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BRE Environmental & Sustainability Standard

BES 5054: ISSUE 3.0

BREEAM Prisons 2008 Assessor Manual

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Changes to the BREEAM Standard

A list of changes between this issue (issue 3.0) and the previous issue (issue 2.0) of the BREEAM standard is published in section 16 of this document. This list also details changes made under previous re-issues of the standard.

Issue number	Date of issue
1.0	24/6/2008
2.0	14/08/2008
3.0	01/05/2009

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1.0 Introduction

1.1 What is BREEAM?

BREEAM (Building Research Establishment's Environmental Assessment Method) is the world's leading and most widely used environmental assessment method for buildings, with over 115,000 buildings certified and nearly 700,000 registered. It sets the standard for best practice in sustainable design and has become the de facto measure used to describe a building's environmental performance. Credits are awarded in ten categories according to performance. These credits are then added together to produce a single overall score on a scale of Pass, Good, Very Good, Excellent and Outstanding. The operation of BREEAM is overseen by an independent Sustainability Board, representing a wide cross-section of construction industry stakeholders.

Aims of BREEAM:

- To mitigate the impacts of buildings on the environment
- To enable buildings to be recognised according to their environmental benefits
- To provide a credible, environmental label for buildings
- To stimulate demand for sustainable buildings

Objectives of BREEAM:

- To provide market recognition to low environmental impact buildings
- To ensure best environmental practice is incorporated in buildings
- To set criteria and standards surpassing those required by regulations and challenge the market to provide innovative solutions that minimise the environmental impact of buildings
- To raise the awareness of owners, occupants, designers and operators of the benefits of buildings with a reduced impact on the environment
- To allow organisations to demonstrate progress towards corporate environmental objectives

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1.2 Governance and Quality Standards

The BRE Global "Sustainability Board" oversees BRE Global's guides, publications, standards and certification schemes in the area of sustainability and the environment.

Current standards and schemes include BREEAM, EcoHomes, Environmental Profiles and ISO 14001. One of the main responsibilities of this Board is to ensure that standards, guides and the way BRE Global operates meet the needs of stakeholders. The Board meets three times a year to review these issues.

The Sustainability Board reports to the BRE Global Governing Body, which has an independent overview of all BRE Global's schemes and activities. Specific responsibilities of the Sustainability Board and other Boards include:

- advising on the need for new certification schemes, standards and publications, including updates to existing ones
- advising BRE Global on relevant legislation and technical matters
- promoting certification
- advising on issues that may affect the reputation and integrity of BRE Global
- approving certification schemes, standards, publications or approvals and reviewing outputs from Expert Groups and Working Groups
- ensuring a balanced participation with no single interest predominating
- providing comments and guidance, where appropriate, on methods of assessment and testing, to review the progress of assessments and advise on content of certificates, prior to publication; and
- reviewing and advising on complaints and appeals as requested.

The Board represents a wide cross section of stakeholders from the construction industry including designers, developers, end users, financiers, insurers and regulators. The first independent chairman elected by the members is Bill Gething. Bill is one of the most respected figures in sustainable architecture and is the RIBA President's Sustainability Advisor, Chair of the Institute's Sustainable Futures Committee and a partner of Feilden Clegg Bradley Architects LLP.

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ISO 9001

BRE Global has ISO 9001 certification for its BREEAM Buildings schemes and also for the assessment and certification of construction materials under the BREEAM LCA (Life Cycle Analysis) environmental profiles. The certification for the BREEAM schemes covers the operations relating to assessor training, licensing, quality management, and record keeping.

UKAS Accreditation

Assessors qualified to deliver the BREEAM buildings schemes are also covered under a UKAS accredited competent persons scheme. In addition, the operations relating to the certification of the BREEAM buildings versions and the environmental profiles are also covered under UKAS accredited product certification schemes.

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1.3 BREEAM Credibility

Technical Credibility

BREEAM is tried and tested, both in terms of its robust technical standards and its commercial delivery, and expert advice (based on scientific evidence) continues to inform almost every issue in BREEAM.

In the UK there are over 115,000 buildings certified and over 700,000 homes and buildings currently registered for assessment. BREEAM can be used to assess any building type anywhere in the world.

Robust Technical Standards

BREEAM has always used objective criteria to recognise good environmental performance:

- Issues for assessment are agreed to be significant, and offer worthwhile reductions in environmental impact
- Issues must be assessable at the relevant stage in the building's life
- Performance levels are based on scientific evidence wherever possible
- Performance levels must exceed demands of law and regulations and encourage innovation
- Improvements encouraged by BREEAM are achievable and cost effective

Where specific targets cannot be set using hard science or research, sensible practical measures are recommended to minimise environmental impact or enhance the environment of the building and its users.

Commercial Credibility

Assessments are undertaken by organisations and individuals trained and licensed by BRE Global (Assessors). This ensures:

- Competition in the market for assessment services
- Engagement with the whole of the industry
- Assessors work to the same quality standards (monitored by BRE)

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BRE Global has gained UKAS (United Kingdom Accreditation Service) accreditation for all its BREEAM schemes. This means that its management of BREEAM is monitored and overseen by UKAS.

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1.4 The BREEAM Manuals

The following BREEAM scheme manuals are available for free download from the BREEAM website:

BREEAM Courts
BREEAM Education
BREEAM Industrial
BREEAM Healthcare
BREEAM Offices
BREEAM Retail
BREEAM Prisons
BREEAM Multi-residential

What is in the BREEAM Manuals?

- A definition of the scope of each BREEAM scheme
- Full information on the technical standards and criteria of each BREEAM scheme (summarised below)
- Rating & scoring information
- Technical checklists

Using the BREEAM Manuals

The BREEAM Assessor Manuals are technical guidance documents which have been created to aid licensed BREEAM Assessors in carrying out Assessments. Please note that the manuals and the information detailed therein has been designed for, and to be used by trained and licensed BREEAM Assessors.

This document must be used by non assessors for reference only (in accordance with the Terms and Conditions of use).

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Understanding the BREEAM Manuals

A BREEAM standard covers ten categories of sustainability including:

- Management
- Health & Wellbeing
- Energy
- Transport
- Water
- Materials
- Waste
- Land Use and Ecology
- Pollution
- Innovation

Each category is detailed in this technical manual and consists of a number of issues (summarised below). Each issue seeks to mitigate the impact of a new or refurbished building on the environment by defining a performance target and assessment criteria that must be met to confirm the target has been achieved. Where a performance target has been achieved the number of available BREEAM credits can be awarded.

Table 1 Summary of BREEAM categories and main issues

Management • Commissioning • Construction site impacts • Security	**Waste** • Construction waste • Recycled aggregates • Recycling facilities
Health and Wellbeing • Daylight • Occupant thermal comfort • Acoustics • Indoor air and water quality • Lighting	**Pollution** • Refrigerant use and leakage • Flood risk • NO_x emissions • Watercourse pollution • External light and noise pollution
Energy • CO_2 emissions • Low or zero carbon technologies • Energy sub metering • Energy efficient building systems	**Land Use and Ecology** • Site selection • Protection of ecological features • Mitigation/enhancement of ecological value
Transport • Public transport network connectivity • Pedestrian and Cyclist facilities • Access to amenities • Travel plans and information	**Materials** • Embodied life cycle impact of materials • Materials re-use • Responsible sourcing • Robustness
Water • Water consumption • Leak detection • Water re-use and recycling	**Innovation** • Exemplary performance levels • Use of BREEAM Accredited Professionals • New technologies and building processes

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The performance targets go beyond the minimum standard needed to satisfy Building Regulation or other legislation. The targets represent good or best practice in the field of sustainable design and procurement.

The majority of BREEAM issues are tradable, meaning that a design team/client can pick and choose which to comply with in order to build their BREEAM performance score. Several BREEAM issues do have minimum standards meaning that, to achieve a particular BREEAM rating, a defined number of credits for that issue must be achieved (BREEAM's minimum standards are outlined in section 3.0 Scoring and Rating).

Each BREEAM issue is structured as follows:

- **Issue Information**: Issue ID, issue title, number of credits available for meeting the performance target and whether the issue forms part of BREEAM's minimum standards.
- **Aim**: Broadly outlines the objective of the issue i.e. the impact it intends to mitigate
- **Assessment Criteria**: outlines the building performance target/benchmark and its criteria. Some issue have *Exemplary Level Criteria.* Where a building demonstrates that it meets *Exemplary Level Criteria* an Innovation Credit can be awarded (refer to section 13 *Innovation* for more detail)
- **Schedule of Evidence Required**: outlines typical examples of the type of information that must be collected from the design team/client by the BREEAM assessor so they can assess if the building complies with the issue criteria.
- **Additional Information**: details relevant definitions of BREEAM terminology and contains information to support the assessment and compliance of the building.

The following pages contain an example BREEAM issue.

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Example of a BREEAM Issue

Please note: this BREEAM issue has been edited for the purpose of demonstration.

Information box appears at the top of each BREEAM issue. Each issue has a unique ID and title.

This box indicates the total number of BREEAM credits available. These credits can be awarded if the assessed building complies with the assessment criteria.

This box states whether or not minimum standards apply to the BREEAM issue. Section 3.3 of the guidance details the specific minimum standards for each relevant BREEAM issue. For example, one of the two available credits for the Man 2 issue must be achieved to obtain an Excellent BREEAM rating.

Issue ID	Issue Title	No. of credits available	Minimum standards
Man 2	Considerate Constructors	2	Yes

The *Aim* describes the objective of the issue and the impact that the *Assessment Criteria* seeks to mitigate.

Aim

To recognise and encourage construction sites which are managed in an environmentally and socially considerate and accountable manner.

Assessment Criteria

The following demonstrates compliance:

1. The main contractor has complied with and achieved formal certi
   Considerate Constructors Scheme(CCS), credits awarded as follows: (see Checklist A1)
   a. One credit where the contractor achieved a CCS *Code of Considerate Practice* score between 24 and 31.5.
   b. Two credits where the contractor achieved a CCS *Code of Considerate Practice* score between 32 and 35.5.

Exemplary level criteria
The following outlines the exemplary level criteria to achieve an *innovation credit* BREEAM issue:

1. The main contractor has complied with and achieved a certified CCS *Code of Considerate Practice* score of 36 or more.

The *Assessment Criteria* details the requirements that the assessed building must demonstrate compliance with for the available BREEAM credits to be awarded.

Occasionally publications and other standards will be referred to within the *Assessment Criteria* followed by a reference number. Full references to these publications are provided in section 17 of this document.

Some BREEAM issues have *Exemplary Level Criteria.* If the assessed building complies with the *Exemplary Level Criteria* an additional BREEAM credit can be awarded for Innovation. See section 13 *Innovation* for further detail.

Compliance notes	
Considerate Constructors score	No credits can be awarded for the Considerate Constructors Scheme where any of the section scores [illegible] the scheme are less than 3, as this represents non compliance with the [illegible] *Code of Considerate Practice*.
Alternative scheme	Where the project is using an alternative scheme to th[illegible] alternative scheme and its assessment criteria that are ass[illegible] against Checklist A2, NOT the project or its contractor.
Site clearance	The scope of this issue applies to the main contractor and their scope of works. If the scope of the main contractor's works includes demolition and site clearance then this stage of work falls within the scope of the credit criteria.

Each BREEAM issue contains a *Compliance Notes* table. This table provides additional guidance on the application and interpretation of the *Assessment Criteria*.

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The *Schedule of Evidence Required* table describes the types of information that must be provided to the BREEAM assessor as evidence of the assessed building's compliance with the *Assessment Criteria*.

The *Schedule of Evidence* table is split in to two sections. The first details the type(s) of evidence required at the interim design stage of assessment. The second describes the type(s) of evidence required at the final post construction stage of assessment. The numbers in the table correspond to the numbered assessment criteria in the above sections.

Schedule of evidence required

Req.	Design Stage	Post Construction Stage
1	A copy of the relevant section of the main contract specification confirming: ▪ A requirement to comply with the CCS ▪ The minimum score to be achieved in each CCS section. OR A formal letter from the client/developer confirming: ▪ The main contract will include a clause requiring CCS certification ▪ The scope of the main contractor's works ▪ A completed copy of checklist A1.	A copy of the Considerate Constructors Scheme certificate of compliance. The Considerate Constructors Monitors report highlighting the total score and the sub scores in each section.
Exemplary Credit		
1-2	A formal letter from the main contractor confirming their commitment to: ▪ Gaining CCS or equivalent certification ▪ A minimum score of ≥36 or equivalent.	Evidence as outlined above for req.1.

Additional information

Relevant definitions

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 t[illegible] scheme a score of at least 24 is required.

www.consideratecon[illegible]uk

The *Additional Information* section contains definitions of terms used in the *Assessment Criteria* and *Compliance Notes* section. This section will also contain further information relevant to the issue e.g. assessment guidance and relevant websites

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2.0 Scope

This section of the guidance outlines the scope of this non-domestic BREEAM scheme and the type of buildings that it can be applied to. The following information is provided in this section:

- The BREEAM assessment and certification stages
- Type of building projects that can be assessed using BREEAM
- Type of buildings that can be assessed using this BREEAM scheme

Non-domestic BREEAM schemes can be used to assess the environmental impacts of a building in accordance with this scope document in England, Scotland, Wales and Northern Ireland. Assessments using UK BREEAM schemes can also be carried out in the Republic of Ireland, but it must be recognised that BREEAM is tailored to the UK's construction sector. No concessions are made in the schemes where the Republic of Ireland building standards and design and procurement practices differ from those in the UK.

Where the building requiring assessment does not fall within the scope of this non-domestic BREEAM scheme or one of the other standard BREEAM schemes (domestic or non-domestic) or Code for Sustainable Homes, it can be assessed using the BREEAM *Bespoke* scheme.

Where the building requiring assessment is outside of the UK it can be assessed using the BREEAM *International* scheme; this includes buildings in the Republic of Ireland where it is not appropriate to use a UK scheme. BREEAM *International* can be used to assess a single development or BRE Global can assist in creating a BREEAM scheme for a country or region.

Further information on the BREEAM *Bespoke* and BREEAM *International* schemes is available at www.breeam.org or via the BREEAM helpdesk breeam@bre.co.uk

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2.1 Stages of assessment

This BREEAM scheme can be used to assess the environmental impacts arising as a result of an individual building development (including external site areas) at the following stages:

1. Design Stage (DS) - leading to an Interim BREEAM Certificate
2. Post-Construction Stage (PCS) – leading to a Final BREEAM Certificate

Design Stage

The DS assessment and subsequent interim BREEAM Certification represents the performance of the building at the design stage of assessment, typically prior to the beginning of operations on site. Certification at this stage does not, therefore, represent the building's final 'as built' BREEAM performance.

To complete an assessment at this stage the design must be advanced to the point where the relevant information is available to enable the BREEAM assessor to demonstrate, in a robust manner, the building's performance against the reporting and evidential criteria of the technical guidance. The interim DS assessment will therefore be completed and certified at the scheme design or detailed design stages.

Post-Construction Stage

The PCS assessment and subsequent BREEAM Certification represents the final 'as built' performance and BREEAM Rating. A final PCS assessment is completed and certified after practical completion of the building works.

There are two approaches to assessment at the post-construction stage:

1. A post-construction review of an interim design-stage assessment
2. A post-construction assessment

A post-construction review serves to confirm the interim BREEAM rating achieved at the design stage in accordance with the reporting and evidential criteria of the technical guidance. Where a formal interim DS assessment has not been carried out and a BREEAM assessment and rating is required, a full PCS assessment can be conducted.

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2.2 Type of projects that can be assessed using BREEAM

A BREEAM assessment can be carried out at the above stages for the following types of building project only:

- Whole new buildings
- Major refurbishments of existing buildings
- New build extensions to existing buildings
- A combination of new-build and existing building refurbishment
- New build or refurbishments which are part of a larger mixed use building

Major refurbishments to existing buildings

For the purposes of a BREEAM assessment, a major refurbishment project is a project that results in the provision, extension or alteration of thermal elements and/or building services and fittings.

- Thermal elements include walls, roofs and floors.
- Fittings include windows (incl. rooflights), entrance doors
- Building services include lighting, heating and mechanical ventilation/cooling

Minor refurbishments

This BREEAM scheme is not designed to assess a minor refurbishment of an existing building, i.e. works that do not result in the provision, extension or alteration of thermal elements and/or building services and fittings; or a change of use.

Please note the Offices, Retail, Industrial and Bespoke schemes can be used to carry out an assessment of a building fit-out (see guidance below).

New build extensions to existing buildings

BREEAM can be used to assess new build extensions to existing buildings and, where the existing building is undergoing major refurbishment, the new build extension and existing building.

When assessing only a new-build extension to an existing building, in some BREEAM issues it is necessary to consider services/facilities within the existing building, where such services/facilities will be integral to the new extension or used by the occupants of the new extension. Assessment guidance is provided in the *Compliance Notes* table within the specific BREEAM issue for such instances, where relevant.

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Similar buildings (or units) on the same site

It is possible to assess a number of separate but similar buildings, or individual units within a larger building development, within one BREEAM assessor's report. This is subject to the following conditions:

1. The buildings/units must all be on the same site
2. The buildings/units must be of the same building type e.g. an office, with the same building functions/spaces and fitted out to a similar specification and therefore assessed using the same BREEAM issues
3. Each BREEAM issue must be assessed, and its credits awarded, based on the worst performing building/unit
4. The assessment and assessors report produces a single BREEAM rating covering all buildings/units assessed

For the above scenario, a single BREEAM certificate will be issued listing all the buildings/units covered by the single BREEAM assessor's report.

Where required, a duplicate of the certificate can be produced for the purposes of display in each individual building/unit. Duplicates of certificates are not chargeable provided they are requested by the BREEAM assessor along with the initial certification request to BRE Global.

Alternatively, a certificate can be produced specific to each individual building/unit. In such cases an additional charge will be made for each individual certificate requested.

In either case the certification criteria must be confirmed by the assessor on the Certificate Request Form submitted with their formal assessment report to BRE Global.

If one or more building/unit performs markedly better than another on the same site and the client wishes to recognise this, a separate BREEAM assessment and therefore certificate is required.

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2.3 Type of buildings that can be assessed using this BREEAM scheme

BREEAM Prisons can be used to assess the following types of prison establishment:

1. **High security prison**: normally holding category A prisoners
2. **Standard secured prison**: normally holding category B and/or C prisoners
3. **Young offender institution**
4. **Local prison**: receive prisoners directly from court on remand or newly sentenced.
5. **Women's prison**: closed prisons only.

BREEAM Prisons can be used to assess either of the following building types where they form a part of one of the above types of establishment:

- House/segregation block
- Visitors' centres
- Workshop
- Education & Training
- Gatehouse
- Reception building
- Kitchen (standalone)
- Sports hall/gymnasium
- Healthcare unit
- Multi-faith building
- Laundry (standalone)
- Main stores
- Estates building
- A hybrid of two or more of the above building types e.g. estates and main stores, reception and visitor centre, regimes building or day care centre

The building functions/areas listed below are covered by the scope of BREEAM Prisons where they form a part of one of the above building types:

Prison specific areas

- Cells
- Association/atrium space (in a houseblock)
- Control room
- Interview and official visit room
- Counselling/medical rooms
- Waiting, holding, search, ID check area
- Open/closed visit areas
- Function/multi-purpose/association room
- Workshop
- Comms room
- Worship area/Prayer room
- Command suite
- CCTV
- Gatehouse (front desk area)
- Mail room
- Consulting/treatment room
- Care/listener suite

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Office/staff areas

- Cellular or open plan offices
- Meeting rooms
- Training/presentation rooms
- Staff restrooms

Other associated functions/areas

- Sports Facilities e.g. gymnasium, swimming pool etc.
- Food preparation and servery
- Reception and waiting areas
- Dining areas
- Cold storage
- Laundry
- Library
- Classrooms
- Pharmacy
- Internal waste/refuse area
- Trolley park
- Play area (in a visitors' centre)
- WCs and changing facilities
- Storage and waste management areas
- I.T suite, server room
- Ancillary areas e.g. plant room, circulation space

The above list is not exhaustive, but serves to indicate the type of spaces covered by the scope of this BREEAM scheme. Where a proposed building contains a small additional function/area that is not listed above, the building can still be assessed using this scheme. If the assessor has reason to believe that this scheme is not appropriate given the small additional function/area type, BRE Global should be contacted for advice.

Unless otherwise indicated, BREEAM Prisons cannot be used to assess any of the above functions/spaces as standalone developments; for example, the Prisons scheme cannot be used to assess and certify a swimming pool or nursery that is not a part of one of the above prison establishments. Such buildings can be assessed using one of the other standard BREEAM schemes or, where appropriate, the BREEAM Bespoke scheme.

Other secure building types

BREEAM Prisons, or a tailored version of the Prisons scheme, may have the scope to assess secure building types as part of a prison establishment not listed above, e.g. open prisons or juvenile offender institutions. BRE Global should be consulted to determine the appropriateness of such cases.

Administrative offices buildings on the prisons estate

Where appropriate the BREEAM Offices scheme should be used to assess an administrative office building on the prison estate. If such a building is combined with one or more of the prison building types outlined above, BRE Global should be consulted when determining the most appropriate BREEAM scheme to carry out the assessment.

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Building does not fit the scope of BREEAM *Prisons*

Building types not covered by the scope of BREEAM Prisons could be assessed using another BREEAM scheme. All BREEAM scheme manuals can be downloaded from www.breeam.org, each manual details the scope of that scheme. Alternatively, if the building does not fall within the scope of an existing BREEAM standard it can be assessed using the BREEAM Bespoke scheme.

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3.0 Scoring and Rating

This section of the BREEAM manual explains how an assessed building's certified BREEAM rating is calculated.

There are a number of elements that determine the BREEAM rating; these are as follows:

- BREEAM rating benchmarks
- BREEAM environmental weightings
- Minimum BREEAM standards
- BREEAM credits for Innovation

Each of these elements is described in the sections on the following pages; this is followed by guidance and an example describing how a BREEAM rating is calculated.

In addition, there is a section describing the conditions that must be met in order to award an assessed building a 'BREEAM Outstanding' rating, the highest achievable BREEAM rating.

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3.1 Rating benchmarks

The rating benchmarks for the 2008 version of BREEAM are outlined in table 2 below for new buildings, major refurbishments and, where applicable to the BREEAM scheme (refer to scope document), fit-out projects:

Table 2 BREEAM 2008 rating benchmarks

BREEAM Rating	% score
UNCLASSIFIED	<30
PASS	≥30
GOOD	≥45
V GOOD	≥55
EXCELLENT	≥70
OUTSTANDING*	≥85

* Please note: there are additional criteria for achieving a BREEAM Outstanding rating. Please refer to the guidance below.

3.2 Environmental section weightings

Table 3 below outlines the environmental weightings for the nine BREEAM sections for the type of building projects that BREEAM Buildings can be used to assess (refer to scope of the scheme document):

Table 3 BREEAM 2008 environmental weightings

BREEAM Section	Weighting (%)	
	New builds, extensions & major refurbishments	Building fit-out only (where applicable to scheme)
Management	12	13
Health & Wellbeing	15	17
Energy	19	21
Transport	8	9
Water	6	7
Materials	12.5	14
Waste	7.5	8
Land Use & Ecology	10	N/A
Pollution	10	11
Innovation	10	10

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3.3 Minimum standards

To achieve a BREEAM rating, the minimum percentage score must be achieved (as outlined in table 2 above) and the minimum standards (i.e. number of credits achieved) applicable to that rating level (below) complied with.

Table 4 Minimum BREEAM standards

BREEAM issue	BREEAM Rating / Minimum number of credits				
	PASS	GOOD	VERY GOOD	EXCELLENT	OUTSTANDING
Man 1 - Commissioning	1	1	1	1	2
Man 2 - Considerate Constructors	-	-	-	1	2
Man 4 - Building user guide	-	-	-	1	1
Man 9 - Publication of building information (BREEAM Education only)	-	-	-	-	1
Man 10 - Development as a learning resource (BREEAM Education only)	-	-	-	-	1
Hea 4 - High frequency lighting	1	1	1	1	1
Hea 12 - Microbial contamination	1	1	1	1	1
Ene 1 - Reduction of CO_2 emissions	-	-	-	6	10
Ene 2 - Sub-metering of substantial energy uses	-	-	1	1	1
Ene 5 - Low or zero carbon technologies	-	-	-	1	1
Wat 1 - Water consumption	-	1	1	1	2
Wat 2 - Water meter	-	1	1	1	1
Wst 3 - Storage of recyclable waste	-	-	-	1	1
LE 4 - Mitigating ecological impact	-	-	1	1	1

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3.4 BREEAM credits for innovation

Innovation credits provide additional recognition for a building that innovates in the field of sustainable performance, above and beyond the level that is currently recognised and rewarded within standard BREEAM issues. Innovation credits therefore enable clients and design teams to boost their building's BREEAM performance and in addition, help support the market for new innovative technologies and practices.

An additional 1% score can be added to a building's final BREEAM score for each Innovation credit achieved. The maximum number of Innovation credits that can be awarded for any one building assessed is 10; therefore the maximum available score achieved for 'innovation' is 10%. Innovation credits can be awarded regardless of the final BREEAM rating i.e. they are awardable at any BREEAM rating level.

There are three different ways in which a building can achieve an Innovation credit (all of which are summarised below and detailed in section 13 *Innovation*). The first is by meeting exemplary performance criteria for an existing BREEAM issue (table 5 outlines the BREEAM issues with exemplary performance criteria).

Table 5 BREEAM issues with exemplary level criteria.

Man 2 - Considerate Constructors
Hea 1 - Daylighting
Hea 14 - Office Space (BREEAM Retail & Industrial Schemes only)
Ene 1 - Reduction of CO_2 emissions
Ene 5 - Low or Zero Carbon Technologies
Wat 2 - Water Meter
Mat 1 - Materials Specification
Mat 5 - Responsible Sourcing of Materials
Wst 1 - Construction Site Waste Management

The second route is where the client/design team has set a specific BREEAM performance targets/objectives and involved a BREEAM Accredited Professional (AP) or Suitably Qualified BREEAM Assessor (SQA) throughout project work stages to deliver a building that meets the performance objectives and target BREEAM rating.

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The final and third route is where an application is made to BRE Global by the BREEAM assessor to have a particular building feature, system or process recognised as ‘innovative’. If the application is successful an Innovation credit can be awarded. The flow chart and eligibility criteria below outline the process to be used when applying for an Innovation credit. An additional fee is charged for each innovation credit application received.

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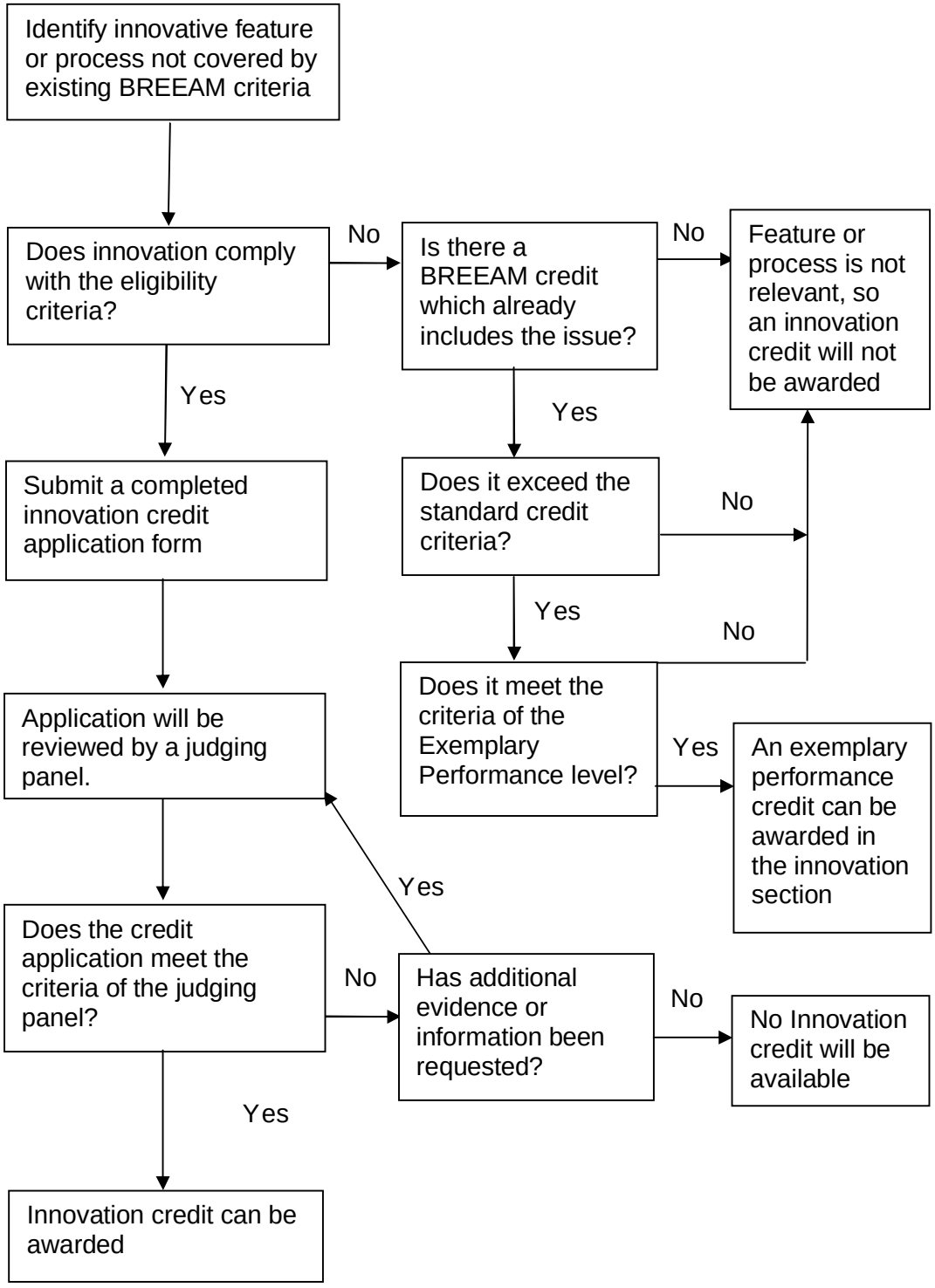
BREEAM Innovation credit: application flow chart



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3.5 Eligibility Criteria for Innovation Credits

The following criteria will be used to evaluate the eligibility of claims for proposed Innovation credit status:

1. Does the feature, system or process aim to reduce the building's impact on one of the following overarching environmental/social issues?

    - Mineral Resource Depletion
    - Fossil Fuel Depletion
    - Acidification
    - Climate Change
    - Nuclear Waste
    - Stratospheric Ozone Depletion
    - Eco-toxicity
    - Eutrophication
    - Human Toxicity
    - Photochemical Ozone Creation (Summer Smog)
    - Waste Disposal
    - Water Use
    - Deforestation
    - Urban Sprawl
    - Reduction of Biodiversity
    - Noise and Nuisance
    - Loss of Heritage
    - Indoor comfort
    - Health and Safety
    - Access and Inclusion

2. Can the impact of the feature, system or process be assessed objectively using clearly defined criteria?

3. Can the sustainability benefits of the feature, system or process be demonstrated?

4. Have a draft aim, assessment criteria and information required to demonstrate compliance been developed (in accordance with the Innovation credit application form)?

A BREEAM assessor can obtain the Innovation credit application form from the BREEAM Office at BRE Global. The form details the eligibility criteria listed above and the fee payable for each submitted application for an Innovation credit.

Innovation credits cannot be awarded until written approval is received from the BREEAM Office.

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3.6 How to calculate a building's rating

A BREEAM assessor must determine the BREEAM rating using the BREEAM Assessor's Spreadsheet Tool and associated calculators. An indication of performance against the BREEAM standard can also be determined using a BREEAM Pre-Assessment Estimator. The Pre-Assessment Estimators are available from the BREEAM website for each scheme.

The process of determining a BREEAM rating is outlined below and in table 6:

1. For each BREEAM section the number of credits awarded must be determined by a BREEAM assessor in accordance with BREEAM's assessment criteria (detailed in the technical sections of the scheme manual).
2. The percentage of the credits achieved is calculated for each BREEAM section.
3. The percentage of credits achieved is then multiplied by the corresponding BREEAM section weighting (see note below). This gives the section score.
4. The section scores are then added together to give the overall BREEAM score. The BREEAM score is compared to the benchmarks in table 2 and, provided all minimum standards have been met, the relevant BREEAM rating is achieved.
5. An additional 1% can be added to the final BREEAM score for each Innovation credit achieved (up to a maximum of 10%).

Note: Where applicable to the BREEAM scheme (see *Scope of the BREEAM Scheme*), *Fit-Out only* assessments do not assess the BREEAM issues under the Land Use & Ecology section. The section weighting for Land Use and Ecology is re-distributed amongst the remaining eight sections. The re-distribution is determined based on the relative weighting of the remaining sections, so for example, the Energy section receives a greater proportion of the Land Use and Ecology weighting than the Water section. See Table 3 above for details of the respective section weighting.

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Table 6 Example BREEAM score and rating calculation

BREEAM Section	Credits Achieved	Credits Available	% of Credits Achieved	Section Weighting	Section score
Management	7	10	70%	0.12	8.40%
Health & Wellbeing	11	14	79%	0.15	11.79 %
Energy	10	21	48%	0.19	9.05%
Transport	5	10	50%	0.08	4.00%
Water	4	6	67%	0.06	4.00%
Materials	6	12	50%	0.125	6.25%
Waste	3	7	43%	0.075	3.21%
Land Use & Ecology	4	10	40%	0.10	4.00%
Pollution	5	12	42%	0.10	4.17%
Innovation	1	10	10%	0.10	1%
Final BREEAM score				**55.87%**	
BREEAM Rating				**VERY GOOD**	

Minimum Standards for BREEAM 'Very Good' rating	**Achieved?**
Man 1 - Commissioning	**P**
Hea 4 - High frequency lighting	**P**
Hea 12 - Microbial contamination	**P**
Ene 2 Sub-metering of substantial energy uses	**P**
Wat 1 - Water consumption	**P**
Wat 2 - Water meter	**P**
LE 4 - Mitigating ecological impact	**P**

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3.7 BREEAM Outstanding Rating

The following conditions must be met in order to certify a building at the Outstanding BREEAM rating level:

1. The building must achieve a final BREEAM Score ≥85%
2. The minimum performance standards (table 4) for the Outstanding rating level must have been met
3. Provision of material for the production and publication of a case study (refer to guidance below) on the Outstanding rated building.

In addition to the above, the 'BREEAM Outstanding' building is required to obtain a BREEAM In Use Certification of Performance within the first three years of the building's operation and use (with regular reviews in accordance with that scheme) in order to maintain the rating. Where the building is not certified against BREEAM In Use during this period, the Outstanding rating will be downgraded to an Excellent BREEAM rating after the expiry of the three years from issue of the Final BREEAM 2008 (Post Construction) certificate.

Production of case study

One of the most important aspects of the Outstanding BREEAM rating will be that projects receiving this rating will act as exemplars for the industry. It is therefore a very important aspect of the new rating that a good-quality case study is produced that design teams can refer to.

The design team and client will be asked via the certificate request form to agree to provide relevant building/project information to allow BRE Global to produce a case study. This information will be required with the formal post construction stage BREEAM assessor's report for the assessed building.

Subject to approval from the design team/client, BRE Global will publish the case study on either the BREEAM website, Green Book live website and other BRE/BREEAM-related publications (as appropriate).

Where information is not provided for the production of a case study, the building will be certified to a BREEAM Excellent rating level.

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4.0 Management

Issue ID	Issue Title	No. of credits available	Minimum standards
Man 1	Commissioning	2	Yes

Aim

To recognise and encourage an appropriate level of building services commissioning that is carried out in a co-ordinated and comprehensive manner, thus ensuring optimum performance under actual occupancy conditions.

Assessment Criteria

The following demonstrates compliance:

First credit

1. An appropriate project team member(s) is appointed to monitor and programme pre-commissioning, commissioning and, where necessary, re-commissioning on behalf of the client.

2. Commissioning to be carried out in line with current Building Regulations and BSRIA[1] and CIBSE[2] guidelines, where applicable.

3. The main contractor accounts for the commissioning programme, responsibilities and criteria within the main programme of works.

4. A specialist commissioning manager is appointed (by either client or contractor) for complex systems such as:
    - Air conditioning
    - Mechanical ventilation, displacement ventilation, complex passive ventilation
    - Building management systems (BMS)
    - Renewable energy sources
    - Microbiological safety cabinets and fume cupboards
    - Cold storage enclosures and refrigeration plant

    The specialist commissioning manager must have been appointed during the design stage and the scope of their responsibility includes:
    - Design input: commissionability design reviews
    - Commissioning management input to construction programming
    - Commissioning management input during installation stages
    - Management of commissioning, performance testing and handover/post handover stages.

5. Where BMS specified, the following commissioning procedures must be carried out:
    a. Commissioning of air and water systems is carried out when all control devices are installed, wired and functional

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b. In addition to air and water flow results, commissioning results include physical measurements of room temperatures, off coil temperatures and other key parameters as appropriate
c. The BMS/controls installation should be running in auto with satisfactory internal conditions prior to handover
d. All BMS schematics and graphics (if BMS is present) are fully installed and functional to user interface before handover
e. The occupier will be fully trained in the operation of the system.

Second credit

1. The first credit has been achieved.

2. The above appointment(s) include the following seasonal commissioning responsibilities over a minimum 12 month period, once the building becomes occupied:

Complex Systems – Specialist commissioning manager

a. Testing of all building services under full load conditions, i.e. heating equipment in mid-winter, cooling/ventilation equipment in mid-summer, and under part load conditions (spring/autumn)
b. Where applicable, testing should also be carried out during periods of extreme (high or low) occupancy
c. Interviews with building occupants (where they are affected by the complex services) to identify problems or concerns regarding the effectiveness of the systems
d. Re-commissioning of systems (following any work needed to serve revised loads), and incorporating any revisions in operating procedures into the O&M manuals.

Where specialist building services systems such as fume cupboards, microbiological safety cabinets and a cold storage system are present then the assessor must ensure that these systems are included in the specialist commissioning agent's responsibilities.

Simple Systems (naturally ventilated) – External Consultant/Facilities Manager

a. Review thermal comfort, ventilation, and lighting, at three, six and nine month intervals after initial occupation, either by measurement or occupant feedback.
b. Take all reasonable steps to re-commission systems following the review and incorporate any relevant revisions in operating procedures into the O&M manuals.

Compliance Notes	
New Build	There are no additional or different criteria to those outlined above specific to new-build projects.
Refurbishment	There are no additional or different criteria to those outlined above specific to refurbishment projects.
Extensions to existing buildings	There are no additional or different criteria to those outlined above specific to the assessment of extensions to existing buildings.
Commissioning monitor (simple systems)	The commissioning monitor can be a person from within the contractor or sub-contractor organisation, provided they are not involved in the general installation works.
Specialist commissioning manager	The commissioning manager for complex systems must be a specialist contractor rather than a general sub-contractor.
Naturally ventilated buildings	Where the building is largely naturally ventilated, using simple cross-flow ventilation relying solely on openable windows and/or trickle vents (except in areas where mechanical ventilation is legally required), the appointment of a specialist commissioning agent is not required to award this credit. If a BMS system is employed, however, to control the natural ventilation and/or if renewable energy sources are utilised in the development, the requirement for a specialist commissioning agent remains.

