for use in its Borough.~~ Later, there were several construction management reviews, ie Latham Report (Constructing the Team) and Egan Report (Rethinking Construction). One of the actions of the Egan Report was to set up a task force to improve the image of the construction industry – consequently, the Considerate Constructors Scheme was developed. The Scheme is concerned about any area of construction activity that may have a direct or indirect impact on the image of the industry as a whole. The main areas of concern fall into three main categories: the environment, the workforce and the general public. The very best performing sites are recognised with Annual National Awards.

Issue ID	Description	No. of credits available	Mandatory Elements
Man 3	Construction Site Impacts	2	No

## Aim

To recognise and encourage construction sites managed in a manner that mitigates environmental impacts.

## Assessment Criteria

Credits are awarded where there is a commitment and strategy to operate site management procedures on site as follows:

Criteria	
	Credits
Where there are procedures that cover 2 or more of the following items: Monitor, report and set targets for CO <sub>2</sub> production or energy use arising from site activities Monitor and report CO <sub>2</sub> or energy use arising from commercial transport to and from site Monitor, report and set targets for water consumption from site activities Adopt best practice policies in respect of air (dust) pollution arising from site activities Adopt best practice policies in respect of water (ground and surface) pollution occurring on the site 80% of site timber is reclaimed, re-used or responsibly sourced	1
Where there are procedures that cover 4 or more of the items listed above.	2
<b>Default Cases</b>	
None	



## Information required to demonstrate compliance

Schedule of Evidence Required	
To be read in conjunction with the <i>Definitions</i> and <i>Calculations</i> Sections	
Design Stage	Post Construction Stage
<p>Specification clause or other confirmation* of commitment from the contractor or developer, demonstrating:</p> <p>A commitment to meet either, two or more, or four or more, of the items in <i>Checklist Man 3</i>. If available at this stage, this can be demonstrated by a completed copy of <i>Checklist Man 3</i></p> <p>* a letter of instruction/intent from the developer to a contractor or the Code assessor giving the specific undertaking</p>	<p>Documentary evidence demonstrating that all the specific requirements of <i>Checklist Man 3</i> have been adhered to (for the different items as appropriate). This should include evidence such as (where applicable):</p> <ul style="list-style-type: none"> <li>• Measurement/consumption records</li> <li>• Target records</li> <li>• Graphs comparing consumption with targets</li> <li>• Delivery records</li> <li>• Site procedures for minimising air/ dust and water pollution</li> <li>• CoC certificates for site timber/ purchase orders confirming re-used/ reclaimed timber</li> </ul>

## Relevant Definitions

None

## Assessment Methodology

### **Design Stage**

- Check that there is a firm commitment to adhere to *Checklist Man 3 – Construction Site Impacts* under *Checklists and Tables*.
- Where at least two items fully meet the checklist criteria, award one credit; where at least four items fully meet the checklist criteria, award two credits.

### **Post Construction Stage**

- Confirm which commitments and evidence provided at the Design Stage are still valid.
- Assess all the new evidence provided at post construction stage.
- Verify that specific Post Construction evidence provided demonstrates that all the Assessment Criteria have been met.

# Calculation Procedures

None

# Checklists and Tables

Checklist Man 3: Construction Site Impacts			
Criteria	Evidence Demonstrating How Criteria Will Be Met	Reference	Tick
<b>a. Commitment to monitor, report and set targets for CO<sub>2</sub> production of energy use arising from site activities</b>			
1. Confirmation is required that monthly measurements of energy use will be recorded and displayed on site.			
2. Appropriate target levels* of energy consumption must be set and displayed (targets could be annual, monthly, or project targets).			
3. As a minimum, monitoring must include checking the meters and displaying some form of graphical analysis in the site office to show consumption over the project duration and how actual consumption compares to the targets set.			
4. The design/site management team is to nominate an individual who will be responsible for the monitoring and collection of data.			
<p>* Targets for energy consumption during the construction process should be set using DTI's Environmental KPI benchmarks. These documents do not specify targets but facilitate projects in setting appropriate targets (see references section of main credit for further details).</p> <p>Note: The Code does not require targets to be met but is encouraging the process of setting, monitoring and reporting against targets.</p>			
<b>b. Commitment to monitor and report on CO<sub>2</sub> or energy arising from commercial transport to and from the site</b>			
<p>1. Confirmation is required that a site monitoring system will be in place to monitor and record deliveries *. This system will need to record:</p> <ul style="list-style-type: none"> <li>• The number of deliveries</li> <li>• The mode of transport</li> <li>• The kilometres/miles travelled for all deliveries</li> <li>• Where the delivery is specifically for the site, a figure of total distance travelled should be used, i.e. a round trip (from the point of origin, to the site and back to the point of origin).</li> <li>• Where the delivery to the site is part of a multiple delivery route, the recorded figure for distance travelled should be the distance travelled to the site (from the previous delivery), plus the distance to the next delivery or return.</li> </ul>			
<i>continued</i>			

Checklist Man 3: Construction Site Impacts			
Criteria	Evidence Demonstrating How Criteria Will Be Met	Reference	Tick
This information can then be used to estimate a total figure for kg of CO <sub>2</sub> for the project. The Code does not require this information to be converted to CO <sub>2</sub> but the information must be made available to the senior project and site management staff/suppliers to establish benchmarks and aid future decision-making towards improving site and transport efficiency. If the project team wishes to convert this information into CO <sub>2</sub> emissions, there are tables provided at the end of this checklist, which can be used.			
2. If the design team or contractor confirms that the project is aiming to achieve the "Construction Site Transport" 'measures for traffic movements and distances' (published April 2003, see references) then this aspect has been achieved automatically. The information obtained for this item can also be used to satisfy the DTI's Environmental KPI on transport.			
3. The design/site management team is to nominate an individual who will be responsible for the monitoring and collection of data.			
* Please see <i>Tables 8.1–8.4</i> below on monitoring site transport CO <sub>2</sub>			
<b>c. Commitment to monitor, report and set targets for water consumption arising from site activities</b>			
1. Compliance is demonstrated by the design/site management team confirming, in writing, that monthly measurements of water consumption will be recorded and displayed on site.			
2. Appropriate target* levels of water consumption must be set and displayed (targets could be annual, monthly or project targets).			
3. As a minimum, monitoring must include checking the meters and displaying some form of graphical analysis in the site office to show consumption over the project duration and how actual consumption compares to targets set.			
4. The design/site management team is to nominate an individual who will be responsible for the monitoring and collection of data.			
* Targets for water consumption during the construction process should be set using DTI's Environmental KPI benchmarks. These documents do not specify targets but facilitate projects in setting appropriate targets (see <i>References and Further Information</i> for details).			
Note: The Code does not require targets to be met but is encouraging the process of setting, monitoring and reporting targets.			
<i>continued</i>			

Checklist Man 3: Construction Site Impacts			
Criteria	Evidence Demonstrating How Criteria Will Be Met	Reference	Tick
<b>d. Commitment to adopt best practice policies in respect of air (dust) pollution arising from site activities</b>			
1. Confirmation is required of the site's procedures to minimise air/dust pollution. This can include: <ul style="list-style-type: none"> <li>• 'dust sheets'</li> <li>• regular proposals to damp down the site in dry weather</li> <li>• covers to skips etc.</li> </ul>			
2. The site team must indicate how this information is disseminated to site operatives.			
Note: Further information can be obtained from DTI/BRE publications 'Control of Dust from Construction and Demolition Activities' and Pollution Control Guide Parts 1–5 provide good practice guidelines on construction related pollution (see <i>References and Further Information</i> for details).			
<b>e. Commitment to adopt best practice policies in respect of water (ground and surface) pollution occurring on the site</b>			
1. Confirmation is required of the site's procedures to minimise water pollution following best practice guidelines outlined in the following documents. <ul style="list-style-type: none"> <li>• PPG 1 – General guide to the prevention of pollution. Environment Agency</li> <li>• PPG 5 – Works in, near or liable to affect watercourses. Environment Agency</li> <li>• PPG 6 – Working at demolition and construction sites. Environment Agency</li> </ul>			
2. The site team must also indicate how this information is disseminated to site operatives			
<b>f. 80% of site timber is reclaimed, re-used or responsibly sourced</b>			
1. 80% of timber used during construction, including formwork, site hoardings and other temporary site timber used for the purpose of facilitating construction, is to be procured from sustainably managed sources, independently certified by one of the top two levels as set out in the Responsible Sourcing of Materials Issues (Mat 2 and Mat 3) in the Materials section of this document. 100% of timber used during construction must be legally sourced.  Re-used timber from off site can be counted as equivalent but re-usable formwork only complies if it meets the above criteria.  This credit can be awarded where all the timber used is reclaimed timber.			

Table : Cat 8.1 : Standard road transport fuel conversion factors					
Fuel used	Total units used	Units	X	kg CO <sub>2</sub> per unit	Total kg CO <sub>2</sub>
Petrol		litres	x	2.30	
Diesel (inc. Low Sulphur)		litres	x	2.63	
Compressed Natural Gas		kg	x	2.65	
Liquid Petroleum Gas		litres	x	1.49	

Source: National Atmospheric Emissions Inventory for 2003 developed by Netcen (2005). UK Greenhouse Gas Inventory for 2003 developed by Netcen (2005), Digest of UK Energy Statistics DTI 2004 and carbon factors for fuels from UKPIA (2004)

Table : Cat 8.2 : Standard road transport fuel conversion factors					
Size of car and distance units	Total units travelled	Units	x	kg CO <sub>2</sub> per unit	Total kg CO <sub>2</sub>
Small petrol car max. 1.4 litre engine		miles	x	0.26	
		km	x	0.16	
Medium petrol car max. 1.4–2.1 litre engine		miles	x	0.30	
		km	x	0.19	
Large petrol car above 2.1 litres		miles	x	0.35	
		km	x	0.22	
Average petrol car		miles	x	0.29	
		km	x	0.18	

Source: NAEI (Netcen, 2005) based on data from DfT combined with factors from TRL as functions of average speed of vehicle derived from test data under real world testing cycles

Table : Cat 8.3 : Standard Road Transport Fuel Conversion Factors					
Size of car and distance units	Total units travelled	Units	x	kg CO <sub>2</sub> per unit	Total kg CO <sub>2</sub>
Small Diesel car 2.0 litres engine and under		miles	x	0.26	
		km	x	0.16	
Large Diesel car over 2.0 litres – 2.1 litre engine		miles	x	0.31	
		km	x	0.19	
Average Diesel car		miles	x	0.27	
		km	x	0.17	

Source: NAEI (Netcen, 2005) based on data from DfT combined with factors from TRL as functions of average speed of vehicle derived from test data under real world testing cycles.

Table : Cat 8.4: Freight road mileage conversion factors							
Type of lorry	Total km travelled	x	Litre Fuel per km	x	Fuel Type	Fuel Conversion Factor	Total kg CO <sub>2</sub>
Articulated		x	0.35	x	Petrol	2.30	
					Diesel	2.63	
					LPG	1.49	
Rigid		x	0.40	x	Petrol	2.30	
					Diesel	2.63	
					LPG	1.49	

Source: *Guidelines for Company Reporting on Greenhouse Gas Emissions, DEFRA. Continuing Survey of Road Goods Transport 2001.*

## Common Cases of Non-Compliance

None

## Special Cases

None

## Background

Construction sites are responsible for significant impacts, especially at a local level. These arise from disturbance, pollution and waste. Impacts such as energy and water use are also significant (although minor in relation to the overall impacts of the building).

### **Pollution**

Construction has the potential for major pollution, largely through pollution to air (through dust emission), and to water (via watercourses and ground water). BRE publishes guidance on construction site dust management, whilst the Environment Agency publishes guidance on water pollution control measures. There are significant statutory requirements in this area under environmental health legislation and the Environmental Protection Act. The Environment Agency and local Environmental Health Officers police these issues.

## ***Energy***

Energy management on site has been a key focus for the Construction Confederation, and they have published specific guidance (referenced) to help achieve this. Monitoring and reporting at site level are the key factors in raising awareness of the impacts of energy consumption. Whilst total energy is frequently monitored, this information is predominantly used to feedback into the tendering process and is seldom used to seek improvements on the site in question.

## ***Targets***

Targets are requested under the Code to promote the process of setting, monitoring and achieving targets. However, the Code does not set targets, as these are project specific. For guidance on setting targets refer to DTI's Construction Industry KPI Pack, this series of documents guides the reader through how to set targets for their own projects.

Issue ID	Description	No. of credits available	Mandatory Elements
Man 4	Security	2	No

## Aim

To encourage the design of developments where people feel safe and secure; where crime and disorder, or the fear of crime, does not undermine quality of life or community cohesion.

## Assessment Criteria

Credits are achieved by complying with *Section 2 – Physical Security* from '*Secured by Design New Homes*', as follows:

Criteria	
	Credits
Where an <i>Architectural Liaison Officer (ALO)</i> or <i>Crime Prevention Design Advisor (CPDA)</i> from the local police force is consulted at the design stage and their recommendations are incorporated into the design of the dwelling (an actual <i>Secured by Design Certificate</i> is not required).	2
<b>Default Cases</b>	
None	



## Information required to demonstrate compliance

Schedule of Evidence Required To be read in conjunction with the <i>Definitions and Calculations</i> Sections	
Design Stage	Post Construction Stage
<p>Specification clause or other confirmation* of commitment, showing:</p> <ul style="list-style-type: none"> <li>• That an ALO/CPDA has been or will be appointed to provide advice EARLY in the design stage to ensure that the requirements of <i>Section 2 – Physical Security of Secured by Design – New Homes</i> are met</li> <li>• That the advice of the ALO/CPDA will be followed</li> </ul> <p>* a letter of instruction to a contractor or a formal letter from the developer to the Code assessor giving the specific undertaking</p>	<p>Confirmation from the ALO/CPDA that all of their recommendations have been incorporated in the design, and that the site meets the standards required in <i>Section 2 – Physical Security of Secured by Design – New Homes</i>. Although not required by this credit, where ‘<i>Secured by Design</i>’ certificate has been issued, this will be deemed to satisfy</p> <p><b>AND EITHER</b></p> <p>Assessor Site Inspection Report</p> <p><b>OR</b></p> <p>As-Built drawings showing security features</p>

## Definitions

### Architectural Liaison Officer (ALO)

The Architectural Liaison Officer (ALO) is a specialist crime prevention officer, trained at the Home Office Crime Reduction College, who deals with crime risk and designing out crime advice for the built environment. In addition to physical security measures, the officer will consider defensible space, access, crime and movement generators, all of which can contribute to a reduction in crime and disorder.” taken from [www.securedbydesign.com](http://www.securedbydesign.com)

### Crime Prevention Design Advisor (CPDA)

Crime Prevention Design Advisors (CPDAs) are to use good design to make it as difficult as possible for criminals to benefit from either access or cover within built environments. For further information see <http://www.thamesvalley.police.uk/reduction/designoutcrime/index.htm>.

### Office of the Deputy Prime Minister (ODPM)

Office of the Deputy Prime Minister. On 5th May 2006 the responsibilities of ODPM transferred to the Department for Communities and Local Government.

**SBD Section 2 – Physical Security** To be awarded a *Secured by Design* award, the ALO/CPDA must be satisfied that the criteria of both Section 1 – *The Development – Layout & Design*, and Section 2 – *Physical Security* are met. The requirements of Section 1 are beyond the remit of the Code and for this issue, only the requirements of Section 2 must be met.

**Secured by Design (SBD)** This is a police initiative to encourage the building industry to adopt crime prevention measures in the design of developments to assist in reducing the opportunity for and fear of crime, creating a safer and more secure environment.

*Secured by Design* is owned by the *Association of Chief Police Officers (ACPO)* and has the support of the Home Office Crime Reduction & Community Safety Group and the Planning Section of the Department for Communities and Local Government.

## Assessment Methodology

### **Design Stage**

- Check that an ALO/CPDA has been appointed and that the developer confirms their advice will be followed.