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Schedule of Evidence Required

Req.	Design Stage	Post Construction Stage
First Credit		
1&4	A copy of a letter or commissioning responsibilities schedule confirming the appointment of [or commitment to appoint]: • Design team member(s) as commissioning monitor and scope of their commissioning role. • Specialist commissioning manager and scope of their commissioning role.	Commissioning records/reports confirming: • Monitoring actions carried out by the nominated design team member. • Specialist commissioning manager's actions/role.
2	A copy of the specification clause stating: • The standards and codes of practice to which commissioning procedures are to comply with.	Commissioning records/reports confirming: • Commissioning procedures executed in compliance with relevant standards.
3	A copy of the specification clause confirming: • The managing contractor's responsibilities with respect to this requirement. **OR** A copy of a commissioning schedule highlighting: • Managing contractor's commissioning responsibilities.	A copy of the main contract programme highlighting; • Commissioning, performance testing and handover period.
5	A copy of the specification clause/commissioning schedule confirming: • The stages of the BMS/Controls commissioning procedures.	Commissioning records/reports confirming that; • BMS/controls commissioning activities were carried out in compliance with the commissioning schedule/specification clause.
Second Credit		
1	Evidence (as outlined above) confirming compliance with the first credit.	Evidence (as outlined above) confirming compliance with the first credit.
2	As evidence criteria for 1 & 3 of the first credit. This evidence must confirm the scope of seasonal commissioning responsibilities/tasks (as required).	A copy of the seasonal commissioning schedule/programme. **OR** A copy of the letter of appointment of commissioning specialist and scope of their responsibilities.

Additional Information

Relevant definitions
None.

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Issue ID	Issue Title	No. of credits available	Minimum standards
Man 2	Considerate Constructors	2	Yes

Aim

To recognise and encourage construction sites which are managed in an environmentally and socially considerate and accountable manner.

Assessment Criteria

The following demonstrates compliance:

1. The main contractor has complied with and achieved formal certification under the Considerate Constructors Scheme(CCS), credits awarded as follows: (see Checklist A1)
    a. One credit where the contractor achieved a CCS *Code of Considerate Practice* score between 24 and 31.5.
    b. Two credits where the contractor achieved a CCS *Code of Considerate Practice* score between 32 and 35.5.

OR

2. The main contractor has complied with an **alternative, independently assessed scheme** (equivalent to CCS), credits awarded as follows: (see Checklist A2)
    a. One credit where the site has been independently assessed using the alternative scheme, **AND** the alternative scheme addresses all the mandatory items plus 50% of the optional items in Checklist A2.
    b. Two credits where the site is to be independently assessed using the alternative scheme **AND** the alternative scheme addresses all the mandatory items plus 80% of the optional items in Checklist A2.

Exemplary level criteria
The following outlines the exemplary level criteria to achieve an *innovation credit* for this BREEAM issue:

1. The main contractor has complied with and achieved a certified CCS *Code of Considerate Practice* score of 36 or more.

OR

2. The main contractor has complied in full with the alternative, independently assessed scheme, and the alternative scheme addresses all the mandatory and optional items in Checklist A2.

Compliance Notes	
New Build	There are no additional or different criteria to those outlined above specific to new-build projects.
Refurbishment	There are no additional or different criteria to those outlined above specific to refurbishment projects.
Extensions to existing buildings	There are no additional or different criteria to those outlined above specific to the assessment of extensions to existing buildings.

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Considerate Constructors score	No credits can be awarded for the Considerate Constructors Scheme where any of the section scores within the scheme are less than 3, as this represents non compliance with the CCS *Code of Considerate Practice*.
Contractor not yet appointed	At the interim design stage of assessment, where the contractor is not yet appointed, the client must either include within the specification, or commit to including, a requirement for the appointed contractor to comply with one of the above criteria. The assessor must use this information to complete the appropriate checklist.
Alternative scheme	Where the project is using an alternative scheme to the CCS, it is the alternative scheme and its assessment criteria that are assessed against Checklist A2, NOT the project or its contractor.
Site clearance	The scope of this issue applies to the main contractor and their scope of works. If the scope of the main contractor's works includes demolition and site clearance then this stage of work falls within the scope of the credit criteria.
Custodial Buildings	For custodial buildings, the National Offender Management Service has developed a scheme called 'Sympathetic Custodial Construction' (SCC). This scheme is categorised as an alternative to the Considerate Constructors Scheme, and should therefore be assessed against Checklist A2 where its use is specified.

Schedule of Evidence Required

Req.	Design Stage	Post Construction Stage
1	A copy of the relevant section of the main contract specification confirming: • A requirement to comply with the CCS • The minimum score to be achieved in each CCS section. **OR** A formal letter from the client/developer confirming: • The main contract will include a clause requiring CCS certification • The scope of the main contractor's works • A completed copy of checklist A1.	A copy of the Considerate Constructors Scheme certificate of compliance. The Considerate Constructors Monitors report highlighting the total score and the sub scores in each section.
2	A copy of the assessment criteria for the alternative scheme that allows the assessor to complete checklist A2. **AND** A formal letter from the client/developer confirming: • The main contract will include a clause requiring compliance with the alternative scheme • The procedure, and individual/ organisation responsible for third party assessment of site compliance. • The scope of the main contractor's works	A copy of the compliance report (and any certification) for the alternative scheme.

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Exemplary Credit		
1-2	A formal letter from the main contractor confirming their commitment to: • Gaining CCS or equivalent certification • A minimum score of ≥36 or equivalent.	Evidence as outlined above for req.1.

Additional Information

Relevant definitions

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.

www.considerateconstructorsscheme.org.uk

Alternative local or national schemes: Where the client/contractor has not used the Considerate Constructors Scheme (CCS) but has made a firm commitment to adopt an alternative independently assessed scheme covering the key issues in Checklist A2, the credits can still be achieved. The purpose of Checklist A2 is to enable the assessor to check whether an alternative, independently assessed scheme complies with the BREEAM assessment criteria. It is not in itself an equivalent construction site management scheme.

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Issue ID	Issue Title	No. of credits available	Minimum standards
Man 3	Construction Site Impacts	4	No

Aim

To recognise and encourage construction sites managed in an environmentally sound manner in terms of resource use, energy consumption and pollution.

Assessment Criteria

The following demonstrates compliance:

1. One credit where evidence provided demonstrates that 2 or more of items a-g (listed below) are achieved. **OR**

   Two credits where evidence provided demonstrates that 4 or more of items a-g (listed below) are achieved. **OR**

   Three credits where evidence provided demonstrates that 6 or more of items a-g (listed below) achieved:

   a. Monitor, report and set targets for CO_2 or energy arising from site activities
   b. Monitor, report and set targets for CO_2 or energy arising from transport to and from site
   c. Monitor, report and set targets for water consumption arising from site activities
   d. Implement best practice policies in respect of air (dust) pollution arising from the site
   e. Implement best practice policies in respect of water (ground and surface) pollution occurring on the site
   f. Main contractor has an environmental materials policy, used for sourcing of construction materials to be utilised on site
   g. Main contractor operates an Environmental Management System.

   The Assessment Criteria for items a-g are detailed in the relevant section of Checklist A3.

2. One credit where evidence provided demonstrates that at least 80% of site timber is responsibly sourced and 100% is legally sourced.

Compliance Notes	
New Build	There are no additional or different criteria to those outlined above specific to new-build projects.
Refurbishment	There are no additional or different criteria to those outlined above specific to refurbishment projects.
Extensions to existing buildings	There are no additional or different criteria to those outlined above specific to the assessment of extensions to existing buildings.

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Site timber	The fourth credit (for responsibly sourced site timber) is not dependent on any of the first three credits being achieved. For the purpose assessing this issue, site timber is considered to be timber used to facilitate construction, including formwork, site hoardings and other temporary site timber used for the purpose of facilitating construction. It does not cover structural timber and timber used for fit-out items (this is addressed in BREEAM issue Mat 5).
Site clearance	The scope of this issue applies to the main contractor and their scope of works. If the scope of the main contractor's works includes demolition and site clearance then this stage of work falls within the scope of the assessment criteria.

Schedule of Evidence Required

Req.	Design Stage	Post Construction Stage
All	A copy of the relevant section from the main contract specification confirming: • Contractor's obligations in respect to each item on the checklist • Site timber will be sourced from suppliers capable of providing certification to the level required for the particular tier claimed (see table 13 of BREEAM issue MAT 5) • All timber will come from a 'legal source' and is not on the CITES list*. **OR** Where the main contract specification is not yet available, a formal letter from the client/developer including: • Completed checklist A3 identifying which items will form part of the main contractor's obligations. • The policy for sourcing site timber for the project. • Confirmation that the above will be implemented in compliance with BREEAM's criteria. * Or in the case of Appendix III of the CITES list, it has not been sourced from the country seeking to protect this species as listed in Appendix III.	Site records demonstrating monitoring and recording of the following (where relevant): • Site energy/CO_2 consumption • Site deliveries • Site water consumption Project targets set for water and energy consumption. Copies of the documented procedures used on site for working to best practice pollution management guidelines. A letter from the main contractor confirming: • Procedures for pollution management and mitigation were implemented • Name/job title of individual responsible for monitoring and managing construction site impacts throughout the project. A copy of the certification document or Chain of Custody (CoC) certificate(s) for the site timber. Where any non-certified timber is used, written confirmation from the supplier(s) confirming that: • All timber comes from a legal source. • 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*).

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Additional Information

Relevant definitions

CITES (Convention on International Trade in Endangered Species)[3] Appendices I and II of the CITES list illustrate species of timber that are protected outright. Appendix III of the CITES list illustrates species that are protected in at least one country. If a timber species used in the development is on Appendix III it can be included as part of the assessment as long as the timber is not obtained from the country(s) seeking to protect this species.

Chain of Custody: 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 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.

Pollution
BRE[4] publishes guidance on construction site dust management, and the Environment Agency[5] publishes guidance on water pollution control measures. There are significant statutory criteria in this area under environmental health legislation and the Environmental Protection Act. The Environment Agency and local Environmental Health Officers police these.

Energy
Energy Management on site has been a key focus for the Construction Confederation[6], and they have published specific guidance 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 in the BREEAM criteria to promote the process of setting, monitoring and achieving targets. BREEAM does not set targets, as these are very project specific. For guidance on setting targets, refer to Constructing Excellence' Construction Industry KPI and Benchmarking (www.constructingexcellence.org.uk/zones/kpizone/default.jsp); this series of documents guides the reader through setting targets for their own projects.

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Issue ID	Issue Title	No. of credits available	Minimum standards
Man 4	Building User Guide	1	Yes

Aim

To recognise and encourage the provision of guidance for the non technical building user so they can understand and operate the building efficiently.

Assessment Criteria

The following demonstrates compliance:

1. A Building User Guide that contains the information described under the '*User Guide Contents*' heading (see additional guidance) has been developed.

2. The *guide* is relevant to the non-technical building user and appropriate to the stakeholder(s) that will occupy the building.

Compliance Notes	
New Build	There are no additional or different criteria to those outlined above specific to new-build projects.
Refurbishment	There are no additional or different criteria to those outlined above specific to refurbishment projects.
Extensions to existing buildings	There are no additional or different criteria to those outlined above specific to the assessment of extensions to existing buildings.
Operation and Maintenance manual	The presence of a building O&M manual does not meet this requirement. The latter provides the detailed specialist information required by technical Facilities Managers (FMs) and maintenance staff/contractors. The guide can be contained in the Operation & Maintenance (O&M) manual, but must be an extractable or 'stand alone' section.
Building users	For the purpose of assessing this issue, building users are defined as HMPS staff, including facilities and building managers.

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Schedule of Evidence Required

Req.	Design Stage	Post Construction Stage
1&2	A copy of the specification clause confirming: • Requirement to develop a Building User Guide • Scope of the Guide's contents. **OR** A formal letter from the client/developer confirming: • That the design team will be required to develop a Building User Guide. • The contents of the Guide will be developed in compliance with the BREEAM criteria.	A copy of the Building User Guide. Written confirmation from the design team that the guide has been distributed to the building's owner, tenant(s) or fit out contractor (for completion), as appropriate.

Additional Information

User Guide Contents

The list below indicates the type of information that should be included to meet the needs of the Facilities Management (FM) Team/Building Manager and the general users (staff).

1. **Building Services Information**
   a. General User - Information on heating, cooling and ventilation in the building and how these can be adjusted, e.g. thermostat location and use, implications of covering heating outlets with files, bags etc., and use of lifts and security systems.
   b. FM – As above, plus a non-technical summary of the operation and maintenance of the building systems (including BMS if installed) and an overview of controls.

2. **Emergency Information**
   a. General User - Include information on the location of fire exits, muster points, alarm systems and fire fighting systems.
   b. FM - As above, plus details of location and nature of emergency and firefighting systems, nearest emergency services, location of first aid equipment.

3. **Energy & Environmental Strategy**
   This should give owners and occupiers information on energy-efficient features and strategies relating to the building, and also provide an overview of the reasons for their use, e.g. economic and environmental savings. Information could include:
   a. General User – Information on the operation of innovative features such as automatic blinds, lighting systems etc., and guidance on the impacts of strategies covering window opening and the use of blinds, lighting and heating controls
   b. FM - As above, plus information on airtightness and solar gain (e.g. the impact of leaving windows/doors open in an air conditioned office, or use of blinds in winter with respect to solar gain); energy targets and benchmarks for the building type, information on monitoring such as the metering and sub-metering strategy, and how to read, record and present meter readings.

4. **Water Use**
   a. General User – details of water saving features and their use and benefits, e.g. aerating taps, low flush toilets, leak detection, metering etc.
   b. FM – As above, plus details of main components (including controls) and operation. Recommendations for system maintenance and its importance, e.g. risk of legionella.

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5. Transport Facilities

a. General User – details of car-parking and cycling provision; local public transport information, maps and timetables; information on alternative methods of transport to the workplace, e.g. car sharing schemes; local 'green' transport facilities.
b. FM - As above, plus information on conditions of access, maintenance and appropriate use of car parking and cycling facilities, e.g. number of spaces provided.

The above information in point 5 does not need to be included in the user's guide if there is a separate dedicated travel information space, accessible to the staff, and in compliance with BREEAM Issue T7. However, the guide must reference the travel information space, the information provided and its location.

6. Materials & Waste Policy

a. General User – Information on the location of recyclable materials storage areas and how to use them appropriately.
b. FM – As above, plus information on recycling, including recyclable building/office/fit out components, waste storage and disposal criteria; examples of Waste Management Strategies and any cleaning/maintenance criteria for particular materials and finishes.

7. Re-fit/Re-arrangement Considerations

a. General User – an explanation of the impact of re-positioning of furniture, i.e. may cover grilles/outlets, implications of layout change, e.g. installation of screens, higher density occupation etc.
b. FM - As above, plus environmental recommendations for consideration in any refit. Relevant issues covered in BREEAM should be highlighted, e.g. the use of natural ventilation, use of Green Guide 'A' rated materials, reuse of other materials etc., the potential impact of increasing occupancy and any provision made in the original design to accommodate future changes.

8. Reporting Provision

a. General User – Contact details of FM/manager, maintenance team, and/or help desk facility; and details of any building user group if relevant.
b. FM – As above, plus contact details of suppliers/installers of equipment and services and their areas of responsibility for reporting any subsequent problems.

9. Training

Details of the proposed content and suggested suppliers of any training and/or demonstrations in the use of the building's services, features and facilities that will be needed. This could include:

a. General User - Training in the use of any innovative/energy saving features.
b. FM – As above, plus training in emergency procedures and setting up, adjusting, and fine tuning, the systems in the building.

10. Links & References

This should include links to other information including websites, publications and organisations. In particular, the Carbon Trust programme should be referenced and links provided to its website and good practice guidance.

11. General

Where further technical detail may be required by the FM Team or manager there should be references to the appropriate sections in the Operation and Maintenance Manual.

12. The guide must also include a copy of HMPS Sustainable development policy and any relevant HMPS environmental, energy and other building related checklists.

Building Log Book

The Building Regulations Part L requires the provision of a 'Building Log-Book' to the owner and/or occupier of the building. In addition on completion, the Construction Design and Management Regulations require the Health and Safety file to be passed onto the building user.

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BREEAM requires an additional 'Building User Guide' that contains the necessary details about the everyday operation of the development in a form that is easy for the intended users to understand.

Without the provision of adequate information and guidance it is likely that the building will be used inappropriately leading to the dissatisfaction of occupants and wasted resources. For example: Some ventilation and/or lighting systems can be impaired by inappropriate positioning of partitions, office furniture etc. so causing inefficiencies, a lack of comfort and poor performance.

The aim of this issue is to ensure that design features are used efficiently and that changes to office space are managed in the most appropriate manner. For example, the design team of a speculative, open plan office, are likely to have considered the need for meeting or cellular space, and may have provided additional riser or duct space to assist future use. The design of the building may require additional or expanded systems to be installed if occupant levels rise above those designed for. This information should be passed on to the personnel making management decisions, so that they are aware of the implications of such decisions on the management of the building.

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Issue ID	Issue Title	No. of credits available	Minimum standards
Man 5	Site Investigation	N/A	No

Issue not assessed in this scheme.

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Issue ID	Issue Title	No. of credits available	Minimum standards
Man 6	Consultation	2	No

Aim

To involve the relevant stakeholders (including building users, business, residents and local government) in the design process in order to provide buildings fit for purpose and to increase local "ownership".

Assessment Criteria

The following demonstrates compliance:

First credit

1. During the preparation of the brief (equivalent to stage B) the following was undertaken:
    a. Members of the local community and *appropriate stakeholders* identified with whom the design team consulted
    b. Knowledge and experience collated from the existing buildings of the same type (if relevant) to identify existing partnerships and networks. If the building is a new development in an existing community or for a community still under construction, a representative consultation group should be identified from similar buildings of the same type in the same authority/area
    c. A consultation plan was prepared and included a timescale and methods of consultation, clearly identifying at which points consultees can usefully contribute and how they will be kept informed about progress on the project.

2. The consultation included at least the following issues:
    a. Functionality, building quality and local impact (including aesthetics)
    b. Building user satisfaction/productivity
    c. Management and operational implications
    d. Maintenance resources/burdens
    e. Good and bad examples of buildings of the same type.
    f. Local traffic/transport impact.
    g. Opportunities for shared use of facilities and infrastructure with the community
    h. Consultation with the *relevant bodies to* confirm whether the building (or site) is classified as any of the following:
        - A Building of local architectural or historic interest referred to in a local authority development plan
        - A Building within an area of outstanding natural beauty and national parks
        - A Building/site that is within the curtilage of, or contains on site, a scheduled ancient monument
        - Buildings or sites with distinguishing local architectural characteristics
        - Buildings within areas of archaeological significance.

3. Feedback has been given to the consultation group regarding suggestions made, and this feedback covered:
    a. What was proposed during the consultation exercise
    b. How each of these proposals were considered
    c. The outcome, e.g. implementation of suggestions or description of why options have not been deemed feasible.

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Second Credit

1. The first credit has been achieved.

2. The project team demonstrate the following:
   a. How the results of the consultation process have influenced, or resulted in modifications to, the proposed design and building operation/use
   b. The measures taken, as agreed with the *relevant bodies*, to protect any areas or features of historic/heritage value.

Compliance Notes	
New Build	There are no additional or different criteria to those outlined above specific to new-build projects.
Refurbishment	There are no additional or different criteria to those outlined above specific to refurbishment projects.
Extensions to existing buildings	There are no additional or different criteria to those outlined above specific to the assessment of extensions to existing buildings.
Relevant Bodies	The relevant bodies, depending on the UK region, will typically include: the Local Authority, English Heritage, Historic Scotland, Environment and Heritage Service (NI) or appropriate agency department of the Assembly Government (Wales).
Appropriate stakeholders	Includes the following (as appropriate): • Local residents and community groups • HMPS Staff • Prison Welfare Organisations such as the Safer Custody Group • Independent Monitoring Boards • Design team members and main contractor • Local Authority.

Schedule of Evidence Required

Req.	Design Stage	Post Construction Stage
First Credit		
1	A list of the stakeholders consulted.	Evidence as outlined at the design stage of assessment.
2	A consultation plan setting out the process and the scope of the consultation. Copies of agendas and minutes of meetings with the stakeholders demonstrating: • The consultation plan in action • The stage in plan of works that consultation occurred.	
3	Copies of documentation demonstrating consultation feedback, including (where relevant): • Newsletters, posters, circulars etc. • Agenda and minutes from meetings.	

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Second Credit		
1	As above.	As above.
2	Marked-up design plans and/or copy of the relevant sections of the specification documents illustrating: • The influence of the consultation process on the final design • Measures taken to protect features of historic value.	Assessor's building/site inspection and photographic evidence confirming: • Existence/installation of identified features on marked-up design plan or in specification.

Additional Information

Relevant definitions

Functionality: The way in which the building is designed to be useful and is split into use, access and space.

Build quality: The engineering and construction performance of a building.

Impact: The building's ability to create a sense of place, and have a positive effect on the local community and environment. This includes character and innovation, form and materials, internal environment and urban and social integration.

Consultation guidance and methodologies

There is a great deal of guidance available on community consultation, and many specialist organisations offer such services. Much of it is focussed on community planning, but is adaptable. Examples of guidance and methodologies in the public domain are:

- The National Charrette Institute is a non-profit educational institution that help communities achieve healthy transformation through collaborative planning processes that harnesses the talents and energies of all interested parties to create and support a buildable plan. www.charretteinstitute.org
- Planning for Real is a participative planning initiative. www.nifonline.org.uk
- For a guide to neighbourhood renewal and various resources see: www.renewal.net
- The Design Quality Indicator is a method to assess the design quality of buildings. www.dqi.org.uk
- The Commission for Architecture and the Built Environment has various publications to provide guidance on design, and a section on education on design for young people. www.cabe.org.uk

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Issue ID	Issue Title	No. of credits available	Minimum standards
Man 7	Shared facilities	N/A	No

Issue not assessed in this scheme.

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Issue ID	Issue Title	No. of credits available	Minimum standards
Man 8	Security	1	No

Aim

To recognise and encourage the implementation of effective design measures that will reduce the opportunity for and fear of crime on the new development.

Assessment Criteria

The following demonstrates compliance:

1. The design team has consulted with and sought the advice of the local police *Architectural Liaison Officer* (ALO), *Crime Prevention Design Advisor* (CPDA) or *Development Manager* (DM) on designing out the opportunity for crime, in accordance with the principles and guidance of the *Safer Parking Scheme*[7].

2. Consultation with the ALO/CPDA/DM occurred during or prior to the *concept design* stage (RIBA stage C) or equivalent.

3. The final design embodies the recommendations of the ALO/CPDA/DM and is built to conform to the principles and guidance of the *Safer Parking Scheme*.

Compliance Notes	
New Build	There are no additional or different criteria to those outlined above specific to new-build projects.
Refurbishment	There are no additional or different criteria to those outlined above specific to refurbishment projects.
Extensions to existing buildings	There are no additional or different criteria to those outlined above specific to the assessment of extensions to existing buildings.
Park Mark® Safer Parking Award	An actual Park Mark® Safer Parking Award/certificate is not required, though this does provide a means of demonstrating compliance at the post construction stage of assessment.
Scope of this issue	This issue applies only in instances where new parking facilities are specified, or existing facilities are being refurbished or expanded as part of the development's scope of works.

Schedule of Evidence Required

Req.	Design Stage	Post Construction Stage
1&2	Correspondence from or a copy of the report/feedback from the ALO/CPDA confirming: • Scope of their advice/involvement • The stage of design in which their advice was sought • Summary of their recommendations	No additional evidence required to that outlined for the design stage of assessment.

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3	A marked-up copy of the site plan(s) highlighting examples of: • The car park conforming to ALO/CPDA/DM recommendations and Safer Parking Scheme principles and guidance. **OR** If the timing of assessment does not permit the above, a copy of the specification clause confirming: • The car park will conform to ALO/CPDA/DM recommendations and SPS principles and guidance.	Assessor's building/site inspection and photographic evidence providing examples of: • The car park conforming to key ALO/CPDA/DM recommendations. **OR** Correspondence from the ALO/CPDA/DM confirming: • The as-built car park or design complies with their recommendations. **OR** A copy of the development's 'Park Mark®' Award certificate.

Additional Information

Relevant definitions:

Secured by Design (SBD): A police initiative that seeks to encourage the construction industry to adopt crime prevention measures in the design of developments, to assist in reducing the opportunity for and fear of crime.

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.

The Association of Chief Police Officers for England Wales and Northern Ireland (ACPO) and the Association of Chief Police Officers for Scotland (ACPOS) represent the police forces of the United Kingdom and both organisations endorse and support the Secured by Design programme.

The Safer Parking Scheme: An initiative of the Association of Chief Police Officers aimed at reducing crime and the fear of crime in parking facilities. Safer parking status, Park Mark®, is awarded to parking facilities that have met the criteria of a risk assessment conducted by the Police. The scheme is managed by the British Parking Association (BPA) and supported by the Home Office and Scottish Executive.

Development Managers: DMs are independent persons appointed by the SPS scheme managers (the British Parking Association) and will assist designated police staff in carrying out site assessments of individual parking facilities.

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Issue ID	Issue Title	No. of credits available	Minimum standards
Man 9	Publication of building information	N/A	Yes

Issue not assessed in this scheme.

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Issue ID	Issue Title	No. of credits available	Minimum standards
Man 10	Development as a learning resource	N/A	Yes

Issue not assessed in this scheme.

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Issue ID	Issue Title	No. of credits available	Minimum standards
Man 11	Ease of maintenance	N/A	No

Issue not assessed in this scheme.

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Issue ID	Issue Title	No. of credits available	Minimum standards
Man 12	Life cycle costing	2	No

Aim

To recognise and encourage the development of a Life Cycle Cost (LCC) analysis model for the project to improve design, specification and through-life maintenance and operation.

Assessment Criteria

The following demonstrates compliance:

First credit

1. A Life Cycle Cost (LCC) analysis has been carried out based on the proposals developed during RIBA Work Stages C/D (concept design/design development), or equivalent.

2. The Life Cycle Costs analysis, based on the concept design/design development proposals, covers the following stages:
    a. Construction
    b. Operation - includes, as a minimum, utilities
    c. Maintenance - includes, as a minimum, planned maintenance, replacements and repairs, cleaning, management costs
    d. End of life.

3. The LCC analysis uses a study period of 25 or 30 (as applicable) **AND** 60 years, shown in real, discounted and non-discounted cash flow terms.

4. The analysis demonstrates that at least two of the following issues have been analysed at a strategic and system level (as per figure 6, Different levels of analysis at different stages of the life cycle, ISO 15686-5**Error! Bookmark not defined.**), comparing alternative options:
    a. Structure
    b. Envelope
    c. Services
    d. Finishes

    The chosen solution is the one that best meets the performance criteria for the built asset.

5. The option(s) with the lowest discounted LCC over the period is preferred, assuming that their selection results in at least one of the following:
    a. The lowest building energy consumption over the operational life span of the building (compared to other options/alternatives analysed)
    b. A reduction in maintenance requirement/frequency
    c. Prolonged replacement intervals of services infrastructure/systems or building fabric
    d. Dismantling and recycling or reuse of building components.

6. The model was updated during RIBA Work Stages D/E (design development/technical design) or equivalent.

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Second credit

1. The first credit is achieved.

2. The results of the study have been implemented in the specification, design and final construction of the assessed building.

Compliance Notes	
New Build	There are no additional or different criteria to those outlined above specific to new-build projects.
Refurbishment	There are no additional or different criteria to those outlined above specific to refurbishment projects.
Extensions to existing buildings	There are no additional or different criteria to those outlined above specific to the assessment of extensions to existing buildings.

Schedule of Evidence Required

Req.	Design Stage	Post Construction Stage
First Credit		
1-4	A copy of the feasibility stage LCC analysis. The details of the cost consultant who has completed the analysis.	No additional evidence required to that outlined for the design stage of assessment.
5	A formal letter from the design team or cost consultant confirming: • The preferred option.	No additional evidence required to that outlined for the design stage of assessment.
6	An updated copy of the LCC analysis for the detailed and final design. **OR** A formal letter from the design team confirming: • The LCC analysis will be updated to reflect the detailed and final design proposals. • Any proposed change(s) made to the specification will be on the basis that they will minimise life cycle costs and impacts.	An updated copy of the LCC analysis for the final design.
Second Credit		
2	A formal letter from the design team confirming: • The option(s) with the lowest discounted life cycle costs have been, or will be, implemented in the design and specification.	Assessor's building/site inspection confirming: • The completed building reflects the preferred option identified in the LCC analysis.

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Additional Information

Relevant definitions

Life Cycle Cost analysis: A procurement evaluation technique which determines the total cost of acquisition, operation, maintenance and disposal of the building.

The assessor should note that BREEAM places fixed criteria on the time at which the Life Cycle Cost feasibility study should be carried out in order that maximum benefit from undertaking this is achieved.

The *strategic level* analysis (looking at issues such as location and external environment, maintainability and internal environment, etc.) and *system level* analysis (looking at issues such as foundations, solid or framed wall and floors, types of energy, ventilation, water capacity, communications etc.) should be carried out early in the design process to influence the fundamental decisions taken regarding the building without having an adverse affect on either cost or design programme. It is however important that this is revisited as the design develops to ensure that an optimal solution is retained throughout the procurement process.

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5.0 Health and Wellbeing

Issue ID	Issue Title	No. of credits available	Minimum standards
Hea 1	Daylighting	1	No

Aim

To give building users sufficient access to daylight.

Assessment Criteria

The following demonstrates compliance:

1. At least 80% of floor area in building areas where people will be working and/or where desk-based tasks are likely to be undertaken, are adequately daylit as follows:
   a. An average daylight factor of 2% or more.

   PLUS either (b) **OR** (c **AND** d) below

   b. A uniformity ratio of at least 0.4 or a minimum point daylight factor of at least 0.8% (spaces with glazed roofs, such as atria, must achieve a uniformity ratio of at least 0.7 or a minimum point daylight factor of at least 1.4%).

   OR

   c. A view of sky from desk height (0.7m) is achieved.

   AND

   d. The room depth criterion $\mathbf{d/w + d/H_W < 2/(1-R_B)}$ is satisfied.

   Where:
   d = room depth
   w = room width
   H_W = window head height from floor level
   R_B = average reflectance of surfaces in the rear half of the room.

   Note: Table 7 Reflectance for maximum room depths and window head heights (see Additional Information) gives maximum room depths in metres for different room widths and window head heights of sidelit rooms

2. All other occupied areas (excluding accommodation block association/atrium and cells) are adequately daylit as follows:
   a. Average daylight factor of 2% or more.
   b. **PLUS** either (b) **OR** (d) above.

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3. In all cells, the following criteria are met:
   a. Average daylight factor of 1.5% or more.
   PLUS either (b) **OR** (c) below
   b. Room depth criterion (as outlined above)
   c. A uniformity ratio of at least 0.4 or a minimum point daylight factor of at least 0.6%.

4. In the internal association/atrium area the following criteria are met:
   a. Average daylight factor of 3% or more **AND**
   b. A uniformity ratio of at least 0.7 or a minimum point daylight factor of 2.1%.

5. The provision of daylight has been designed in accordance with the guidance in CIBSE Lighting Guide 10**Error! Bookmark not defined.** Daylighting and window design[8], BS8206 Part 2[9] and the BRE Site Layout Guide.

Exemplary level criteria
The following outlines the exemplary level criteria to achieve an *innovation credit* for this BREEAM issue.

1. At least 80% of the floor area (for the building spaces/room identified above in the standard criteria) has an average daylight factor of 3% in multi-storey buildings and 4% in single-storey buildings.

2. All custody cells to be adequately daylit with an average daylight factor of 2%

3. In the internal association/atrium area the following criteria are met:
   a. Average daylight factor of 5% or more **AND**
   b. A uniformity ratio of at least 0.7 or a minimum point daylight factor of 3.5%.

4. The criteria outlined above concerning uniformity ratio, view of sky or room depth criterion are met. Where demonstrating compliance via uniformity ratio or point daylight factor the following minimum criteria apply:
   a. Multi-storey: A uniformity ratio of at least 0.4 or a minimum point daylight factor of at least 1.2%; (spaces with glazed roofs, such as atria, must achieve a uniformity ratio of at least 0.7 or a minimum point daylight factor of at least 2.1%).
   b. Single storey: a minimum point daylight factor of at least 1.6%; (spaces with glazed roofs, such as atria, must achieve a uniformity ratio of at least 0.7 or a minimum point daylight factor of at least 2.8%).

Compliance Notes	
New Build	There are no additional or different criteria to those outlined above specific to new-build projects.
Refurbishment	There are no additional or different criteria to those outlined above specific to refurbishment projects.
Extensions to existing buildings	The criteria of this issue apply only to the scope of the assessed building. If this scope includes the existing building as well as the new building then the relevant areas within the existing building must be assessed against the criteria of this BREEAM issue. If the assessment covers only the new building, then the areas in the existing building do not need to be assessed.
Percentage of assessed area	Where the compliance requirement specifies that 80% of *office* or other *occupied space* floor area must be adequately daylit, it refers to 80% of the total floor area of all the rooms that must be assessed i.e. the compliant area. If for example a development has 6 rooms that must be assessed, each 150m^2 (total area 900m^2) then 720m^2 must comply with the criteria; this is equal to 4.8 rooms. The number of rooms that must comply must always be rounded up; therefore in this example, five rooms must have an average daylight factor of 2% or more (plus meet the other criteria) to achieve the credit.

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View of sky requirement	To comply with the *view of sky* criteria at least 80% of the room that complies with the average daylight factor requirement must meet the view out requirement; i.e. it is permissible for up to 20% of the room not to meet the view of sky requirement and still achieve a compliant room.
Uniformity with rooflights	The room depth criteria cannot be used where the lighting strategy relies on rooflights. In such areas either appropriate software should be used to calculate the uniformity ratio or, in the case of a regular array of rooflights across the whole of the space, 'Figure 2.36' (p37) within CIBSE Lighting Guide LG10 can be used to determine the uniformity ratio.
Two-side lit rooms	For rooms lit by windows on two opposite sides, the maximum room depth that can be satisfactorily daylit is twice the limiting room depth (d) (measured from window wall to window wall; CIBSE Lighting Guide LG10. The reflectance of the imaginary internal wall should be taken as 1.
Borrowed light	For areas where borrowed light is used, calculations or results from appropriate lighting design software must be provided to demonstrate that such areas meet the BREEAM criteria (if contributing to the percentage of compliant area). Examples of borrowed light include: light shelves, clerestory glazing, sun pipes or internal translucent/transparent partitions (such as those using frosted glass).

Schedule of Evidence Required

Req.	Design Stage	Post Construction Stage
All	Design plans for each floor in the building with each room/area appropriately labelled for use. **AND** Daylight calculations confirming: • Building areas assessed • The daylighting variables/criterion measured • Average daylight factor for each area • Compliance with room depth criterion, uniformity ratio, view of sky (if required) • The daylight provision is in compliance with the relevant standards.	Daylight calculations for the building 'as built' confirming compliance with all criteria. **OR** Assessor's site inspection report or 'as-built' drawings confirming: • The window sizes and room layout and dimensions are as per design-stage daylighting compliant room • A letter from the design team or main contractor confirming that window specification, size and/or room layout have not changed since the design stage assessment. Where there have been changes, revised calculations are required to demonstrate compliance for the relevant areas/rooms. **OR** Results from on-site measurements* that have been carried out. *These must be in accordance with methodology detailed in BRE IP 23/93[10].

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Additional Information

Relevant definitions

Occupied space: A room or space within the assessed building that is likely to be occupied for 30 minutes or more by a building user.

Point daylight factor: A point 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 (Commission Internationale de l'Eclairage) overcast sky'.

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.

Illuminance: The amount of light falling on a surface per unit area, measured in lux.

Uniformity: The uniformity is the ratio between the minimum illuminance (from daylight) on the working plane within a room (or minimum daylight factor) and the average illuminance (from daylight) on the same working plan (or average daylight factor).

View of sky / no-sky line: Areas of the working plane have a view of sky when they receive direct light from the sky, i.e. when the sky can be seen from working plane height. The no-sky line divides those areas of the working plane, which can receive direct skylight, from those that cannot.

Working plane: CIBSE LG10 defines the working plane as the horizontal, vertical or inclined plane in which a visual task lies. The working plane is normally taken as 0.7 m above the floor for offices and 0.85 m for industry.

Computer simulation: Software tools that can be used to model more complex room geometries for daylighting.

The table below gives maximum room depths in metres for different room widths and window head heights of sidelit rooms:

Table 7 Reflectance for maximum room depths and window head heights

Reflectance (R_B)	0.4		0.5		0.6	
Room Width (m)	3.0	10.0	3.0	10.0	3.0	10.0
Window Head Height (m)						
2.5	4.5	6.7	5.4	8.0	6.8	10.0
3.0	5.0	7.7	6.0	9.2	7.5	11.5
3.5	5.4	8.6	6.5	10.4	8.1	13.0

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Issue ID	Issue Title	No. of credits available	Minimum standards
Hea 2	View Out	1	No

Aim

To allow occupants to refocus their eyes from close work and enjoy an external view, thus reducing the risk of eyestrain and breaking the monotony of the indoor environment.

Assessment Criteria

The following demonstrates compliance:

1. The *relevant building areas* are within 7m distance of a wall with a window or permanent opening providing an *adequate view out*, where the window/opening is ≥20% of the total inside wall area *(*refer to Compliance Notes for a definition of *relevant building areas* and *adequate view out)*.

2. Cells have a *view out* and the distance between each window and nearest external solid object (i.e. buildings, screens, walls/fences) is ≥10m. Where existing features prevent compliance with this requirement in less than 20% of the cells within the building, the credit can still be awarded.

3. Where present within the assessed building; all patient-occupied spaces (e.g. wards and dayrooms) must be within 7m distance of a window or permanent opening providing a *view*. Where the room depth is greater than 7m, compliance is only possible where the percentage of window/opening is the same as or greater than the values in table 1.0 of BS 8206[9].

4. Where present within the assessed building; for patient-occupied areas the distance between the wall with the window/opening and nearest external solid object (i.e. buildings, screens, walls/fences) is ≥10m.

Compliance Notes	
New Build	There are no additional or different criteria to those outlined above specific to new-build projects.
Refurbishment	There are no additional or different criteria to those outlined above specific to refurbishment projects.
Extensions to existing buildings	There are no additional or different criteria to those outlined above specific to the assessment of extensions to existing buildings.
Adequate view out	The view out should ideally be through an external window providing a view of a landscape or buildings (rather than just the sky) at seated eye level (1.2 – 1.3m) in the *relevant building areas.* A view in to an internal courtyard or atrium will comply provided the distance from the opening to the back wall of the courtyard/atrium is at least 10m (therefore allowing enough distance for the eyes to refocus). The view cannot be an internal view across the room, as this is likely to become obstructed by partitions, filing cabinets etc.
High level windows	Roof lights and high level windows that do not provide an *adequate view out* do not meet the criteria for this BREEAM issue.