### **Post Construction Stage**

- Check that there is confirmation from the ALO/CPDA that all dwellings comply with *Secured by Design* Section 2 (i.e. the development is SBD-Part Compliant) or the developer has been awarded a SBD certificate which indicates compliance with both Sections 1 and 2 of *Secured by Design*.

## Calculation Procedures

None

## Checklists and Tables

None

## Common Cases of Non-Compliance

None

## Special Cases

None

## Background

“Safety and security are essential to successful, sustainable communities. Not only are such places well-designed, attractive environments to live and work in, but they are also places where freedom from crime, and from the fear of crime, improves the quality of life.

Sustainable communities are communities which succeed now, economically, socially and environmentally, and respect the needs of future generations. They are well-designed places where people feel safe and secure; where crime and disorder, or the fear of crime, doesn't undermine quality of life or community cohesion.”

(Safer Places – The Planning System & Crime Prevention, ODPM)

*'Secured by Design'* is a free certification scheme run by the police, who provide an Architectural Liaison Officer to give advice to a developer.

The *'Secured by Design'* award does not signify that premises are crime proof, but that they have been subjected to a minimum standard of security that, in the experience of the police service and other agencies, can significantly reduce the risk of crime. Local conditions may require additional or alternative measures.

# Category 9: Ecology

Issue ID	Description	No. of credits available	Mandatory Elements
Eco 1	Ecological Value of Site	1	No

## Aim

To encourage development on land that already has a limited value to wildlife, and discourage the development of ecologically valuable sites.

## Assessment Criteria

Credits are awarded where the site is defined as land of inherently low ecological value in accordance with the following criteria:

Criteria	
	Credits
<p>Where the <i>development site</i> is confirmed as land of inherently <i>low ecological value</i></p> <p><b>EITHER</b></p> <p>By meeting the criteria for low ecological value (using Checklist Eco 1 – Land of Low Ecological Value under Checklists and Tables below)</p> <p><b>OR</b></p> <p>By being confirmed by a Suitably Qualified Ecologist</p> <p><b>OR</b></p> <p>Where an independent ecological report of the site, prepared by a <i>Suitably Qualified Ecologist</i>, confirms that the <i>construction zone</i> is of low or insignificant ecological value</p> <p><b>AND</b></p> <p>Any land of ecological value outside the <i>construction zone</i> but within the <i>development site</i> will remain undisturbed by the construction works.</p>	1
<p><b>Default Cases</b></p> <p>None</p>	

## Information required to demonstrate compliance

<b>Schedule of Evidence Required</b> <b>To be read in conjunction with the <i>Definitions</i></b>	
Design Stage	Post Construction Stage
<p><b>Where using the checklist:</b></p> <p>Plans of the site and surrounding area prior to development, identifying any features, both built and ecological</p> <p><b>AND</b></p> <p>Site visit report from the design team/ assessor confirming details adequate to meet <i>Checklist Eco 1</i> (including photographs)</p>	<p>If Design stage report not submitted, all the relevant design stage evidence must be provided at post construction stage</p> <p><b>AND</b></p> <p>Confirmation (where relevant) that any land of ecological value outside the <i>construction zone</i> was adequately protected during construction works provided by:</p>
<p><b>Where a Suitably Qualified Ecologist is appointed:</b></p> <p>A copy of the ecologist's report (in the format outlined in the Code for Sustainable Homes Ecology Report Template) or a detailed letter from the ecologist, confirming that:</p> <ul style="list-style-type: none"> <li>• The ecologist meets the requirements of a <i>Suitably Qualified Ecologist</i> or confirmation that the ecologist has submitted a <i>Verified Ecological Report</i></li> <li>• The <i>construction zone</i> is of <i>low ecological value</i></li> <li>• All land outside the <i>construction zone</i> will remain undisturbed by the construction works in areas of ecological value</li> </ul> <p>Text describing (on drawings or in the specification*) or illustrations identifying the <i>construction zone</i> and how any areas of ecological value outside the <i>construction zone</i> will remain undisturbed in accordance with the ecologists recommendations.</p>	<p>As Built site plans identifying features present</p> <p><b>OR</b></p> <p>Assessor Site Inspection Report</p>

* or letter of instruction to contractor/ supplier or a formal letter from the developer to the Code assessor giving the specific undertaking	
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## Definitions

### **Construction Zone**

The construction zone includes any land used for buildings, hard standing, landscaping, site access and any land where construction work is carried out (or land is being disturbed in any other way), plus a 3m boundary in either direction around these areas. It also includes any areas used for temporary site storage and buildings. If it is not known exactly where buildings, hard standing, site access, temporary storage and buildings will be located it must be assumed that the construction zone is the development site.

### **Contaminated Land**

A site can be defined as contaminated land where the site is contaminated to the extent to where the site could not be developed without decontamination being carried out.

Contamination includes any solid, liquid or gaseous material including in, or on the ground to be covered by the building and which is a pollutant or could become toxic, corrosive, explosive, flammable or radioactive and therefore likely to be a danger to health and safety or the environment. This also includes non-native invasive plant species as defined below.

Where the only decontamination required is for the removal of asbestos within an existing building fabric to be demolished, this can not be classified as contaminated land. Where asbestos is found to be present in the ground this will be classed as contamination for the purposes of this issue.

### **Development Site**

The development site is the whole site up to and including the boundary.

### **Ecological Features**

Ecological Features are defined in Checklist Eco 1 – Land of Low Ecological Value, found in Checklists and Tables below and include trees, hedges, ponds, streams, rivers, marshes, wetlands, meadows, species rich grassland, heathland and heather.

**Low Ecological Value**

Land defined as having low ecological value using Checklist Eco 1 OR defined by a *Suitably Qualified Ecologist* to have low or insignificant ecological value.

**Non-Native Invasive Species**

Are non-indigenous species (e.g. plants or animals) that adversely affect the habitats they invade economically, environmentally or ecologically. For the purposes of the Code, this currently includes Japanese Knot weed and Giant Hogweed only. Further information on the control and disposal and how this fits into the legislative framework relating to such species can be obtained from DEFRA.

**Suitably Qualified Ecologist**

A *Suitably Qualified Ecologist* is defined as an individual that:

- Holds a degree or equivalent qualification (e.g. N/SVQ level 5) in ecology or a related subject.
- Is a practising ecologist, with a minimum of three years relevant experience (within the last five years). Such experience must clearly demonstrate a practical understanding of factors affecting ecology in relation to construction and the built environment; including acting in an advisory capacity to provide recommendations for ecological protection, enhancement and mitigation measures. Examples of relevant experience are: ecological impact assessments; Phase 1 and 2 habitat surveys; and habitat restoration.
- Is covered by a professional code of conduct and subject to peer review.

Peer review is defined as the process employed by a professional body to demonstrate that potential or current full members maintain a standard of knowledge and experience required to ensure compliance with a code of conduct and professional ethics.

Full members of the following organisations, who meet the above requirements are deemed to be *Suitably Qualified Ecologists*:

- Association of Wildlife Trust Consultancies (AWTC)
- Chartered Institution of Water and Environmental Management (CIWEM)
- Institute of Ecology and Environmental Management (IEEM)

- Institute of Environmental Management and Assessment (IEMA)
- Landscape Institute (LI)

### **Verified Ecological Report**

A Verified Ecological Report is a where the Ecological Report has been carried out by an Ecologist that does not fully meet the requirements of a *Suitably Qualified Ecologist*. In order for the report to comply, as a minimum an ecologist that is a *Suitably Qualified Ecologist* must have read and reviewed the report and confirmed in writing they found it to:

- Represent sound industry practice
- Report and recommend correctly, truthfully and objectively
- Be appropriate given the local site conditions and scope of works proposed
- Avoids invalid, biased and exaggerated statements
- Additionally, written confirmation from the third party verifier that they comply with the definition of a *Suitably Qualified Ecologist*.

## Assessment Methodology

### **Design Stage**

- Where using *Checklist Eco 1 – Land of Low Ecological Value*, verify that the answer to all questions in *Section 1* is 'No' and that 'Yes' has been answered to at least one question in *Section 2*.
- Where a *Suitably Qualified Ecologist* has been appointed, confirm that the ecologist's report verifies that the *construction zone* is of low or insignificant value and that any land of ecological value outside of the *construction zone* will remain undisturbed by the construction works.
- Confirmation must also be provided that the ecologist meets the definition of a *Suitably Qualified Ecologist*, as defined above or where the ecologist does not fully meet the requirements of a *Suitably Qualified Ecologist* that the report is a *Verified Ecological Report*.

### **Post Construction Stage**

- Where the construction zone was of low ecological value, ensure that the area designated as the construction zone has not changed from design stage.
- Ensure that where any land of ecological value was present outside the *construction zone* but within the *development site*, that this has remained undisturbed by the construction works.



## Calculation Procedures

None

## Checklists and Tables

Checklist Eco 1		
<b>General Information:</b> In order for the development to be defined as 'land of low ecological value', the assessor must answer NO to all of the questions in Section 1 and YES to any of the question in Section 2.		
<b>Section 1 : Ecological features of the site</b>		
<b>Instruction:</b> Criteria 1.1–1.5 can be used to determine the presence of existing ecological features across the site. If YES is recorded against <b>any</b> question in Section 1 then the site cannot be defined as having <i>land of low ecological value</i> and the credit cannot be awarded. If NO is recorded against <b>all</b> the questions in Section 1 then proceed to Section 2.		
1.1	Does the site contain any trees or hedges above 1m high or with a trunk diameter greater than 100mm?	YES <input type="checkbox"/> NO <input type="checkbox"/>
1.2	Are there any ponds, streams or rivers on, or running through the site?	YES <input type="checkbox"/> NO <input type="checkbox"/>
1.3	Is there any marsh or other wetland present on the site?	YES <input type="checkbox"/> NO <input type="checkbox"/>
1.4	Are there any meadows or species-rich grassland present on the site?	YES <input type="checkbox"/> NO <input type="checkbox"/>
1.5	Is there any heath land, consisting of heather and/or scrub present on the site?	YES <input type="checkbox"/> NO <input type="checkbox"/>
<b>Section 2: Type of land</b>		
<b>Instruction:</b> In addition to answering NO to all the questions in Section 1, if YES is recorded against one or more of the questions in Section 2, the <i>development site</i> can be defined as having <i>land of low ecological value</i> and the credit can be awarded. (The assessor MUST check that these agree with the site drawings.)		
2.1	Does the <i>development site</i> consist of land which is entirely within the floor plan/s of existing building/s or building/s demolished within the past two years?	YES <input type="checkbox"/> NO <input type="checkbox"/>
2.2	Does the <i>development site</i> consist of land which is entirely covered by other constructions such as sporting hard surfaces, car parking or such constructions which have been demolished within the past two years?	YES <input type="checkbox"/> NO <input type="checkbox"/>
2.3	Does the <i>development site</i> consist of land which is contaminated by industrial or other waste to the extent that it would need decontamination before building?	YES <input type="checkbox"/> NO <input type="checkbox"/>
2.4	Does the <i>development site</i> consist of land which is a mixture of either existing building, hard surfaces and/or contaminated land?	YES <input type="checkbox"/> NO <input type="checkbox"/>
2.5	Does 80% of the land within the <i>development site</i> comply with statements 2.1, 2.2 or 2.3 and the remaining 20% of the ground area of the building extend into land which has been either; used for single-crop arable farming for at least five years, OR consists of regularly cut lawns and sports fields.	YES <input type="checkbox"/> NO <input type="checkbox"/>

## Common Cases of Non-Compliance

A site that consists of buildings, hard surfaces, car parking or other such construction which has been derelict for more than two years cannot achieve the credit unless it can be verified by a *Suitably Qualified Ecologist* that the site is of low or insignificant ecological value.

## Special Cases

Areas of high ecological importance can be omitted from the construction zone if the *Suitably Qualified Ecologist* is satisfied that they will not be disturbed by actions on site. Confirmation from the *Suitably Qualified Ecologist* is required in writing including details of the features and their locations. At the Post Construction Stage, confirmation that these areas were not affected by site activities is required from the *Suitably Qualified Ecologist*.

## Background

Wherever possible there is a benefit in development being restricted to land that already has a limited value to wildlife. The ecological value of a site is affected by previous uses and the presence of ecological features such as trees, hedges, watercourses, wetlands, meadows, etc. Therefore, the re-use of existing sites will help to slow down the destruction of natural habitats and the wildlife they support, as well as preventing loss of land used for agriculture, parkland, etc.

Wherever homes are constructed, there is always a risk that however environmentally benign the building or development itself is, it may present a threat to local ecology or areas of natural beauty. The principle here is to minimise the damage to existing local ecology and then, where possible, to enhance it.

Damage can be minimised either by selecting a site of low ecological value or by developing a site in a way that protects the most important ecological features. House building need not reduce the ecological value of the site; it may enhance it in many cases. There will always be some temporary disturbance to the local ecology, but wildlife will return once construction is complete, providing an appropriate habitat is provided.

Whilst it may be an attractive option to build on and revitalise a previously derelict site, care must be exercised if it has been derelict for some time. The site may be inhabited by rare, protected or locally important species and, therefore have high, but hidden, ecological value.

Issue ID	Description	No. of credits available	Mandatory Elements
Eco 2	Ecological Enhancement	1	No

## Aim

To enhance the ecological value of a site.

## Assessment Criteria

Where there is a commitment to enhance the ecological value of the development site in accordance with the following criteria:

Criteria	
	Credits
Where a <i>Suitably Qualified Ecologist</i> has been appointed to recommend appropriate ecological features that will positively enhance the ecology of the site.  <b>AND</b> Where the developer adopts all key recommendations and 30% of additional recommendations.	1
<b>Default Cases</b> None	

## Information required to demonstrate compliance

<b>Schedule of Evidence Required</b> <b>To be read in conjunction with the <i>Definitions</i></b>	
Design Stage	Post Construction Stage
<p>A copy of the ecologist's report (in the format outlined in the 'Code for Sustainable Homes Ecology Report Template') which:</p> <ul style="list-style-type: none"> <li>Clearly outlines the key and additional recommendations</li> <li>Confirms that all UK and EU legislation in relation to protected species has been met and recommendations go beyond these requirements</li> <li>Confirms that the ecologist meets the requirements set out in the definition of a <i>Suitably Qualified Ecologist</i></li> <li>Confirms that the ecologist made a site visit prior to the commencement of initial site preparation works ideally at RIBA stage B</li> </ul> <p><b>AND</b></p> <p>Specification clause or other confirmation* detailing:</p> <ul style="list-style-type: none"> <li>How the key recommendations and 30% of additional recommendations will be incorporated into the design</li> <li>The planting schedule of any species to be incorporated from <i>Suitably Qualified Ecologists</i> recommendations</li> </ul> <p>*drawings or a letter of instruction to a contractor/supplier or a formal letter from the developer to the Code assessor giving the specific undertaking</p>	<p>Where the final phase is complete, confirmation that what was agreed at design stage has been implemented by providing:</p> <p>Plans showing both proposed and implemented recommendations</p> <p><b>OR</b></p> <p>Photographic evidence with notes confirming the date and site address</p> <p><b>OR</b></p> <p>Assessor Site Inspection Report</p> <hr/> <p>Where the whole site has not been built out and:</p> <ul style="list-style-type: none"> <li>New ecological features have not been added;</li> </ul> <p><b>OR</b></p> <ul style="list-style-type: none"> <li>Where features are being added at a later date in an appropriate planting season.</li> </ul> <p>All such enhancement works must be completed within a single annual cycle from completion of construction works on the final dwellings on the site</p> <p>The assessor must provide confirmation that there is either a contract in place or a letter confirming when the planting will be complete, which must be within 12 months from completion.</p>

## Definitions

### **Recommendations**

Recommendations are defined as measures adopted to enhance the ecology of the site, which may include:

- The planting of native species
- The adoption of horticultural good practice (e.g. no, or low, use of residual pesticides)
- The installation of bird, bat and/or insect boxes at appropriate locations on the site
- Development of a full Biodiversity Management Plan including avoiding clearance/works at key times of the year (e.g. breeding seasons)
- The proper integration, design and maintenance of SUDs and green roofs, community orchards etc

Only native floral species or those with a known attraction or benefit to local wildlife can be considered for the purpose of enhancing the ecological value of the site.