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Relevant building areas	Where the term '*relevant building areas'* is referenced in this BREEAM issue it refers to any *occupied areas* of the building where close work (reading, writing, drawing, manual work, VDU work) is carried out, including the following areas: • Cells • Offices • Consulting/treatment room • Care/listener suite • Interview and official visit room • Staff rest rooms • Library • Classrooms • Workshop • Comms room • Gatehouse (front desk) • Mail room • Play areas • Command suite
Excluded building areas	Staff areas that contain workstations that, for security or observational purposes must be located centrally, can be excluded from the assessment of this issue. Any clinical areas where the control of environmental/operational conditions prevents such spaces from providing a view out can also be exempt from the assessment of this BREEAM issue.

Schedule of Evidence Required

Req.	Design Stage	Post Construction Stage
All	Design plan and elevation showing: • All *relevant building areas* and room depths • Actual or notional workstations/desk layout • Window/open areas Site plan showing: • Building location and proximity to external obstructions.	Assessor's site inspection report and photographic evidence confirming: • All *relevant building areas* comply. **OR** As built drawings or a formal letter form the design team confirming: • No changes have occurred since design stage, therefore design stage evidence demonstrates compliance post construction.

Additional Information

Relevant definitions

Occupied space: refer to BREEAM issue Hea 1.

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Issue ID	Issue Title	No. of credits available	Minimum standards
Hea 3	Glare Control	1	No

Aim

To reduce problems associated with glare in occupied areas through the provision of adequate controls.

Assessment Criteria

The following demonstrates compliance:

1. An occupant-controlled shading system on all windows, glazed doors and rooflights in all *relevant building areas*.

2. In all other *occupied areas* the potential for disabling glare has been designed out by one or more of the following measures:
   a. Brise-soleil
   b. Low eaves
   c. Bioclimatic design that provides shading from high level summer and low level winter sun.

Compliance Notes	
New Build	There are no additional or different criteria to those outlined above specific to new-build projects.
Refurbishment	There are no additional or different criteria to those outlined above specific to refurbishment projects.
Extensions to existing buildings	Where the existing building falls within the scope of the assessment, then the criteria extend to the *relevant building areas* and *occupied spaces* of the existing building. If only the new extension is being assessed then the criteria apply to the relevant areas of the new building.
Relevant building areas	Where the term '*relevant building areas'* is referenced in this BREEAM issue it refers to any areas of the building where there are, or will be, workstations/benches, desks and/or close work will be undertaken or visual aids used.

Schedule of Evidence Required

Req.	Design Stage	Post Construction Stage
1	Marked-up copy of the design plan(s) confirming: • A description of the function of each of the building spaces. A copy of the relevant specification clause(s), window schedule or design plan confirming: • Type of shading system(s) and control to be installed.	Assessor's building/site inspection and photographic evidence confirming: • Installation of compliant glare control system.

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2	Marked-up copy of the design plan(s) demonstrating: • The design measures that limit glare in all other occupied areas.	As above for requirement 1.

Additional Information

Relevant definitions

Occupied space: A room or space within the assessed building that is likely to be occupied for 30 minutes or more by a building user and, with respect to this issue, where it would be desirable to limit the potential for glare or provided a system of glare control.

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Issue ID	Issue Title	No. of credits available	Minimum standards
Hea 4	High frequency lighting	1	Yes

Aim

To reduce the risk of health problems related to the flicker of fluorescent lighting.

Assessment Criteria

The following demonstrates compliance:

1. All fluorescent and compact fluorescent lamps are fitted with high frequency ballasts.

Compliance Notes	
New Build	There are no additional or different criteria to those outlined above specific to new-build projects.
Refurbishment	There are no additional or different criteria to those outlined above specific to refurbishment projects.
Extensions to existing buildings	Where the existing building falls within the scope of the assessment, then the criteria extend to the existing building. If only the new extension is being assessed then the criteria apply to the new building only.

Schedule of Evidence Required

Req.	Design Stage	Post Construction Stage
1	A copy of the specification clause or room data sheets confirming: • A compliant lighting strategy.	Assessor's building/site inspection and photographic evidence confirming: • Installation of high frequency ballasts. **OR** As-built drawings/specification confirming: • No changes have occurred since design stage assessment. • Where changes have occurred, a compliant lighting strategy is installed.

Additional Information

Relevant definitions

Occupied space: refer to BREEAM issue Hea 1.

High frequency ballast: High frequency ballasts increase the frequency of the power coming from the grid (50Hz) to a frequency optimising the performance of fluorescent lamps, typically around 30kHz.

There are several advantages to running fluorescent lamps at higher frequencies. At 30kHz, the frequency of re-ignition of a fluorescent lamp is too quick to be detected by the human eye, therefore

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reducing visible flicker that some fluorescent lamps running on mains frequency fail to do. Additionally, 30kHz being above the audible range of the human ear, the buzzing noise coming out of low quality main frequency ballasts is avoided. Finally, the luminous efficacy of fluorescent lamps increases with frequency; it can be optimised by up to 10% when they are running at 30kHz compared to those operating at 50Hz.

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Issue ID	Issue Title	No. of credits available	Minimum standards
Hea 5	Internal and external lighting levels	2	No

Aim

To ensure lighting has been designed in line with best practice for visual performance and comfort.

Assessment Criteria

The following demonstrates compliance:

First credit

1. Illuminance (lux) levels in all internal areas of the building are specified in accordance with the CIBSE Code for Lighting 2006[11].

2. For areas where computer screens are regularly used, the lighting design complies with CIBSE Lighting Guide 7[12] sections 3.3, 4.6, 4.7, 4.8 and 4.9. This gives recommendations highlighting:
   a. Limits to the luminance of the luminaires, to avoid screen reflections. (Manufacturers' data for the luminaires should be sought to confirm this).
   b. For up-lighting, the recommendations refer to the luminance of the lit ceiling rather than the luminaire; a design team calculation is usually required to demonstrate this.
   c. Recommendations for direct lighting, ceiling illuminance, and average wall illuminance.

3. Cells must be lit to a maintained illuminance of 200 lux at table-top level. In addition there must be the facility (using, for example, dimming, step switching or separate task and general lighting) for the cell's occupant to select a lower level of general lighting if required.

Second credit

1. Illuminance levels for lighting in all external areas within the *construction zone* are specified in accordance with CIBSE Lighting Guide 6[13], '*The outdoor environment*'.

2. In addition, exercise yards should be lit to a maintained illuminance of at least 10 lux. However, if such spaces are, or will be, used as sports facilities they must be lit to a maintained illuminance of 100 lux.

Compliance Notes	
New Build	There are no additional or different criteria to those outlined above specific to new-build projects.
Refurbishment	There are no additional or different criteria to those outlined above specific to refurbishment projects.
Extensions to existing buildings	Where the existing building falls within the scope of the assessment, then the criteria extend to the existing building. If only the new extension is being assessed then the criteria apply to the areas of the new building only.
Second credit	The second credit is not dependent on the first credit being achieved and vice versa. Where no external light fittings are specified within the *construction zone*, the criteria relating to external lighting do not apply and both available credits can be awarded on the basis of compliance with the internal lighting criteria.

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Schedule of Evidence Required

Req.	Design Stage	Post Construction Stage
All	**EITHER** A copy of the specification or relevant room schedules confirming: • The internal/external maintained illuminance levels **AND/OR** • The standards that the illuminance levels are specified to. **OR** A formal written declaration of conformity from the relevant member of the design team confirming: • The maintained illuminance levels for each internal/external space are in compliance with the relevant Standard.	A formal written declaration from the design team or main contractor confirming: • Light fittings have been installed in compliance with the lighting specification. • No changes have occurred in the lighting specification used to demonstrate design stage compliance. Where changes have occurred, a further declaration is required confirming that the revised lighting specification is in compliance with the BREEAM criteria.

Additional Information

Relevant definitions

Occupied space: Refer to BREEAM issue Hea 1.

Construction zone: For the purpose of this BREEAM issue the construction zone is defined as the site which is being developed for the BREEAM-assessed building, and the external site areas that fall within the scope of the new works.

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Issue ID	Issue Title	No. of credits available	Minimum standards
Hea 6	Lighting zones and controls	N/A	No

Issue not applicable under this scheme.

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Issue ID	Issue Title	No. of credits available	Minimum standards
Hea 7	Potential for Natural Ventilation	N/A	No

issue is not applicable under this scheme.

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Issue ID	Issue Title	No. of credits available	Minimum standards
Hea 8	Indoor Air Quality	1	No

Aim

To reduce the risk to health associated with poor indoor air quality.

Assessment Criteria

The following demonstrates compliance:

1. **Air-conditioned and mixed-mode buildings**: Where the building's air intakes and exhausts are over 10m apart to minimise recirculation **AND** intakes are over 20m from *sources of external pollution*.

2. **Naturally-ventilated buildings**: Where openable windows/ventilators are over 10m from *sources of external pollution*.

3. In addition to the specific BREEAM criteria above, the building has been designed to provide fresh air rates to dilute pollutants in accordance with the following good practice:
    a. In general office type areas fresh air is provided in accordance with the top of the range recommended in the British Council for Offices *Guide to Best Practice in the Specification of Offices*[14] i.e. 12 litres per second per person.

Compliance Notes	
New Build	There are no additional or different criteria to those outlined above specific to new-build projects.
Refurbishment	There are no additional or different criteria to those outlined above specific to refurbishment projects.
Extensions to existing buildings	There are no additional or different criteria to those outlined above specific to the assessment of extensions to existing buildings.
Measuring the distance	The distance requirement does not necessarily mean the plan distance, but the three dimensional distance around and over objects; e.g. on plan the air intakes may be less than 20m from a source of external pollution, but the intake may be on the roof of a 10 storey building and therefore over 20m from the source of pollution.
Sources of external pollution	This includes the following: • Highways and the main access roads on the assessed site. • Car parks and delivery/vehicle waiting bays • Other building exhausts, including from building services plant industrial/agricultural processes
Excluded sources	Service and access roads with restricted and infrequent access (for example roads used only for waste collection) are unlikely to represent a significant source of external pollution. These roads can therefore be excluded from the criteria of this issue. This does not include vehicle pick-up/drop-off or waiting bays.
Filters	It must be noted that filters fitted on the air supply are not considered by BREEAM to provide adequate protection from sources of external pollution. As such the distance criteria cannot be relaxed where filters are specified.

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Fresh air criteria for other areas/spaces	Fresh air criteria are not specified for other areas of the building (i.e. those not listed above) as the provision of fresh air is adequately covered in Approved Document Part F *Ventilation*[15] (and the standards referenced there in).

Schedule of Evidence Required

Req.	Design Stage	Post Construction Stage
1&2	A marked-up proposed site plan highlighting: • Locations of intakes, extracts, openable windows, ventilators • Any existing or proposed sources of external pollution.	Assessor's building/site inspection and as built drawings confirming: • Locations of intakes, extracts, openable windows, ventilators • Proximity of any sources of external pollution to the above.
3	Design team calculations and/or performance specification criteria confirming: • The fresh air rate set for each space • That the fresh air rate can be met using the chosen strategy • The relevant standard(s) to which the design is in accordance with.	For a naturally ventilated building, a formal letter of declaration from the design team or main contractor confirming the building has been built in accordance with a design compliant with the BREEAM criteria. For a mechanically ventilated building, the commissioning manager's performance testing report confirming: • The required fresh air rates are achieved.

Additional Information

Relevant definitions

Occupied space: Refer to BREEAM issue Hea 1.

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Issue ID	Issue Title	No. of credits available	Minimum standards
Hea 9	Volatile Organic Compounds	1	No

Aim

To recognise and encourage a healthy internal environment through the specification of internal finishes and fittings with low emissions of volatile organic compounds (VOCs).

Assessment Criteria

The following demonstrates compliance:

1. The following products (where specified) have been tested against and meet the relevant standards outlined in the table below for Volatile Organic Compound (VOC) emissions:

Table 8 VOC criteria by product type

Product	European Standard	Emission level required
Wood Panels • Particleboard, • Fibreboard including MDF, • OSB, • Cement-bonded particleboard • Plywood • Solid wood panel and acoustic board	BS EN 13986:2002[16]	Formaldehyde E1 (Testing req 1 – see below) Verify that regulated wood preservatives are absent and of the minimum content.
Timber Structures • Glued laminated timber	BS EN 14080:2005[17]	Formaldehyde E1 (Testing req 1)
Wood flooring • e.g. parquet flooring	BS EN 14342:2005[18]	Formaldehyde E1(Testing req 1) Verify that regulated wood preservatives are absent and of the minimum content.
Resilient, textile and laminated Floor coverings • Vinyl/linoleum • Cork and rubber • Carpet • Laminated wood flooring	BS EN 14041:2004[19]	Formaldehyde E1(Testing req 1) Verify that regulated preservatives are absent and of the minimum content.
Suspended ceiling tiles	BS EN 13964:2004[20]	Formaldehyde E1 (Testing req 1) No asbestos.
Flooring adhesives	BS EN 13999-1:2007[21]	Verify that carcinogenic or sensitising volatile substances are absent (Testing req. 2-4).
Wall-coverings • Finished wallpapers • Wall vinyl's and plastic wall-coverings • Wallpapers for subsequent decoration. • Heavy duty wall-coverings • Textile wall-coverings	BS EN 233:1999[22] BS EN 234:1989[23] BS EN 259:2001[24] BS EN 266:1992[25]	Formaldehyde (testing req. 5) and Vinyl chloride monomer (VCM) (testing req. 5) release should be low and within the BS EN standard for the material. Verify that the migration of heavy metals(5) and other toxic substances are within the BS EN

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		standard for the material.
Adhesive for hanging flexible wall-coverings	BS 3046:1981[26]	No harmful substances and preservatives used should be of minimum toxicity.
Decorative paints and varnishes	BS EN 13300:2001[27] referred to the criteria of Decorative Paint Directive 2004/42/CE[28]	VOC (organic solvent) content (testing req. 6), requirement for Phase 2. Fungal and algal resistant.
Testing requirement: 1. BS EN 717-1:2004[29] 2. BS EN 13999-2:2007 - Volatile Organic Compounds (VOCs)[30] 3. BS EN 13999-3:2007 - Volatile aldehydes[31] 4. BS EN 13999-4:2007 - Volatile diisocyanates[32] 5. BS EN 12149:1997[33] 6. BS EN ISO 11890-2:2006[34]		

Compliance Notes	
New Build	There are no additional or different criteria to those outlined above specific to new-build projects.
Refurbishment	There are no additional or different criteria to those outlined above specific to refurbishment projects.
Extensions to existing buildings	There are no additional or different criteria to those outlined above specific to the assessment of extensions to existing buildings.
Furnishings	The scope of this BREEAM issue does not extend to furnishings e.g. desks/shelving, it focuses on the key internal finishes and fittings integral to the building.

Schedule of Evidence Required

Req.	Design Stage	Post Construction Stage
1	A copy of the relevant specification clause confirming: • The VOC content of the relevant specified product types will comply with the standards specified above.	For each relevant product, a formal letter from or copies of the manufacturer's literature confirming: • The standard(s) against which the product is tested • The VOC emissions achieved • The VOC emissions meet the required level.

Additional Information

Relevant definitions
None.

Volatile Organic Compounds
VOCs are emitted by a wide array of products numbering in the thousands. Examples include: paints and lacquers, paint strippers, cleaning supplies, pesticides, building materials and furnishings, glues and adhesives, Urea-formaldehyde foam insulation (UFFI), pressed wood products (hardwood plywood wall panelling, particleboard, fibreboard) and furniture made with these pressed wood products.

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'No' or 'low' VOC paints are available from most standard mainstream paint manufacturers. There 'eco-friendly' paints are made from organic plant sources and also powdered milk-based products. The emissions of VOCs from paints and varnishes are regulated by the Directive 2004/42/CE, implemented in the UK by the Volatile Organic Compounds in Paints, Varnishes and Vehicle Refinishing Products Regulation 2005. Products containing high organic solvent content should also be avoided (EU VOC Solvent Directive 1999/13/EC).

Wood products that contain phenol-formaldehyde (PF) generally emit formaldehyde at considerably lower rates than those containing urea-formaldehyde (UF). Although formaldehyde is present in both types of resins, pressed woods that contain PF would be preferable to those containing UF resin.

Exposure risk assessment of any possible release of chemicals from manufactured products and their possible impact on health and the environment generally, is an important requirement of European regulations. The possible impact of a building product on indoor air quality is included in the European Construction Products Directive, 89/106/EEC. The amended Directive, 93/68/EEC provided the criteria for CE Marking of products.

Products to be fitted in buildings should not contain any substances regulated by the Dangerous Substances Directive 2004/42/CE, which could cause harm to people by inhalation or contact. Materials containing heavy metals (e.g. antimony, barium, cadmium, lead and mercury) and other toxic elements (e.g. arsenic, chromium and selenium) or regulated biocides (e.g. pentachlorophenol) should be avoided.

Various labelling schemes identify products that have been tested and shown to be low emitting and these have been summarised in BRE Digest 464[35].

Dangerous substances are defined in the Dangerous Substances Directive (67/548/EEC)

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Issue ID	Issue Title	No. of credits available	Minimum standards
Hea 10	Thermal Comfort	1	No

Aim

To ensure, with the use of design tools, that appropriate thermal comfort levels are achieved.

Assessment Criteria

The following demonstrates compliance:

1. Thermal modelling has been carried out using software selected and applied in accordance with CIBSE AM11 *Building Energy and Environmental Modelling*[36].

2. The modelling demonstrates that the building design and services strategy can deliver thermal comfort levels in *occupied spaces* in accordance with the criteria set out in CIBSE Guide A *Environmental Design*[37]; in particular that internal winter and summer temperature ranges will be in line with the recommended comfort criteria in table 1.5 of the Guide.

3. The software used to carry out the simulation at the detailed design stage must provide *full dynamic thermal analysis*. For smaller and more basic building designs an alternative less complex means of analysis may be appropriate (such methodologies must still be selected and applied in accordance with CIBSE AM11).

Compliance Notes	
New Build	There are no additional or different criteria to those outlined above specific to new-build projects.
Refurbishment	There are no additional or different criteria to those outlined above specific to refurbishment projects.
Extensions to existing buildings	Where the existing building falls within the scope of the assessment, then the criteria extend to all *occupied spaces* of the new and existing building. If only the new extension is being assessed then the criteria apply to the occupied areas of the new building.

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Schedule of Evidence Required

Req.	Design Stage	Post Construction Stage
1&3	A copy of the relevant specification clause confirming: • The criteria for thermal comfort analysis. **OR** Correspondence (e.g. letter, email or meeting minutes) from the design team confirming: • The name of the thermal comfort modelling software used. • The software has been selected and applied in accordance with CIBSE AM11.	Formal written confirmation from the design team confirming: • No changes have occurred since design stage thermal comfort assessment was carried out, therefore design stage evidence demonstrates compliance at the post construction stage. Where changes have occurred, an updated copy of the results from the modelling demonstrating the internal temperatures in compliance with the relevant standards.
2	A copy of the results from the modelling demonstrating the internal temperatures in compliance with the relevant standards.	

Additional Information

Relevant definitions

Occupied space: For the purpose of this BREEAM issue an occupied space is a room or space within the assessed building that is likely to be occupied for 30 minutes or more by a building user. The definition excludes the following:

a. Atria/concourses
b. Entrance halls/reception areas
c. Ancillary space e.g. circulation areas, storerooms and plantrooms

Thermal Dynamic Analysis: Thermal comfort analysis tools can be subdivided into a number of methods of increasing complexity. The most complex of these and the one that provides greatest confidence in results is the full dynamic model. This type of model enables annual heating/cooling loads, overheating risks and control strategies to be assessed.

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Issue ID	Issue Title	No. of credits available	Minimum standards
Hea 11	Thermal Zoning	1	No

Aim

To recognise and encourage the provision of user controls which allow independent adjustment of heating/cooling systems within the building.

Assessment Criteria

The following demonstrates compliance:

1. The heating/cooling system is designed to allow *occupant control* of zoned areas within all *occupied spaces* in the building.

2. The zoning allows *separate occupant control* (within the *occupied space*) of each perimeter area (i.e. within 7m of each external wall) and the central zone (i.e. over 7m from the external walls).

Compliance Notes	
New Build	There are no additional or different criteria to those outlined above specific to new-build projects.
Refurbishment	There are no additional or different criteria to those outlined above specific to refurbishment projects.
Extensions to existing buildings	Where the existing building falls within the scope of the assessment, then the criteria extend to the *occupied spaces* of the existing building. If only the new extension is being assessed then the criteria apply to the relevant spaces of the new building.
Long lag systems	Where *long-lag systems* are specified, the criteria can be met where they are designed to service the base load only and a responsive secondary heating system and controls are provided, zoned in compliance with the above criteria.
Distance requirement	The distance requirement is approximate; however, the assessor must use sound judgement considering fully the aims of this issue, before accepting solutions that do not strictly meet the above criteria.
Controls for wet heating systems	Adequate TRVs (thermostatic radiator valves) placed in zones around the building perimeter, and the provision of local occupant controls to internal areas, such as fan coil units, would satisfy the criteria for this BREEAM issue.

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Schedule of Evidence Required

Req.	Design Stage	Post Construction Stage
1&2	A copy of the relevant clauses of specification and/or marked-up M&E drawings confirming: • Scope of the heating/cooling system • The type of user controls for the above systems • The scope of the controls i.e. control zone.	Assessor's building/site inspection and photographic evidence confirming: • Installation of user controls in each *occupied space.** *For large buildings it would not be expected that the assessor check every individual *occupied space*, but a random selection of spaces that confirm compliance.

Additional Information

Relevant definitions

Long-lag systems: These low temperature systems use the thermal mass of the building to provide a consistent supply of heat to the space during the occupied period. As the mass of the building is used to regulate and supply the heat, the temperature in the space lags behind any change required by the occupants via the systems controls. An example of a long-lag system is under-floor heating.

Occupied space: For the purpose of this BREEAM issue an occupied space is a room or space within the assessed building that is likely to be occupied for 30 minutes or more by the prison staff and officials. The definition excludes areas where building users would not expect, or be expected, to control temperature in the space, including the following:

a. Atria/association space
b. Entrance halls/reception areas
c. Circulation areas
d. Storerooms

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Issue ID	Issue Title	No. of credits available	Minimum standards
Hea 12	Microbial Contamination	1	Yes

Aim

To ensure the building services are designed to reduce the risk of legionellosis in operation.

Assessment Criteria

The following demonstrates compliance:

1. All *water systems* in the building are designed in compliance with the measures outlined in the Health and Safety Executive's "*Legionnaires' disease - The control of legionella bacteria in water systems*". Approved Code of Practice and guidance, 2000[38].

2. Where no humidification is specified or only steam humidification is provided.

Compliance Notes	
New Build	There are no additional or different criteria to those outlined above specific to new-build projects.
Refurbishment	There are no additional or different criteria to those outlined above specific to refurbishment projects.
Extensions to existing buildings	If the extended and existing building share the same water systems, then these systems must be assessed against the criteria regardless of whether the existing building forms a part of the assessment or not. If the extension is served by independent systems, only these need be assessed against the Assessment Criteria. If it is the intention that building users of the extended building will use water systems in the existing building, then it must be confirmed that the existing systems comply with the criteria.
CIBSE TM13	Design teams may refer to CIBSE TM13 *Minimising the risk of Legionnaires disease*, 2002[39] in demonstrating that the design meets the criteria of ACoP.
Assessor's responsibility	The BREEAM assessor **is not** required to confirm that the design is compliant with the relevant standard; this is the responsibility of the design team. The assessor is simply required to record, for the purposes of validation, whether or not the design team confirms compliance.

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Schedule of Evidence Required

Req.	Design Stage	Post Construction Stage
1&2	A copy of the relevant specification clause(s) confirming: • All types of water system in the building and on the assessed site. • The standards to which all water systems in the building will be designed. Where design responsibility is to be passed on to the contractor/installer, a copy of the relevant specification clause(s) stating: • The criteria on the contractor/installer with regards to minimising the risk of Legionnaires disease from the specified water systems.	For all water systems in the building, a formal letter of declaration from the design team, main contractor or installer of the relevant systems confirming: • The design and installed systems comply with the HSE's ACoP. • If relevant, any existing water systems comply with the HSE's ACoP.

Additional Information

Relevant definitions

Water systems: For the purpose of this issue, this refers to:

- Cooling towers
- Evaporative condenser
- Domestic hot and cold water systems
- Other plant and systems containing water which is likely to exceed 20°C and which may release a spray or aerosol during operation or when being maintained, for example:
    - humidifiers and air washers
    - spa baths and pools
    - car/bus washes
    - wet scrubbers
    - Indoor fountains and water features.

Legionnaires disease: The HSE describes Legionnaires disease as a type of pneumonia caused by the bacterium Legionella pneumophilia. People catch Legionnaires' disease by inhaling small droplets of water suspended in the air, which contain the bacteria.

Humidification Units

Humidification options fall into two broad groups; the first group relies on a heated air stream evaporating water vapour either from a pond or stream of water. This includes so-called 'trickle-down' systems. These are dependent on sterilisation technologies such as UV, ultrasonic etc, to ensure that the water vapour is not contaminated. Whilst these systems are effective when working properly, any partial failure will allow untreated water into a warmed air stream. Where this occurs, the health-related consequences are likely to be significant.

The second group relies on failsafe systems that minimise risk if the plant fails. The only option in this group is steam humidification. This process sterilises the water vapour and ensures that untreated water cannot enter the air stream when no steam is being produced.

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Issue ID	Issue Title	No. of credits available	Minimum standards
Hea 13	Acoustic Performance	2	No

Aim

To ensure the acoustic performance of the building meets the appropriate standards for its purpose.

Assessment Criteria

The following demonstrates compliance:

First credit

1. Indoor ambient noise levels in all *unoccupied spaces* comply with the good practice levels of BS8233:1999, Tables 5 & 6[42]**Error! Bookmark not defined.**. Typical, appropriate noise levels are given below, although the following list is not intended to be exhaustive:
    a. ≤40 dB $L_{Aeq,T}$ General spaces (staffrooms, restrooms)
    b. ≤40dB $L_{Aeq,T}$ in single occupancy offices
    c. 40-50dB $L_{Aeq,T}$ in multiple occupancy offices
    d. ≤50 dB $L_{Aeq,T}$ in catering kitchens
    e. 40-55dB $L_{Aeq,T}$ in restaurant areas
    f. ≤45 dB $L_{Aeq,T}$ in informal café/canteen areas
    g. ≤55 dB $L_{Aeq,T}$ in manual workshops
    h. ≤45 $L_{Aeq,T}$ in open visit areas
    i. 40-50 $L_{Aeq,T}$ in library areas

    In addition to the above, any rooms/spaces used for medical purposes i.e. treatment, should be designed to meet airborne and impact sound insulation criteria in accordance with Health Technical Memorandum 08-01[40].

2. All teaching/lecture areas achieve the Indoor ambient noise level criteria for secondary schools in Section 1 of Building Bulletin 93[41]**Error! Bookmark not defined.**.

3. The sound insulation between *acoustically sensitive rooms* and other *occupied spaces* complies with section 7.6.3.1 of BS8233[42], as follows:
    a. $D_w + L_{Aeq,T} > 75$
        - D_w is the weighted sound level difference between the two spaces
        - $L_{Aeq,T}$ is the design (or measured) indoor ambient noise level in the space adjacent to the *acoustically sensitive room*.

    The source and receive room sound pressure levels from which D_w is derived must be measured in accordance with BS EN ISO 140-4:1998 and the guidance in Annex B of Approved Document E. Measurements must be based on finished rooms, accounting for any carpets and acoustically absorbent ceilings specified. The measurements can be conducted in either furnished or unfurnished rooms.

4. Pre-completion acoustic testing is carried out by a suitably qualified acoustician to ensure that all relevant spaces (as built) achieve the performance standards required, and any required remedial works in spaces that do not meet the standards are completed prior to handover and occupation.

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Second credit

5. All areas used for speech achieve reverberation times compliant with table 8 of BS8233 1999.

   AND

   All areas used for teaching, training and educational purposes achieve reverberation times compliant with table 1.5 of BB93.

6. Pre-completion acoustic testing is carried out by a suitably qualified acoustician to ensure that all relevant spaces (as built) achieve the performance standards required, and any required remedial works in spaces that do not meet the standards are completed prior to handover and occupation.

Compliance Notes	
New Build	There are no additional or different criteria to those outlined above specific to new-build projects.
Refurbishment	There are no additional or different criteria to those outlined above specific to refurbishment projects.
Extensions to existing buildings	There are no additional or different criteria to those outlined above specific to assessments of extensions to existing buildings.
Awarding the second credit	The first credit does not have to be achieved to award the second credit.
Acoustically sensitive rooms	Where the term '*acoustically sensitive rooms'* is referenced in this BREEAM issue, it refers to the following types of space/rooms (where specified) where privacy, and therefore appropriate sound insulation levels, are deemed important: • Cellular offices and meeting rooms • Consulting and treatment rooms • Care/listener suites • Interview and official visit rooms • 'Closed visits' rooms • Any other room/space the design team or client deems to be acoustically sensitive for the purposes of privacy.
Areas used for speech	Where the term '*areas used for speech'* is referenced in this BREEAM issue, it refers to spaces/rooms used for classrooms and worship. If a building type does not contain '*areas used for speech'* and therefore the reverberation criteria are not applicable, the second credit can be awarded on the basis of compliance with the first credit i.e. two credits can be awarded for complying with the indoor ambient noise level criteria.
Unoccupied spaces	Where the term '*unoccupied space'* is referenced in this BREEAM issue, it refers to the nature of the space for the purpose of carrying acoustic calculations or measurements i.e. such measurements must be carried when the space is unoccupied and therefore devoid of sources of noise. Care should be taken to avoid confusing this term with the definition "*occupied space*" (see relevant definitions) as they have two different meanings within the context of this BREEAM issue.
Measurement procedures	The Additional Information section outlines the criteria for carrying out measurements and calculations to demonstrate compliance with this BREEAM issue. The appointed acoustician must confirm that the acoustic performance has been measured/calculated in accordance with these procedures. Where the acoustician has felt it necessary to deviate from these procedures, they must give justifiable reasons why they have done so.

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Privacy	Where ranges of noise levels are specified where privacy is not deemed by the final occupier to be an issue, it is acceptable to disregard the lower limit of the range and consider the noise levels to be lower or equal to the upper limit of the range.
Reverberation times	Where the reverberation times stated above or in the referenced documents are not appropriate for the type of space/building assessed, the acoustician must confirm why this is the case. In addition the acoustician must set alternative appropriate reverberation times and provide these to demonstrate compliance.

Schedule of Evidence Required

Req.	Design Stage	Post Construction Stage
1-3	A copy of the design plan for each level of the building with each room/area clearly labelled. A copy of the specification clause or acousticians calculations confirming: • Indoor ambient noise levels in each relevant room/area • Sound insulation levels between each *acoustically sensitive room* and adjacent *occupied areas*. • The standards to which calculations/measurements have complied, or are required to comply with.	Copies of acoustic field test report/results confirming: • The required performance levels have been achieved for each room/area of the completed building. • Where relevant, any remedial work/actions required to meet the performance standards. Evidence, such as a formal letter from the acoustician or their test report confirming that they meet BREEAM's definition of a *suitably qualified acoustician*. A letter from the design team or main contractor confirming: • Any and all required remedial works have been carried out in accordance with the acoustician's recommendations.
4&6	A copy of the specification clause or a formal letter from the project team confirming: • A programme of pre-completion acoustic testing by a *suitably qualified acoustician* will be commissioned. • Where rooms/areas do not comply with the required levels, appropriate remedial works will be actioned and completed.	
5	A copy of the specification clause or acousticians calculations confirming: • The reverberation times in areas *used for speech*. • The standards to which calculations/measurements have complied, or are required to comply with.	

Additional Information

Relevant definitions

Suitably qualified acoustician: Those organisations or individuals having UKAS accreditation or accredited by a European equivalent of UKAS. The definition includes organisations or individuals registered to schemes that are UKAS accredited, or equivalent, to ensure consistency and technical competence in sound testing. At the time of writing the Association of Noise Consultants (ANC)

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Registration Scheme is in the process of obtaining UKAS accreditation and can be deemed to comply with this requirement until advised otherwise.

Single occupancy offices: cellular office space designed to accommodate one or two desk spaces/workstations (typically no greater than 10m^2).

Multiple occupancy offices: Office space that is not cellular in nature i.e. it is open-planned, and designed to accommodate more than two desk spaces/workstations.

Occupied space: For the purpose of this BREEAM issue an occupied space is a room or space within the assessed building that is likely to be occupied for 30 minutes or more by a building user (see also description of 'unoccupied space' in the Compliance Notes table above).

Measurement/calculation procedures
The following procedures must be followed by the acoustician when measuring or calculating the levels required to demonstrate compliance with this BREEAM issue (see also compliance note above on measurement procedures):

- Noise from both internal sources (e.g. mechanical ventilation systems, plant noise) and external sources (e.g. traffic noise transmitted via the building façade) should be included, and, where windows are openable as part of the ventilation strategy, these should be assumed to be open for the purposes of calculations and open for measurements.
- Noise from occupants and office equipment (e.g. computers) should not be included in the measurements.
- Measurements should be made in at least four rooms in which noise levels can be expected to be greatest either because they are on the noisiest façade or because they are on a naturally ventilated façade.
- Where different ventilation strategies are used, measurements should be conducted in rooms utilising each strategy. Otherwise, measurements should be made in rooms on the noisiest façade.
- T in $L_{\mathrm{Aeq},T}$ is taken as the duration of the normal working day (typically 8 hours between 09.00 and 17.00).
- Measurements need not be made over a period of 8 hours if a shorter measurement period can be used. In this case, measurements should be made when external noise levels are representative of normal conditions throughout the day.
- Measurement periods shorter than 5 minutes should not be used.
- Measurements should be taken in a minimum of 3 locations in rooms at a height of 1.2 m above the floor level and at least 1 m away from any surface.

For music rooms it may be possible to aid compliance with the above requirements by positioning and orientating such rooms away from more noise-sensitive areas such as libraries and classrooms.

NR curves
Noise assessments based on NR curves are often used by building services consultants to predict internal noise levels due to mechanical ventilation systems. However, the BREEAM requirement uses the indoor ambient noise level, $L_{\mathrm{Aeq},T}$ which includes external noise transmitted via the façade as well as internal noise such as that from mechanical ventilation systems. In the absence of strong low frequency noise, $L_{\mathrm{Aeq},T}$ can be estimated from the NR value using the following formula: $L_{\mathrm{Aeq},T} \approx \mathrm{NR} + 6$ dB. Therefore, if the NR value is known, but not the sound pressure levels in the individual frequency bands, an estimate for the indoor ambient noise level $L_{\mathrm{Aeq},T}$ can still be determined from the NR value for the building services noise. The $L_{\mathrm{Aeq},T}$ for the external noise transmitted via the façade must then be combined with the $L_{\mathrm{Aeq},T}$ for the building services.

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6.0 Energy

Issue ID	Issue Title	No. of credits available	Minimum standards
Ene 1	Ene 1 Reduction of CO_2 Emissions	15	Yes

Aim

To recognise and encourage buildings that are designed to minimise the CO_2 emissions associated with their operational energy consumption.

Assessment Criteria

The following demonstrates compliance:

1. The number of credits achieved is determined by comparing the building's CO_2 index (EPC Rating), taken from the Energy Performance Certificate (EPC), with the table of benchmarks below:

Table 9 CO_2 index benchmarks and BREEAM credits

BREEAM Credits	CO_2 Index (EPC Rating)	
	New Build	Refurbishment
1	63	100
2	53	87
3	47	74
4	45	61
5	43	50
6	40	47
7	37	44
8	31	41
9	28	36
10	25	31
11	23	28
12	20	25
13	18	22
14	10	18
15	0	15
Exemplar credit 1	<0	≤0
Exemplar credit 2	*True zero carbon building*	

For buildings that are part new-build part refurbishment refer to Compliance Notes.

2. The CO_2 index for the assessed building must be entered in to the relevant box of the *Ene 1 Reduction of CO_2 emissions* calculator.

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3. The building has been modelled using a method compliant with the National Calculation Method (NCM) and an Energy Rating and certificate produced using *Approved software* by an *Accredited Energy Assessor*.

Historic Buildings only
In addition to the above an additional 2 credits may be awarded (up to a maximum of 15) for carrying out the following:

1. A specialist study has been undertaken by a heritage conservation specialist, who is a full Member of the Institute of Historic Building Conservation, to investigate the implications of improving building fabric performance whilst minimising the potential negative impacts on both the historic character of the building and the condition of the building fabric.

2. The report makes recommendations for potential improvements to the building fabric in accordance with the guidance given in English Heritage's *Balancing the needs for energy conservation with those of building conservation: an Interim Guidance Note on the application of Part L*[43] and, as a minimum, covers the following issues:
    a. Each element of the following building elements (as a minimum) must be considered and recommendations for improvements made:
        i. Roof
        ii. External/Sheltered walls
        iii. Ground floor
        iv. Upper floors
        v. Windows and external doors
        vi. Junctions between building elements such as between roof and walls.
        vii. Junctions between different parts of the building such as between different ages or methods of construction.

    Where significant improvement cannot be made to an element then the report should state the reason, setting out in detail the conservation and/or building performance issues that have resulted in this recommendation.

    b. The potential for improvements in ventilation, air tightness and moisture control within the building, ensuring that these are considered in balance with that of the welfare of the historic building fabric. In general, tighter building fabric can be balanced with controlled ventilation improvements (passive and mechanical) and the benefits and disadvantages must be set out together with the recommendations.

3. The study must have been carried out at or prior to concept design stage (equivalent to RIBA stage C or earlier).

4. The building design has implemented and accounted for the study's recommended improvements and, in particular, demonstrates:
    - The design strategy chosen is that which has the greatest impact in terms of potential improvements in energy use, whilst minimising the detrimental impacts on the historic building fabric.
    - That any improvements made to the thermal insulation of the building have been specified in accordance with the recommendations of '*Thermal Insulation: avoiding risks*'[44].

Exemplary level criteria
The following outlines the exemplary level criteria to achieve an *innovation credit* for this BREEAM issue:

1. One additional innovation credit can be awarded where evidence provided demonstrates the building is designed to be a *carbon neutral* building as defined by the NCM (i.e. in terms of building services energy demand), as follows:
    a. A new building achieves a CO_2 index **less than** 0 on the benchmark scale.

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b. A refurbished building achieves a CO_2 index **equal to or less than** 0 on the benchmark scale.

2. Two additional innovation credits can be awarded where evidence provided demonstrates the building is designed to be a *True zero carbon building* (in terms of building services and operational energy demand).

Compliance Notes	
New Build	New buildings should compare their Energy Rating to the New Build benchmark scale.
Refurbishment	Existing buildings that have undergone or are undergoing major refurbishment should compare their Energy Rating to the Refurbishment benchmark scale. This separate scale aims to better recognise and encourage the energy-efficient refurbishment of existing buildings which results in a significant reduction in the energy demand for that building.
Extensions to existing buildings	Where an existing building is being extended (and only the new extension is being assessed) and that extension uses existing building services plant, the energy modelling and CO_2 Index must be based on the building fabric of the new extension and any existing, common, building services plant and new building services plant installed that will service the new extension. The energy modelling does not have to consider the existing building fabric where this will not form part of the scope of the BREEAM assessment. Nor does it have to consider existing building services where they are not supplying services (heating, cooling and/or ventilation) to the new extension being BREEAM assessed.
Part new-build extension part refurbishment	For assessments of buildings that are a mixture of new build and existing building refurbishment a weighted benchmark scale is used. The weighted benchmark scale is determined using the area (m^2) for new build and area (m^2) for refurbishment and the two benchmark scales in table 9 for new build and refurbishment. If there is a higher proportion of new build to refurbishment then the weighted scale will be biased towards the benchmark scale for new buildings and vice-versa if there is a higher proportion of refurbished element. As the benchmarks are influenced by the split in areas between the new build element and major refurbished element of the assessed building, the benchmarks will change if the new build/refurbishment area totals change. To determine the weighted benchmark scale and number of credits achieved, the assessor must enter the area (m^2) for new build and area (m^2) for refurbishment in to the relevant box of the *Ene 1 Reduction of CO_2 emissions* calculator.
Renewable and low carbon Installations	Where included as part of the project and therefore assessed under this BREEAM issue, the installation of low or zero carbon technologies can be used to off-set the assessed building's CO_2 emissions. The LZC technology can be installed *on-site, near-site* where a *private wire arrangement* is in place (see relevant definitions) or *off-site* via *accredited external renewables* (see compliance note below).

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Accredited external renewables	For the purpose of this BREEAM issue *accredited external renewables* are renewable energy schemes located off-site, but within the UK, 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 building (i.e. not just units of carbon) • Are additional to capacity already required under the Renewables Obligation At the time of writing, BRE Global are not aware of a mechanism for accrediting off-site renewables and therefore any renewable energy schemes that meet the above definition; though some ESCOs may achieve these criteria.
Energy exported to the grid	Any electricity from an *onsite* LZC energy source that is exported to the grid may be included in the calculations as if it were used within the building.
EPC certificates, BREEAM & building use/tenancy arrangement	The legislative criteria for an Energy Performance Certificate vary according to building size, use, services and tenancy arrangement. In some instances an EPC will be required for the whole building, in others an EPC will be required for each individual unit or tenanted area within a building. The scope of a BREEAM assessment typically covers the whole building, regardless of whether that building consists of a number of units to be sub let. Where an EPC is required for each unit, for the purposes of determining the number of BREEAM credits, the CO_2 index is the total of the area-weighted average of the CO_2 index of each individual unit. Where the development contains conditioned common and/or landlord spaces, the area of these spaces, unless otherwise accounted for, should be divided and attributed amongst the separate units. The proportion of common area attributed to each unit must be equivalent to the ratio of each unit's area as a proportion of the total area of all units. All units, heating systems and common areas within the assessed building must be accounted for in the assessment of Ene 1. For further information on the EPC criteria, refer to guidance on the Communities and Local Government Website (see references section).
EPC in Scotland	The approach adopted in Scotland for determining an Energy Rating differs from that used in England, Wales and Northern Ireland. Scotland bases its EPC rating on actual CO_2 emissions, regardless of building type, whereas an EPC certificate for the other UK countries uses a CO_2 Index. Whilst both approaches have their merit, for the purpose of comparing BREEAM-assessed buildings on a 'level playing field' a decision has been taken to adopt one approach – the CO_2 Index. Using the *approved software*, buildings located in Scotland can easily determine their CO_2 Index by changing the '*Building Regulations & EPBD parameters'* in the '*Project details*' tab of the NCM-compliant approved software from '*EPC Scotland*' to '*EPC England'* or '*EPC Wales'* or '*EPC Northern Ireland'*.

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Schedule of Evidence Required

Req.	Design Stage	Post Construction Stage
1-3	A copy of the EPC output from the *approved software* for the assessed building at the design stage. The *accredited energy assessor's* name and accreditation number (this information will be on the EPC).	A copy of the final registered EPC from the *approved software* for the constructed building*. For buildings assessed in Scotland, a copy of the EPC Output from the *approved software* demonstrating the building's CO_2 Index. The *accredited energy assessor's* name and accreditation number. *The final rating must account for any changes to the specification during construction; and the measured air leakage rate, ductwork leakage and fan performances (as required by Building Regulations).
Historic buildings only		
1-3	A copy of the heritage conservation specialist's report. A letter from the specialist confirming the qualifications, experience and IHBC status.	The evidence required at this stage of assessment does not differ from that outlined at the design stage of assessment.
4	Marked-up drawings or a specification document demonstrating: • Implementation of the study's recommendations • Compliance with 'Thermal Insulation: avoiding risks' [2]. **OR** Where a formal letter from the design team confirming the above will be implemented.	'As built' drawings and specification demonstrating: • Implementation of the study's recommendations • Compliance with '*Thermal Insulation: avoiding risks'*. Assessor's building/site inspection and photographic evidence demonstrating: • Examples of the recommendations of the study having been manifested in the actual complete building (as highlighted by the design team during the building inspection).

Additional Information

Relevant definitions

Accredited energy assessor: An individual trained and qualified to use *approved software* and produce EPC ratings for non-domestic buildings who are members of an accredited scheme. A register of non-domestic *accredited energy assessors* can be found here: https://www.ndepcregister.com/

For a full list of approved accreditation schemes for Non-dwelling Energy Assessment's visit www.communities.gov.uk

Approved Software: Software approved by Communities and Local Government to produce Energy Performance Certificates (EPC) for non-domestic buildings and check compliance with building regulations.

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Carbon neutral building: Where net carbon dioxide emissions resulting from energy consumed in the operation of the space heating/cooling, hot-water systems, ventilation and internal lighting is zero or better.

The calculation of CO_2 emissions can take account of contributions from *on-site*, *near-site* and *accredited external* renewable/low carbon installations. Off-site renewables that are not accredited cannot be used to meet this definition.

CO_2 Index: The energy performance of a building (for England, Wales and N.I.) is shown on the EPC as a Carbon Dioxide (CO_2) based index. It is this index that is used to determine where the building falls on the A+ to G rating scale and the number of BREEAM credits that can be awarded.

Dynamic Simulation Model (DSM): A software tool that models energy inputs and outputs for different types of building over time. In certain situations, SBEM will not be sophisticated enough to provide an accurate assessment of a building's energy efficiency. In these cases Government-approved proprietary dynamic simulation models may be used. Communities and Local Government provide such approval.

Historic buildings - For the purpose of assessing this BREEAM issue, historic buildings are defined as:

a. Listed buildings
b. Existing buildings situated in conservation areas (where the existing building itself has conservation status and contributes to the status of the conservation area)
c. Existing buildings which are of architectural and historical interest and which are referred to as a material consideration in a local authority's development plan
d. Existing buildings of architectural and historic interest within national parks, areas of outstanding natural beauty, and world heritage sites.

Institute of Historic Building Conservation (IHBC): The Institute of Historic Building Conservation (IHBC) is the professional institute which represents conservation professionals in the public and private sectors in the United Kingdom and Ireland. The IHBC exists to establish the highest standards of conservation practice to support the effective protection and enhancement of the historic environment. Full Membership of the IHBC is open to all whose principal skill, expertise, training and employment is in providing specialist advice for the conservation of the historic environment. Full Members are normally expected to demonstrate skills and experience under all of the IHBC's eight Areas of Competence.

Energy Performance Certificate: A certificate that confirms the energy rating of the building from A to G, where A is the most efficient and G is the least efficient. The better the rating, the more energy-efficient the building is, and the lower the fuel bills are likely to be. The energy performance of the building is shown as a Carbon Dioxide (CO2) based index. EPCs are generated using *approved software* by *accredited energy assessors*.

Non-Domestic Energy Performance Certificate Register: A register of *accredited energy assessors* and *Energy Performance Certificates*. Using the certificate reference number the validity of the EPC rating for a constructed building can be confirmed.

Near-site LZC: renewable energy generated near to the site that is provided for all or part of the community, including the assessed building, e.g. decentralised energy generation linked to a community heat network or renewable connected via private wire.

On-site LZC: renewable energy generated on the site of the assessed development.

Private wire arrangement: Where used in the context of BREEAM for low or zero carbon technology installations, a private wire arrangement is where any electricity generated on or in the vicinity of the site is fed directly to the building being assessed, by dedicated power supplies. If electricity is generated which is surplus to the instantaneous demand of the building this electricity may be fed back to the National Grid. The carbon benefit associated with any electricity fed into the grid in this manner

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can only be allocated against an individual installation or building. In cases where a building is supplied by a communal installation, no carbon benefit can be allocated to buildings which are not connected to the communal installation.

Simplified Building Energy Model (SBEM): SBEM is a computer program that provides an analysis of a building's energy consumption. The SBEM tool is designed to cover buildings that are not dwellings. It has been adopted by government as part of the UK national methodology for calculation of the energy performance of buildings. For more information visit: www.ncm.bre.co.uk/.

True zero carbon building: Where net carbon dioxide emissions resulting from energy consumed in the operation of the space heating/cooling, hot-water systems, ventilation, internal lighting AND process related energy consumption is zero or better.

The calculation of CO_2 emissions can take account of contributions from *on-site*, *near-site* and *accredited external* renewable/low carbon installations. Off-site renewables that are not accredited cannot be used to meet this definition.

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Issue ID	Issue Title	No. of credits available	Minimum standards
Ene 2	Sub-metering of Substantial Energy Uses	2	Yes

Aim

To recognise and encourage the installation of energy sub-metering that facilitates the monitoring of in-use energy consumption.

Assessment Criteria

The following demonstrates compliance:

1. Separate *accessible energy sub-meters*, labelled with the end energy consuming use, are provided for the following systems (where present):
    a. Space Heating
    b. Domestic Hot Water
    c. Humidification
    d. Cooling
    e. Fans (major)
    f. Lighting
    g. Small Power (lighting and small power can be on the same sub-meter where supplies are taken at each floor/department).
    h. Other major energy-consuming items where appropriate (see Compliance Notes).

Compliance Notes	
New Build	There are no additional or different criteria to those outlined above specific to new-build projects.
Refurbishment	There are no additional or different criteria to those outlined above specific to refurbishment projects.
Extensions to existing buildings	Where an existing building is being extended and it has existing building services plant and systems that will be common to both the new extension and existing building, the criteria for energy metering cover the entire building.
Lighting & small power	Due to traditional distribution methods, it can be difficult to cost-effectively separate lighting and small power. It is acceptable, within a single floor, for lighting and small power to be combined for metering purposes, provided that sub-metering is provided for each floor plate.
Other major energy-consuming items	Other major energy-consuming items, depending on the building type, might include, for example, plant used for swimming or hydrotherapy pools, kitchen plant, cold storage plant, laboratory plant, sterile services equipment, transportation systems (e.g. lifts & escalators) drama studios and theatres with large lighting rigs.
Modular boiler systems	Where the building uses a modular system and the rated input power of the lead boiler is less than the figure in Table 10 Size of plant for which separate metering would be required(Additional Information), but greater than 10kW (see Additional Information), sub-metering of the lead boiler is still required to comply with the criteria of this issue.

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Accessible meters	The energy meters must be located in an area of the building that allows for easy access to facilitate regular monitoring and readings by the buildings staff and facilities manager. Typically this will be the plant room, main distribution room or control room (where BMS is installed).

Schedule of Evidence Required

Req.	Design Stage	Post Construction Stage
All	Specification document or technical drawings confirming: • Energy-consuming systems and their rated outputs • Metering arrangements for each system, type and location of meter specified. • If applicable, scope of BMS and its energy-monitoring capability.	Assessor's building/site inspection and photographic evidence confirming: • Location and labelling/function of the individual sub-meters or BMS.

Additional Information

Relevant definitions

BMS: Building (energy) Management System is a central computer controlling, monitoring and optimising building services and systems such as heating, air-conditioning, lighting and security.

Common areas: Developments that have several tenant units, particularly large retail developments, may also share common facilities and access that is not owned or controlled by any one individual tenant, but used by all. Common areas are typically managed and maintained by the development's owner, i.e. landlord or their managing agent. Examples of common areas include an atrium, external areas e.g. parking, stairwells and main entrance foyers/reception.

Table 10[45] Size of plant for which separate metering would be required

Plant Item	Rated input power (kW)
Boiler installation comprising one or more boilers or CHP plant feeding a common distribution circuit	50
Chiller installations comprising one or more chiller units feeding a common distribution circuit	20
Electric humidifiers	10
Motor control centres providing power to fans and pumps	10
Final electrical distribution boards	50

Detailed guidance on how to develop an appropriate metering strategy for the energy criteria of a new building is available in General Information Leaflet 65: Metering energy use in new non-domestic buildings.

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Issue ID	Issue Title	No. of credits available	Minimum standards
Ene 3	Sub-metering of High Energy Load and Tenancy Areas	N/A	No

This issue is not assessed in this scheme.

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Issue ID	Issue Title	No. of credits available	Minimum standards
Ene 4	External Lighting	1	No

Aim

To recognise and encourage the specification of energy-efficient light fittings for external areas of the development.

Assessment Criteria

The following demonstrates compliance (where provided):

1. All external light fittings for the building, access ways and pathways have a luminous efficacy of at least 50 lamp lumens/circuit Watt when the lamp has a colour rendering index (Ra) greater than or equal to 60. **OR** 60 lamp Lumens / circuit Watt when the lamp has a colour rendering index (Ra) less than 60.

2. All external light fittings to car parking areas, associated roads and floodlighting has a luminous efficacy of at least 70 lamp lumens/circuit Watt when the lamp has a colour rendering index (Ra) greater than or equal to 60. **OR** 80 lamp Lumens / circuit Watts when the lamp has a colour rendering index (Ra) less than 60.

3. All external light fittings for signs and uplighting have a luminous efficacy of at least 60 lamp lumens/circuit Watt when the lamp wattage is greater than or equal to 25W. **OR** 50 lamp lumens/circuit Watt when the lamp wattage is less than 25W.

4. External light fittings are controlled through a time switch, or daylight sensor, to prevent operation during daylight hours. Daylight sensor override on a manually switched lighting circuit is acceptable.

Compliance Notes	
New Build	There are no additional or different criteria to those outlined above specific to new-build projects.
Refurbishment	There are no additional or different criteria to those outlined above specific to refurbishment projects.
Extensions to existing buildings	Refer to the guidance below for single building assessments on large existing developments/campuses.
Single building assessments on larger developments/ campuses	Where the building being assessed forms part of larger development (or is an extension to an existing building) containing common areas and other buildings, the scope of the external lighting criteria apply only to external new and existing lighting within the *construction zone* of the assessed building.
No external lighting specified	Where the building is designed to operate without external lighting, including external lighting on the building, signs and at entrances, the credit can be awarded.

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Low energy innovative light fittings	Any fitting that consumes less than 5W complies with the criteria provided each individual fitting is a direct replacement for an alternative, individual BREEAM-compliant fitting and provides an equivalent amount of light for the necessary task. The assessor must ensure that several low watt fittings are not being specified in place of one higher watt but overall more energy-efficient fitting. This compliance note is to allow for the specification of innovative low energy light sources, such as LEDs.
Decorative and floodlighting	Decorative lighting and floodlighting must not be exempt from the assessment criteria although temporary lighting such as theatrical, stage or local display installations, where specified, may be excluded.
Security lighting	The criteria are concerned only with general external lighting e.g. way-finding, car parking, decorative, signage, landscape, storage areas etc. Lighting specified for specific prison security purposes does not need to be assessed against the BREEAM criteria.

Schedule of Evidence Required

Req.	Design Stage	Post Construction Stage
1-4	Marked-up site plan and building elevations showing: • Location and purpose of all external lighting fittings. Lighting specification or lighting designer's calculations confirming: • Lamp lumens/circuit watt for each type of fitting as well as the colour rendering index Ra (where appropriate) • External lighting control strategy..	As design stage, but 'as built' documentation. **AND** Assessor's building/site inspection and photographic evidence confirming: • External lighting controls. Manufacturers' literature confirming: • Technical spec for the installed external light fittings.

Additional Information

Relevant definitions

Colour rendering index (Ra): A measure, between 0 and 100, of the ability of a lamp to reproduce the colour of objects in comparison to their aspect under a natural or reference source of light. An incandescent source has a Ra of 100 and a low pressure sodium source a Ra of 0 (see below for further information on colour rendering).

Construction zone: For the purpose of this issue the construction zone is defined as the site which is being developed for the BREEAM-assessed building and its external site areas i.e. the scope of the new works.

Daylight Sensors: A type of sensor that detects daylight and switches lighting on at dusk and off at dawn.

Luminous efficacy in lamp Lumens per circuit Watt: The ratio between the luminous flux produced by a lamp (in Lumens) and the total power consumed by both the lamp and its associated control gear (in Watts).

Time switch: A switch with an inbuilt clock which will allow lighting to be switched on and off at programmed times.

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Colour Rendering

At night time, the sensitivity of the eye is shifted towards the blue region of the visual spectrum. As a result, lamps with poor colour rendering index, such as some sodium lamps that emit light between the yellow and red region of the visual spectrum, require more luminous output to light an object with the same level of brightness than a source with better colour rendering index. Sources with a poor colour rendering index also make the differentiation of coloured objects more difficult for individuals.

In BS 5489-1:2003[46] Code of practice for the design of road lighting - Part 1: Lighting of roads and public amenity areas, this is acknowledged by allowing a relaxation of the lighting levels (illuminance levels) required when the source specified has a colour rendering index Ra greater than or equal to 60.

The colour rendering index requirement means compliance with this issue using sources of light with a poor colour rendering index is harder to achieve than those with an index greater than or equal to 60. Other benefits of using sources with an index greater than 60 include an increased feeling of safety for individuals, making recognition of spaces and other individuals easier. In areas where CCTV is used, the colour rendering index of lighting sources is critical; an Ra value of at least 80 is recommended (but not required by BREEAM).

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Issue ID	Issue Title	No. of credits available	Minimum standards
Ene 5	Low or Zero Carbon Technologies	3	Yes

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

The following demonstrates compliance:

First credit

1. A feasibility study has been carried out by an *energy specialist* (see Compliance Notes) to establish the most appropriate local (on-site or near-site) LZC energy source for the building/development. This study covers as a minimum:
    a. Energy generated from LZC energy source per year
    b. Payback
    c. Land use
    d. Local planning criteria
    e. Noise
    f. Feasibility of exporting heat/electricity from the system
    g. Life cycle cost/lifecycle impact of the potential specification in terms of carbon emissions
    h. Any available grants
    i. All technologies appropriate to the site and energy demand of the development.
    j. Reasons for excluding other technologies.

2. A local LZC energy technology has been specified for the building/development in line with the recommendations of the above feasibility study.

3. The feasibility study has been carried out at RIBA stage C (concept design) or equivalent procurement stage.

OR

4. The organisation that occupies the building has in place a contract with an energy supplier to provide electricity for the assessed building/development from a 100% renewable energy source. This supply must be delivered by an *accredited external renewable* source. The contract must be valid for a minimum of 3 years from the date the assessed building becomes occupied.

Second credit

1. The first credit for a feasibility study must be achieved.

2. A local LZC energy technology has been installed in line with the recommendations of the above feasibility study and this method of supply results in a 10% reduction in the building's CO_2 emissions.

3. Figures used for calculations of the percentage carbon reduction provided by LZC technology are based on the output from *approved energy modelling software*.

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Third credit

1. The first credit for a feasibility study must be achieved.

2. A local LZC energy technology has been installed in line with the recommendations of the above feasibility study and this method of supply results in a 15% reduction in the building's CO_2 emissions.

3. Figures used for calculations of the percentage carbon reduction provided by LZC technology are based on the output from *approved energy modelling software*.

Exemplary level criteria
The following outlines the exemplary level criteria to achieve an *innovation credit* for this BREEAM issue.

1. The first credit for a feasibility study must be achieved.

2. A local LZC energy technology has been installed in line with the recommendations of the above feasibility study and this method of supply results in a 20% reduction in the building's CO_2 emissions.

3. Figures used for calculations of the percentage carbon production provided by LZC technology are based on the output from *approved energy modelling software*.

Buildings complying with the exemplary level criteria would therefore achieve four credits for this issue.

Compliance Notes	
New Build	There are no additional or different criteria to those outlined above specific to new-build projects.
Refurbishment	There are no additional or different criteria to those outlined above specific to refurbishment projects.
Extensions to existing buildings	There are no additional or different criteria to those outlined above specific to the assessment of extensions to existing buildings.
Feasibility study	When undertaking a feasibility study at a later stage than *outline proposals*, an additional element will need to be included in the report to highlight the local 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. If the feasibility study discounts all local LZC as unfeasible due to the late stage in the project that the study was commissioned, then the credit for the feasibility study must be withheld. If the feasibility was commissioned at the *outline proposals* stage or earlier and in the unlikely event the study concludes that the specification of any local LZC technology is unfeasible, the first credit can still be awarded. Subsequent credits for installing LZC technology that meets a percentage of building energy demand will not be achievable.

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List of recognised LZC 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 • Tidal power • Wave power **Wind** • Wind turbines **Biomass** • Biomass single room heaters/stoves • Biomass boilers • Biomass community heating schemes **Combined Heat and Power (CHP) for use with the following fuels:** • Biomass • Natural gas • Sewerage gas and other biogases CHP systems must meet the threshold criteria for good quality CHP as set by DEFRA's CHPQA programme[47] **Community heating**, including utilising waste heat from processes such as large scale power generation where the majority of heating comes from waste heat (see also Compliance Notes below). **Heat Pumps** • Ground source heat pumps • Water source heat pumps • Geothermal heating systems • Air source heat pumps For heat pumps to comply, the heat source (ground or water) must be from a renewable source, for example soil, outside air, ground water, or a river. **Other** • Fuel cells using hydrogen generated from any of the above 'renewable' sources The list above is not a definitive list of technologies compliant with BREEAM, but a list of those technologies that may be considered to comply. If the assessor has a justified reason to doubt the low or zero carbon credentials/feasibility of the above technologies, where specified for a development they are assessing, they can justifiably withhold the available BREEAM credits.

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LZC technology not listed	Other systems may be acceptable as part of a LZC strategy under this issue but are not inherently considered as LZC technologies. Acceptability will be dependent on the nature of the system proposed. The BREEAM Assessor must confirm acceptability with BRE if in doubt.
Waste heat from a building related operational process	Waste heat from a process that takes place within the assessed building (or on the assessed site), for the purpose of this BREEAM issue, can be considered as 'Low carbon'. This is on the condition that the generation of the heat from the process is integral to the assessed building.
Waste incineration	Waste heat from an incineration plant can only be considered as a low carbon for the purpose of this BREEAM issue under the following circumstances: 1. All other LZC technologies have been considered and discounted in the feasibility study. **And either** 2. The Local Authority or region in which the incineration plant is located is demonstrably meeting its annual waste reuse/recycling targets and waste management policies. **Or** 3. A near- or onsite facility connected to the building, via a *private wire arrangement*, which demonstrably removes re-usable and recyclable waste material prior to incineration.
Biofuels	Given the current uncertainty over their impact on biodiversity, global food production and green house gas savings, plus the ease of inter-changeability between fossil fuels, BREEAM does not recognise or reward building systems fuelled by *first generation biofuels* manufactured from feedstock's e.g. biofuels manufactured from sugars, seeds, grain, animal fats etc. BREEAM will recognise systems using *second generation biofuels* (see relevant definitions) or biofuels manufactured from biodegradable waste materials e.g. biogas, or locally and sustainably sourced solid biofuels e.g. woodchip, wood pellets.
Community and off-site schemes	'Local' does not have to mean *on-site* and community schemes (near site) can be used as means of demonstrating compliance. As this BREEAM issue seeks to encourage the installation of *on-site* and *near-site* LZC technologies, *accredited external renewables* (accept where stated to achieve one credit) cannot be used to demonstrate compliance with the criteria of this BREEAM issue.
Export to the grid	Any electricity from an *onsite* LZC energy source that is exported to the grid may be included in the calculations as if it were used within the building.
More than one technology	The percentage can be made up from more than one of the above technologies.
Building assessed part of a larger development	Where the building under assessment forms part of a larger development and either a new or existing LZC installation is provided for the whole site, then the amount of LZC energy generation counted for in this issue, and subsequent CO_2 emissions saved, should be proportional to the building's energy demand compared to the total energy demand for the site (see also note below on existing LZC technology).
LZC technology already available on site	For developments where there is an existing LZC energy source that can supply a compliant percentage of energy to the assessed building, a feasibility study will still have to be carried out to demonstrate that the existing technology is the most appropriate for the assessed building/development. The study should seek to identify any other options to supply a higher proportion of the building's energy demand in addition to that supplied by the existing source.
Calculation of the CO_2 emissions saved	When calculating the energy contribution and CO_2 emissions saved from the LZC installation the following rules should be applied: • The net yield of the LZC installation(s) must be used (i.e. subtract any CO_2 related to the energy used by the LZC technology itself such as pumps, inverters, controllers, etc).

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	• The percentage CO_2 savings should be calculated using the following assumptions: o Renewable heat energy is displacing gas where the location for the building would practically have access to a gas connection. Where there is no access to a gas connection assume oil is being displaced.* o Renewable electrical energy is displacing grid electricity at the national CO_2 conversion rate. * The design team is required to provide the assessor with sufficient justification that gas is not available.

Schedule of Evidence Required

Req.	Design Stage	Post Construction Stage
First Credit		
1&3	A copy of the feasibility study report. Letter from the energy specialist confirming: • Compliance with the definition of an energy specialist • The timing of the feasibility report within the plan of works.	Assessor's building/site inspection (or "as built" drawings) and photographic evidence confirming: • Installation of LZC technology.
2	Marked-up design plan or specification confirming: • Proposed installation of LZC energy technology. Manufacturer's technical data and details or calculations stating the carbon savings as a result of the installed LZC technology.	
4	Where an offsite supply is being used as a method of compliance, supplier's documentation confirming: • Name and details of supplier • Details of the source of supply. A copy of the contract or other formal documentation confirming the length of contract to supply 100% renewable energy.	As design stage evidence.
Second, Third & Exemplary Level Credit		
1	Evidence (as outlined above) confirming compliance with the first credit.	Evidence (as outlined above) confirming compliance with the first credit.
2&3	A copy of the report produced by the *approved energy modelling software* illustrating; • The name of the approved software used to carry out the modelling • Confirmation of the expertise and experience of the individual carrying out the modelling	Where there have been changes to the proposed design or LZC technology specification, a copy of the 'as built' report produced by the Building Regulations-compliant energy model confirming the same data as outlined at the design stage.

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	• Total CO_2 emissions for the assessed building (without LZC energy technology). **AND** Calculations/outputs from the manufacturer, supplier, engineer or *approved software* confirming: • Total carbon savings as a result of the installed LZC technology.	

Additional Information

Relevant definitions

Accredited External Renewables: Please refer to the Compliance Notes in BREEAM issue Ene 1.

Approved Energy Modelling Software: Please refer to the relevant definitions in BREEAM issue Ene 1.

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 commercial buildings sector; and is not professionally connected to a single low or zero carbon technology or manufacturer.

First and second generation biofuels: first generation biofuels are biofuels made from sugar, starch, vegetable oil, or animal fats using conventional technology. Second generation biofuels are biofuels from lignocellulosic biomass feedstock using advanced technical processes[48] Common first generation biofuels include vegetable oil, biodiesel and bioalchols.

Feasibility credit objective: The objective of the feasibility study is to make sure that LZC energy technologies installed on a particular site are the most appropriate for this site and ensure maximum reduction of pollutants to the atmosphere. Therefore, no credit can be awarded if a feasibility study has not been undertaken.

Life Cycle Costs: the total cost of a building or its parts throughout its life, including the costs of planning, design, acquisition, operations, maintenance and disposal, less any residual value, in terms of carbon emissions.

Life cycle impact: this is the requirement to look at the carbon balance of each technology over its whole life. Encouraging people to not just 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.

Near-site LZC: Please refer to the relevant definitions in BREEAM issue Ene 1.

On-site renewable: Please refer to the relevant definitions in BREEAM issue Ene 1.

Private wire arrangement: Please refer to the relevant definitions in BREEAM issue Ene 1.

Payback period: the period of time needed for a financial return on an investment to equal the sum of the original investment.

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Issue ID	Issue Title	No. of credits available	Minimum standards
Ene 6	Building fabric performance and avoidance of air infiltration	1	No

Aim

To recognise and encourage measures taken to minimise heat loss and air infiltration through the building fabric.

Assessment Criteria

The following demonstrates compliance:

Design measures

Where all of the measures below have been specified/installed to minimise heat loss and air infiltration through the building fabric from treated/conditioned spaces:

1. Installation of personnel door(s) between internal and external areas within proximity of any adjacent openings for goods delivery access; **AND** a draught lobby between office areas (where present) and the external building access.

2. Delivery loading/unloading areas and operational and/or storage areas are partitioned (see also compliance note on relevancy of design measures).

3. Where present all goods/personnel access, vents in the roof and backdraught dampers on extract fans are draught sealed.

4. Loading/unloading bay doors insulated to 0.6 W/m^2K.

5. Plastic strip curtains are specified between internal delivery areas and other internal warehouse storage or operational areas (where there is no other draught sealing or doors). The strip curtains should have a partial overlap.

6. Either of the following are specified on the external goods doors/vehicle delivery bays:
    a. Plastic strip curtains (with a partial overlap)
    b. Air curtains (not door heaters) covering the entire width of the opening
    c. Pneumatic dock seals mounted on all vehicle delivery bays.

7. Rapid rise loading/unloading bay doors with at least 1.0 m/sec closing speed or less than 5 secs closing time between fully opened and fully closed are specified/installed.

As built performance measures

8. In addition to the above and Building Regulations requirement for air tightness testing, a comprehensive thermographic inspection of the building fabric (once construction is complete) has been or will be undertaken to confirm the following:
    a. Continuity of insulation in accordance with the construction drawings
    b. Avoidance of excessive thermal bridging
    c. No air leakage paths through the fabric (except through intentional openings)

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9. The inspection has been, or will be, carried out in accordance with BS EN 13187 *Qualitative detection of thermal irregularities in building envelopes. Infrared method*[49] and CIBSE TM23:2000 *Testing Buildings for Air Leakage*[50].

10. Any defects identified via the inspection are rectified and the building re-inspected to confirm it complies with the criteria of point 1.

11. Plus, where integral cold storage facilities are present, these have been tested and commissioned in accordance with the cold storage criteria of BREEAM issue Man 1 (this does not necessarily require BREEAM issue Man 1 to have been awarded).

Compliance Notes	
New Build	There are no additional or different criteria to those outlined above specific to new-build projects.
Refurbishment	There are no additional or different criteria to those outlined above specific to refurbishment projects.
Extensions to existing buildings	There are no additional or different criteria to those outlined above specific to the assessment of extensions to existing buildings.
Scope of the thermographic survey	The thermographic survey must ensure that all exterior walls to treated areas and all walls separating treated and untreated spaces will be tested.
Where some design measures are not relevant	If some of the design measures are not relevant, e.g. partitioning between delivery and storage areas may not be practical because of operational reasons or the building/unit is too small; the assessor may omit them from the assessment. In such instances the design team must provide the assessor with an adequate statement of justification as to why this is the case. The assessor must use their discretion in determining the validity of the case and reference any justification and design team statement in the formal BREEAM report.
No heated or air conditioned areas	Where the scope of the building specification covers fitted-out elements and the building is designed to be untreated then the requirement to comply with the 'as built' performance measures can be omitted. The design measures are still applicable for future-proofing i.e. in the event that the building at some point has heating and/or air conditioning plant installed.
Scope of the issue	This issue is applicable only for assessments of buildings that have a warehouse storage/operational area and/or dedicated vehicle delivery bays/access. Where this is not the case the issue will be filtered from the list of applicable issues by the BREEAM assessor's spreadsheet tool. Where the issue is applicable, the 'as built' performance measures i.e. the requirement for a thermographic survey applies to the whole building, not just the warehouse/delivery area (to ensure completeness of the measures).
Synergy with E1	It should be recognised that whilst there is only one credit available for this BREEAM issue, the benefit of installing the above measures will also be recognised in BREEAM issue Ene 1, Reduction of CO_2 emissions. This BREEAM issue is provided in addition to Ene 1 to recognise and encourage specific measures taken to reduce air infiltration to and heat loss from the internal storage, warehousing and delivery areas of the building.

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Schedule of Evidence Required

Req.	Design Stage	Post Construction Stage
1-7	A copy of the relevant clauses of the specification or proposed design plan confirming: • Each of the relevant measures incorporated into the design.	Assessor's building/site inspection and photographic evidence confirming compliance.
8-10	A copy of the specification clause(s) confirming: • A requirement to commission a thermographic study • The standards/method to which the survey will be carried out • A requirement to rectify any defects and re-inspect to confirm performance.	A copy of the survey report or certificate confirming either: • No consequential defects in construction details or continuity of insulation. **OR** • All consequential defects remedied following re-inspection.
11	Evidence as outlined under BREEAM issue Man 1 for the relevant requirement.	Evidence as outlined under BREEAM issue M1 for the relevant requirement.

Additional Information

Relevant definitions

Thermographic inspection: A method of producing images of a building using thermal radiation. The images help to identify areas of the building fabric with a higher (or lower in the case of internal fabric) than expected surface temperatures, thus indicating heat loss from, or air infiltration to, the building and therefore highlighting construction defects.

Air curtain: A fan heater that directs a curtain of warm air downwards over an opening which prevents the transfer of heat through the opening. Air curtains help to manage and minimise heat loss from the building when it is necessary to open external doors or access a cold storage enclosure.

Air permeability: The Building Regulations Approved Document L2A defines air permeability as the "*physical property used to measure air tightness of the building fabric*" (refer to the Approved Document for a fuller definition).

Pneumatic dock seals: Also referred to as inflatable shelters, are structures that surround the top and sides of a vehicle loading dock forming a seal between the building and delivery vehicle and therefore minimising heat loss from the building.

Treated: A term to describe an area of the building that is heated and/or mechanically cooled by plant integral to the building.

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Issue ID	Issue Title	No. of credits available	Minimum standards
Ene 7	Cold Storage	3	No

Aim

To recognise and encourage the installation of energy efficient cold storage systems, therefore reducing operational CO_2 emissions.

Assessment Criteria

The following demonstrates compliance:

First credit

1. The following components, where specified as part of the cold storage refrigeration plant/strategy, are on the ECA Energy Technology Product List or an equivalent list:
    - Air cooled condensing units
    - Automatic air purgers
    - Cellar cooling equipment
    - Commercial service cabinets (cold food storage)
    - Curtains, Blinds, Sliding Doors and Covers for Refrigerated Display Cabinets
    - Evaporative condensers
    - Forced air pre-coolers
    - Liquid pressure amplification
    - Refrigerated display cabinets
    - Refrigeration compressors
    - Refrigeration system controls

Second credit

2. Where the cold storage refrigeration plant complies with the following minimum criteria:
    a. Variable speed drives are fitted to the compressors, pumps and fans
    b. Strip curtains are installed on the cold storage opening(s)
    c. Low powered/heat lighting is fitted e.g. fibre optics, LEDs
    d. *Defrost on demand* controls for evaporators are installed
    e. The installed refrigeration plant, controls and monitoring system has been specified in accordance with the guidance outlined in the Food & Drink Industry Refrigeration Efficiency Initiative Guide 2 Purchase of Efficient Refrigeration plant
    f. The plant has been commissioned in compliance with the criteria for cold food storage commissioning outlined in BREEAM Issue Man 1 Commissioning (this does not necessarily require BREEAM Issue M1 to have been awarded).

Third credit

3. Where the plant is capable of **EITHER** of the following free cooling/heating strategies:
    - Thermal storage during periods of low load to provide additional cooling during periods of peak cooling load **OR**
    - Heat recovery of the waste heat to meet in part or full space heating and/or hot water criteria for the assessed building or other local demand e.g. air curtain above the cold storage enclosure entrance.

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Compliance Notes	
New Build	There are no additional or different criteria to those outlined above specific to new-build projects.
Refurbishment	The criteria apply to any new or existing refrigeration plant. If the existing building contains refrigeration plant that will remain, then this plant must meet the criteria in order to achieve the credit.
Extensions to existing buildings	If the assessment comprises of a part new build-extension and part refurbishment and there is existing cold storage plant in the existing building that also serves the new extension, then the compliance note above for refurbishment applies.
Awarding the credits	Each of the three credits can be awarded independently of each other i.e. it is not a requirement of the second credit that the first credit is achieved, likewise for the third credit.
Heat recovery or thermal storage unfeasible	Where the specification of thermal storage or heat recovery is unfeasible because there will be no low load periods and/or there is no demand for recovered heat, then the third credit can be awarded provided all the criteria of the second credit are met. The design team must justify why there are no feasible opportunities for heat recovery, free cooling or thermal storage.

Schedule of Evidence Required

Req.	Design Stage	Post Construction Stage
1	A copy of the relevant clause of the specification requiring the specific undertaking. **OR** A letter from the manufacturer/supplier or copies of their technical literature confirming the specific components are on the ECA list or compliant with ECA eligibility criteria. **OR** A print out of the ETPL listing the specific products.	The evidence required at this stage is the same as that outlined at the design stage.
2a-e & 3	A copy of the relevant clause of the specification confirming: • Cold storage plant and enclosure criteria. **AND/OR** A letter from the manufacturer/supplier or copies of their technical literature confirming compliance.	The evidence required at this stage is the same as that outlined at the design stage.
2f	Evidence as outlined under BREEAM issue Man 1 for the relevant requirement.	Evidence as outlined under BREEAM issue Man 1 for the relevant requirement.

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Additional Information

Relevant definitions

Defrost on demand controls for evaporators: A control system that automatically initiates a defrost sequence when an appropriate amount control of ice has built up on the evaporator surface.

ECA Energy Technology Product List (ETPL): The EPTL list is part of the Governments Enhanced Capital Allowance Scheme, a key part of the Government's programme to manage climate change. The Scheme provides a tax incentive to encourage investment in low carbon energy-saving equipment that meets published energy-efficiency criteria. The Energy Technology List (ETL) details the criteria for each type of technology, and lists those products in each category that meet them: www.eca.gov.uk.

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Issue ID	Issue Title	No. of credits available	Minimum standards
Ene 8	Lifts	2	No

Aim

To recognise and encourage the specification of energy-efficient transportation systems.

Assessment Criteria

The following demonstrates compliance:

First credit

1. An analysis of transport demand and patterns for the building has been carried out by the design team to determine the optimum number and size of lifts and *counterbalancing ratio* on the basis of anticipated passenger demand.