### **Suitably Qualified Ecologist**

As defined for Eco1 – Ecological Value of Site.

## Assessment Methodology

### ***Design Stage***

- The assessor must confirm that a *Suitably Qualified Ecologist* has been appointed to provide a report detailing key and additional recommendations for enhancing the ecology of the site and that:
  - a) the report has been prepared using the 'Code for Sustainable Homes Ecology Report Template' and it is recommended that this is carried out at RIBA stage B
  - b) the ecologist meets all the requirements as stated in the definition of a *Suitably Qualified Ecologist*
  - c) the *Suitably Qualified Ecologist* has confirmed that all UK and EU law in respect of protected species has been complied with and that any key and additional recommendations are beyond the requirements of such laws
  - d) the ecologist made a site visit prior to the commencement of initial site preparation works
  - e) the ecologist's recommendations are based on the existing site ecology, determined from the site visit
  - f) the site visit was made at appropriate times of year when plant and animal species were evident

Where there has been no site visit prior to initial site preparation, this is only acceptable where the credit for *Eco1 – Ecological Value of the Site* has been achieved, and evidence provided to achieve *Eco 1* has been passed on to the Ecologist as a basis for the ecological report. This evidence must be in accordance with the Information Required to Demonstrate Compliance as detailed in *Eco 1*.

### **Post Construction Stage**

- Confirm which specifications and evidence provided at the Design Stage are still valid.
- Assess all the new specifications and evidence provided at post construction stage
- Verify that the Post Construction Stage evidence provided demonstrates that all the Assessment Criteria have been met.
- Where the whole site has not yet been built out, the assessor must confirm that there is either a contract in place or a letter confirming when final site wide issues such as planting will be complete.

## Calculation Procedures

None

## Checklists and Tables

None

## Common Cases of Non-Compliance

The credit cannot be achieved where the developer/client has confirmed a commitment to comply with all current EU and UK legislation relating to protected species and habitats applicable to the development site but no ecological enhancement is proposed.

Where enhancement has been made to an area/areas outside of the site boundary and unconnected to the site and no enhancement has been made within the site boundary, the credit cannot be awarded.

Where ecological features have been designed in to the development to enhance the ecology of the site but they are not recommendations from a *Suitably Qualified Ecologist*, the credit cannot be awarded.

## Special Cases

None

## Background

In many cases it is possible to improve the ecological value of the site. However, this requires careful consideration of the existing and neighbouring features in addition to careful selection of plant species and habitats. This is an area of specialist expertise and requires input from experts at both site master planning and detailed design stages. Preferably ecological advice should be sought at initial site inspection in prior to planning order to get advice on code issues to give the best head start and to maximise the potential benefits to enhancing biodiversity.

Issue ID	Description	No. of credits available	Mandatory Elements
Eco 3	Protection of Ecological Features	1	No

## Aim

To protect existing ecological features from substantial damage during the clearing of the site and the completion of construction works.

## Assessment Criteria

Where there is a commitment to maintain and adequately protect features of ecological value during site preparation and construction works in accordance with the following criteria:

Criteria	
	Credits
Where all existing features of ecological value on the development site potentially affected by the works, are maintained and adequately protected during site clearance, preparation and construction works.	1
<p><b>Default Cases</b></p> <p>The credit can be awarded by default where the site has been classified as having <i>low ecological value</i> in accordance with <i>Eco 1 – Ecological Value of the Site</i> AND no features of ecological value have been identified.</p> <p>If a Suitably Qualified Ecologist has confirmed a feature can be removed due to insignificant ecological value or where an arboriculturalist has confirmed a feature can be removed due to poor health/condition (e.g. diseased trees which require felling, either for health and safety and/or conservation reasons), the credit can be achieved provided all other features are adequately protected in accordance with the ecologist's recommendations.</p>	



## Information required to demonstrate compliance

<b>Schedule of Evidence Required</b> <b>To be read in conjunction with the <i>Definitions</i></b>	
Design Stage	Post Construction Stage
<p>Site visit report from the design team including photographs confirming ecological features present prior to commencement of construction works/ site clearance.</p> <p><b>AND</b></p> <p>Drawings or specification text* detailing how ecological features will be protected</p> <p>* or a letter of instruction to a contractor/ supplier or a letter from the developer to the Code assessor giving the specific undertaking</p> <p><b>AND EITHER</b></p> <ul style="list-style-type: none"> <li>• Plans of the site and boundary identifying ecological features prior to construction</li> <li>• Written evidence from an appropriate statutory body of any requirement to remove any features for health and safety and/or conservation reasons</li> <li>• Written confirmation that all EU and UK law with regards to protected species have been adhered to</li> </ul> <p><b>OR</b></p> <p>A copy of the ecologist's report confirming:</p> <ul style="list-style-type: none"> <li>• That they meet the requirements of a <i>Suitably Qualified Ecologist</i></li> <li>• The ecological features present (or if low ecological value and no features present)</li> <li>• Recommendations for protecting all ecological features</li> </ul>	<p>Where the whole site has not been built out, evidence of protection measures, provided by:</p> <p><b>EITHER</b></p> <p>Photographic evidence of protection measures in place</p> <p><b>OR</b></p> <p>Assessor Site Inspection Report</p> <hr/> <p>Where the final phase is complete, confirmation that what was agreed at design stage was implemented, including:</p> <p><b>EITHER</b></p> <p>Photographic evidence of features protected</p> <p><b>OR</b></p> <p>Assessor Site Inspection Report</p>

## Definitions

<b>Ecological Features</b>	As defined for Eco 1 – Ecological Value of Site.
<b>Protection of natural areas</b>	The provision of physical barriers to prevent damage to existing natural areas. Natural areas include meadows, species rich grassland, heath land consisting of heather and/or scrub, marshes and wetlands, ponds streams and rivers. If such areas are remote from site works or storage, construction activity should be prevented in their vicinity.
<b>Protection of trees and hedges</b>	Where trees and hedges have been protected in accordance with BS5837 'Trees in Relation to Construction'. This standard requires the development of a Tree Protection Plan which involves the erecting of physical barriers to prevent damage to existing trees, with an exclusion area around the trees. It also looks at defining a Root Protection Area and requires consideration to be made where compulsory work is required within the Root Protection Area.
<b>Protection of watercourses and wetland areas</b>	The provision of physical barriers (e.g. bunds and cut off ditches), and site drainage to ensure no site run-off damages the local water courses. Specialist advice should be obtained from a <i>Suitably Qualified Ecologist</i> , Natural England or the Environment Agency with reference to Pollution Prevention Guidelines 05.
<b>Suitably Qualified Ecologist</b>	As defined for Eco 1 – Ecological Value of Site.

## Assessment Methodology

### **Design Stage**

- Confirm that a report has been prepared on ecological features in accordance with the *Information Required to Demonstrate Compliance*, together with details of ecological protection to be carried out prior to the start of any preliminary construction or preparation works (e.g. site clearance or the erection of temporary site facilities).
- Where there are no ecological features to protect and the credit is being awarded by default, evidence provided must demonstrate this and that *Eco 1 – Ecological Value of the Site* has also been awarded.
- The assessor must check that the developer/client has confirmed compliance with all current EU and UK legislation relating to protected species and habitats applicable to the development site. This is in addition to the protection of ecological features as set out above.

### **Post Construction Stage**

- Confirm that any features identified at design stage have been successfully protected.

## Calculation Procedures

None

## Checklists and Tables

None

## Common Cases of Non-Compliance

Credits cannot be awarded for the re-location of ecological features.

Where ecological features (as defined above) have not been protected, credits cannot be awarded. This applies even where the developer/client has confirmed a commitment to comply with all current EU and UK legislation relating to protected species and habitats applicable to the development site.