2. The energy consumption for at least two types of lift or lift strategy 'fit for purpose' has been estimated and the system with the lowest energy consumption specified.

Second credit

3. The first credit is achieved.

4. Of the following energy-efficient features, the three that offer the greatest potential energy saving are specified:
    a. The lifts operate in a stand-by mode during off-peak and idle periods. For example the power side of the lift controller and other auxiliary equipment such as lift car lighting and ventilation fan switch off when the lift is not in motion.
    b. Where lift motors use a drive controller capable of variable-speed, variable-voltage, variable-frequency control of the drive motor.
    c. The lift has a regenerative unit so that energy generated by the lift (due to running up empty and down full) is returned back to the grid or used elsewhere on site.
    d. The lift car uses energy-efficient lighting and display lighting (>60 Lumens/watt or fittings that consume less than 5W e.g. LEDS).

Compliance Notes	
New Build	There are no additional or different criteria to those outlined above specific to new-build projects.
Refurbishment	There are no additional or different criteria to those outlined above specific to refurbishment projects.
Extensions to existing buildings	There are no additional or different criteria to those outlined above specific to the assessment of extensions to existing buildings.
Building has no lifts	Please note that this issue will not be assessed where a building contains no lifts. In such instances the BREEAM assessor's spreadsheet tool will filter this issue from the list of applicable issues.

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Schedule of Evidence Required

Req.	Design Stage	Post Construction Stage
1-2	A copy of the relevant report or documentation detailing the analysis undertaken and findings/recommendations. A copy of the lift specification.	The evidence required at this stage is the same as that outlined at the design stage.
3-4	A copy of the lift specification. **OR** Formal letter from the lift manufacturer/supplier confirming that the lift to be installed on the project meets the relevant criteria for the number of credits sought.	The evidence required at this stage is the same as that outlined at the design stage.

Additional Information

Relevant definitions

Counterbalancing ratio: Lifts use a counterweight to balance the weight of the car plus a proportion of the maximum weight of the passengers; this reduces the size of the drive motor required for the lift. Lowering the counterbalancing ratio means a smaller motor and controlling drive unit are required, thus saving energy.

ISO Draft standard CD25745-1 ***Energy performance of lifts, escalators and moving walks – Part 1 Energy and conformance***
It has been estimated that between 5-15% of a building's total energy consumption can be attributed to the operation of lifts and 58% of the energy consumption of lifts is attributable to stand-by mode.

A Working Group of an International Standards Organisation's Technical Committee is developing a draft standard for the Energy performance of lifts, escalators and moving walkways. This standard draft standard outlines proposed procedures to be used when making energy measurements of lifts, escalator and moving walkways.

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Issue ID	Issue Title	No. of credits available	Minimum standards
Ene 9	Escalators and travelling walkways	N/A	No

Issue not assessed under this scheme.

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Issue ID	Issue Title	No. of credits available	Minimum standards
Ene 10	Free Cooling	N/A	No

Issue not assessed under this scheme.

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Issue ID	Issue Title	No. of credits available	Minimum standards
Ene 11	Energy Efficient Fume Cupboards	N/A	No

Issue not assessed under this scheme.

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Issue ID	Issue Title	No. of credits available	Minimum standards
Ene 12	Swimming pool ventilation and heat loss	1	No

Aim

To reduce unnecessary energy consumption of heating and ventilation plant for pool areas.

Assessment Criteria

The following demonstrates compliance:

1. Where automatic or semi-automatic pool covers are fitted to ALL pools, including spa pools and jacuzzi (if relevant) within the building.

2. The covers envelop the entire pool surface when fully extended.

3. Where the air temperature in the pool hall can be controlled so that it is 1˚C above the water temperature.

Compliance Notes	
New Build	There are no additional or different criteria to those outlined above specific to new-build projects.
Refurbishment	There are no additional or different criteria to those outlined above specific to refurbishment projects.
Extensions to existing buildings	There are no additional or different criteria to those outlined above specific to the assessment of extensions to existing buildings.
Building has no pools	Please note that this issue will not be assessed where a building contains no pools. In such instances the BREEAM assessor's spreadsheet tool will filter this issue from the list of applicable issues.

Schedule of Evidence Required

Req.	Design Stage	Post Construction Stage
1	Design drawing highlighting: • All pools within the building. A copy of the specification confirming: • Requirement and type of pool covers to be installed. If available at the time of assessment, manufacturer's/supplier's details/technical documentation.	Assessor's building/site inspection and photographic evidence confirming: • Installation of compliant covers on all pools. • Heating and ventilation control strategy for the pool areas.
2	A copy of the M&E specification confirming: • Heating and ventilation control strategy for the pool areas.	

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Additional Information

Relevant definitions

None.

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Issue ID	Issue Title	No. of credits available	Minimum standards
Ene 13	Labelled Lighting Controls	1	No

Aim

To provide adequate instruction on the operation of all light switches to encourage building user responsibility for turning off lights during unoccupied periods.

Assessment Criteria

The following demonstrates compliance:

1. All lighting control panels/switches have tamper-proof labelling that identifies:
    a. The zone/building area controlled by the switch(es)
    b. A request that the lights are turned off when the space is left unoccupied.
    c. The labelling must be engraved and form either a part of the light switch or positioned securely next to the switch (electronic labelling also complies).

Compliance Notes	
New Build	There are no additional or different criteria to those outlined above specific to new-build projects.
Refurbishment	There are no additional or different criteria to those outlined above specific to refurbishment projects.
Extensions to existing buildings	There are no additional or different criteria to those outlined above specific to the assessment of extensions to existing buildings.
Scope of the labelling	Labelling of switches in cells, small offices, stores and other small rooms where there is no more than two light fittings require no zonal identification on the label. Lighting controls in these areas do still require a request to turn the lights off when the space is left unoccupied.
Stickers	Stickers outlining the above information do not comply with the above criteria.

Schedule of Evidence Required

Req.	Design Stage	Post Construction Stage
1	A copy of the specification and/or design details confirming: • Scope and type of labelling • Location of lighting controls.	Assessor's building/site inspection and photographic evidence confirming: • Provision of labelling on, or next to, lighting controls. Note: It is not necessary to check all lighting controls. A select few in the main building areas will suffice.

Additional Information

Relevant definitions
None.

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Issue ID	Issue Title	No. of credits available	Minimum standards
Ene 14	BMS	1	No

Issue not assessed under this scheme.

Aim

To minimise energy-inefficient operation though the specification of adequate building services monitoring and control systems.

Assessment Criteria

The following demonstrates compliance:

1. A BMS with the ability to monitor and control the following has been installed:
    a. Boiler plant
    b. Chiller, air handling units and pumps (where specified)
    c. Internal environmental conditions

2. The BMS must have the ability to draw to the attention of the user out of range operational values, and monitor internal environmental conditions within the assessed building.

3. The BMS must have the ability to control heating output so that internal temperatures are maintained within an appropriate pre-determined range. This control must not automatically override local heating controls, where such controls are provided.

Compliance Notes	
New Build	There are no additional or different criteria to those outlined above specific to new-build projects.
Refurbishment	There are no additional or different criteria to those outlined above specific to refurbishment projects.
Extensions to existing buildings	If the extended and existing building share the same building services, then these services must be assessed against the criteria regardless of whether the existing building forms a part of the assessment or not. If the extension is served by independent services, only these need be assessed against the Assessment Criteria.
Existing BMS	For an assessment of a building on an existing prison site, to achieve the credit the assessed building's services and controls must be compatible and integrated with any existing BMS in operation on that prison site.

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Schedule of Evidence Required

Req.	Design Stage	Post Construction Stage
1-3	A copy of the specification confirming: • A description of the type and scope of the BMS and its level of control. Where using an existing BMS to demonstrate compliance, a written description from the client/building occupier confirming: • The type and scope of the BMS and its level of control.	Assessor's building/site inspection and photographic evidence confirming: 2. Existence of a compliant BMS.

Additional Information

Relevant definitions
None.

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7.0 Transport

Issue ID	Issue Title	No. of credits available	Minimum standards
Tra 1	Provision of Public Transport	2	No

Aim

To recognise and encourage development in proximity to good public transport networks, thereby helping to reduce transport-related emissions and traffic congestion.

Assessment Criteria

The following demonstrates compliance:

1. The public transport *Accessibility Index* for the building is calculated and BREEAM credits awarded in accordance with Table 11 AI benchmarks and BREEAM credits:

Table 11 AI benchmarks and BREEAM credits

Accessibility Index	BREEAM credits
≥2	1
≥4	2

The *Accessibility Index* is determined by entering the following information in to the BREEAM assessor's TRA 1 *Provision of Public Transport calculator:*

a. The distance (m) from the *main building entrance* to each *compliant public transport node*
b. The public transport type serving the compliant node e.g. bus or rail
c. The *average number of services* stopping per hour at each *compliant node* during the standard *operating hours* of the building for a *typical day* (see additional guidance).

Compliance Notes	
New Build	There are no additional or different criteria to those outlined above specific to new-build projects.
Refurbishment	There are no additional or different criteria to those outlined above specific to refurbishment projects.
Extensions to existing buildings	There are no additional or different criteria to those outlined above specific to the assessment of extensions to existing buildings.

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Operating hours	BREEAM seeks to define the building's accessibility to the public transport network for the period during which the majority of building users will travel to and from the building. In most cases the normal operating hours of the building can be used; however, some buildings will operate for 24 hours a day and on a shift work basis. As a result, during what typically would be deemed unsociable hours and therefore periods where a) there is little if any public transport operating and b) the number of total building users travelling to the building during this time is a minority; such periods are not required to be accounted for in the assessment of this issue. Where the assessed building operates on a 24-hour basis, or the operating hours are unknown at the time of assessment, then refer to and use the table of default operating hours, which can be found in the Additional Information section of this issue.
Compliant public transport node	A compliant node includes any bus stop within 650m and any railway station within 1000m of the assessed building's main entrance, measured via a safe pedestrian route (not '*as the crow flies'*). The service stopping at each node must provide transport from, or onward travel to, either an urban centre, major transport node or a community focal point e.g. doctor's surgery, library, school or village centre. There is no limit on the number of nodes that can be considered when calculating the AI, provided they all meet the above criteria.
Average number of services	For the purpose of the calculation, the frequency of public transport is the average number of services per hour. This is calculated by determining the number of stopping services at the node during the operating hours, divided by the number of hours within the operating period. For example: the average number of services for an assessment of a building that operates between 8am - 7pm (11 hours) and is within proximity of a bus stop with 35 stopping services during this period is 3 (equivalent to an average service frequency of 20 minutes).
Typical day	The typical day is that which represents the period when travel to and from the building by staff and visitors will be at its highest. For most buildings this should be taken as a mid-week day. In choosing a typical day the assessor should check that the timetabled information for that day is, within reason, representative of the public transport provision for the entire operating week (excluding Sundays).
Multiple services	Services that operate from more than one node within proximity of the building, i.e. two separate bus stops served by the same bus, must be considered only once - at the node in closest proximity to the building. Different services at the same node, however, should be considered as separate entities.
Bi-directional routes	Routes will be bi-directional; however for the purpose of calculating the index, consider only the direction with the highest frequency.
Dedicated transport services	Where a dedicated company bus service is provided for staff during, or before or after, *operating hours* (as defined in above), the building entrance can be substituted for the drop-off/pick-up destination point of this service and therefore public transport accessibility measured from that point.

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Phased developments	In the case of a large phased development where new transport facilities will be provided, but at a later stage than the building being assessed, the assessment can consider such facilities provided that: • A commitment to provide transport facilities has been made in the General Contract Specification or in the form of a Section 106 Agreement. **And the shortest of the following periods - Either** • The transport facilities will be available for use by the time 25% of all phases have been completed and are ready for occupation. **Or** • The transport facilities will be available for use within 25% of the total build time for the phase in which the assessed building forms a part, measured from the completion date of that phase. The most appropriate rule for the development in question must be used, ensuring that the time building users have to wait before having use of the transport facilities is as short as possible. Where the transport facilities will not be available for use within a period of five years from occupation of the building, they cannot be considered for determining compliance with the BREEAM criteria.
Buildings in Greater London	Buildings in Greater London should refer to the guidance in the Additional Information section of this issue for details of demonstrating compliance via other complementary means.

Schedule of Evidence Required

Req.	Design Stage	Post Construction Stage
1	A copy of the output from the *Provision of Public Transport calculator**. *Or via the alternative means for buildings in Greater London (see Additional Information).	The evidence required at this stage is the same as that outlined at the design stage. Where relying on a calculation carried out at the design stage to demonstrate compliance post construction, if the period between design and post construction stage reporting is greater than 12 months, then the AI must be re-calculated using up-to-date public transport timetable information.
2	Scale map highlighting the location of the building and all public transport nodes in proximity of the building. Timetables for each service at each public transport node considered.	

Additional Information

Relevant definitions

Accessibility Index: A measure that provides an indicator of the accessibility and density of the public transport network at a point of interest (in the case of BREEAM, a building). The index is influenced by the proximity and diversity of the public transport network and the level or frequency of service at the accessible node.

Provision of Public Transport Calculator: A spreadsheet-based calculator used to determine the *Accessibility Index* for the assessed building and the number of BREEAM credits achieved. BREEAM calculators are provided in the BREEAM Assessor's spreadsheet tool.

Main building entrance: For the purpose of assessment, this should be taken as the prison Gatehouse entrance.

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AI Indicator of performance – comparison with previous version of BREEAM
For comparison with the criteria of previous versions of BREEAM, a building that has a single public transport node 500m from its main building entrance with one service stopping every 15 minutes i.e. 4 services per hour on average, will score an AI of approximately 1.90. Alternatively, the same node with one service every 15 minutes, but 300m from the building entrance will achieve an AI of 2.26. The same node with two services stopping every 15 minutes will score an AI of 2.85. The greater the number of compliant nodes, services and their proximity to the building, the higher the AI.

Table 12 Default hours of operation for a typical day

Building type	AM	PM
Office	8.00am - 7.00pm	
Industrial	8.00am - 7.00pm	
School	7.30am -10.00am	3.00pm - 5.30pm
Further Education	8.00am - 7.00pm	
Courts	8.00am - 7.00pm	
Prison	7am - 8pm (encompassing visiting hours and the typical daytime shift pattern)	
Healthcare	7am - 8pm (encompassing visiting hours and the typical daytime shift pattern)	
Shopping centre	9.00am - 7.00pm	
Supermarket	8.00am - 10.00pm	
Bank/Service provider	8.00am - 6.00pm	
Convenience store	7.00am - 10.00pm	
DIY/retail park	8.00am - 8.00pm	
Other retail	8.00am - 6.00pm	
Bespoke & other	8.00am - 7.00pm Or use any of the above hours, as appropriate to the building type.	
24 hour use building	7am - 8pm	

Calculation methodology
The methodology for calculating the *Accessibility Index* uses Transport for London's *Public Transport Accessibility Level* (PTAL) method, itself based on a methodology developed in 1992 by the London Borough of Hammersmith and Fulham. For a description of the PTAL methodology and how it works refer to appendix B of *Transport Assessment Best Practice; Guidance Document* http://www.tfl.gov.uk/assets/downloads/corporate/TAGuidance_LQ.pdf

Buildings in Greater London
There is a public transport accessibility map for Greater London which can be used for determining the *Accessibility Index* for assessed buildings, without necessarily having to complete a separate calculation. This map can be found at: http://www.london.gov.uk/thelondonplan/maps-diagrams/map-2a-03.jsp

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The map shows the Public Transport Accessibility Levels throughout London (PTALs range from 1-6); the PTAL is determined using the AI as follows:

PTAL	AI
1	0.00 – 5.00
2	5.01 – 10.00
3	10.01 – 15.00
4	15.01 – 20.00
5	20.01 – 25.00
6	25.01 +

As an example, if the building is located in an area of London that has a PTAL of 2 this could have an AI at any point in the 5-10 range. As such, for the purpose of BREEAM, the lower AI of 5 must be assumed and the credit awarded accordingly, or alternatively the specific AI for the assessed building can be determined using the TRA 1 *Provision of Public Transport calculator* and, potentially, a higher number of credits awarded.

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Issue ID	Issue Title	No. of credits available	Minimum standards
Tra 2	Proximity to amenities	N/A	No

Issue not assessed under this scheme.

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Issue ID	Issue Title	No. of credits available	Minimum standards
Tra 3	Cyclist Facilities	1	No

Aim

To encourage building users to cycle by ensuring adequate provision of cyclist facilities.

Assessment Criteria

The following demonstrates compliance:

1. The number of *compliant cycle storage spaces* provided is as follows:
    a. 10% of *building users* up to 500 **PLUS**
    b. 7% for *building users* in the range of 501 – 1000 **PLUS**
    c. 5% for *building users* over 1000

    See Compliance Notes for definition of *building users.*

2. At least two of the following *compliant facilities* must be provided for the *building users*:
    a. Compliant showers
    b. Compliant changing facilities and lockers for clothes
    c. Compliant drying space for wet clothes

    See Compliance Notes for definition of *building users.*

Compliance Notes	
New Build	There are no additional or different criteria to those outlined above specific to new-build projects.
Refurbishment	There are no additional or different criteria to those outlined above specific to refurbishment projects.
Extensions to existing buildings	Refer to the compliance note below on existing compliant facilities.
Building users	Where the term *building users* is referenced this refers to the staff, therefore the number of staff that will work within the building must be used to determine the number of *compliant facilities* that must be provided to achieve the credit. Whilst staff numbers are the means by which compliance with the assessment criteria is determined, the percentage requirements account for visitors and patients (if applicable to scheme) that will travel to and use or work within the building. As such the compliant cycle facilities must be accessible to all these types of building users.

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Compliant cycle storage space	Compliant cycle storage facilities are those that meet the following: • The space is covered overhead and protected from the rain • The covered area and the cycle racks are set in or fixed to a permanent structure (building or hardstanding) and allow both the wheel and frame to be locked securely (e.g. Sheffield type). Or racks are located in a locked structure fixed to or part of a permanent structure with CCTV surveillance. • There is a minimum distance of 1.0m between cycle racks, where the racks allow for two-sided parking, and 0.8m for one-sided parking to enable bikes to be easily stored and accessed. • Racks positioned in a circular array are spaced in accordance with the guidance in the New Metric Handbook[51]. • There is a minimum distance from any obstruction e.g. wall (located either to the side of the stand or in front of it) of 300mm for single-sided use and 900mm for double-sided use. • Adequate lighting is provided in accordance with BS5489 Part 1 – *Lighting of roads and amenity areas*[52]. • The facilities are in a prominent site location that is viewable from the building. • The majority of the cycle racks are within 100m of a building entrance (ideally within 50m).
Vertical bike racks	Vertical racks, which allow direct access (without the need to get alongside the locked bike) and permit one bike per vertical stack can comply with the criteria (provided all other criteria are met). For this type of rack, the distance between each rack can be less than 1.0m but not less than 600mm (the typical width of a bike across the handlebars).
Non compliant cycle racks	These types of cycle storage devices do not comply with BREEAM: • Hooks and wall attachments • Single wheel (butterfly) bike rack holders (these racks provide less security and can cause damage to bike wheels).
Compliant showers	One shower must be provided for every 10 cycle storage spaces and both male and female users catered for i.e. either separate showers within shared gender-specific facilities or single shower cubicles and changing space for mixed use. The showers can be available for others to use in addition to cyclists.
Compliant changing facilities & lockers	Changing facilities and locker criteria; • The assessor can use their judgement to determine whether the changing area is appropriate given the number of cycle storage spaces/showers provided. As guidance to aid the assessor, where a shower/changing cubicle is provided there should be a minimum of one square metre of changing space adjacent to the shower(s) with a bench seat and hooks for hanging clothes. Where there is more than one shower provided there should be a minimum of one square metre of changing space per shower, subject to a minimum changing area of four square metres. Where there are no showers specified, but there is a changing facility, there is a minimum of one square metre of changing space for every 10 cycle storage spaces, subject to a minimum of four square metres of changing area with a bench seat and hooks for hanging clothes. • The number of lockers is at least equal to the number of cycle spaces provided. • Lockers are either in or adjacent to compliant changing rooms. Where the changing space is a cubicle the locker(s) must not be located within the cubicle. • Each locker is at least 900mm high by 300mm wide by 450mm deep, or a locker with dimensions that provide an equivalent volume of storage space.

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	• Both male and female users are catered for i.e. either gender specific, shared facilities or single changing cubicles in mixed use areas. • Toilet cubicles do not count as changing facilities.
Compliant drying space	The drying space (for wet clothes) must be a specially designed and designated space with adequate heating/ventilation. A plant room is not a compliant drying space.
Existing compliant facilities	For assessments of new *infill* buildings on an existing site, where there are existing compliant facilities, such facilities can be assessed against the criteria of this issue. The number of existing compliant facilities must be large enough to cater for the building users of the assessed building, in addition to the users from any existing buildings.
Minimum number of facilities	Where more than the minimum number of compliant cycle spaces is provided, it is not necessary to also provide more than the minimum number of showers/lockers/changing facilities.
City centre locations	In city centre locations the criteria for *compliant cycle spaces* can be reduced by 50% where at least **two** of the available BREEAM credits for provision of public transport (Tra 1) have been awarded.
Rural locations	Sites in rural locations can reduce by 50% the criteria for *compliant cycle spaces* where the average building user commuting distances are likely to be greater than 10 miles. A rural location is one where the site is on land clearly not within or on an urban boundary; this includes village locations and green field sites.

Schedule of Evidence Required

Req.	Design Stage	Post Construction Stage
1	Site plan, design drawings and/or a copy of the specification confirming: • The location of the cycle storage facilities • The number of cycle spaces provided • The type, dimensions and layout of cycle racks • The materials and construction specified for the facility. • The lighting for the facility is in accordance with BS5489 Part 1. • Building occupancy or, where relevant, net lettable/floor area. Where the building is in a city centre location, and the benchmarks reduced, evidence as outlined under BREEAM credit Tra 1 demonstrating the relevant number of credits achieved.	Assessor's building/site inspection and photographic evidence confirming the installation of the compliant facilities.
2	Design drawings or a copy of the specification confirming: • Number of showers • Changing room • Secure locker locations, dimensions and numbers • Drying space	Assessor's building/site inspection and photographic evidence confirming the installation of the compliant facilities.

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Additional Information

Relevant definitions

None.

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Issue ID	Issue Title	No. of credits available	Minimum standards
Tra 4	Pedestrian and Cyclist Safety	N/A	No

Issue not assessed under this scheme.

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Issue ID	Issue Title	No. of credits available	Minimum standards
Tra 5	Travel Plan	1	No

Aim

To recognise the consideration given to accommodating a range of travel options for building users, thereby encouraging the reduction of user reliance on forms of travel that have the highest environmental impact.

Assessment Criteria

The following demonstrates compliance:

1. A travel plan has been developed as part of the feasibility and design stages which considers all types of travel relevant to the building type and *users*.

2. The travel plan is structured to meet the needs of the particular site and takes into consideration the findings of a site-specific transport survey and assessment that covers the following (as a minimum):
    a. Where relevant, existing travel patterns and opinions of existing *building or site users* towards cycling and walking so that constraints and opportunities can be identified
    b. Travel patterns and transport impact of future *building users*
    c. Current local environment for walkers and cyclists (accounting for visitors who may be accompanied by young children)
    d. Disabled access (accounting for varying levels of disability and visual impairment)
    e. Public transport links serving the site
    f. Current facilities for cyclists

3. The travel plan includes a package of measures that have been used to steer the design of the development in order to meet the travel plan objectives and minimise car-based travel patterns. This is demonstrated via specific examples such as:
    a. Providing parking priority spaces for car sharers
    b. Providing dedicated and convenient cycle storage and changing facilities
    c. Lighting, landscaping and shelter to make pedestrian and public transport waiting areas pleasant
    d. Negotiating improved bus services, i.e. altering bus routes or offering discounts
    e. Restricting and/or charging for car parking
    f. Criteria for lobby areas where information about public transport or car sharing can be made available
    g. Pedestrian and cycle friendly (for all types of user regardless of the level of mobility or visual impairment) via the provision of cycle lanes, safe crossing points, direct routes, appropriate tactile surfaces, well lit and signposted to other amenities, public transport nodes and adjoining offsite pedestrian and cycle routes.

Compliance Notes	
New Build	There are no additional or different criteria to those outlined above specific to new-build projects.
Refurbishment	There are no additional or different criteria to those outlined above specific to refurbishment projects.

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Extensions to existing buildings	There are no additional or different criteria to those outlined above specific to the assessment of extensions to existing buildings.
Building users	Where the term *building users* is referenced, this refers to members of staff, visitors and personnel who make deliveries to the development.
Existing Travel Plan	The credit can be awarded if the building being assessed is a refurbishment or infill new build on an existing site that has an existing up-to-date travel plan that is compliant with BREEAM and applicable to all building users (in the existing and assessed buildings).

Schedule of Evidence Required

Req.	Design Stage	Post Construction Stage
1-3	A copy of the Travel Plan. A copy of the site-specific transport survey/assessment.	The evidence required at this stage is the same as that outlined at the design stage.
3	A marked-up copy of the site plan demonstrating examples of design measures, implemented in support the travel plan's findings. **OR** Where a detailed site plan is not available, a formal letter from the client confirming that measures will be implemented into the final design in support the travel plan's findings.	Assessor's building/site inspection and photographic evidence confirming: • The installation of measures that support the travel plan.

Additional Information

Relevant definitions

Travel Plan: A travel plan is a strategy for managing all travel and transport within an organisation, principally to increase choice and reduce reliance on the car by seeking to improve access to a site or development by sustainable modes of transport. A travel plan contains both physical and behavioural measures to increase travel choices and reduce reliance on single-occupancy car travel.

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Issue ID	Issue Title	No. of credits available	Minimum standards
Tra 6	Maximum Car Parking Capacity	N/A	No

Issue not assessed under this scheme.

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Issue ID	Issue Title	No. of credits available	Minimum standards
Tra 7	Travel Information Point	1	No

Aim

To ensure the building has the capacity to provide users with up-to-date information on local public transport routes and timetables.

Assessment Criteria

The following demonstrates compliance:

1. There is a dedicated space for the provision of local public transport and taxi information.

2. There are no specific size criteria as the information could be presented using a wall-mounted lockable noticeboard or electronically. However, the following apply;
    a. The space is secure and tamper-proof
    b. A power point and network access point is provided within the space to facilitate future installation and connection of an electronic 'real-time' system or internet access point.
    c. The space is located in a part of the building that is accessible to the majority of staff working in the prison. Information available via a staff intranet complies with the criteria, provided all staff can gain access to the intranet.
    d. There is a space compliant with the above in the waiting room of the visitors' reception centre with adequate signage at its point of use and throughout appropriate areas of the reception area indicating its purpose and location/existence.

Compliance Notes	
New Build	There are no additional or different criteria to those outlined above specific to new-build projects.
Refurbishment	There are no additional or different criteria to those outlined above specific to refurbishment projects.
Extensions to existing buildings	There are no additional or different criteria to those outlined above specific to the assessment of extensions to existing buildings.

Schedule of Evidence Required

Req.	Design Stage	Post Construction Stage
1&2	Design plan and/or a copy of the relevant specification clause(s) confirming: • Location and scope of the travel information point/facility	Assessor's building/site inspection and photographic evidence confirming compliant installation of the travel information point(s).

Additional Information

Relevant definitions
None.

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Issue ID	Issue Title	No. of credits available	Minimum standards
Tra 8	Deliveries and Manoeuvring	1	No

Aim

To ensure that safety is maintained and disruption due to delivery vehicles minimised through well-planned layout and access to the site.

Assessment Criteria

The following demonstrates compliance:

1. Parking and turning areas are designed for simple manoeuvring according to the type of delivery vehicle likely to access the site, thus avoiding the need for repeated shunting.

2. There is a separate parking area for waiting goods vehicles, away from the manoeuvring area and staff/visitor car parking.

3. Delivery areas are not accessed through parking areas and do not cross or share pedestrian and cyclist routes and other outside amenity areas accessible to building users and general public.

4. There is a dedicated space for the storage of refuse skips and pallets away from the delivery vehicle manoeuvring area and staff/visitor car parking.

Compliance Notes	
New Build	There are no additional or different criteria to those outlined above specific to new-build projects.
Refurbishment	There are no additional or different criteria to those outlined above specific to refurbishment projects.
Extensions to existing buildings	There are no additional or different criteria to those outlined above specific to the assessment of extensions to existing buildings.
Small buildings/units	For the purpose of assessing this issue, smaller buildings/units (i.e. <200m^2) and developments where heavy goods vehicles are unlikely to access the site, the criteria for the manoeuvring area need be sized only to accommodate large delivery vans (i.e. transit type or similar). Also, requirement 3 '*delivery areas are not be accessed through parking areas'* can be relaxed for smaller sites if it can be confirmed that all deliveries to the building will be made by small vans and not heavy goods vehicles.
No vehicle delivery and manoeuvring areas	This BREEAM issue is not assessed where the development does not have a vehicle delivery and manoeuvring area. In such cases this issue will be filtered from the list of relevant credits by the assessor's spreadsheet tool.

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Schedule of Evidence Required

Req.	Design Stage	Post Construction Stage
1-4	Proposed site plan clearly showing: • Manoeuvring area • Delivery vehicle waiting area • Designated area for skips/pallets Appropriate documentation or correspondence from the design team confirming: • Likely vehicle delivery type that will access the development. • Predicted frequency of deliveries	Assessor's building/site inspection and photographic evidence confirming the existence of a compliant delivery area.

Additional Information

Relevant definitions
None.

The Metric Handbook[51] contains details of typical delivery/freight vehicle sizes and turning circles.

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8.0 Water

Issue ID	Issue Title	No. of credits available	Minimum standards
Wat 1	Water Consumption	4	Yes

Aim

To minimise the consumption of potable water in sanitary applications by encouraging the use of low water use fittings.

Assessment Criteria

The following demonstrates compliance:

First credit

1. All WCs have an *effective flush volume* of 4.5 litres or less.

2. Where dual flush toilets are specified they have guidance or symbols instructing the user on the appropriate operation of the flushing device. This can be provided on the flush control buttons, cistern, or nearby for a group of cisterns.

Second credit

3. The second credit can be awarded for **EITHER** of the following:
    c. All WCs have an *effective flush volume* of 3 litres or less **OR**
    d. All WCs are compliant with the criteria for the first credit and fitted with a *delayed action inlet valve*.

4. Where dual flush toilets are specified they have guidance or symbols instructing the user on the appropriate operation of the flushing device. This can be provided on the flush control buttons, cistern, or nearby for a group of cisterns.

Third & Fourth credits

5. Of the following, the two that offer the greatest possible reduction in annual water consumption have been specified:
    - All taps except kitchen taps, cleaners' sinks and external taps have a maximum flow rate less than 6 litres/min for a water pressure of 0.3MPa and are one of, or a combination of, the following types:
        - Timed automatic shut-off taps e.g. push taps
        - Electronic sensor taps
        - Low flow screw-down/lever taps
        - Spray taps

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- All showers, where specified, have a measured flow rate that does not exceed 9 litres per minute for a water pressure of 0.3MPa, assuming a delivered water temperature of 37ºC.
- All urinals are either:
  - Fitted with individual presence detectors that operate the flushing control after each use.
  - Ultra low flush or waterless urinals.
- All baths have a capacity of 100 litres to the overflow and each bath is fitted with a device that automatically stops the flow from the taps when the bath's maximum capacity is reached.

6. A volume controller – an automatic control device to turn off the water supply once the maximum preset volume is reached within a defined period – is specified on the individual fittings or water supply to each cell.

7. For assessments of a healthcare unit, the flushing control must be suitable for operation by patients with frail or infirm hands or activated by electronic sensors. Furthermore the criteria for taps do not apply to 'scrub' facilities in *clinical areas*, cleaners' taps, kitchen and external taps.

Compliance Notes	
New Build	There are no additional or different criteria to those outlined above specific to new build projects.
Refurbishment	There are no additional or different criteria to those outlined above specific to refurbishment projects.
Extensions to existing buildings	Where a project under assessment consists solely of an extension, and no new sanitary facilities are to be provided, facilities provided in the existing building should be assessed (this refers to the nearest accessible facilities for each gender/function, where appropriate, i.e. those likely to be used by the occupants and visitors in the extension building).
No Fittings specified	Where no sanitary fittings are to be installed in the building being assessed then the credit must be assessed on the basis of the nearest accessible facilities likely to be used by the occupants of the assessed building.
Showers with a range of flow rates	Where a shower head delivers a range of flow rates, the average or typical flow rate should be used.
Third and fourth credits	Awarding the third and fourth credits is not dependent on the first and second credits having been achieved.
Swimming / Hydrotherapy Pools	Where the assessment is of a building containing a swimming pool or hydrotherapy pools, the criteria of this issue, with respect to showers, are also applicable to all 'pre-swim-showers, in addition to all 'post-swim' showers within the wet change facilities.
Scrub taps	Although scrub taps are excluded from the scope of this issue, HTM07-04[53] contains guidance on water savings from medical related activities.
Waterless urinals	Due to overriding health and safety concerns in some healthcare facilities, the specification of waterless urinals may not be feasible. In such cases, compliance can be sought by one of the other available means, e.g. ultra low flush volume or infra-red proximity.
Infection control in healthcare facilities	In some cases, the use of water-efficient fittings and appliances may not be appropriate to the needs of the patient, and inappropriate specification may adversely affect the incidence and propagation of infections. In such instances, the assessor will need to confirm with the BREEAM office the approach for assessing this issue in these building areas. Furthermore, the design team should consult NHS guidelines concerning appropriate selection of sanitary fittings and fixtures and the control of legionella.

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Schedule of Evidence Required

Req.	Design Stage	Post Construction Stage
All	A copy of the relevant section of the M&E specification and/or manufacturer's details confirming: • Technical specification for sanitary fittings (flow rate) and controls to be installed. Design plan showing the location within the building of the sanitary facilities.	Assessor's building/site inspection report and photographs or purchase orders confirming: • The type and amount of fittings and controls installed. Manufacturer's details for installed fittings/controls confirming the technical specification.

Additional Information

Delayed action inlet valve: Devices that prevent water entering the WC cistern until it has completely emptied, enabling a precise volume of water to be discharged independent of water pressure.

Effective flush volume: The volume of water needed to clear the toilet pan and transport any content far enough to avoid blocking the drain.

Dual Flush Cisterns: Devices that have the facility to provide lower flush volume for liquids and higher flush volume for solids and paper.

Calculating the effective flushing volume of dual flush toilets: For dual flush WCs the ratio *full flush:reduced flush* is taken to be 1:3 for non-domestic buildings. The effective flush volume can therefore be calculated as follows, using a 6/4 litre dual flush volume WC:

((6 Litre*1) + (4 Litre*3))/4

= 4.5 Litre effective flushing volume

Product Certification of Low Flush WCs
Product certification schemes provide specifiers and clients with greater assurance of manufacturers' claim regarding the performance of the actual flush volume of their products and therefore the potential water savings of different products. At present BREEAM does not require that the flushing volume of WCs (or any other water-consuming device) meet an approved standard to gain BREEAM credits.

BRE Global currently operates a certification and listing scheme for low flush WCs and products certified to this standard will be listed on www.greenbooklive.com. Green Book Live is a free-to-view online database designed to assist specifiers and end users in the identification of environmentally beneficial products and services. If you would like to know more information about the Certification and Listing of Low Flush WCs Scheme please contact BRE Global at enquiries@breglobal.com

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Issue ID	Issue Title	No. of credits available	Minimum standards
Wat 2	Water Meter	1	Yes

Aim

To ensure water consumption can be monitored and managed and therefore encourage reductions in water consumption.

Assessment Criteria

The following demonstrates compliance:

1. The specification of a water meter on the mains water supply to each building; this includes instances where water is supplied via a borehole or other private source.

2. The water meter has a pulsed output to enable connection to a Building Management System (BMS) for the monitoring of water consumption.

3. If there is a swimming pool on site within the scope of the assessment, the building housing it must be covered by a separate meter in accordance with the above criteria. The changing facilities (including showers, toilets etc) housed in this building should also be covered by this meter.

Exemplary level criteria
The following outlines the exemplary level criteria to achieve an *innovation credit* for this BREEAM issue:

1. Where sub meters are fitted to allow the metering of individual water-consuming plant or building areas, where demand in such areas will be equal to or greater than of 10% of the total water demand of the building (see also compliance note).

2. Each sub meter has a pulsed output to enable connection to a Building Management System (BMS) for the monitoring of water consumption.

Compliance Notes	
New Build	There are no additional or different criteria to those outlined above specific to new build projects.
Refurbishment	There are no additional or different criteria to those outlined above specific to refurbishment projects.
Extensions to existing buildings	If no new water supply is being installed because occupants of the extended building will use the facilities in, and therefore water supply to the existing building, then the issue should be assessed on the basis of whether a compliant water meter is installed on the existing supply.
No water supply to the building/unit	If there is no water supply to the building during operation because there will be no installed water-consuming fittings in the building, then the issue must be assessed on the basis of the water supply to the nearest accessible building with such facilities, likely to be used by the future occupants of the assessed building.

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Exemplary level criteria	It is widely accepted that water usage can be decreased by how water is consumed by building users. If there are only small water consuming units used within the building such as singular toilets, small kitchen etc. It is unlikely there will be an opportunity to reduce water consumption by increased water management. And therefore there will be no benefit to installing a sub-meter; in such instances the exemplary credit is not available. Compliance with the criteria can also be demonstrated where the water metering/monitoring equipment is integral to the water consuming plant, as oppose to a sub meter on the water supply to the plant.

Schedule of Evidence Required

Req.	Design Stage	Post Construction Stage
All	A copy of the specification clause confirming: • The specification and type of water meter(s). Design plan(s) showing: • Location of the water meter(s) in each assessed building/unit.	Assessor's building/site inspection report and photographs or 'as built' drawings confirming: • The location of the water meter(s). Manufacturer's details confirming: • The specification of a pulsed output on the installed meter(s). If connected to a BMS, the assessor's site inspection confirming live meter readings can be used in lieu of manufacturer's details confirming specification of a pulsed output.

Additional Information

Relevant definitions
None.

The requirement for a pulsed output has been included to encourage the use of meters capable of transmitting (by wire or wirelessly) a continuous or pulsed signal with water management information such as total water consumed or flow rate to a Building Management System. This allows demand patterns on water systems to be monitored and evaluated over time. A significant increase in demand may indicate the presence of a leak or inappropriate or unexpected water consumption.

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Issue ID	Issue Title	No. of credits available	Minimum standards
Wat 3	Major Leak Detection	1	No

Aim

To reduce the impact of major water leaks that may otherwise go undetected.

Assessment Criteria

The following demonstrates compliance:

1. A leak detection system capable of detecting major leaks on the water supply has been installed. The system must cover all mains water supply between and within the building and the site boundary.

2. The leak detection system is:
   a. Audible when activated
   b. Activated when the flow of water passes through the water meter/data logger at a flow rate above a pre-set minimum for a pre-set period of time
   c. Able to identify different flow and therefore leakage rates, e.g. continuous, high and/or low level, over set time periods
   d. Programmable to suit the owner/occupiers' water consumption criteria
   e. Where applicable, designed to avoid false alarms caused by normal operation of large water-consuming plant such as chillers.

Compliance Notes	
New Build	There are no additional or different criteria to those outlined above specific to new build projects.
Refurbishment	There are no additional or different criteria to those outlined above specific to refurbishment projects.
Extensions to existing buildings	If the water supply to the new extension is via the existing building then the water supply to the existing building must be assessed against the criteria of this issue.
Ancillary or multiple buildings	The criteria apply to the water supply to all buildings falling within the scope of the assessment.
Mains supply shut-off	It is not a requirement of this issue that the leak detection system shut off the water supply when the alarm is triggered.
No water supply to the building/unit	If there is no water supply to the building because there will be no installed water-consuming fittings in the building, then the issue must be assessed on the basis of the water supply to the nearest accessible building with such facilities, likely to be used by the future occupants of the assessed building.
Leakage Rates	This issue does not specify what the high and low level leakage rates should be; however, the equipment installed must have the flexibility to distinguish between different flow rates to enable it to be programmed to suit the owner/occupier's usage patterns.

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Pre-set flow rates	Pre-set flow rates and time periods will vary depending on the building type and usage.
System criteria	It is anticipated that this credit will usually be achieved by installing a system which detects higher than normal flow rates at meters and/or sub-meters. It does not require a system that would directly detect water leakage along part or the whole length of the water supply system.
Water authority meters	Where there is a water authority meter at the site/building boundary, it may be necessary to install a separate flow meter to detect leaks; however, if the water authority agrees to some form of leak detection being installed on their meter, this would also be acceptable.

Schedule of Evidence Required

Req.	Design Stage	Post Construction Stage
1&2	A copy of the specification clause confirming: • Scope and performance criteria of leak detection system. **AND/OR** Manufacturer's details confirming: • The technical specification the specified systems.	Assessor's building/site inspection and photographic evidence confirming: • The installation and operation of the leak detection system. • The pre-set variables of the system for triggering the alarm and the flexibility of the building occupier to vary these*. * This can be confirmed in a letter from the contractor/installer to the assessor.

Additional Information

Relevant definitions
None.

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Issue ID	Issue Title	No. of credits available	Minimum standards
Wat 4	Sanitary Supply Shut Off	1	No

Aim

To reduce the risk of minor leaks in toilet facilities.

Assessment Criteria

The following demonstrates compliance:

1. Solenoid valves are installed on the water supply to each toilet area in the building and the flow of water through that supply is controlled by a link to either:
   - Infra-red movement detectors within each toilet facility **OR**
   - Sensors or switches placed at or on entry doors to each facility.

Compliance Notes	
New Build	There are no additional or different criteria to those outlined above specific to new build projects.
Refurbishment	There are no additional or different criteria to those outlined above specific to refurbishment projects.
Extensions to existing buildings	If the facilities are within the existing building then it is those existing facilities that must be assessed against the criteria of this issue.
No toilet facilities in the assessed building	If no toilet areas exist in the building then the assessment criteria must be assessed on the basis of the nearest accessible building with such facilities likely to be used by the occupants of the assessed building.
Shut-off systems	Shut-off systems may control combined toilet areas, such as male and female toilets within a core.
Proximity detection criteria	Proximity detection shut-off is not required for each individual sanitary appliance to achieve the credit. The requirement is for the water supply to be isolated for each toilet block on a floor when not being used by the occupants.
Single WCs	The criteria for this issue apply to facilities with a single WC (potentially within smaller or low occupancy buildings). In these instances shut-off can be provided via the same switch that controls the lighting (whether proximity detection or a manual switch).
Cells	Volume controls on the water supply to each cell comply with the assessment criteria for this type of space.

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Schedule of Evidence Required

Req.	Design Stage	Post Construction Stage
1	A copy of the specification clause confirming: • The specification of shut-off valves • The controls for the shut-off valves. A design plan showing: • The location of the toilet facilities.	Assessor's building/site inspection and photographic evidence confirming: • The location and installation of proximity detection controls. **AND** 'As built' drawings showing: • The specification of shut-off valves

Additional Information

Relevant definitions

Solenoid valve: An electrically operated shut-off device that controls the flow of water in pipes.

Volume controller: An automatic control device to turn off the water supply once a maximum preset volume is reached.

Programmed time controller: An automatic time switch device to switch the water supply on and/or off at predetermined times.

Light fittings in toilets are often controlled by proximity detection by IR movement detectors or sensors placed at entry doors (the latter can be less accurate as more than one person can enter or depart in the opening of one door). The sensors used to control the lighting can also be linked to a solenoid valve in the cold water supply. This will then act as a proximity detection system.

Small water leaks can result in significant losses over time, increasing costs as well as causing damage. There is a significant risk of leaks going undetected, particularly as toilet accommodation is often unoccupied for long periods. A proximity detection shut-off system prevents waste water from minor leaks by shutting off the water supply when toilet accommodation is not occupied.

Valves in cisterns supplying urinals and WCs are especially prone to failure, leading to wastage of water via the overflow. Whilst leakage from any valve is variable, a typical value for a leaking valve toilet might be 4 litres/day.

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Issue ID	Issue Title	No. of credits available	Minimum standards
Wat 5	Water Recycling	3	No

Aim

To encourage the collection and re-use of waste water or rainwater to meet toilet flushing needs and reduce the demand for potable fresh water.

Assessment Criteria

The following demonstrates compliance:

1. Where one of the following water recycling strategies has been implemented:

No. of credits	% rainwater collection req.	Volume of rainwater for consideration
1 credit	20%	Of the total predicted rainwater run-off from the roof catchment area for the *defined period of collection*. **OR** Of the rainwater run-off required to meet the total predicted flushing demand for the *defined period of collection*.
2 credits	50%	
3 credits	80%	

Compliance Notes	
New Build	There are no additional or different criteria to those outlined above specific to new build projects.
Refurbishment	There are no additional or different criteria to those outlined above specific to refurbishment projects.
Extensions to existing buildings	If the assessment is of the new extension only, then the roof catchment area can be taken as the roof area of the extended building. If feasible however, the total roof area of the new extension and existing building can be used. If the assessment is of the new build extension and existing building i.e. whole building, then the roof catchment area is taken as the whole roof area of the building.
Rainwater collection tank size	Of the two options available for demonstrating compliance, it is the option with the lesser of the two figures (litres) that should be specified and therefore used to demonstrate compliance. For example it would not be expected to size a system that collected significantly more rainwater over the defined period than was required to meet flushing demand in the building over the same period, unless the collection system is being used to meet landscape irrigation demand or forms part of a storm water management strategy.
Calculation criteria	See additional guidance for an example of calculating compliance with the assessment criteria.

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Run-off from paved areas	Run-off from paved areas can also be collected and included in the calculation. Where the run-off is collected from part roof, part paved areas, the total catchment area must be at least equivalent to the plan area of the roof.
Using rainwater to meet irrigation and other process demands	Using rainwater collection for WC/urinal flushing is the first priority. Where this demand is met, additional rainwater resources can be used to meet water demand for irrigation or building/operational processes.
Clinical areas	Toilet facilities in clinical areas can be excluded from the assessment of this issue where the use of recycled water for flushing is deemed by the client unfeasible on the grounds that it presents a risk to patient health.
Calculating total predicted flushing demand	Total predicted flushing demand can be estimated by the design team on the basis of the following variables: • Number of building users (staff and visitors) • Effective flush volume of WCs/urinals • Estimated number* of WC/urinal uses per person per day (multiplied by the defined period of collection) * For staff use, unless other data is available, assume 1.3 WC uses per person per day and 2 urinal uses per person per day (assume that only 50% of the building occupants will use urinals).

Schedule of Evidence Required

Req.	Design Stage	Post Construction Stage
All	A copy of the specification clause confirming: • Type of collection system specified. • WC, urinal, taps and shower specification (where appropriate). Design team calculations for the *defined period of collection* demonstrating (where appropriate): • Rainwater yield for the catchment area (mm) • Predicted WC/urinal flushing demand • Estimated potential for waste water collection from taps/showers. • Size (litres) of the rainwater/greywater collection tank specified.	Assessor's building/site inspection and photographic evidence confirming: • The installation of the collection system. Where changes have occurred since design stage assessment, a revised copy of the technical specification and sizing calculations for the installed system.

Additional Information

Relevant definitions

Defined period of collection: For the purpose of assessing this Issue the defined period of collection is 18 days. This is equivalent to approximately 5% of annual rainfall yield.

Potable water: Defined as drinkable and/or mains supplied water. This definition includes water obtained by borehole abstraction and water sourced from rivers, mountain streams, lakes etc.

Catchment area: An area that catches rainfall and delivers it to a collection tank for re-use.

Greywater: Waste water from taps, showers and laundries.

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Calculating compliance
The following formula can be used to calculate the volume of collectable rainwater for the assessed building's catchment area for the defined period of collection:

$\sum (A_{RF} \times C \times R_{co\text{-}ef} \times F_{co\text{-}ef} \times D_{col})$

Where:

A_{RF} = Annual rainfall for the site location (mm)
C = Rainwater catchment area (m^2)
$R_{co\text{-}ef}$ = Run-off co-efficient
$F_{co\text{-}ef}$ = Filter co-efficient.
D_{col} = Defined period of collection: 18 days/365 days = 0.05

Annual rainfall: The local EA, SEPA, EHS office or the Met Office should be able to supply rainfall data.

Run-off co-efficient: A coefficient is used to adjust the tank size calculation to allow for the fact that not every drop of rain that falls within the catchment area will be collected by the tank. Drainage co-efficient is dependent on the type of roof specified for the building, flat roofs having a lower co-efficient. Below are some typical co-efficient factors:

Roof type	Run-off co-efficient
Pitched roof tiles	0.75 - 0.9
Flat roof smooth tiles	0.5
Flat roof with gravel layer	0.4 – 0.5

Filter co-efficient: Not all the water that drains from the roof down the gutters will reach the holding tank; the filter co-efficient accounts for this. Most manufacturers/installers of systems will recommend a filter co-efficient of 90% i.e. 0.9.

Drainage and filter co-efficiencies can be found in CIRIA guidance[54], though these should be in the design team's sizing calculations.

Example calculation:

Average annual rainfall for the site location (mm)	757mm
Roof catchment area (m^2)	3,500m^2
Drainage co-efficient (tiled pitched roof)	0.8
Filter co-efficient.	0.9
Defined period of collection	0.05
Volume of rainwater for the defined period of collection	95,382 Litres

An installed rainwater collection tank with a capacity of 50,000 litres would therefore collect 52.4% of the total predicted rainwater run-off from the roof catchment area for the defined period of collection.

Design issues
BS4800:1989 *Schedule of paint colours for building purposes*. This BS covers the need to have pipework in standardised colours to avoid cross contamination and sets colours for rainwater and greywater system pipes' flow and return.

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BS1710:1984 *Specification for identification of pipelines and services*. This BS covers the identifying marks that should be placed on pipes containing different substances, including greywater pipes, and references the colours in the above BS.

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9.0 Materials

Issue ID	Issue Title	No. of credits available	Minimum standards
Mat 1	Materials Specification (Major Building Elements)	3	No

Aim

To recognise and encourage the use of construction materials with a low environmental impact over the full life cycle of the building.

Assessment Criteria

The following demonstrates compliance:

1. The Green Guide rating for the specifications for the following building elements must be determined and entered in to the BREEAM assessor's *Mat 1 Calculator*. Green Guide ratings for the specification(s) of each element can be found at: www.thegreenguide.org.uk

Building Element	Applicable elements to assessment stage
External Walls	**P**
Windows	N/A
Roof	**P**
Upper Floor Slabs	**P**
Internal Walls	N/A
Floor Finishes / Coverings	N/A

The calculator awards points for each applicable element according to its Green Guide rating as follows:

Green Guide Rating	Points/element
A+	3
A	2
B	1

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C	0.5
D	0.25
E	0

The calculator translates the total number of points in to BREEAM credits as follows:

New build & Refurbishments	
Total Points	**Credits**
2	1
4	2
6	3

Note: Also refer to the guidance concerning the Mat 1 calculator tool in the *Additional Information* section of this issue for further explanation of how the tool awards the available credits.

Exemplary level criteria

The following outlines the exemplary level criteria to achieve an *innovation credit* for this BREEAM issue.

1. One exemplary BREEAM credit can be awarded as follows:
    a. Where assessing four or more applicable building elements, the building achieves at least two points additional to the total points required to achieve maximum credits under the standard BREEAM criteria.
    b. Where assessing fewer than four applicable building elements, the building achieves at least one point additional to the total points required to achieve maximum credits under the standard BREEAM criteria.

Compliance Notes	
New Build	There are no additional or different criteria to those outlined above specific to new-build projects.
Refurbishment	For each element that is reused in situ, BREEAM allocates an 'A+' rating and these elements should also be included in the 'A+' rated area in the MW1 calculator. New elements specified as part of a refurbishment project, e.g. windows, must be assessed as outlined above.
Extensions to existing buildings	Any applicable new-build elements, forming part of the new extension, must be assessed as outlined above. If the existing building forms part of the scope of the assessment, then any existing applicable element that is reused in situ achieves an 'A+' rating, as outlined above for refurbishments.
Green Guide Online	Refer to the Additional Information section below for guidance on using the Green Guide online and accessing the appropriate ratings for the assessed elements.
Element consisting of more than one specification	Where more than one specification is present for a given element, the rating and area for each specification should be entered into the tool and an average points score is calculated (by area).
Finding exact Green Guide Ratings	Whilst exact matches in specifications are not always found, it should be possible to identify a similar specification and use its rating for the purposes of assessment. Where no similar specification can be found, assessors should seek guidance from BRE on the appropriate rating.

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New elements containing reused materials	If a new element is specified e.g. external wall, and part of that element includes a reused material e.g. reclaimed bricks, assessors should seek guidance from BRE on the appropriate rating.
Mixed use developments	Where the assessment covers only some of the floors in the building, the roof must still be assessed as it is protecting the assessed building below. If the roof is directly above domestic accommodation (e.g. flats), the equivalent domestic Green Guide rating for the roof must be used as opposed to the ratings for non-domestic roofs. Roof areas not protecting parts of the assessed building/space can be omitted from the assessment.
Single storey buildings and upper floors	Where the assessed building is a single storey building and therefore has no upper floors, the upper floor element does not need to be assessed. In such instances the BREEAM assessor's *Mat 1 Calculator* will re-calculate the requirement and award the available credits in accordance with the Green Guide ratings for the remaining applicable elements.

Schedule of Evidence Required

Req.	Design Stage	Post Construction Stage
1 & Exemp. level req.	Specification confirming: • A detailed description of each applicable element and its constituent materials. Design drawings or specification detailing: • Location and area (m^2) of each applicable element. A copy of the output from the Mat 1 Calculator, including Green Guide rating and element number* for each specification assessed. * Element numbers may change from time-to-time due to updates in the green guide data. As a result assessors should keep a note of the element numbers they use to give Green Guide rating advice on BREEAM assessments for auditing purposes.	Assessor's building/site inspection and photographic evidence confirming: • Element in-situ (where possible) **AND** As built drawings and, where relevant, written design team confirmation of any changes to materials specification.

Additional Information

Relevant definitions

Ecopoint: The Ecopoint used in the Green Guide online is single score that measures the total environmental impact of a product or process as a proportion of overall impact occurring in Europe - 100 Ecopoints is equivalent to the impact of a European Citizen. Green Guide ratings are derived by sub-dividing the range of Ecopoints/m^2 achieved by all specifications considered within a building element.

Green Guide: The *Green Guide to Specification* is an easy-to-use comprehensive reference website and electronic tool, providing guidance for specifiers, designers and their clients on the relative environmental impacts for a range of different building elemental specifications. The ratings within the Guide are based on Life Cycle Assessment, using the Environmental Profile Methodology.

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Reused materials: are materials that can be extracted from the waste stream and used again without further processing, or with only minor processing, that does not alter the nature of the material (e.g. cleaning, cutting, fixing to other materials).

The Mat 1 Calculator: A spreadsheet-based calculator required to determine the number of credits achieved for this BREEAM issue based on each applicable element's Green Guide rating. The Mat 1 Calculator makes four adjustments to the points achieved for each specification/element assessed, as follows:

1. The first is the scoring based on the Green Guide rating; A+ =3, A=2, B=1, C=0.5, D=0.25 and E=0.
2. The second, where an element consists of several different specifications, is to weight the points achieved according to the relative area and Green Guide rating of each of the individual specifications. So if 50% of an element was A+ and 50% was C, the score would be (50%*3) + (50%*0.5) = 1.75.
3. The third is to weight based on the overall area of different elements - this is done by multiplying the area of each element by the weighted Green Guide score, adding the total for all elements and then dividing by the total area of the assessed elements. As a 20 storey office block will have a smaller roof area than floor area, so the area weighting will take this into account by giving a smaller weighting to the score for the roof than the external walls.
4. The final adjustment relates to the *Ecopoints* range for each assessed element. This adjustment ensures the environmental impact of the element in relation to the impacts of other assessed elements within the building is considered. For example; the external walls have a larger *Ecopoints* range than the internal walls, therefore, if both elements achieve the same Green Guide rating the rating of the external walls achieves a higher proportion of the overall points than the rating for the internal walls, thus recognising the relatively higher reduction possible in the environmental impact of the external walls, due to the larger *Ecopoints* range for that element.

Using the Green Guide to Specification
The Green Guide categorises ratings by building type and element. When using the Green Guide online, (www.thegreenguide.org.uk), the main page asks the user to select a building type.

Where assessing common elements (see below) any building type can be selected. To obtain appropriate ratings for elements that are not common (upper-floors and roofs), select the '*healthcare*' category. For prison building types that are more akin to commercial buildings in their construction e.g. visitors centres, catering buildings, sports halls select the '*offices*' (commercial) category.

These categories include ratings that are most appropriate to the elemental specifications used for these types of prison buildings.

The following elements, for the purpose of non domestic buildings, have common Green Guide ratings irrespective of the building type:

- External walls
- Landscaping
- Windows - commercial

The user can therefore search for ratings for the above elements under any building category.

Indoor Air Quality and the Green Guide flooring category ratings
The Green Guide Online does not cover the potential health and comfort issues associated with flooring materials and indoor air quality, which is covered in BREEAM by issue Hea 9 *Volatile Organic Compounds*.

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Issue ID	Issue Title	No. of credits available	Minimum standards
Mat 2	Hard Landscaping and Boundary Protection	1	No

Aim

To recognise and encourage the specification of materials for boundary protection and external hard surfaces that have a low environmental impact, taking account of the full life cycle of materials used.

Assessment Criteria

The following demonstrates compliance:

1. Where at least 80% of all external hard landscaping and boundary protection (by area) achieves an A or A+ rating, as defined in the *Green Guide to Specification*.

   Green Guide ratings for the specification(s) of each element can be found at: www.thegreenguide.org.uk

Compliance Notes	
New Build	There are no additional or different criteria to those outlined above specific to new-build projects.
Refurbishment & existing elements	For each element that is reused in situ, BREEAM allocates an 'A+' rating. New elements specified as part of a refurbishment must be assessed as outlined above.
Extensions to existing buildings	There are no additional or different criteria to those outlined above specific to the assessment of extensions to existing buildings.
Green Guide Online	When using the Green Guide for the purpose of assessing this BREEAM issue, ratings for landscaping elements are common across all building types. The rating will therefore be the same irrespective of the building type selected via the Green Guide online.
Finding exact Green Guide Ratings	Whilst exact matches in specifications are not always found, it should be possible to identify a similar specification and use its rating for the purposes of assessment. Where no similar specification can be found, seek guidance from BRE for the appropriate rating.
Minor alteration of existing elements	Where less than 20% of the total area of existing hard landscaping and boundary protection elements are subject to minor alterations or maintenance, these elements are awarded an A+ rating for the purposes of this analysis.
No hard landscaping or boundary protection	If one of the elements is not present, e.g. boundary protection, then the credit must be assessed on the basis of the specification of the single element e.g. hard landscaping. Where the development has neither element, the credit can be awarded.
Building façade forming boundary	Any part of an external building façade (of either the assessed building or any other neighbouring building) that forms a part of the site boundary should be excluded from the assessment of this credit.
Existing natural features	Any existing or specified natural boundary protection (such as hedging or other living barrier) should be awarded with an A+ rating for the purposes of this analysis.

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Scope of hard landscaping	For the purpose of assessment, hard landscaping includes parking areas, but excludes access/approach roads and designated vehicle manoeuvring areas.
Secure Perimeter Zones/Areas	The criteria for hard surfaces are applicable only to those areas outside of the secure perimeter zone, but within the overall curtilage of the site. The criteria for boundary protection apply to all specifications within the secure perimeter zone and external zone, including its borders/curtilage, i.e. the whole site. The criteria DO NOT apply to the secure perimeter fence/wall or any other fencing subject to security standards.

Schedule of Evidence Required

Req.	Design Stage	PCR Stage
1	Specification confirming: • A detailed description of each applicable element and its constituent materials. Design drawings or specification detailing: • Location and area (m^2) of each applicable element. The Green Guide rating and element number for the assessed specifications.	Assessor's building/site inspection and photographic evidence confirming: • Element in-situ (where possible) As built drawings/calculations. Written confirmation from the design team or contractor of any changes to the specification.

Additional Information

Relevant definitions

Green Guide: See Mat 1.

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Issue ID	Issue Title	No. of credits available	Minimum standards
Mat 3	Re-Use of Facade	1	No

Aim

To recognise and encourage the in-situ reuse of existing building façades.

Assessment Criteria

The following demonstrates compliance:

1. At least 50% of the total final building façade (by area) is reused.

2. At least 80% of the reused façade (by mass) comprises in-situ reused material.

3. Where an existing building is being reused and/or extended and the function/purpose of the new building will be the same as that which the existing building was used for, i.e. there is no change of use, the credit can be awarded where:

   a. At least 25% of the façade by area of the **total** building is to be reused;
   b. At least 80% of the façade by mass of the **existing** building is made up from in-situ reused material.

   The criteria in this instance are reduced as the existing building is likely to require less remedial work as it is not subject to a change of use.

Compliance Notes	
New Build	New-build schemes with retained façades provide a means of achieving the credit.
Refurbishment	Refurbishment projects are likely to achieve this credit without difficulty.
Extensions to existing buildings	There are no additional or different criteria to those outlined above specific to the assessment of extensions to existing buildings.
Curtain walling & windows	Where existing windows are being replaced they may be excluded from the calculation of façade area; however, curtain walling counts as façade.

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Schedule of Evidence Required

Req.	Design Stage	Post Construction Stage
1&2	Drawings detailing: • The elevations of the existing and the new-build façades. Calculations demonstrating: • The % of façade comprising in situ material. These calculations should be simply based on the volume of each material and its density, with totals compared for the new and retained parts of the structure.	Assessor's building/site inspection and photographic evidence confirming: • The existence of the reused façade. As built drawings/calculations. Written confirmation from the design team or contractor of any changes to the specification for the façade.
3	As above.	As above.

Additional Information

Relevant definitions

Façade: Any exposed building face, not just the front elevation. The definition excludes party walls.

In practice, reusing façades will often require extensive renovation and/or reinforcement, hence the BREEAM requirement for at least 80% by mass of the reused façade to be in situ reused material. Façades with new external cladding or internal lining therefore can gain this credit provided that this criterion is met.

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Issue ID	Issue Title	No. of credits available	Minimum standards
Mat 4	Re-Use of Structure	1	No

Aim

To recognise and encourage the reuse of existing structures that previously occupied the site.

Assessment Criteria

The following demonstrates compliance:

1. Where at least 80% by volume of an existing primary structure is reused without significant strengthening or alteration works.

2. Where a project is part refurbishment and part new build, the reused structure comprises at least 50% by volume of the final building, i.e. any new-build extension to a building being refurbished should not be larger than the original building to qualify for this credit.

3. Where an existing building is being reused and/or extended and the function/purpose of the new building will be the same as that which the existing building was used for, i.e. there is no change of use, the credit can be awarded where;
    a. 80% of the **existing** building structure, by gross building volume, is reused without significant strengthening or alteration works.
    b. The reused structure comprises at least 25%, by gross building volume, of the **final total** building structure.

Compliance Notes	
New Build	There are no additional or different criteria to those outlined above specific to the assessment of new-build projects.
Refurbishment	Refurbishment projects are likely to be the only buildings to achieve this credit.
Extensions to existing buildings	There are no additional or different criteria to those outlined above specific to the assessment of extensions to existing buildings.

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Schedule of Evidence Required

Req.	Design Stage	Post Construction Stage
1&2	Drawings or design team calculations detailing: • The sections of the existing structure to be reused. • Any parts of the structure to be demolished and the total new structure. • Where appropriate, calculations confirming any strengthening/alteration are not deemed 'significant' in terms of the assessment criteria for the mass of materials used.	As built drawings/calculations. Written confirmation from the design team or contractor of any changes to the structural specification.
3	As above.	As above.

Additional Information

Relevant definitions

Significant strengthening or alteration: Defined as where the mass of new material is equal to or greater than 50% of the total mass of the reused structure.

Primary structure: Defined as structural floors, columns, beams, load bearing walls and foundations i.e. where required for structural use by the new building.

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Issue ID	Issue Title	No. of credits available	Minimum standards
Mat 5	Responsible Sourcing of Materials	3	No

Aim

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

Assessment Criteria

The following demonstrates compliance:

New Build and Major Refurbishment assessments

1. Up to 3 credits are available where evidence provided demonstrates that 80% of the *applicable materials* (listed below) comprising each of the following building elements are responsibly sourced:

   a. Structural Frame
   b. Ground floor
   c. Upper floors (including separating floors)
   d. Roof
   e. External walls
   f. Internal walls
   g. Foundation/substructure
   h. Staircase

   Applicable materials
   - Brick (including clay tiles and other ceramics)
   - Resin-based composites and materials, including GRP and polymeric render
   - Concrete (including in-situ and pre-cast concrete, blocks, tiles, mortars, cementious renders etc.)
   - Glass
   - Plastics and rubbers (including EPDM, TPO, PVC and VET roofing membranes including polymeric renders)
   - Metals (steel, aluminium etc.)
   - Dressed or building stone including slate
   - Timber, timber composite and wood panels (including glulam, plywood, OSB, MDF, chipboard and cement bonded particleboard)
   - 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 that form a part of an applicable building element, but do not fit into the applicable materials list or the exclusions list, please refer to BRE who will identify the relevant Key Process and Supply Chain Process or Processes.

2. Each *applicable material* is assigned to a responsible sourcing tier level based on the level and scope of certification achieved by the material supplier(s)/manufacturer(s) (see Table 13 Responsible Sourcing Tier Levels and Criteria and Table 14 EMS Criteriain the additional guidance section).

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3. Follow the *Calculation Procedure* outlined in the additional guidance section, and use the *Mat 5 Responsible Sourcing Calculator* to determine the number of credits to be awarded.

4. Any non-certified timber used in the development comes from a legal source and is not included on the CITES list (see definition for legally sourced timber).

Exemplary level criteria
The following outlines the exemplary level criteria to achieve an *innovation credit* for this BREEAM issue:

1. Where, in addition to the above criteria, 95% of the applicable materials, comprised within the applicable building elements, have been responsibly sourced.

Compliance Notes	
New Build	There are no additional or different criteria to those outlined above specific to new-build projects.
Refurbishment	In the case of a refurbishment assess the newly specified applicable and reused materials (reused as defined below).
Extensions to existing buildings	There are no additional or different criteria to those outlined above specific to the assessment of extensions to existing buildings.
Building element not present	Where an element is not present in a project (e.g. an assessment of a ground floor of a building only and therefore no roof in the scope of the assessment), the points for this/these element(s) will be redistributed by the calculator to reward only the elements being assessed.
Reused in-situ materials	Materials reused in-situ can be excluded from the assessment. The aim of this issue is to focus on the responsible sourcing of new specified materials.
Specified reused Materials	Reused materials specified for the development e.g. recycled aggregates are considered equivalent to materials covered by certification schemes that fall within tier 1 of Table 13 Responsible Sourcing Tier Levels and Criteria.
CITES list	CITES (Convention on International Trade in Endangered Species) Appendices I and II of the CITES list[55] illustrate species of timber that are protected outright. Appendix III of the CITES list illustrates species that are protected in at least one country. If a timber species used in the development is on Appendix III it can be included as part of the assessment as long as the timber is not obtained from the country(ies) seeking to protect this species (see Additional Information for further details).
A Government licence	A Government licence e.g. UK Forestry Commission felling licence certificate, does not comply as a third party timber certification scheme for this credit, but can be used as evidence of legally sourced timber.
Pre or post consumer waste	Where materials being assessed (including timber) are part of a pre- or post-consumer waste stream, the EMS sections of the credit can be applied for; however, using an EMS scheme (ISO, EMAS etc.) for new timber does not demonstrate timber certification and therefore does not qualify for any of these BREEAM credits.
Checklist A5	Checklist A5 is contains information for the BREEAM assessor, including an explanation of what is required for each of the responsible sourcing tiers.

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Schedule of Evidence Required

Req.	Design Stage	Post Construction Stage
1	Design plan and/or specification confirming: • the location of elements and materials specified • Details of the materials specified.	As built drawings or as built specifications confirming that the building has been constructed in accordance with the design stage drawings/specifications. Copies of purchase orders or receipts or certificate/letter of conformity for all applicable materials, including those recycled or reused
2&3	A copy of the output from the Responsible Sourcing of Materials Calculator Tool. AND EITHER A letter of intent from the design team confirming: • The product shall be sourced from suppliers capable of providing certification to the level required for the particular tier claimed. OR If the material has been ordered, supplied or the supplier is known: • Purchase order from the supplier including (as appropriate) Chain of Custody (CoC) number and/or BES6001:2008 Certificate number and/or EMS Certificate number OR • A copy of the CoC and/or BES6001 and/or EMS certificate.	A copy of the output from the Responsible Sourcing of Materials Calculator Tool (if different from Design Stage calculation). A copy of the CoC and/or BES6001 and/or EMS (EMAS/ISO14001) certificate. OR For *Small* companies, (see *Relevant Definitions*) confirmation that the company EMS is structured in compliance with either: • BS8555 2003 (or equivalent) and the EMS has completed phase audits one to four as outlined in BS8555. This evidence can be found from 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. • Green Dragon Environmental Standard ® 2006 (Safon Amgylcheddol Y Ddraig Werdd ®) completed up to and including Level 4. Confirmation is taken from a Green Dragon Standard certificate stating the company's achievement of Level 4. As company's achieving Level 4 will normally be required to undertake annual audits, this certification should be dated within 1 year at the point of the last purchase made from the company. For smaller companies with low environmental impacts, a renewal date of within 2 years is acceptable. For clarification on whether a company is certified against the Green Dragon Environmental Standard please see the Register of companies available at the Green Dragon website.

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4	Written confirmation from the developer confirming that: • All timber will come from a 'legal source' and one not on the CITES list*. * Or in the case of Appendix III of the CITES list, it has not been sourced from the country seeking to protect this species as listed in Appendix III.	Where any non-certified timber is used, written confirmation from the supplier(s) confirming that: • All timber comes from a legal source. • 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*). * Or in the case of Appendix III of the CITES list, it has not been sourced from the country seeking to protect this species as listed in Appendix III.

Additional Information

Calculation Procedure (using the Mat 5 calculator)

1. Choose from the list of options in the drop down box of the calculator the appropriate type of assessment and press the select button.
2. Choose from the list of options in the drop down box the relevant BREEAM scheme and press the select button (this selection ensures the appropriate 'generic specifications' for the building types are used).
3. For each element, select the number of different types of element you wish to enter in the relevant drop down box and press the select button. If the element is not present select '0'. Note: this will adjust the points required benchmarks accordingly.
4. For each element, select the 'data type' from the relevant drop down box. There are two or three options depending on the element type, 'Generic specification', 'Volume' or 'Percentage'. Generic specification' is not available for all element types.

   Generic Specification

   a. Choose the specification from the relevant drop down box that matches the element specification for the building. If more than one construction specification is present for an element, select additional construction specifications from the list in element type 2, 3, 4 etc. (see point 3 for adding additional types). If no specification matches, then the specification will need to be assessed using one of the 'User Defined' methods.

      Based on the specification selected from the drop down list the material types and their percentage will automatically be entered in the relevant cell of the *material type* and *percentage/volume of relevant materials present* columns. The assessor can then enter the percentage of each material that complies with either tier 1, 2, 3 or 4, as appropriate. At least 80% of the materials that make up an element type must comply with one or more of the tiers to achieve any points for that element type.

   User Defined - Volume

   a. For all present elements, enter the names of the material types comprising each individual element in the relevant cell of the column *materials types*.

   b. Enter the volume of each individual material type in the relevant cell of the column titled *percentage/volume of relevant materials present*.

   c. Enter the total combined volume of the material types in the cell *total volume of element present.*

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d. Enter the volume of each material that complies with either tier 1, 2, 3 or 4, as appropriate. At least 80% of the total volume must comply with one or more of the tiers to achieve any points for that element type.

User Defined - Percentage

a. For all present elements, enter the names of the material types comprising each individual element in the relevant cell of the column *materials types*.

b. Enter the percentage of each individual material type (as a percentage of the whole element type) in the relevant cell of the column titled *percentage/volume of relevant materials present*.

c. Enter the percentage of each material (as a percentage of the whole element type) that complies with either tier 1, 2, 3 or 4, as appropriate. At least 80% of the materials that make up an element type must comply with one or more of the tiers to achieve any points for that element type.

Combination

a. A combination of *generic* and *user defined* data can be entered for any of the elements, simply select the number of element types you wish to enter for an element (point 3) and follow the above guidance.

3. Once all data has been entered correctly and in compliance with the criteria, the tool will calculate the total number of points achieved and translate this into the number of credits awarded.

The following scale is used to award credits for new builds and major refurbishment projects:

a.	≥15 points	3 credits awarded
b.	≥10 points	2 credits awarded
c.	≥5 points	1 credit awarded

Note: Where not all applicable elements are specified within the development, the number of points required to credits available are re-allocated based on the number of elements that are specified.

Although only 80% of the materials in an element have to be assessed, it may be beneficial to include even small percentages of materials that are in the higher tiers.

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Table 13 Responsible Sourcing Tier Levels and Criteria

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, Reused Materials, Schemes compliant with BES6001:2008[56] (or similar) Excellent* and Very Good* Performance Ratings (Note; the EMS required to achieve these ratings must be independently certified)
2	Legality & responsible sourcing	2	Certification scheme	Schemes compliant with BES6001:2008 (or similar) Good* and Pass* Performance Ratings (Note; the EMS required to achieve these ratings must be independently certified)
3	Legality & responsible sourcing	1.5	Certification scheme/ EMS	Timber: MTCC, Verified**, SGS, TFT
				Other materials: Certified EMS for the Key Process and *Supply Chain*.
				Recycled Materials with certified EMS for the *Key Process*
4	Legality & responsible sourcing	1	Certification scheme/EMS	Certified EMS for key process stage.

Note:
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.

Where new in situ concrete (not existing 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.

* Performance ratings for schemes compliant with BES6001:2008 (or similar) can only be used to demonstrate compliance with the assessment criteria for this issue where certification covers the key process and supply chain processes for the material being assessed.

**** "Verified" is the name of a scheme produced by SmartWood.

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Table 14 EMS Criteria

Material	Key Process	Supply chain processes
Brick (including clay tiles and other ceramics)	Product Manufacture	Clay Extraction
Resin-based composites and materials (including GRP and polymeric render but excluding timber based composites)	Composite product manufacture	Glass fibre production (or other principle matrix material) Polymer production
In situ Concrete (including ready mix and cemetitious mortars and renders)	Ready mixed concrete plant	Cement production Aggregate extraction and production
Precast concrete and other concrete products (including blocks, cladding, precast flooring, concrete or cementitious roof tiles)	Concrete product manufacture	Cement production Aggregate extraction and production
Glass	Glass production	Sand extraction Soda Ash production or extraction
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	Metal production: Steel: Electric arc furnace or Basic oxygen furnace process, Aluminium, ingot production, Copper: ingot or cathode production.
Dressed or building stone (including slate)	Stone product manufacture	Stone extraction
Plasterboard and plaster	Plasterboard or plaster manufacture	Gypsum extraction Synthetic gypsum (from flue gas desulphurisation) by default (recycled content)
Virgin timber	Timber from certified sources	Timber from certified sources
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: Timber from certified sources	Cement production Timber from certified sources
Wood panel and wood based composite products such as Oriented Strand Board, plywood, HPL, chipboard/particle, glulam, LVL,etc.)	Wood products, including those with recycled content, can only use the Timber Certification route	
Bituminous materials, such as roofing membranes and asphalt	Product manufacture	Bitumen production Aggregate extraction and production
Other mineral-based materials, including fibre cement and calcium silicate	Product manufacture	Cement production lime production other mineral extraction and production
Products with 100% recycled content	Product manufacture	Recycled input by default
Products with lower % of recycled content	Product manufacture	Supply chain process/processes for any virgin material in the relevant product type above. Recycled input by default
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

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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 13 Responsible Sourcing Tier Levels and Criteria. 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.

Calculation procedure: Post Construction/Post Fit Out stage

1. Check that the *As Built* construction matches that proposed at design stage (see *Schedule of Evidence*). Where there are any differences in the specification, obtain the relevant volumes and/ or percentages of materials for each element that differs.

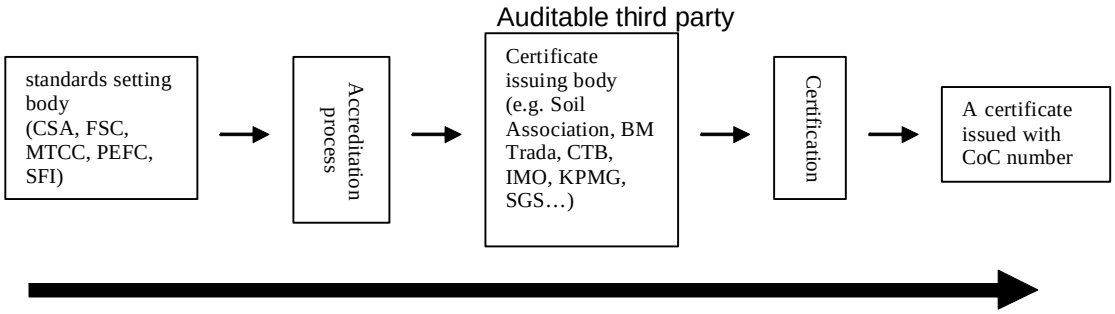
2. Obtain the relevant confirmation of tier certification for post construction stage (see *Schedule of Evidence*) for all materials, from all sources/suppliers.

3. Confirm and/or re-assign a tier level to each material based on the level of certification provided (see Table 13 Responsible Sourcing Tier Levels and Criteriaand *Information Required to Demonstrate Compliance).*

4. Adjust the design stage Responsible Sourcing Calculator accordingly to include any revised information following the calculation procedure used at design stage.

Chain of Custody
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 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.