## Special Cases

None

## Background

Construction sites often contain existing ecological features that need to be protected from damage (both direct and indirect). Such damage can be caused by impacts, fires, pollution, soil compaction, changes in the water table, etc. Steps need to be taken to minimise the risk of such damage.

Protecting the ecological features on site can ensure that the local 'wild' areas are sustained. Maintaining native species can lead to reduced maintenance and reduced risk of liabilities under wildlife legislation, as well as increasing and maintaining the aesthetic qualities of a development.

Good practice dictates that ecological features need to be linked to reach their full potential, therefore links to features external to the site should be made whenever possible. Knowledge of existing species movements, and predictions of potential new species movements, is required to fully integrate and support ecological features and their associated species.

Issue ID	Description	No. of credits available	Mandatory Elements
Eco 4	Change in Ecological Value of Site	4	No

## Aim

To reward steps taken to minimise reductions and to encourage an improvement in ecological value.

## Assessment Criteria

Credits are awarded where the resulting change in ecological value is as follows:

Criteria	
	Credits
<p>The ecological value before and after development is measured, and the overall change in species per hectare is:</p> <ul style="list-style-type: none"> <li>• Minor negative change: between -9 and less than or equal to -3</li> <li>• Neutral: greater than -3 and less than or equal to +3</li> <li>• Minor enhancement: greater than 3 and less than or equal to 9</li> <li>• Major enhancement: greater than +9</li> </ul>	<p>1</p> <p>2</p> <p>3</p> <p>4</p>
<p><b>Default Cases</b></p> <p>None</p>	

## Information required to demonstrate compliance

Schedule of Evidence Required	
To be read in conjunction with the <i>Definitions</i> and <i>Calculations</i> Sections	
Design Stage	Post Construction Stage
<p>Drawings showing:</p> <ul style="list-style-type: none"> <li>• Site layout</li> <li>• The existing site survey, clearly indicating natural and built features on both the site and land surrounding the site before the proposed development</li> </ul>	<p>Where the final phase is complete, confirmation of change in ecological value, from Eco 4 Calculator Tool or similar calculations need to be provided</p>

- Landscape and plot categories (in accordance with the *Assessment Methodology*) with a list of site areas provided

**AND**

Copy of the calculations from the assessor showing proposed change in ecological value. (If new planting or species to be added or where actual species/hectare values are being used for the site prior to construction, these can only be counted if based on the advice of a suitably qualified ecologist.)

If the advice of an ecologist is sought, the following must also be provided:

A copy of the ecologist's report (in format outlined in the Code for Sustainable Homes Ecology Report Template) confirming:

- The ecologist meets the requirements of a *Suitably Qualified Ecologist*
- The species/hectare of any proposed planting schemes
- The actual species/hectare of existing plots (where relevant) with confirmation that the site visit was made by the ecologist prior to any site preparation works

**AND**

Text describing (on drawings and in the specification) or illustrations showing how the ecologist's recommendations for any proposed planting schemes will be implemented

**AND EITHER**

The planting schedule

**OR**

A letter of instruction to a contractor/supplier, or a formal letter from the developer to the Code assessor giving the specific undertaking.

**AND EITHER**

Where applicable, letter/certificate of conformity from the developer confirming that:

- the specification or Ecologist's report recommendations have been followed and;
- how the landscaping has been completed in accordance with the planting schedule.

**OR**

Where the whole site has not been built out and:

- The planting schedule has not been implemented
- It is not possible to measure the Ecological value at this point

The assessor should seek confirmation that there is either a contract in place or a letter confirming that the planting will be completed within a single annual cycle from completion of construction works on the final dwellings on the site.

## Definitions

**Suitably Qualified Ecologist (SQE)** As defined for Eco I – Ecological Value of Site.

**Verified Ecological Report** As defined for Eco I – Ecological Value of Site.

### Definitions of Landscape Types applicable to Table : Cat 9.3:

**Arable** Land dominated by cereals and other arable crops, as well as intensively managed grasslands.

**Derelict Land** The ecological value of derelict sites (*Table : Cat 9.3, Checklists and Tables*) is time dependent; a linear scale has been used to determine intermediate values between zero ecological value at 1 year from dereliction/ demolition to a value at 30 years based on marginal upland figures. This presents a worst case figure which can be amended on the advice of a *Suitably Qualified Ecologist*.

**Marginal upland** Areas that are on the periphery of upland and are dominated by mixtures of low-intensity agriculture, forestry and semi-natural vegetation.

**Pastoral** Mainly grasslands used for grazing purposes.

**Upland** Land generally above a height suitable for mechanised farming and frequently dominated by semi-natural vegetation.

**Urban Mosaic** A complex mix of habitats located within cities, towns or villages, which will include: buildings, hard standing, pockets of disused land and scrub, and areas of managed green spaces, such as gardens, allotments, and parkland.

### Definitions of Vegetation Plot Types applicable to Table : Cat 9.3:

**'Wildlife' garden planting\*** Garden planting that uses native species and those that have a known attraction or benefit to local fauna, based on the advice of a suitably qualified ecologist.

**Crops/weeds** Mostly highly disturbed vegetation of arable fields and their boundaries; includes cereal and vegetable crops.

**Fertile grass** The bulk of agriculturally improved grasslands, intensive pasture and silage crops; but also includes mown areas of improved grasslands for recreational and amenity purposes, as well as resown roadside verges.

<b>Heath/bog*</b>	Mostly heather moorland, blanket bog and upland heath, but also lowland heath and raised bog.
<b>Infertile grass*</b>	A diverse group of semi-improved and semi-natural grasslands; includes acidic to basic, wet to dry grasslands, and tall-herb vegetation mainly present in the lowlands; often found on stream sides and roadside verges.
<b>Lowland wooded*</b>	Includes wooded vegetation of hedges and broadleaved woods in the lowlands.
<b>Moorland grass/mosaic*</b>	Typically grazed moorland vegetation, including extensive upland acidic and peaty grassland; and species-rich but very localised flushes.
<b>Tall grassland/herb*</b>	Typical vegetation of overgrown lowland field boundaries, stream sides, ditches and roadside verges.
<b>Upland wooded*</b>	A varied group of acidic vegetation types usually associated with upland woods, including: semi-natural woodland; conifer plantations; bracken; and wooded stream sides.

\* See Background: Eco 4 and the Environment KPIs

## Assessment Methodology

### **Design Stage**

- Calculate the change in ecological value of the development site by comparing the estimated diversity of plant species before and after construction using the method described in *Calculation Procedures* below.

### **Post Construction Stage**

- Confirm which specifications and evidence provided at the Design Stage are still valid.
- Assess all the new specifications and evidence provided at post construction stage.

## Calculation Procedures

### **Before Development**

1. Select the most appropriate Landscape Type from *Table : Cat 9.3 (Checklists and Tables)* using the descriptions provided in *Definitions*. This will be based on the typology of the land surrounding the site and is likely to be the same throughout the development. In some cases however, it may differ, such as

when a disused site is developed as part of a master plan for a mixed-use development. Typical of this would be a new town development (e.g. Milton Keynes), or the development of an inner-city derelict site.

2. Select all of the Plot Types from *Table : Cat 9.3 (Checklists and Tables)* which are applicable to the development site and calculate the area of each of these Plot Types. It is important to ensure that the appropriate Vegetation Plot Types for the site and their areas are correctly defined.

Where areas of 'garden planting (typical)' and 'wildlife garden planting' are present, these will always record a score of zero, unless a *Suitably Qualified Ecologist* has been appointed, whereby they will make the distinction between 'typical' and 'wildlife' garden planting species and record 'actual' species numbers.

Enter the following details into *Table : Cat 9.2a*: the name of each Plot Type, its area and the number of species per Plot Type (from *Table : Cat 9.3, Checklists and Tables*). Follow the prompts to calculate the total average number of species before development.

Where a *Suitably Qualified Ecologist* has been appointed and an ecological site survey has been conducted, the habitat types, their areas and number of species per habitat type can be entered directly into *Table : Cat 9.2a* as an alternative to using the figures provided in *Table : Cat 9.3 (Checklists and Tables)*.