Third party certification process



Timber certification process

CITES - Convention on International Trade in Endangered Species of wild fauna and flora (extract taken from the CITES website)

''CITES works by subjecting international trade in specimens of selected species to certain controls. All import, export, re-export and introduction from the sea of species covered by the Convention has to be authorized through a licensing system. Each Party to the Convention must designate one or more Management Authorities in charge of administering that licensing system and one or more Scientific Authorities to advise them on the effects of trade on the status of the species.

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The species covered by CITES are listed in three Appendices, according to the degree of protection they need.

1. Appendix I includes species threatened with extinction. Trade in specimens of these species is permitted only in exceptional circumstances.
2. Appendix II includes species not necessarily threatened with extinction, but in which trade must be controlled in order to avoid utilization incompatible with their survival.
3. Appendix III contains species that are protected in at least one country, which has asked other CITES Parties for assistance in controlling the trade.''

Calculation of Timber Volumes

a. Most of the information on areas, lengths and volumes of timber will be available from the component manufacturers or estimator, who should provide a detailed breakdown of quantities of materials.

b. In order to calculate the volume of wood in timber frame windows, the total length of frame must be obtained. This can then be converted to a volume by multiplying the length of frame on fixed windows by 0.00653 and the length of frame on opening windows by 0.01089.

c. In order to calculate the volume of timber in composite timber doors such as a flush door, calculate the total area of all doors summed over the whole building and multiply this by 0.02187 (this factor gives the total volume of timber in the doors and frames).

BES 6001:2008 Framework Standard for Responsible Sourcing of Construction Products
BES 6001:2008 is a BRE Global standard that provides a framework for the assessment of responsible sourcing schemes and provides a route to certification of construction products.

The framework comprises a number of criteria setting out the criteria of an organisation in managing the supply of construction products in accordance with a set of agreed principles of sustainability. To comply with the standard a product must meet a number of mandatory criteria, where a product demonstrates compliance beyond the mandatory levels, higher levels of performance can be achieved. The standard's performance ratings range from Pass to Good, Very Good and Excellent.

The development of this standard and subsequent certification schemes will, it is envisaged, provide construction products, not wholly covered under current recognised standards, a means for demonstrating their responsibly sourced credentials. In turn this will allow clients, developers and design teams to specify responsibly sourced construction products with greater assurance and provide a means of demonstrating compliance with the assessment criteria for this BREEAM issue.

To view a list of products approved to BES6001:2008 visit: www.greenbooklive.com/page.jsp?id=169

For further information about BES6001:2008, including a copy of the standard itself visit: www.greenbooklive.com/page.jsp?id=153

Relevant Definitions

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.

Frame: The frame is any of the main structural elements that are not included in the roof, external walls and floors. For example, timber or metal studwork within a plasterboard partition would be included within the internal walls, and timber joists would be included within the floor construction.

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Where a concrete or steel frame is used, this would be treated as the Frame as it would not be integral to the internal walls for example.

Green Dragon Environmental Standard ® (Safon Amgylcheddol Y Ddraig Werdd ®): A stepped standard used to accredit compliance with the Green Dragon Environmental Management Scheme. Dependant on the content of the EMS being assessed, a Level of 1, 2, 3, 4 or 5 may be achieved. At level 4 and above, the Green Dragon Environmental Standard ® can be used as evidence of a compliant EMS for small companies being considered under the assessment of this BREEAM issue. www.greendragonems.com

Key Processes: 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 criteria for each of the assessed materials are detailed in Table 14 EMS Criteria.

Legally Sourced Timber: BREEAM follows the UK Government's definition of legally sourced timber, as outlined in the CPET 2nd Edition report on UK Government Timber Procurement Policy[57], which states that legal timber and wood derived products are those which originate from a forest where the following criteria are met:

1. The forest owner/manager holds legal use rights to the forest.
2. There is compliance by both the forest management organisation and any contractors with local and national legal criteria including those relevant to:
    a. Forest management
    b. Environment
    c. Labour and welfare
    d. Health & safety
    e. Other parties' tenure and use rights
3. All relevant royalties and taxes are paid.
4. There is compliance with the criteria of CITES.

Relevant documentation demonstrating the above must be provided or made available on request subject to the availability of such materials in the country concerned. Certification from any of the timber certification schemes identified in tiers 1, 2 and 4 for this credit demonstrate legally sourced timber.

Pre-consumer waste stream: 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.

Post-consumer waste stream: 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.

Responsible Sourcing: Demonstrated through auditable third party certification schemes.

Reused materials: Materials that can be extracted from the waste stream and used again without further processing, or with only minor processing, that does not alter the nature of the material (e.g. cleaning, cutting, fixing to other materials).

Recycled Material: 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 *Calculating and declaring recycled content in construction products, "Rules of Thumb" Guide* (WRAP, 2008) www.wrap.org.uk/wrap_corporate/news/wraps_rules_of.html

Responsible Sourcing Calculator: A BRE spreadsheet-based tool designed to simplify assessment of this issue. Access is provided to all BRE licensed BREEAM assessors.

Supply Chain EMS: covers all of the major aspects of processing and extraction involved in the supply chain for the end product. Note that recycled materials are not required to demonstrate a Supply Chain

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EMS. If EMS certification is provided for the Key Processes for recycled materials, this is assumed by default.

Small Company: A company is defined as 'small' if it satisfies at least two of the following criteria:

a. A turnover of not more than £5.6 million;
b. 50 employees or fewer.

This is based on the definition stated in the Companies Act of 1985.

Tier levels – a graded 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 13 Responsible Sourcing Tier Levels and Criteria).

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Issue ID	Issue Title	No. of credits available	Minimum standards
Mat 6	Insulation	2	No

Aim

To recognise and encourage the use of thermal insulation which has a low embodied environmental impact relative to its thermal properties and has been responsibly sourced.

Assessment Criteria

The following demonstrates compliance:

1. Any new insulation specified for use within the following building elements must be assessed:
    - External walls
    - Ground floor
    - Roof
    - Building services

First credit - Embodied Impact

2. The Green Guide rating for the thermal insulation materials must be determined. Green Guide ratings for thermal insulation can be found at: www.thegreenguide.org.uk (please refer to the Compliance Notes for guidance where specific insulation has been assessed within an element for the Mat 1 BREEAM issues).

3. Where the *Insulation Index* for the building insulation is the same as or greater than 2.

4. The *Insulation Index* is calculated using the Mat 6 *Insulation Index Calculator Tool* in the BREEAM assessor's spreadsheet tool. For each type of thermal insulation used in the relevant building elements, the volume weighted thermal resistance provided by each type of insulation is calculated as follows:
    a. (Area of insulation (m^2) * thickness(m)) / Thermal Conductivity (W/ m.K) **OR**
    b. Total volume of insulation used (m^3) / Thermal conductivity (W/m.K)

    The volume weighted thermal resistance for each insulation material is then multiplied by the relevant Green Guide point(s) from the following table:

Table 15 Green Guide rating points/element

Green Guide Rating	Points/element
A+	3
A	2
B	1
C	0.5
D	0.25
E	0

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To calculate the *Insulation Index*, the sum of these values is divided by the sum of the volume weighted thermal resistance values (an example calculation is provided in the Additional Information section).

Second credit - Responsible Sourcing

5. At least 80% of the thermal insulation used in the building elements identified in Item 1 must be responsibly sourced, i.e. each insulation product must be certified in accordance with Levels 1, 2 or 3 described in Table 13 *Tier levels and criteria*, as outlined in Mat 5. Table 16 below shows the Key Processes and Supply Chain processes required for common insulation products.

Table 16 EMS criteria for insulation products

Material	Key Process	Supply chain processes
Foam Insulation	Insulation manufacture	Principal Polymer production, e.g. Polystyrene, MDI , Phenolic resin or equivalent
Stone wool, glass & cellular glass made using < 50% recycled input	Product manufacture	Any quarried or mined mineral over 20% of input
Wool	Product manufacture	Wool Scouring
Products using > 50% recycled content except those using timber	Product manufacture	Recycled content by default
Timber-based insulation materials including those using recycled timber	Product manufacture	Recycled timber by default, all other timber from one of the recognised timber certification schemes in Table 13.
Other renewable-based insulation materials using agricultural by-products (e.g. straw)	Product manufacture	By-product manufacture by default
Any other product	Product manufacture	1 or 2 main inputs with significant production or extraction impacts should be identified

Compliance Notes	
New Build	There are no additional or different criteria to those outlined above specific to new-build projects.
Refurbishment and materials reused in-situ	For each element that is reused in-situ, BREEAM allocates an 'A+' rating. For the purpose of responsible sourcing, existing in-situ insulating materials are not assessed. If no new insulating products are being specified as part of the refurbishment both credits can be awarded.
Extensions to existing buildings	There are no additional or different criteria to those outlined above specific to the assessment of extensions to existing buildings.
Insulation incorporated as part of an off-site manufactured element	If the insulation is incorporated as a component of an element that has been manufactured offsite e.g. a wall or roof, and that element has been assessed as part of Mat 1, then for the purpose of assessing the insulation for this BREEAM issue, a Green Guide rating of A+ should be used. The same rule applies to insulation that has a significant additional function, such as providing supporting structure e.g. structural insulated panels (SIPS). In the Green Guide the actual insulation will be listed within the element title, rather than under the generic insulation category.

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Awarding credits	Both credits can be awarded independently of each other - i.e. it is not a requirement of the second credit that the first is achieved, and vice-versa.
Element consisting of more than one insulation	Where more than one insulation type is present for a given element, the rating, area and conductivity for each insulation should be entered into the tool and an average is calculated (by area).
Finding exact Green Guide Ratings	Where no similar insulation can be found assessors should seek guidance from BRE on the appropriate rating.

Schedule of Evidence Required

Req.	Design Stage	Post Construction Stage
1-4	Marked-up design plan/elevations and/or a copy of the specification confirming: • The location of insulating materials. • The area (m^2) and thickness (m) or volume (m^3) of insulation specified. Manufacturer's technical details confirming: • Thickness and thermal conductivity of the insulating materials specified. A copy of the output from the Insulation Index Calculator Tool. The Green Guide rating and element number for the assessed insulation specifications.	Assessor's building/site inspection and photographic evidence confirming: • Element in-situ (where possible) **AND** As built drawings and, where relevant, written design team confirmation of any changes to the materials specification.
5	Evidence (as outlined in Mat 5) confirming compliance for the insulating materials.	Evidence (as outlined Mat 5) confirming compliance.

Additional Information

Relevant definitions

Insulation Index: A measure of performance used in BREEAM that seeks to assess the thermal properties of insulation products used in the building relevant to the embodied impact of that insulating material.

Insulation Index Calculator Tool: A spreadsheet tool used by the BREEAM assessor to determine the Insulation Index and therefore, whether the BREEAM credit is achieved.

Example calculation
The Insulation Index is calculated for a building using the following types of insulation as follows:

Type 1 Walls
Area = 450m^2. Thermal insulation thickness = 100mm. Thermal conductivity = 0.023 W/mK Green Guide rating = A (2 points)
Area weighted thermal resistance: ((450*0.100)/0.023) = 1956
Green Guide rating correction: 1956* 2.0 = 3912

Type 2 Building Services
Volume of insulation used = 21m^3. Thermal conductivity = 0.022 W/mK
Green Guide rating = C (0.5 points)

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Area weighted thermal resistance: (21/0.022) = 955
Green Guide rating correction: 955 * 0.5 = 477

Type 3 Roof
Area = 210m^2. Thermal insulation thickness = 120mm. Thermal conductivity = 0.027 W/mK Green Guide rating = A+ (3 points)
Area weighted thermal resistance: ((210*0.120)/0.027) = 933
Green Guide rating correction: 933 * 3.0 = 2799

Type 4 Ground Floor
Area = 210m^2. Thermal insulation thickness = 120mm. Thermal conductivity = 0.027 W/mK Green Guide rating = B (1 point)
Area weighted thermal resistance: ((210*0.120)/0.027) = 933
Green Guide rating correction: 933 * 1.0 = 933

Total area weighted thermal resistance = 1956+955+933+933 = 4777
Green Guide rating correction = 3912 + 477 + 2799 +933 = 8121

Insulation Index: Green Guide Rating Correction / Total Area weighted thermal resistance = 8121/4777 = 1.7 (credit not achieved).

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Issue ID	Issue Title	No. of credits available	Minimum standards
Mat 7	Designing for Robustness	1	No

Credit aim

To recognise and encourage adequate protection of exposed parts of the building and landscape, therefore minimising the frequency of use of replacement materials.

Assessment Criteria

The following demonstrates compliance:

1. Internal and external areas of the building where vehicular, trolley and pedestrian movement occur have been identified.

2. Suitable durability and protection measures or design features have been specified to prevent damage to the vulnerable parts of these building areas from such traffic. This must include, but is not necessarily limited to:
    a. Protection from the effects of high pedestrian traffic in main entrances, public areas and thoroughfares (corridors, lifts, stairs, doors etc).
    b. Protection against any internal vehicular/trolley movement within 1m of the internal building fabric in storage, delivery, corridor and kitchen areas.
    c. Protection against, or prevention from, any potential vehicular collision where vehicular parking and manoeuvring occurs within 1m of the external building façade for all car parking areas and within 2m for all delivery areas.

Compliance Notes	
New Build	There are no additional or different criteria to those outlined above specific to the assessment of new-build projects.
Refurbishment	Where the assessment is of a refurbished building on an existing site then the criteria apply to the areas that form a part of the works or hard landscape for that building.
Extensions to existing buildings	There are no additional or different criteria to those outlined above specific to the assessment of extensions to existing buildings.
Suitable durability measures	Suitable durability and protection measures to vulnerable parts of the building can include: • Bollards/barriers/raised kerbs to delivery and vehicle drop-off areas • Robust external wall construction, up to 2m high • Corridor walls specified to Severe Duty (SD) as per BS 5234-2[58]. • Protection rails to walls of corridors • Kick plates/impact protection (from trolleys etc) on doors • Hard-wearing and easily washable floor finishes in heavily used circulation areas (i.e. main entrance, corridors, public areas etc)
Entry building and works dept.	The assessor must pay particular attention to the entry building and works area/department, where being assessed. This is where the majority of vehicle movement will occur on a prison site.

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Vehicle Impact Protection	Any vehicle impact protection measures specified must be positioned at an adequate distance from the building to protect the fabric from impact from any vehicle with a measurable overhang of the body from the wheel track, in particular for any goods delivery areas. In vehicle movement areas only; where the specification of external robust wall construction is specified to comply with the credit, additional protection must be provided to ensure against potential damage to the robust façade from vehicle movement, i.e. specifying bollards or protection rails.
Public / Common Areas	Consideration should be given to materials specification in public/common areas (especially public waiting areas and toilet areas) to provide protection against potential malicious or physical abuse in as far as it is possible.

Schedule of Evidence Required

Req.	Design Stage	Post Construction Stage
1	Design drawings marked up to illustrate: • Vulnerable areas/parts of the building.	Assessor's building/site inspection and photographic evidence confirming: • Vulnerable areas of the building • The durability measures in-situ.
2	Design drawings and/or specification confirming: • The durability measures specified.	

Additional Information

Relevant definitions
None.

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10.0 Waste

Issue ID	Issue Title	No. of credits available	Minimum standards
Wst 1	Construction Site Waste Management	4	No

Aim

To promote resource efficiency via the effective and appropriate management of construction site waste.

Assessment Criteria

The following demonstrates compliance:

New Build and Major Refurbishments - Up to three credits are available

1. Where non-hazardous construction waste generated by the building's construction phase (excluding demolition and excavation waste) meets or exceeds the following resource efficiency benchmarks:

	Amount of waste generated per 100m^2 (gross internal floor area)	
BREEAM credits	**m^3**	**tonnes**
One credit	13.0 - 16.6	6.6 - 8.5
Two credits	9.2 – 12.9	4.7 - 6.5
Three credits	<9.2	<4.7

* Volume (m^3) is actual volume of waste (not bulk volume)

2. Where there is a Site Waste Management Plan (SWMP) that contains:
   a. The target benchmark for resource efficiency i.e. m^3 of waste per 100m^2 or tonnes of waste per 100m^2
   b. Procedures and commitments for minimising non-hazardous waste in line with the benchmark
   c. Procedures for minimising hazardous waste
   d. Procedures for monitoring, measuring and reporting hazardous and non-hazardous site waste
   e. Procedures for sorting, reusing and recycling construction waste into defined waste groups (see additional guidance section), either on site or through a licensed external contractor
   f. The name or job title of the individual responsible for implementing the above.

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Demolition & refurbishment projects

3. In addition to the above, sites with existing buildings that will be refurbished or demolished, where demolition forms a part of the principal contractor's works contract, must comply with the following:
    a. Completed a pre-demolition/pre-refurbishment audit of the existing building to determine if, in the case of demolition, refurbishment is feasible and, if not, to maximise the recovery of material from demolition or refurbishment for subsequent high-grade/value applications. The audit must be referenced in the SWMP and cover:
        i. Identification of the key refurbishment/demolition materials.
        ii. Potential applications and any related issues for the reuse and recycling of the key refurbishment and demolition materials.

New build, Refurbishment and Fit Out only projects - one credit is available

1. Where at least 75% by weight or 65% by volume of non-hazardous construction waste generated by the project has been diverted from landfill and either:
    a. Reused on site (in-situ or for new applications)
    b. Reused on other sites
    c. Salvaged/reclaimed for reuse
    d. Returned to the supplier via a 'take-back' scheme
    e. Recovered from site by an approved waste management contractor and recycled.

2. For demolition projects, in addition to the above requirement for construction-related waste, 90% by weight or 80% by volume of non-hazardous demolition waste has been diverted from landfill.

3. Where there is a Site Waste Management Plan (SWMP) complying with the above criteria.

4. Waste materials will be sorted into separate key waste groups (according to the waste streams generated by the scope of the works) either onsite or offsite through a licensed contractor for recovery.

Exemplary level criteria
The following outlines the exemplary level criteria to achieve an *innovation credit* for this BREEAM issue.

1. Where non-hazardous construction waste generated by the building's development meets or exceeds the resource efficiency benchmark required to achieve three credits (as outlined above).

2. Where at least 90% by weight (80% by volume) of non-hazardous construction waste and 95% of demolition waste by weight (85% by volume) (if applicable) generated by the build has been diverted from landfill and either:
    a. Reused on site (in-situ or for new applications)
    b. Reused on other sites
    c. Salvaged/reclaimed for reuse
    d. Returned to the supplier via a 'take-back' scheme
    e. Recovered from site by an approved waste management contractor and recycled.

3. All key waste groups are identified for diversion from landfill at pre-construction stage SWMP.

Compliance Notes	
New Build	There are no additional or different criteria to those outlined above specific to new-build projects.
Refurbishment	There are no additional or different criteria to those outlined above specific to refurbishment projects.

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Extensions to existing buildings	If the building is part refurbishment part new-build extension then the whole building must be used to determine compliance with this issue. For assessments of extensions to existing buildings, where only the extension is being assessed, it is the extension only that must comply.
Pre-demolition/pre-refurbishment audit	A pre-demolition/pre-refurbishment audit should be carried out using an appropriate methodology. At the time of writing BRE are currently developing a tool as part of the SMARTWaste system for carrying out such audits, and the ICE has produced guidance on pre-demolition audits, including '*A report on the Demolition Protocol*[59].
SWMP	Since April 2008 any construction project in England costing over £300k requires a Site Waste Management Plan. To achieve any of the construction site waste management credits the assessed development, regardless of value or locality, must have a SWMP compliant with best practice (see relevant definitions in additional guidance section).
Limited site space for segregation and storage	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 agreed levels and that materials are reused/recycled as appropriate.

Schedule of Evidence Required

Req.	Design Stage	Post Construction Stage
All Credits and Exemplary level		
All	A copy of the compliant Site Waste Management Plan containing the appropriate benchmarks, commitments and procedures. Where relevant, a copy of the pre-demolition/pre-refurbishment audit. **OR** A copy of the specification clause that: • Requires the principal contractor to produce a SWMP in line with the criteria • Contains the detailed criteria with respect to resource efficiency benchmarks and target(s) and procedures to be included in the SWMP • Where relevant, requires the principal contractor to carry out a pre-demolition/pre-refurbishment audit. **OR** A letter from the client or their representative containing: • Confirmation that the specification will contain a clause on site waste management criteria. • An outline of the detailed criteria that	A copy of the SWMP summary datasheets or equivalent monitoring records/report confirming: • The total waste arising for the development. • Comparison of the total waste arising against the benchmark • Quantities of waste by groupings • Where required, the amount and proportion of waste arising that was reused, recycled and landfilled. • Custody/application/destination of reused/recycled materials.

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	will be included in that specification clause.	

Additional Information

Relevant definitions

Significant Majority: Defined as meeting at least the percentages required within the assessment criteria section of this manual.

Site Waste Management Plan (SWMP): SWMP aims to promote resource efficiency and to prevent illegal waste activities. Resource efficiency includes minimising waste at source and ensuring that clients, designers and principal contractors assess the use, reuse and recycling of materials and products on and off the site.

Best Practice SWMP: Best practice (site waste management) is a combination of commitments to:

a. design out waste
b. reduce waste generated on site
c. develop and implement procedures to sort and reuse/recycle construction waste on and off site (as applicable).
d. follow guidance from:
   - DEFRA (Department of Environment, Food and Rural Affairs)
   - BRE (Building Research Establishment)
   - Envirowise
   - WRAP (Waste & Resources Action Programme)

Table 17 Construction waste groups

European Waste Catalogue)	Key Group	Examples
170102	Bricks	Bricks
170101	Concrete	Pipes, kerb stones, paving slabs, concrete rubble, precast and in situ
170604	Insulation	Glass fibre, mineral wool, foamed plastic
1501	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
200301	Canteen/office	Office waste, canteen waste, vegetation
1301	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, sanitaryware
1701	Inert	Mixed rubble/excavation material, glass
1704	Metals	Radiators, cables, wires, bars, sheet
170802	Gypsum	Plasterboard, render, plaster, cement, fibre cement sheets, mortar

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170203	Plastics	Pipes, cladding, frames, non-packaging sheet
200307	Furniture	Tables, chairs, desks, sofas
1705	Soils	Soils, clays, sand; gravel, natural stone
Most relevant EWC	Liquids	Non-hazardous paints, thinners, timber treatments
Most relevant EWC	Hazardous	Defined in the Hazardous Waste List (HWL) of the European Waste Catalogue (EWC)
Most relevant EWC	Floor coverings (soft)	Carpets, vinyl flooring
Most relevant EWC	Architectural Features	Roof tiles, reclaimed bricks, fireplaces
170904 (Mixed)	Mixed/ other	Efforts should be made to categorise waste into the above categories wherever possible

BREEAM construction waste benchmarks
The benchmarks used have been derived from BRE's SMARTWaste system and through a DEFRA-funded project for predicting construction waste and will be updated annually for the purposes of BREEAM. The benchmarks are based on real-life data and have been subject to a number of statistical and logical tests. The benchmarks used apply to actual volume, and standard conversion factors have been used for tonnages from the Environment Agency. Compliance with the benchmarks can be demonstrated using either volume of weight of construction waste.

For more information on these benchmarks and to break them down by waste type, please go to www.smartwaste.co.uk

Tools for preparing, implementing and reviewing a SWMP
SMARTWaste Plan is a free web-based tool for preparing, implementing and reviewing a SWMP. This tool includes an integrated waste measurement tool (a revised SMARTStart) which is aligned to defined waste groups. SMARTWaste Plan will manage all aspects of creating SWMPs and measuring waste generated on projects. Templates are available to meet the BREEAM credits and can also be downloaded. The tool includes online waste measurement, industry waste benchmarks and links to BREMAP. A carbon calculator and economic assessment of waste will also be added.

BREMAP is a geographical information system of waste management facilities. See www.bremap.co.uk

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Issue ID	Issue Title	No. of credits available	Minimum standards
Wst 2	Recycled Aggregates	1	No

Aim

To recognise and encourage the use of recycled and secondary aggregates in construction, thereby reducing the demand for virgin material.

Assessment Criteria

The following demonstrates compliance:

1. Where the amount of recycled and secondary aggregate specified is over 25% (by weight or volume) of the total *high-grade* aggregate uses for the building. Such aggregates can be **EITHER**:
    a. Obtained on site **OR**
    b. Obtained from waste processing site(s) within a 30km radius of the site; the source will be principally from construction, demolition and excavation waste (CD&E) – this includes road planings **OR**
    c. Secondary aggregates obtained from a non-construction post-consumer or post-industrial by-product source (see Compliance Notes).

Compliance Notes	
New Build	There are no additional or different criteria to those outlined above specific to new-build projects.
Refurbishment	The credit available for this issue can be awarded automatically where no new aggregate is being used. Potentially the case in most refurbishments.
Extensions to existing buildings	There are no additional or different criteria to those outlined above specific to the assessment of extensions to existing buildings.
Secondary aggregates	Recognised non-construction post-consumer or post-industrial by-products include: • China clay waste • Slate overburden • Pulverised Fuel Ash (PFA) • Ground Granulated Blast Furnace Slag (GGBFS) • Air-cooled blast furnace slag • Steel slag • Furnace bottom ash (FBA) • Incinerator bottom ash • Foundry sands • Recycled glass • Recycled plastic • Tyres • Spent oil shale • Colliery spoil • Municipal Solid Waste Treatment Residues

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Schedule of Evidence Required

Req.	Design Stage	Post Construction Stage
1	A copy of the relevant specification or contract clause confirming: • Recycled and secondary aggregate use criteria for the project. A letter from the design team or main contractor confirming: • The source of recycled/secondary aggregates • The amount and quality required can be obtained from this source.	Structural engineers calculations demonstrating the weight/volume of: • Total high grade aggregate used. • Total recycled and secondary aggregates used. Third party documentation as follows: Delivery notes for all recycled and secondary aggregates confirming: • Source of recycled/secondary aggregate. **AND/OR** A letter or email from the aggregate/ concrete supplier confirming that: • The aggregate supplied and used was from a recycled/secondary source • Source of recycled/secondary aggregate.

Additional Information

Relevant definitions

High Grade aggregate uses are considered to be:

Bound
- Structural frame;
- Floor slabs including ground floor slabs;
- Bitumen or hydraulically bound base, binder, and surface courses for paved areas and roads.

Unbound
- Asphalt-based or similar road surfaces
- Granular fill and capping
- Pipe bedding
- Sub bases/building foundations
- Gravel landscaping.

Crushed masonry used as fill material for general landscaping is not considered to be *high grade.* This practice is now common place on construction sites due to landfill costs.

Pre-consumer waste stream: 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.

Post-consumer waste stream: 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.

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Recycled aggregates: are those derived from reprocessing materials previously used in construction, e.g. crushed concrete or masonry from construction and demolition waste material.

Secondary aggregates: By-products of industrial processes that can be processed to produce secondary aggregates. Secondary Aggregates are sub-divided into manufactured and natural, depending on their source.

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Issue ID	Issue Title	No. of credits available	Minimum standards
Wst 3	Recyclable Waste Storage	2	Yes

Aim

To recognise the provision of dedicated storage facilities for a building's operational-related recyclable waste streams, so that such waste is diverted from landfill or incineration.

Assessment Criteria

The following demonstrates compliance:

First credit

1. A dedicated storage space to cater for the recyclable materials generated by the building during occupation, compliant with the following:
    a. Clearly labelled for recycling
    b. Located within a dedicated centralised waste management unit or alternatively within easy reach of the assessed building(s) (e.g. less than 20m away from an appropriate building entrance)
    c. In a location with good vehicular access to facilitate collections.

Second credit

2. The first credit must be achieved.

3. A dedicated and adequate work area to sort and segregate waste streams from the site's buildings with the following characteristics:
    a. Sized appropriately for the volume of waste generated by the building/site
    b. Located within a dedicated centralised waste management unit
    c. Access to an office and wash facilities
    d. A water supply for hosing down (with appropriate drainage)
    e. In a location with good vehicular access to facilitate collections.

Compliance Notes	
New Build	There are no additional or different criteria to those outlined above specific to new-build projects.
Refurbishment	There are no additional or different criteria to those outlined above specific to refurbishment projects.
Extensions to existing buildings	Where there are facilities within the existing building, these can be used to assess compliance. The scope of these facilities must be adequate to cater for the total volume of predicted waste from the new and existing buildings.
Multiple building assessments	Where the assessment applies to a number of buildings then a dedicated centralised storage space should be provided on site and this should be sized to accommodate the likely amount of recyclable materials for all buildings. Building areas that do not generate any operational waste, e.g. swimming pool or sports hall, can be excluded.

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Accessible reach of the building	Typically 'accessible reach' is defined in BREEAM as within 20m of a building entrance. In some circumstances, depending on the size of the building, site restrictions or tenancy arrangements, it may not be possible to meet a 20m requirement. If it is the opinion of the assessor that it is not feasible to meet this 20m requirement then they can use their judgement to determine if the facility is in an easily accessible location for building occupants and vehicle collection and to state their reasons in the assessment report.
Individual Recycling Bins	Individual recycling bins located at convenient locations throughout the building are necessary to maximise recycling rates. On their own, however, these are not sufficient to obtain this credit.
Internal storage areas	Where the facilities are situated internally, vehicular gate heights/widths and manoeuvring and loading space must be sized correctly to ensure ease of access for vehicles collecting recyclable materials.
General waste	The area for recyclable materials storage must be provided in addition to areas and facilities provided for dealing with general waste and other waste management facilities, e.g. compactors and balers.

Schedule of Evidence Required

Req.	Design Stage	Post Construction Stage
All	Marked-up building/site plan and/or copy of the specification confirming: • The location of the dedicated recyclable storage area • Storage area for general waste • The area (m^2) of the storage space(s) • Description of the labelling.	Assessor's building/site inspection and photographic evidence confirming: • The location, size and capacity of the storage provision • Labelling of the dedicated facilities.

Additional Information

Relevant Definitions
None.

The following footprint dimensions can act as a guide when determining size and accessibility criteria for the recyclable storage space:

- **Compactor dimensions:** about the size of one car parking bay; 4.8 x 2.4m
- **Skip:** The footprint of an 8 and 12 cubic yard skip measures 3.4m x 1.8m, therefore allow a minimum of 2.0m width and 4.0m length or $8m^2$ area for the storage and access of such containers
- **Wheeled bins:** 360 litre = 0.86m x 0.62 / 660L= 1.2m x 0.7m / 1100L = 1.28m x 0.98m
- **Roll-on-roll-off containers:** allow a minimum of 6.1m x 2.4m.
- **Vehicle access:** The following are dimensions for lorry types that are typically used to collect waste. Therefore gate height/widths should not be smaller than these measurements:
    - **Dustcart:** medium capacity; length = 7.4m Height = 4m width 3.1m
    - **Skip lorry:** length = 7m Height = 3.35m width 3.1m

Consideration must also be given to any other types of vehicle requiring access to this area, e.g. lorries for roll on/off containers.

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Issue ID	Issue Title	No. of credits available	Minimum standards
Wst 4	Compactor / Baler	1	No

Aim

To recognise and encourage the provision of facilities which enable efficient and hygienic waste sorting and storage.

Assessment Criteria

The following demonstrates compliance:

1. A static waste compactor or baler is installed and situated in a service area or dedicated waste management space.
2. At least one water outlet is provided for each waste sorting and/or storing facility.
3. The recyclable waste storage criteria of BREEAM issue WST 3 have been met.

Compliance Notes	
New Build	There are no additional or different criteria to those outlined above specific to new-build projects.
Refurbishment	There are no additional or different criteria to those outlined above specific to refurbishment projects.
Extensions to existing buildings	There are no additional or different criteria to those outlined above specific to the assessment of extensions to existing buildings.

Schedule of Evidence Required

Req.	Design Stage	Post Construction Stage
1 - 2	Marked-up design plan and/or a copy of the specification confirming: • Provision of waste compactor/baler • Location and size of space for waste compactor/baler • Water outlet Manufacturer/supplier literature confirming • The type of compactor/baler specified.	Assessor's building/site inspection and photographic evidence confirming: • The installation of the compactor/baler (or space for installation for speculative developments) • Installation of a water outlet • The location, size and capacity of the recyclable storage provision (as required for compliance with WST 3)
3	As defined in the schedule of evidence for BREEAM issue WST 3.	As defined in the schedule of evidence for BREEAM issue WST 3.

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Additional Information

Relevant definitions

Waste compactor or baler: A machine that is designed to compress waste streams in order to improve storage and transport efficiency.

The requirement to achieve the credit for storage of recyclable materials is set in order to encourage the minimisation of the assessed development's waste streams by encouraging a more integrated approach to the issue of waste management, recycling and disposal. The provision of adequate recycling and waste management facilities helps to ensure that this objective can be achieved.

Compacting dry waste can significantly reduce the volume of waste sent to landfill. Furthermore, whether for recycling or landfill, compacting waste at source will reduce the number of trips required for the collection and delivery of the waste and therefore result in reduced fuel consumption and vehicle emissions. Reduced vehicle movements will also provided social and health & wellbeing benefits to the surrounding community and economic benefits to the building occupier.

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Issue ID	Issue Title	No. of credits available	Minimum standards
Wst 5	Composting	1	No

Aim

To encourage the provision of facilities that help facilitate the reduction in volume of compostable organic waste going directly to landfill during the building's operation.

Assessment Criteria

The following demonstrates compliance:

1. A vessel is installed on site for composting suitable food waste resulting from the building's daily operation and use.

2. There is adequate space for storing segregated food waste and composted organic material.

3. At least one water outlet is provided for cleaning in and around the facility.

OR

4. Where there are space or access limitations on site, the following demonstrates compliance:
    a. There is a dedicated segregated space for storing compostable food waste prior to collection and delivery to an alternative composting facility.
    b. At least one water outlet is provided for cleaning in and around the facility.

Compliance Notes	
New Build	There are no additional or different criteria to those outlined above specific to new-build projects.
Refurbishment	There are no additional or different criteria to those outlined above specific to refurbishment projects.
Extensions to existing buildings	There are no additional or different criteria to those outlined above specific to the assessment of extensions to existing buildings.
Storage Capacity	No criteria are defined for the type of vessel or storage capacity required as this will be determined by the end user and predicted volumes of organic compostable waste. The assessor should be satisfied that, within reason, the installation is adequate for the size of development, bearing in mind the likely quantity of organic waste that will be produced by the development.

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Schedule of Evidence Required

Req.	Design Stage	Post Construction Stage
1-4	Marked-up design plan and/or a copy of the specification confirming (as appropriate): • Specification of composting vessel • Location and size of space for vessel and storage of waste/compost • Water outlet.	Assessor's building/site inspection and photographic evidence confirming: • The installation of the vessel • The provision of adequate storage space/facilities • Installation of a water outlet If appropriate, a letter from the occupier or service provider confirming: • Location of the off-site facility where compostable material will be delivered. • The procedure and frequency for collecting the compostable material.

Additional Information

Relevant definitions
None.

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11.0 Land Use and Ecology

Issue ID	Issue Title	No. of credits available	Minimum standards
LE 1	Reuse of Land	1	No

Aim

To encourage the reuse of land that has been previously developed, and discourage the use of previously undeveloped land for building.

Assessment Criteria

The following demonstrates compliance:

1. At least 75% of the proposed development's footprint is on an area of land which has previously been *developed* for use by industrial, commercial or domestic purposes in the last 50 years.

Compliance Notes	
New Build	There are no additional or different criteria to those outlined above specific to new build projects.
Refurbishment	In the case of refurbishment, the credit can be awarded by default where no new building work or infrastructure is being constructed as part of the refurbishment.
Extensions to existing buildings	Where a refurbishment includes new buildings, hard landscaping, or infrastructure, 75% of the total proposed development footprint (refurbished plus new build and/or hard landscaping and/or infrastructure) must comply with the requirement.
Temporary works	Undeveloped areas of the site to be used for temporary works (e.g. temporary offices/parking, material/machinery storage) must be considered as development on undeveloped land and therefore included in the calculations unless they have been defined as 'land of low ecological value' (Ecological Value and Protection issue, LE3).
Developed more than 50 years ago	Where a site has been previously developed (more than 50 years ago) but is now considered undeveloped, the credit may only be awarded on this basis if the site is deemed to be "contaminated" as defined in BREEAM issue LE2.
Land within a secure perimeter fence	All land within a secure perimeter fence on an existing prison site can be classified as previously developed. Therefore assessments of buildings located within this area will achieve the credit.
Extension of secure perimeter fence	If the secure perimeter fence is being extended to accommodate the proposed building, or the proposed building is located on a completely new prison development, then the building must comply with the assessment criteria.

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Schedule of Evidence Required

Req.	Design Stage	Post Construction Stage
1	Existing site plan, report or site photographs confirming: • Type and duration of previous land use. • Area (m^2) of previous land use. Proposed site plan showing; • Location and footprint (m^2) of proposed development and temporary works.	Assessor's building/site inspection or as built drawings confirming: • The footprint or orientation of the developed area has not altered from that confirmed in the design stage evidence. • Where alteration has occurred the % must be re-calculated using 'as built' plans.

Additional Information

Relevant definitions

Proposed Development: Is defined as the area of any building, hard landscaping, car park and access roads that fall within the boundary of the proposed site.

Previously Developed Land: For the purposes of this issue, BREEAM uses the definition from Planning Policy Statement 3[60] which defines previously developed land as that which is or was occupied by a permanent structure, including the curtilage of the developed land and any associated fixed surface infrastructure.

The definition includes:

a. Defence buildings

The definition excludes:

b. Land that is or has been occupied by agricultural or forestry buildings.
c. Land that has been developed for minerals extraction or waste disposal by landfill purposes where provision for restoration has been made through development control procedures.
d. Land in built-up areas such as parks, recreation grounds and allotments which, although may feature paths, pavilions and other buildings, have not been previously developed.
e. Land that was previously developed but where the remains of the permanent structure or fixed surface structure have blended into the landscape in the process of time (to the extent that it can reasonably be considered as part of the natural surroundings).

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Issue ID	Issue Title	No. of credits available	Minimum standards
LE2	Contaminated Land	1	No

Aim

To encourage positive action to use contaminated land that otherwise would not have been remediated and developed.

Assessment Criteria

The following demonstrates compliance:

1. The site is deemed to be *significantly contaminated* as confirmed by a contaminated land specialist's site investigation, risk assessment and appraisal identifying:
    a. the degree of contamination
    b. the contaminant sources/types
    c. the options for remediating sources of pollution which present an unacceptable risk to the site.

2. The client or contractor confirms that remediation of the site will be carried out in accordance with the remediation strategy and its implementation plan.

Compliance Notes	
New Build	There are no additional or different criteria to those outlined above specific to new build projects.
Refurbishment	There are no additional or different criteria to those outlined above specific to refurbishment projects.
Extensions to existing buildings	There are no additional or different criteria to those outlined above specific to the assessment of extensions to existing buildings.
Prior Decontamination	The credit can only be awarded where remediation has taken place to enable current development of the site for the assessed building, or part of a larger phased development that includes the assessed building (see below). The credit is not achievable for instances where historical remediation and development of the site has occurred outside the scope of the current development proposals.
Large sites split into smaller plots	Where a large site has been decontaminated and is then packaged up into smaller plots of land for individual buildings (possibly as part of a phased development strategy), the credit can be awarded regardless of the plot location of the assessed building. This is on the condition that the whole site could not have been developed without remediation work taking place.
Health and Safety-related decontamination	Contaminated land that has been decontaminated solely for health and safety reasons (rather than for the specific purpose of re-development) does not comply.
Asbestos	Where the only decontamination required is for the removal of asbestos within an existing building fabric, this cannot be classified as contaminated land. However, where asbestos is found to be present in the ground this will be classed as contamination for the purposes of assessing this issue.