It is acceptable for the report not to have been produced by a *Suitably Qualified Ecologist*. Where this is the case, the report must be a *Verified Ecological Report* by having the third party *Suitably Qualified Ecologist* verify the report.

Table : Cat 9.2a : Calculation of the Ecological Value of the Site Before Development				
Plot Type	Area of Plot Type (m <sup>2</sup> )		Species No. (from Table 2 or an SQE)	Species × Area of Plot Type
		x		
		x		
		x		
		x		
		x		
		x		
		x		
		x		
		x		
		x		
<b>(1) Total Site Area =</b>		<b>(2) Total <math>\Sigma</math> Species × Area =</b>		
<b>Species per Plot Type Before Development:</b>				
Total $\Sigma$ Species × Area of Plot Type/Total Site Area = (2)/(1) =				



### **After Development**

1. Repeat steps 1–2 above.
2. Enter the following details into *Table : Cat 9.2b*: the name of each Plot Type, plot area and number of species per Plot Type (from *Table : Cat 9.3, Checklists and Tables*). Follow the prompts to calculate the total average number of species after development.
3. Where a *Suitably Qualified Ecologist* has been appointed, an ecological site survey has been conducted and new habitat types/planting schemes have been recommended, their areas and number of species per habitat type can be entered directly into *Table : Cat 9.2b*.

Where new habitats are to be created or floral species are to be planted as part of a landscape design, only those species which are native or have a known attraction to local wildlife can be included in the calculations based on the advice and recommendations of a *Suitably Qualified Ecologist*.

Where 'extensive green roofs' are designed by a *Suitably Qualified Ecologist*, add this area to 'wildlife garden' Plot Type and subtract the area from 'Building' Plot Type.

The species value figures in *Table : Cat 9.3 (Checklists and Tables)* are figures given for an existing, well-established site. It takes many years before the ecological value of a specific landscape type is established naturally. It is therefore not possible to assume that, for example, a newly developed urban parkland has between 13.8 and 17.6 species just after construction without the expert knowledge of a *Suitably Qualified Ecologist*. However, if the homes are to be built on an existing urban parkland and part of the site is left undisturbed, the ecological value of that part of the site can be assumed unchanged. If an urban parkland is being created on part of the site the number of species on this part of the site will need to be confirmed by a *Suitably Qualified Ecologist* (taken from the actual number of indigenous species being planted) rather than assuming that the new parkland will immediately have a species value of 11.6 (assuming fertilisers are going to be used).

Table : Cat 9.2b : Calculation of the Ecological Value of the Site After Development				
Plot Type	Area of Plot Type (m <sup>2</sup> )		Species No. (from Table 2 or a SQE)	Species × Area of Plot Type
		x		
		x		
		x		
		x		
		x		
		x		
		x		
		x		
		x		
		x		
<b>(1) Total Site Area =</b>		<b>(2) Total ∑ Species × Area =</b>		
<b>Species per Plot Type Before Development:</b>				
Total ∑ Species × Area of Plot Type/Total Site Area = (2)/(1) =				

#### 4. Calculation of the Change in Ecological Value

The average number of species for the site before development is calculated by multiplying the area of the different plot types and the equivalent number of 'species' for those plot types (values taken from *Table : Cat 9.3* or given by a *Suitably Qualified Ecologist*), adding these values and then dividing by the area of the whole site. The same procedure is carried out after the development, and the two values are compared to establish the change.

$$Species_{BeforeDevelopment} = \frac{\sum_1^n (AreaPlotTypeN \times SpeciesPlotTypeN)}{TotalSiteArea}$$

$$Species_{AfterDevelopment} = \frac{\sum_1^n (AreaPlotTypeN \times SpeciesPlotTypeN)}{TotalSiteArea}$$

$$Species_{Change} = Species_{AfterDevelopment} - Species_{BeforeDevelopment}$$

## Checklists and Tables

### ***Ecological Value***

Table : Cat 9.3 below provides default values to be used when calculating the change of ecological value of the site. This information is based on national figures from the Countryside Survey prepared for the Digest of Environmental Statistics No 20, 1998 (DEFRA).

The actual number of species may be used to replace any of the figures in Table : Cat 9.3 below, provided that a *Suitably Qualified Ecologist* has been appointed and has reported actual species values in accordance with the Calculation Procedure above.

Table : Cat 9.3 : Average Number of Species per Landscape and Vegetation Plot Type for Existing Habitats										
Plot Type	Landscape Type									
	Arable	Pastoral	Marginal Upland	Upland	Existing Building/ Hard Landscaped Areas	Urban Mosaic	Industrial Derelict Land <1 year	Industrial Derelict Land <10 years	Industrial Derelict Land <20 years	Industrial Derelict Land ≥30 years
<b>Crop Weeds</b>	5.4	8.3	-	-	0	-	-	-	-	-
<b>Tall grassland/herb</b>	12.7	15.0	-	-	0	17.6	0	6.3	15.8	21.1
<b>Fertile grassland</b>	11.6	12.7	15.3	-	0	11.6	0	4.6	11.5	15.3
<b>Infertile grassland</b>	17.1	17.6	21.1	-	0	17.6	0	6.3	15.8	21.1
<b>Lowland wooded</b>	12.9	12.5	-	-	0	13.8	-	-	-	-
<b>Upland wooded</b>	-	12.7	13.8	20.4	0	13.8	-	-	-	-
<b>Moorland grass/mosaic</b>	-	2.0	20.4	21.0	0	-	-	-	-	-
<b>Heath/Bog</b>	-	-	14.3	20.0	0	-	-	-	-	-
<b>Hard Landscaping</b>	0	0	0	0	0	0	0	0	0	0
<b>Buildings</b>	0	0	0	0	0	0	0	0	0	0
<b>Garden Planting (Typical)</b>	tbe	tbe	tbe	tbe	tbe	tbe	-	-	-	-
<b>Wildlife Garden Planting</b>	tbe	tbe	tbe	tbe	tbe	tbe	-	-	-	-

' - ' insufficient data to produce national averages, as not all vegetation plot types are found in all landscape types. Values are data from: DEFRA "Digest of Environmental Statistics" No. 20. HMSO, 1998

tbe: To be evaluated by a Suitably Qualified Ecologist – otherwise assume 0

## Common Cases of Non-Compliance

Where the site has increased in ecological value due to the creation of a habitat such as Garden Planting or Wildlife Garden Planting, the credit cannot be achieved where the new habitat has been created without the advice of a Suitably Qualified Ecologist in terms of the species required and species per hectare achieved.

## Special Cases

None

## Background

Any development of land will potentially affect its ecological value. This section of the Code is designed to reward steps taken to minimise reductions in ecological value and to encourage improvement. This is done by comparing the value of a site before and after development and making a direct comparison in terms of plant species (which is used as a proxy for biodiversity). The method takes account of the local landscape type and the different habitats that exist to calculate an average value for the site.

### ***Eco 4 and the Environment KPIs***

The Construction Industry's Environmental Key Performance Indicator (KPI) on 'Area of Habitat Retained/Created', adopts the same approach as the credit above. It subtracts the area of ecologically valuable habitat after development from that before development, and expresses the change as a percentage of total site area. The difference between this credit and the KPI, is that the KPI does not assign specific ecological values to habitat types (for simplicity).

In the KPI approach both the vegetation groups marked \* above, and derelict urban/industrial land with a more diverse number of species, fall into the category of 'ecologically valuable habitat'. This makes it possible to also use the figures derived for this credit, to determine the project's KPI score.

Issue ID	Description	No. of credits available	Mandatory Elements
Eco 5	Building Footprint	2	No

## Aim

To promote the most efficient use of a building's footprint by ensuring that land and material use is optimised across the development.

## Assessment Criteria

This issue is assessed on a site wide basis. Credits are awarded where the ratio of combined net internal floor area to footprint area (as measured by the total net internal ground floor area of all dwellings on the site) meets the requirements defined below: Individual dwellings (i.e. detached, semi-detached and terraces, not individual flats) that are not subject to a Code assessment, can be excluded from the assessment of this issue

Criteria	
	Credits
<p>For houses, where the Net Internal Floor Area: Net Internal Ground Floor Area ratio is greater than or equal to 2.5:1</p> <p><b>OR</b></p> <p>For blocks of flats, where the Net Internal Floor Area: Net Internal Ground Floor Area is greater than or equal to 3:1</p> <p><b>OR</b></p> <p>For a combination of houses and flats, a ratio of Total Net Internal Floor Area: Total Net Internal Ground Floor Area of all houses and flats (i.e. the Site Wide Footprint to Floor Area ratio) is greater than the area weighted average of the two target ratios above (see calculation procedures)</p>	1
<p>For houses, where the Net Internal Floor Area: Net Internal Ground Floor Area ratio is greater than or equal to 3:1</p> <p><b>OR</b></p> <p>For block of flats, where the Net Internal Floor Area: Net Internal Ground Floor Area is greater than or equal to 4:1</p> <p><b>OR</b></p> <p>For a combination of houses and flats, a ratio of total Net Internal Floor Area: Total Net Internal Ground Floor Area of all houses and flats (i.e. the Site Wide Footprint to Floor Area ratio) is greater than the area weighted average of the two target ratios above (see calculation procedures)</p>	2
<p><b>Default Cases</b></p> <p>None</p>	

## Information required to demonstrate compliance

Schedule of Evidence Required To be read in conjunction with the <i>Definitions and Calculations</i> Sections	
Design Stage	Post Construction Stage
<p>General layout drawings and elevations including dimensions for:</p> <ul style="list-style-type: none"> <li>• Each type of dwelling</li> <li>• All other buildings with permanent foundations, such as bin/cycle stores, garages</li> <li>• The site plan</li> </ul> <p><b>AND</b></p> <p>Calculation of the building footprint ratio</p>	<p>As Built drawings or specifications showing the calculation of the building footprint ratio</p> <p><b>OR</b></p> <p>A formal letter from the developer to the Code assessor confirming that the dwellings and buildings have been constructed in accordance with the design stage drawings/specifications and that the footprint ratio is the same as calculated at design stage.</p>

## Definitions

### Habitable Space

The definition of a habitable space is a heated space, typically occupied for greater than 30 minutes throughout the day with safe access by a permanent stairway or other means of entrance which complies with the requirements of relevant national Building Regulations AND where the space is 'finished' with floor, walls, lighting and electric sockets.

### Net Internal Floor Area

The area of all habitable spaces. This includes the area taken up by halls, stairwells, cupboards, internal partitions, habitable loft spaces and basements. This also includes common areas of blocks of flats and apartment buildings including stairwells, circulation spaces and entrance lobbies.

For semi-detached or terraced dwellings, this excludes the area of the party walls.

For flats, the floor area includes the party walls and separating walls to common areas.

Where residential accommodation is constructed above other occupied space such as shops or offices (garages or car parking would not be included), the floor area of these spaces can be included within the Net Internal Floor Area of the dwelling provided the areas are directly beneath the residential space.

**Net Internal Ground Floor Area**

Also referred to as the Building Footprint, this is the area of land that is taken up by the permanent foundations of the dwelling (including any other outbuildings with permanent foundations that are associated with the dwelling), within the external walls of the building.

This is measured for this Issue, as the total net internal floor area of the ground floor, excluding the area taken up by the external walls.

In blocks of flats, this also includes the area taken up by party walls and separating walls to common areas, with the exception of party walls to adjoining buildings.

For staggered dwellings, the footprint area equals the Total Net Internal Floor Area of the floor with the largest plate.

- Areas that normally count towards the footprint include conservatories, garages, permanent outhouses, fully enclosed permanent waste storage areas, communal garages or storage rooms and any other permanent buildings used by the occupants.
- Areas that will NOT normally count towards the footprint include hard landscaping, semi-enclosed external spaces, pergolas and carports.
- Garden sheds will not count unless they are built on a permanent solid foundation and are fitted out as habitable space with heating, lighting and power.
- If a dwelling is raised above ground level on columns or other structures, the Net Internal Ground Floor Area should be measured from the lowest floor of the dwelling.
- Where other occupied spaces (e.g. non domestic spaces such as retail and offices etc) form the ground floor or lower floors under a block of flats, the Net Internal Ground Floor Area should be measured as the Net Internal Floor Area of the lowest floor of the block of flats.

**Other Occupied Space**

Other occupied spaces include retail, office spaces and other non domestic spaces which are occupied for greater than 30 minutes throughout the day.

Garages or car parking would not be included in this definition.

**Staggered Dwellings**

These are dwellings on several levels which are of unequal floor area. For example, a dwelling which has a first floor area which is greater than the ground floor area which may overhang the ground floor.



## Assessment Methodology

### **Design Stage**

- Verify that the evidence provided demonstrates that all the Assessment Criteria have been met.
- Calculate the Floor Area: Footprint ratio for each type of dwelling. Note that any outbuildings such as permanent garages and cycle stores need to be taken into account in the footprint area.

### **Post Construction Stage**

- Confirm which specifications and evidence provided at the Design Stage are still valid.
- Assess any new specifications and evidence provided at post construction stage.

## Calculation Procedures

1. Where there is a mixture of houses and flats, to calculate the area weighted target ratio for the site, use the following formula:

#### **For one credit:**

$$\text{Area weighted target ratio} = \frac{(\text{Total NIFA Houses} \times 2.5) + (\text{Total NIFA Flats} \times 3.0)}{\text{Total NIFA of all houses and flats}}$$

#### **For two credits:**

$$\text{Area weighted target ratio} = \frac{(\text{Total NIFA Houses} \times 3.0) + (\text{Total NIFA Flats} \times 4.0)}{\text{Total NIFA of all houses and flats}}$$

2. The site wide ratio should then be calculated using the following formula and assessed against the above target ratio. Credits can be awarded where the ratio calculated using the following formula is greater than the target area weighted ratio as described in point 1 above.

$$\text{Site wide footprint to Floor Area ratio} = \left( \frac{\text{Total NIFA of all dwellings}}{\text{Total NIGFA of all dwellings}} \right) \times 100$$

Where:

NIFA = Net Internal Floor Area

NIGFA = Net Internal Ground Floor Area

## Checklists and Tables

None

## Common Cases of Non-Compliance

Two-storey dwellings will not achieve the credit criteria unless a habitable loft space or basement is provided depending on the provision of any other permanent structures such as garages or outhouses which may impact on the footprint area.

## Special Cases

None

## Background

Land available for development will become increasingly expensive as land resources come under pressure with the potential loss of urban parkland, allotments, agricultural land and the pressure on more valued ecological sites such as salt marshes. Use of 'greenfield' sites is already being limited and developers are likely to experience opposition from the local community. To make best use of the available land and other resources, including materials and energy, it is important to ensure effective use of the building footprint by maximising the usable space. This issue is further emphasised by the current growth targets for new build housing which will require an increasing amount of land and therefore the more efficient this land is used the lower the impact on land use and ecology.

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## **Ene 5**

EST helps you find energy efficient products and gives you information on the EU energy efficiency labelling scheme.

<http://www.energysavingtrust.org.uk/myhome/efficientproducts/recommended/index.cfm>

[http://www.energysavingtrust.org.uk/energy\\_saving\\_products/other\\_energy\\_labels/the\\_eu\\_energy\\_label/](http://www.energysavingtrust.org.uk/energy_saving_products/other_energy_labels/the_eu_energy_label/)

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### **Mat 2**

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[www.awtc.co.uk/contact.htm](http://www.awtc.co.uk/contact.htm)

Chartered Institution of Water and Environmental Management (CIWEM) – 15 John Street, London, WC1N 2EB. Tel: 020 78313110 Fax: 020 74054967 Email: [admin@ciwem.org](mailto:admin@ciwem.org) [www.ciwem.org](http://www.ciwem.org)

Institute of Environmental Management and Assessment (IEMA) – St Nicholas House, 70 Newport, Lincoln, LN1 3DP. Tel 01522 540069. Fax 01522 540090  
E-mail [info@iema.net](mailto:info@iema.net) [www.iema.net](http://www.iema.net)

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