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Schedule of Evidence Required

Req.	Design Stage	Post Construction Stage
1	A copy of the specialist's land contamination report confirming: • The degree, type and sources of site contamination. • The options for remediating the site. Existing site plan(s) showing: • Location of areas contaminated and to be remediated in relation to any proposed development.	The evidence required at the post construction stage is the same as for a design stage assessment.
2	A letter from the main contractor or remediation contractor confirming: • The remediation strategy for the site. • Summary details of the implementation plan. If a contractor has not yet been appointed, a letter from the client, or their representative confirming: • That the appointed contractor will undertake necessary remediation works to mitigate the risks identified in the specialist report.	A copy of the verification report (or relevant sections of the report) confirming: • Description of remedial works undertaken. • Description of relevant *pollution linkages* addressed*. * This may not be applicable where the contaminant is a non-native invasive plant species.

Additional Information

Relevant definitions

Contaminant: Is defined as any solid, liquid or gaseous material in, or on the ground to be covered by the building, which is classed as a hazard and therefore presents an unacceptable risk to human health and the environment. The definition also includes land significantly infested by *non-native invasive plant species* (see below).

Significant contamination: For the purposes of this issue, significant contamination is contamination compliant with the above and that, without remediation, development of the site is not possible.

Remediation: Activity undertaken to prevent, minimise, remedy or mitigate the risk caused by contaminated land to human health or the environment.

Non-native invasive plant species: Are non-indigenous species that adversely affect the habitats they invade economically, environmentally or ecologically. For the purposes of BREEAM this currently includes Japanese Knotweed 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.

Pollution Linkages: A relevant pollutant linkage is one that has been identified during the risk assessment stage as representing unacceptable risks to human health or the environment.

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Issue ID	Issue Title	No. of credits available	Minimum standards
LE3	Ecological Value of Site and Protection of Ecological Features	1	No

Aim

To encourage development on land that already has limited value to wildlife and to protect existing ecological features from substantial damage during site preparation and completion of construction works.

Assessment Criteria

The following demonstrates compliance:

1. Land within the *construction zone* is defined as 'land of low ecological value' using either:
   a) BREEAM checklist A4 **OR**
   b) A *suitably qualified ecologist* who has identified the land as being of 'low ecological value' within an ecological assessment report, based on a site survey.

2. All existing features of ecological value surrounding the construction zone and site boundary area are adequately protected from damage during clearance, site preparation and construction activities as listed below:
   - Trees of over 100 mm trunk diameter, and/or of significant ecological value, are protected by barriers. Barriers must prohibit construction works in the area between itself and the tree trunk. Minimum distance between tree trunk and barriers must be either the distance of branch spread or half tree height, whichever is the greater.
   - In all cases trees must be protected from direct impact and from severance or asphyxiation of the roots.
   - Hedges and natural areas requiring protection must either have barriers erected and be protected, or, when remote from site works or storage areas, be protected with a prohibition of construction activity in their vicinity.
   - Watercourses and wetland areas are to be protected by cut-off ditches and site drainage to prevent run-off to natural watercourses (as this may cause pollution, silting or erosion).

3. In all cases, the contractor is required to construct ecological protection prior to any preliminary site construction or preparation works (e.g. clearing of the site or erection of temporary site facilities).

Compliance Notes	
New Build	There are no additional or different criteria to those outlined above specific to new build projects.
Refurbishment	A refurbishment of a building (with no new construction), must protect any existing ecological features of value. Protection includes clear exclusion procedures for construction traffic/personnel and material storage, as well as physical barriers.
Extensions to existing buildings	Where a refurbishment includes new building work or infrastructure, the land on which the new build area and its associated infrastructure (e.g. roads, pavements, car parks etc) will be situated, must comply with the criteria.

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No features of ecological value	Where the construction zone is defined as 'land of low ecological value' and where the surrounding site contains no features of ecological value, this credit can be awarded.
Use of a suitably qualified ecologist	Where a suitably qualified ecologist is employed and has, using their professional judgement, defined the site as land of low ecological value, this assessment/judgement overrides any assessment determined using checklist A4. The suitably qualified ecologist must base their findings on data collected from a site visit conducted at appropriate time(s) of the year, when different plant and animal species are evident. The content of the Ecology Report is to be representative of the existing site's ecology prior to the commencement of initial site preparation works (i.e. before RIBA stage K, construction to practical completion). Where the ecologist has made no on-site visit, the credit cannot be awarded. See additional guidance for definition of a suitably qualified ecologist.
Features of little or no ecological value	If a suitably qualified ecologist has confirmed that a feature has little or no ecological value, or where a tree is deemed to create a significant danger to the public or occupants by a statutory body or qualified arboriculturalist, then that feature may be exempt from the protection of ecological features requirement of this issue.
Removal of features of ecological value	If features of ecological value have been removed as part of site clearance then the development cannot achieve this credit, even if they are to be replaced as part of a new landscaping strategy.
Site clearance prior to purchase of the site	For sites that have been cleared more than five years ago, the ecological value of the site would be its present ecological value, on the basis that in the intervening five years, ecological features would have started to re-establish themselves and therefore act as an indicator of the site's ecological value. For sites that have been cleared less than five years before assessment, a suitably qualified ecologist should make an estimation of the site's ecological value immediately prior to clearance on the basis of available desktop information (including aerial photography) and the landscape type/area surrounding the site. Where it is not possible for the ecologists to determine that the site was of low ecological value prior to the site clearance then the credit must be withheld.

Schedule of Evidence Required

Req.	Design Stage	Post Construction Stage
1&2	A completed copy of checklist A4 signed and dated by the client, their representative or a design team member e.g. architect. **AND** One of the following: A plan and/or site photographs of the existing site highlighting any ecological features **OR**	The evidence required at the post construction stage is the same as for a design stage assessment.

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	A copy of the ecologist's report containing: • Confirmation that the land within the construction zone is of low ecological value. • A description of any ecological features within the site or on the site boundary. • Date(s) of site survey(s). A completed, signed copy of sections A and B of checklist A6 'Guidance for relating ecology reports to BREEAM' to confirm the ecologist's professional status **OR** A copy of the ecologist's report containing the information in sections A and B from the above.	
2&3	A copy of the relevant section of the contract specification confirming: • Requirement to protect all identified features of ecological value. • Scope of protection measures required. • Protection measures implemented prior to commencement of site activities.	Assessor site inspection report **OR** ecologist's report confirming: • The boundary of the site and the construction zone has not been altered. • Where applicable, all existing ecological features still remain.

Additional Information

Relevant definitions

Construction zone: For the purpose of this BREEAM issue the construction zone is defined as any land on the site which is being developed (and therefore disturbed) for buildings, hard standing, landscaping, site access, 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 and temporary storage will be located it must be assumed that the construction zone is the entire site.

Suitably qualified ecologist (SQE): An individual achieving all the following items can be considered to be "suitably qualified" for the purposes of a BREEAM assessment:

1. Holds a degree or equivalent qualification (e.g. N/SVQ level 5) in ecology or a related subject.

2. 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.

3. 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.

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Full members of the following organisations, who meet the above criteria, are deemed suitably qualified ecologists for the purposes of BREEAM:

- 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)

Where a suitably qualified ecologist is verifying an Ecology Report produced by another ecologist who does not meet the SQE criteria, they must, as a minimum, have read and reviewed the report and confirm in writing that they have found it to:

a. represent sound industry practice
b. report and recommend correctly, truthfully and objectively
c. be appropriate given the local site conditions and scope of works proposed
d. avoid invalid, biased and exaggerated statements.

Additionally, written confirmation from the third party verifier that they comply with the definition of a *Suitably Qualified Ecologist* is required.

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Issue ID	Issue Title	No. of credits available	Minimum standards
LE4	Mitigating Ecological Impact	2	Yes

Aim

To minimise the impact of a building development on existing site ecology.

Assessment Criteria

The following demonstrates compliance:

1. One credit where the change in ecological value of the site is less than zero and equal to or greater than minus nine plant species i.e. a minimal change.

2. Two credits where the change in ecological value of the site is equal to or greater than zero plant species i.e. no negative change.

The change in ecological value of the site is calculated using **EITHER** of the following:

3. Determine the following information and input this data in to Ecology calculator 1 within the spreadsheet tool:
    a. Plot type(s) that define the landscape of the assessed site, in its existing pre-developed state and proposed state (see additional guidance)
    b. Areas (m^2) of the defined existing and proposed plot types.

    OR

4. Where a *suitably qualified ecologist* has been appointed and, based on a site survey, they confirm the following and the assessor or ecologist inputs this data in to the Ecology calculator 2:
    a. Actual plot/habitat types that define the landscape of the assessed site in its existing pre-developed state and proposed state
    b. Area (m^2) of each plot/habitat type
    c. Number of different plant species found within each plot type.

Compliance Notes	
New Build	There are no additional or different criteria to those outlined above specific to new build projects.
Refurbishment	There are no additional or different criteria to those outlined above specific to refurbishment projects.
Extensions to existing buildings	There are no additional or different criteria to those outlined above specific to the assessment of extensions to existing buildings. Refer also to the note below on infill developments.

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Completing Ecology Calculator 1	First, define the landscape type (based on the typology of the surrounding sites, Table 18 General Landscape Types). This category is unlikely to change through the development, although it may in some cases, e.g. when a disused site is developed as part of a master plan for a large multi-use or multi-building development/regeneration project. Then, define and calculate the area (m^2) of each vegetation-plot type (Table 19 Vegetation Plot Types) and building or hard landscaped area, both before and after development, for the site. Once the data is entered, the Ecology Calculator 1 will indicate the indicative change in ecological value. The result must be used to award the credits.
Number of plant species	BREEAM measures ecological value using number of plant species. The plant species figures for each land type are programmed into the Ecology Calculator tool 1. These figures are based on national figures from the Countryside Survey prepared for the Digest of Environmental Statistics[61] (see Table 20 Number of plant species by plot for different landscape types). Where an ecologist has been appointed actual number of plant species (before and after construction), based on the ecologists site survey should be used to determine the change in ecological value.
Wildlife garden planting	In the 'change of ecological value' table, 'garden planting (typical)' and 'wildlife garden planting' 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.
Derelict Sites	The ecological value of derelict sites is time dependent (table 20); 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.
Assessment of a single development on a larger site	Where the assessment is of a single building that forms part of a larger site development and the landscaping and ecological features form a common part of the whole site, for the purpose of assessing this issue the plot types and areas for the entire site must be used.
Infill developments on existing occupied site	Where a development is an infill (or new building) on an existing occupied site, then the *construction zone* for the new building would be the area of site assessed for the purposes of this issue.
Site clearance prior to purchase of the site	Refer to the compliance note in LE3 on this issue.
Green Roofs	The contribution of species from a Green roof can only be incorporated where a suitably qualified ecologist has been appointed.

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Schedule of Evidence Required

Req.	Design Stage	Post Construction Stage
First & Second Credit		
1,2 & 3	Existing and proposed site plans and, if required, maps and aerial photographs confirming: • Landscape and vegetation plot types • Area (m^2) of vegetation plot types **AND** A completed copy of Ecology Calculator 1.	The evidence required at the post construction stage is the same as for a design stage assessment. Plus: Assessor's/ecologist's building/site inspection confirming: • Post construction vegetation plot types and areas are in accordance with design stage evidence.
1,2 & 4	A copy of the suitably qualified ecologist's report confirming prior to and after the development: • Landscape and vegetation plot types • Area (m^2) of vegetation plot types **AND** A completed, signed copy of checklist A6 – Relating ecology reports to BREEAM **OR** a copy of the ecology report containing the information outlined in checklist A6. **AND** A completed copy of Ecology Calculator 2.	

Additional Information

Relevant Definitions

Construction zone: As defined for issue LE3 – Ecological Value of site AND Protection of ecological features

Suitably qualified ecologist (SQE): As defined for issue LE3 – Ecological Value of site AND Protection of ecological features

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Table 18 General Landscape Types

Pastoral	Mainly grasslands.
Arable	Land dominated by cereals and other arable crops, as well as intensively managed grasslands.
Marginal Upland	Areas which are on the periphery of the uplands, and which are dominated by mixtures of low intensity agriculture, forestry and semi-natural vegetation.
Upland	Land generally above a height suitable for mechanised farming and frequently dominated by semi-natural vegetation.
Building & Derelict Land	Land currently or previously occupied by buildings.
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. Parklands can be characterised as being accessible to the public and will usually be fairly intensively managed spaces, consisting of a matrix of grassland (grazed or mown) with scattered trees at various densities and areas of dense planting. This landscape type is to be used only when no other landscape type in the table is more appropriate / predominates.

Table 19 Vegetation Plot Types

Crops/weeds	Mostly highly disturbed vegetation of arable fields and their boundaries; includes cereal and vegetable crops.
Tall grassland/herb	Typical vegetation of overgrown lowland field boundaries, ditches and roadside verges.
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 re-sown roadside verges.
Infertile grass	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.
Lowland wooded	Includes wooded vegetation of hedges and broadleaved woods in the lowlands.
Upland wooded	A varied group of acidic vegetation types usually associated with upland woods, including: semi-natural woodland; conifer plantations; bracken and wooded streamsides.
Moorland grass/mosaic	Typically grazed moorland vegetation, including extensive upland acidic and peaty grassland, and species-rich but very localised flushes.
Heath/bog	Mostly heather moorland, blanket bog and montane heath, but also lowland heath and raised bog.
Wildlife garden planting	Garden planting that uses native species and/or those that have a known attraction or benefit to local fauna, based on the advice of a suitably qualified ecologist.

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Table 20 Number of plant species by plot for different landscape types

Types of Plot	Landscape Types									
	Arable	Pastural	Marginal Upland	Upland	Existing Building/Hard Landscaped Areas	Urban Mosaic	Derelict Land <1 Years	Derelict Land < 10 Years	Derelict Land < 20 Years	Derelict Land <= 30 Years
Crop Weeds	5.4	8.3	-	-	-	-	-	-	-	-
Tall Grassland/Herb	12.7	15.0	-	-	-	17.6	0	6.3	15.8	21.1
Fertile Grassland	11.6	12.7	15.3	-	-	11.6	0	4.6	11.5	15.3
Infertile Grassland	17.1	17.6	21.1	-	-	17.6	0	6.3	15.8	21.1
Lowland Wooded	12.9	12.5	-	-	0	13.8	-	-	-	-
Upland Wooded	-	12.7	13.8	20.4	0	13.8	-	-	-	-
Moorland Grass/Mosaic	-	2.0	20.4	21.0	-	-	-	-	-	-
Heath/Bog	-	-	14.3	20.0	-	-	-	-	-	-
Hard Landscaping	0	0	0	0	0	0	0	0	0	0
Buildings	0	0	0	0	0	0	0	0	0	0
Garden Planting (typical)	-	-	-	-	0	0	0	0	0	0
Wildlife Garden Planting*	-	-	-	-	0	0	0	0	0	0

- Insufficient data to produce national averages, as not all vegetation plot types are found in all landscaped types.
* Only where the rule concerning wildlife garden planting in table 19 has been met can actual species values be used.

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Calculating the change and increase in ecological value

BREEAM calculates the change in ecological value by comparing the diversity (number and area) of plant species on the site pre and post construction. The ecological value of the site is expressed as an area-weighted average of plant species for the site's landscape type. This enables BREEAM to use this as an indicator of the proposed development's impact on the site's existing ecological value.

A simple example of the calculation is outlined below.

1. Calculate the ecological value of a previously developed existing site:

   A 2065m^2 existing site consists of the following types of land:

   a. 1865 m^2 hard landscaping = 0 species
   b. 200m^2 urban mosaic - infertile grassland = 17.6 species (Table 20 Number of plant species by plot for different landscape types).

   The ecological value of the existing site is calculated as follows, for each plot type;

   - Number of species on plot type x plot type area as % of total area.

   Therefore, for our example site:

   a. Hard landscaping: {(0 species x (1865m^2/2065m^2)} = 0 species
   b. urban mosaic-infertile grassland: {(17.6 species x (200m^2/2065m^2)} = 1.70 species
   c. Ecological value of the existing site = 0 + 1.70 = 1.70 species

2. Calculate the ecological value of the proposed site:

   The 2065m^2 post-construction site consists of the following types of land:

   a. 1375m^2 of building = 0 species.
   b. 550m^2 of hard landscaping = 0 species
   c. 140 m^2 has remained as urban mosaic-infertile grassland = 17.6 species

   The ecological value of the proposed site is as follows:

   a. Building: {(0 species x (1375m^2/2065m^2)} = 0 species
   b. Hard landscaping: {(0 species x (550m^2/2065m^2)} = 0 species
   c. Urban mosaic-infertile grassland: {(17.6 species x (140m^2/2065m^2)} = 1.19 species
   d. Ecological value of the proposed site = 0 + 0 + 1.19 = 1.19 species

The ecological impact is the difference between the two ecological values:

Change in ecological value: 1.19 – 1.70 = - 0.51 species

<u>Therefore, for this example 1 credit is achieved.</u>

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Issue ID	Issue Title	No. of credits available	Minimum standards
LE5	Enhancing Site Ecology	2	No

Aim

To recognise and encourage actions taken to maintain and enhance the ecological value of the site as a result of development.

Assessment Criteria

The following demonstrates compliance:

First credit

1. A *suitably qualified ecologist* (SQE) has been appointed to report on enhancing and protecting the ecology of the site.
   a. The SQE provides an Ecology Report with appropriate recommendations for protection and enhancement of the site's ecology.
   b. The report is based on a site visit/survey by the SQE prior to the commencement of initial site preparation works.

Second credit

1. The first credit is achieved.

2. The *recommendations* of the Ecology Report for enhancement and protection of site ecology have been implemented.

Compliance Notes	
New Build & Refurbishment on existing prison sites	For assessments of new buildings on existing prison sites, where it is not possible to implement ecological enhancements within the construction zone due to security concerns, ecological enhancement to other areas of the site can be taken into account.
Extensions to existing buildings	There are no additional or different criteria to those outlined above specific to the assessment of extensions to existing buildings.
Timing of Ecologist Report	It is recommended that the suitably qualified ecologist is appointed to carry out site surveys of existing site ecology, on which their report is based, or to provide verification where the report is prepared by others, at the design brief stage (RIBA Stage B or equivalent) in order to facilitate and maximise potential ecological enhancement.
General recommendations	'General' recommendations for enhancing and protecting the ecological value of the site are to include, and go beyond, compliance criteria for all current EU and UK legislation relating to protected species and habitats. These 'general' recommendations may include ecological recommendations as detailed in the definitions.
Guidance for ecologists and assessors	Please refer to Checklist A6 – Relating ecology reports to BREEAM, section D for assistance in assessing and interpreting the assessment criteria for this BREEAM issue.

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Plant species	Only native floral/plant species, and/or those contributing to a local or UK Biodiversity Action Plan or those with a known attraction or benefit to local fauna can be considered for the purpose of increasing the number of species on site, as well as general enhancement. The Natural History Museum has an online *Postcode Plants Database* which generates lists of native plants and wildlife for any specified postal district in the UK. http://www.nhm.ac.uk/nature-online/life/plants-fungi/postcode-plants/index.html

Schedule of Evidence Required

Req.	Design Stage	Post Construction Stage
First Credit		
1	A copy of the ecologist's report containing: • Details and scope of the site survey. • Information as outlined in checklist A6 – Relating ecology reports to BREEAM. **OR** A copy of the ecologist's report containing a completed, signed copy of checklist A6.	The evidence required at the post construction stage is the same as for a design stage assessment.
Second Credit		
1	Evidence (as outlined above) confirming compliance with the first credit.	Evidence (as outlined above) confirming compliance with the first credit.
2	Proposed site plan highlighting implementation of the ecologist enhancement recommendations. **AND** One of the following: A copy of the relevant section of the specification requiring the main contractor to implement the SQE's recommendations for protection and enhancement **OR** A letter from the client or design team member confirming: • That the specification will require the main contractor to implement the ecologist's recommendations.	Assessor's site inspection report and photographic evidence confirming that the ecologist's recommendations have been implemented. For large mixed-use/multi-building developments, where the whole site has not been completed and ecological enhancements have not been added, or where features are being added at a later date in an appropriate planting season: • A copy of the contract/specification or a letter from the main contractor confirming when the planting will be complete. This must be within 18 months from completion of the development.

Additional Information

Relevant Definitions

Suitably qualified ecologist (SQE): As defined for BREEAM Issue LE3.

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Ecological recommendations are defined as measures adopted to enhance the ecology of the site, which may include:

- The planting of native species or those with a known attraction or benefit to local wildlife
- 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.

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Issue ID	Issue Title	No. of credits available	Minimum standards
LE6	Long Term Impact on Biodiversity	3	No

Aim

To minimise the long term impact of the development on the site's, and surrounding area's, biodiversity.

Assessment Criteria

The following demonstrates compliance:

One credit can be awarded where there is a commitment to achieve the mandatory criteria and at least two of the additional criteria (listed below).

Two credits can be awarded where there is a commitment to achieve the mandatory criteria and at least three of the additional criteria (listed below).

Three credits can be awarded where there is a commitment to achieve the mandatory criteria and at least four of the additional criteria (listed below).

Mandatory Criteria

1. A *suitably qualified ecologist* (SQE) has been appointed prior to commencement of activities on site.

2. The *suitably qualified ecologist* confirms that all relevant UK and EU legislation relating to protection and enhancement of ecology has been complied with during the design and construction process.

3. A landscape and habitat management plan, appropriate to the site, is produced covering at least the first five years after project completion. This is to be handed over to the building occupants and includes:
   - Management of any protected features on site
   - Management of any new, existing or enhanced habitats
   - A reference to the current or future site level or local Biodiversity Action Plan.

Additional Criteria

1. The contractor nominates a 'Biodiversity Champion' with the authority to influence site activities and ensure that detrimental impacts on site biodiversity are minimised in line with the recommendations of a suitably qualified ecologist.

2. The contractor trains the site workforce on how to protect site ecology during the project. Specific training should be carried out for the entire site workforce to ensure they are aware of how to avoid damaging site ecology. Training should be based on the findings and recommendations for protection of ecological features highlighted within a report prepared by a suitably qualified ecologist.

3. The contractor records actions taken to protect biodiversity and monitor their effectiveness throughout key stages of construction. The requirement commits the contractor to make such records available where publicly requested.

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4. Where a new ecologically valuable habitat, appropriate to the local area, is created. This includes habitat that supports nationally, regionally or locally important biodiversity, and/or which is nationally, regionally or locally important itself; including any habitat listed in the UK Biodiversity Action Plan (UK BAP)[62], Local Biodiversity Action Plan (LBAP), those protected within statutory sites (e.g. SSSIs), or those within non-statutory sites identified in local plans.

5. Where flora and/or fauna habitats exist on site, the contractor programmes site works to minimise disturbance to wildlife. For example, site preparation, ground works, and landscaping have been, or will be, scheduled at an appropriate time of year to minimise disturbance to wildlife. Timing of works may have a significant impact on, for example, breeding birds, flowering plants, seed germination, amphibians etc. Actions such as phased clearance of vegetation may help to mitigate ecological impacts. This additional requirement will be achieved where a clear plan has been produced detailing how activities will be timed to avoid any impact on site biodiversity in line with the recommendations of a suitably qualified ecologist.

Compliance Notes	
New Build	There are no additional or different criteria to those outlined above specific to new build projects.
Refurbishment	There are no additional or different criteria to those outlined above specific to the assessment of refurbished buildings (unless the building is listed – see below).
Extensions to existing buildings	There are no additional or different criteria to those outlined above specific to the assessment of extensions to existing buildings.
Refurbishment of listed buildings	The refurbishment of a listed building may be exempt from the assessment criteria if they conflict with the need to maintain the building's listed features, or are counter to the conservation criteria. Confirmation is required from a suitably qualified ecologist that all possible criteria/enhancements have been achieved before the credit can be awarded (i.e. if no suitably qualified ecologist has been appointed then this credit cannot be awarded).
Biodiversity Champion	A Biodiversity Champion does not have to be an ecologist or ecological expert but must have sufficient authority and time on site to influence activities and ensure that they have minimal detrimental impact on biodiversity.
Local biodiversity expertise	Local biodiversity expertise should be sought at, or before, the design stage to help identify species of local biodiversity importance on site. It is likely that their recommendations will draw on the Local Biodiversity Action Plan (LBAP) where one exists.
The site and surrounding areas	The steps taken in the above criteria will depend on the nature of the site, e.g. urban sites, and the surrounding areas. It is likely that either all, or none, of the optional items will apply. Where the optional items and the mandatory item 3, the management plan, are deemed, in writing, by the appointed suitably qualified ecologist not to be applicable, all credits can be awarded. Mandatory items 1 and 2 must be met in all instances. This is likely to be the case in the majority of assessments in central town/city areas which have a high proportion of surrounding and existing development and no existing external landscaped areas within the boundary of the assessed site.
Sites of no ecological value	Where a site is deemed to have no ecological value, it is still necessary to employ a suitably qualified ecologist to achieve this credit. The ecologist must confirm that all the mandatory items (1), (2) and (3) have been achieved and provide guidance on how to achieve optional item (4). Note that in such cases, mandatory item (1) and additional requirement (4) is likely to be applicable in relation to any ecological enhancements (e.g. green roofs, bird boxes, etc.) adopted in order to achieve the Enhancing Site Ecology issue (LE5).

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<table>
<tr><td>Not all additional items are applicable</td><td>Where the SQE confirms that not all additional items are applicable to the development, then the credits can be awarded accordingly:
<table>
<tr><th>No. applicable items</th><th>No. of BREEAM credits</th><th>Criteria</th></tr>
<tr><td rowspan="3">1 item</td><td>One credit</td><td rowspan="3">Meet mandatory reqs. plus applicable item</td></tr>
<tr><td>Two credits</td></tr>
<tr><td>Three credits</td></tr>
<tr><td rowspan="3">2 items</td><td>One credit</td><td rowspan="3">Meet mandatory reqs. plus all applicable items</td></tr>
<tr><td>Two credits</td></tr>
<tr><td>Three credits</td></tr>
<tr><td rowspan="3">3 items</td><td>One credit</td><td>Meet mandatory reqs. plus 1 applicable items</td></tr>
<tr><td>Two credits</td><td>Meet mandatory reqs. plus 2 applicable items</td></tr>
<tr><td>Three credits</td><td>Meet mandatory reqs. plus all applicable items</td></tr>
<tr><td rowspan="3">4 items</td><td>One credit</td><td>Meet mandatory reqs. plus 2 applicable items</td></tr>
<tr><td>Two credits</td><td>Meet mandatory reqs. plus 3 applicable items</td></tr>
<tr><td>Three credits</td><td>Meet mandatory reqs. plus 3 applicable items</td></tr>
</table></td></tr>
<tr><td>Prison Service Biodiversity Action Plan (PSBAP)</td><td>The creation of a new ecologically valuable habitat in additional requirement 4 should consider the Prison Service Biodiversity Action Plan (PSBAP)[63] in lieu of, or as well as, the UKBAP.</td></tr>
<tr><td>Existing prison sites</td><td>For assessments of new building/major refurbishment on existing prison sites, the assessor should determine which classification of the PSBAP the site falls into (see Additional Information). The classification of the site will affect the measures required to maintain any new ecologically valuable habitat and protect long-term biodiversity.</td></tr>
</table>

Schedule of Evidence Required

Req.	Design Stage	Post Construction Stage
Mandatory Criteria		
1&2	The SQE report or letter confirming: • That they were appointed prior to commencement of activities on site. • All relevant UK and EU legislations will be complied with. **AND** A completed, signed copy of checklist A6 – Relating ecology reports to BREEAM **OR** A copy of ecology report containing the information outlined in checklist A6.	A letter from the SQE confirming: • That all relevant UK and EU legislation relating to protection and enhancement of ecology has been complied with.

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3	A copy of the site management plan. **OR** A copy of the specification requiring the development of plan and outlining the scope of its content. **OR** Where the timing of assessment does not permit either of the above, a letter from the client confirming: • A commitment to produce a management plan • The scope of the management plan	A copy of the site's landscape and habitat management plan.
Additional Criteria		
1	A letter from the contractor confirming: • The appointment of the biodiversity champion and their job title. • Their on site role and responsibilities. **OR** Where not yet appointed, a copy of the specification clause requiring the appointment of a biodiversity champion.	A copy of the relevant sections of the site log book, highlighting: • Details of any action/events taken by the biodiversity champion. If no actions required/taken, this should be confirmed in the log book.
2	Training schedule or letter of confirmation from the contractor committing to provide relevant training. **OR** Where not yet appointed, a copy of the specification clause requiring the training of the site's workforce.	A record of training undertaken by the site workforce confirming: • Who delivered & developed the training • The scope of the training delivered.
3	A letter from the contractor confirming: • Monitoring and reporting criteria for the development. • The records will be publicly available if and when requested. **OR** Where not yet appointed, a copy of the specification clause outlining the contractor's monitoring and reporting criteria.	A copy of the relevant sections of the site log book, highlighting: • Records of monitoring and actions taken to protect biodiversity. • Records and outcome of any requests to view such information.
4	A copy of the proposed site plan highlighting the new ecologically valuable habitat. A SQE's report or letter confirming that the habitat supports the relevant biodiversity action plan(s)	Assessor's (or SQE's) site inspection report and photographic evidence confirming the existence of the proposed habitat.

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5	The SQE's report or letter confirming: • Wildlife on site that needs to be accounted for in programming works. • Actions required with respect to programming site works to minimise disturbance. A copy of the contractor's main programme of works. **OR** A copy of the relevant section of the main contract confirming: • The programme of site works will minimise disturbance to wildlife in accordance with SQE's recommendations.	A letter from the SQE, or a copy of their report confirming: • Site works executed in a manner that minimised disturbance to wildlife in accordance with their recommendations.

Additional Information

Relevant definitions

Suitably qualified ecologist (SQE): As defined for Issue LE3 – Ecological Value of site AND Protection of ecological features

Biodiversity: Is defined as the variety of life on earth. It includes all species, animal, plants, fungi, algae, bacteria and the habitats that they depend upon.

Biodiversity Action Plan: A plan which sets specific, measurable, achievable, realistic and time bound conservation targets for species and habitats. The UKBAP website www.ukbap.org supports the implementation of the UK Biodiversity Action Plan (UK BAP) on behalf of the UK Biodiversity Partnership and the UK Government.

Steps to produce a BAP are outlined in the UK Business and Biodiversity Resource Centre website, hosted by Earthwatch Institute Europe http://www.businessandbiodiversity.org under 'your sector'

Prison Service BAPs: In March 2003 HM Prison Service produced a Strategy Statement of Action for a Prison Service biodiversity action plan. The Prison Service BAP comprises three stages, the first of which involves managing SSSI sites. The second stage addresses the management of sites that are not designated, but which may have land which has local, county or regional importance on biodiversity. The third stage addresses the rest of the prison estate, principally comprising urban prisons.

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12.0 Pollution

Issue ID	Issue Title	No. of credits available	Minimum standards
Pol 1	Refrigerant GWP – Building Services	1	No

Aim

To reduce the contribution to climate change from refrigerants with a high global warming potential.

Assessment Criteria

The following demonstrates compliance:

1. The building has no refrigerants **OR**
2. The refrigerants used within the building services have a GWP less than 5.

Compliance Notes	
New Build	There are no additional or different criteria to those outlined above specific to new build projects.
Refurbishment	There are no additional or different criteria to those outlined above specific to refurbishment projects.
Extensions to existing buildings	If the extended and existing building share the same building services, then these services must be assessed against the criteria regardless of whether the existing building forms a part of the assessment or not. If the extension is served by independent services, only these need be assessed against the Assessment Criteria.
Solid refrigerant	The credit can be awarded by default where a solid refrigerant is used.
Refrigerant charge less than 5kg	The credit can be awarded where the total refrigerant charge used in the building services is less than 5kg.
Multiple split units	In the case of multiple split units, through-the-wall or other packaged units, the credit can be awarded where the **total** collective refrigerant charge is less than 5kg. If the **total** collective refrigerant charge in such systems is greater than 5kg, then the refrigerant(s) must comply with the BREEAM criteria.

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Office server and comms rooms	Refrigerants used in services for typical office server and comms rooms cannot be excluded from the assessment. Where air conditioning equipment is provided, the equipment may not be able to achieve this credit as smaller systems often require refrigerants with a GWP > 5. In this instance the credit cannot be awarded by default as there are alternatives for designers to consider. These alternatives include revisiting the design and the room conditions specification to see if the cooling equipment is necessary. In addition, whilst a manufacturer or supplier may specify a narrow temperature band for server equipment, acceptable limits detailed in ASHRAE guidance[64] may allow a greater temperature range without adverse effect and thus the cooling equipment may not be necessary.
GWP data not available	Where GWP data for the specified refrigerant is not available, the credit cannot be awarded on a default basis.

Schedule of Evidence Required

Req.	Design Stage	Post Construction Stage
1&2	A copy of the specification clause confirming either: • Absence of refrigerant in the development OR • Type(s) of refrigerant to be used. **AND** Manufacturer's information confirming: • GWP of each refrigerant.	Assessor's building/site inspection and as built drawings confirming: • Presence or absence of any refrigeration plant. **OR** • A letter from the design team/developer confirming: - The refrigerant type specified remained unchanged. **OR** Where a change has occurred, written confirmation from the design team confirming: • Type of refrigerant(s) used. **AND** Manufacturer's information confirming: • GWP of each refrigerant.

Additional Information

Global Warming Potential: GWP 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.

Ozone Depleting Potential: ODP is the ratio of the relative amount of degradation to the ozone layer caused by a particular substance relative to the calculated depletion for the reference gas CFC 11 (ODP = 1.0). The ODP of the refrigerants is not assessed under this issue and there is no link between GWP and ODP.

Refrigerant: there are three main make-ups of refrigerants:

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- Hydrogenated Fluorocarbon Refrigerants (HFCs) are made up of hydrogen, fluorine, and carbon. Because they do not use a chlorine atom (which is used in most refrigerants) they are known to be one of the least damaging to our ozone.
- Hydrogenated Chlorofluorocarbon Refrigerants (HCFCs) are made up of hydrogen, chlorine, fluorine, and carbon. These refrigerants contain minimal amounts of chlorine; they are not as detrimental to the environment as some other refrigerants.
- Chlorofluorocarbon Refrigerants (CFCs) contain chlorine, fluorine and carbon. These refrigerants carry high amounts of chlorine so they are known for being the most hazardous to the ozone layer.

Table of refrigerants and their Global Warming Potentials: the table below includes available substances which are capable of acting as refrigerants. Many are not currently used as such and some have been phased out and withdrawn from the market.

Table 21 Refrigerant GWP

Refrigerant type	GWP	Refrigerant type	GWP
R11 (CFC-11) *	4000	R32 (HCFC-32) *	580
R12 (CFC-12) *	8500	R407C (HFC-407)	1600
R113 (CFC-113) *	5000	R152a (HFC-152a)	140
R114 (CFC-114) *	9300	R404A (HFC blend)	3800
R115 (CFC-115)*	9300	R410A (HFC blend)	1900
R125 (HFC-125)	3200	R413A (HFC blend)	1770
Halon-1211	N/A	R417A (HFC blend)	1950
Halon-1301	5600	R500 (CFC/HFC) *	6300
Halon-2402	N/A	R502 (HCFC/CFC) *	5600
Ammonia	0	R507 (HFC azeotrope)	3800
R22 (HCFC-22) *	1700	R290 (HC290 propane)	3
R123 (HCFC-123) *	93	R600 (HC600 butane)	3
R134a(HFC-134a)	1300	R600a (HC600a isobutane)	3
R124 (HCFC-124) *	480	R290/R170(HC290/HC170)	3
R141b (HCFC-141b) *	630	R1270 (HC1270 propene)	3
R142b (HCFC-142b) *	2000	R143a (HFC-143a)	4400

N/A Indicates that there is insufficient data available to give a GWP value.

- Global warming potential (GWP) values are based on best available data at the time of writing and are based on a 100-year time horizon. Other published data may be based on different time horizons.

- All CFC/HCFC refrigerants (marked *) have an ODP > 0 and as such are illegal for new installations. Existing equipment may continue to use them at present. The use of CFCs and HCFCs as refrigerants has been addressed under the Montreal protocols. Phase out programmes have been agreed resulting in these substances no longer being used as refrigerants in all new build and most existing situations. The industry's favoured replacements are currently HFCs which are often potent global warming contributors.

- Whilst it is currently still legal to have an existing system that uses refrigerants with an ozone depleting potential, it is now illegal to top up with CFCs (either new or recycled refrigerant). It will be illegal to top up with new HCFCs from 2010, and it will be illegal to top up with recycled/recovered HCFCs from 2015.

- Hydrocarbons and ammonia-based refrigerants have low or zero GWP and are therefore preferred long-term options. These are now widely available and are valid alternatives to HFCs in all buildings, provided health and safety issues are fully addressed.

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Issue ID	Issue Title	No. of credits available	Minimum standards
Pol 2	Preventing Refrigerant Leaks	1	No

Aim

To reduce the emissions of refrigerants to the atmosphere arising from leakages in cooling plant.

Assessment Criteria

The following demonstrates compliance:

1. The building has no refrigerants **OR**
2. Systems using refrigerants are contained in a moderately air tight enclosure (or a mechanically ventilated plant room), and a refrigerant leak detection system is installed covering high-risk parts of the plant. **OR**
3. An automatic permanent refrigerant leak detection system is specified, which is NOT based on the principle of detecting or measuring the concentration of refrigerant in air.
4. The automatic shutdown and pump down of refrigerant occurs on the detection of high concentrations of refrigerant in the plant room/enclosure. For the majority of cases only systems in mechanically ventilated/moderately air tight plant rooms (or enclosures) comply.
5. Automatic pump-down to either a separate storage tank or into the heat exchanger is acceptable but only where automatic isolation valves are fitted to contain the refrigerant once fully pumped down.
6. The alarm threshold that triggers automatic pump down is set to a maximum of 2000ppm (0.2%), but lower levels can be set. The credit cannot be awarded for manual systems.

Compliance Notes	
New Build	There are no additional or different criteria to those outlined above specific to new build projects.
Refurbishment	There are no additional or different criteria to those outlined above specific to refurbishment projects.
Extensions to existing buildings	Where an existing building is being extended and it has existing building services plant and systems that will be common to both the new extension and existing building, the existing plant must be assessed against the criteria of this issue. If the extension is served by independent services, only these need be assessed against the Assessment Criteria.
Type of refrigerant	This issue is applied in instances where any type of refrigerant is present, i.e. even if the ozone depleting potential (ODP) of the refrigerant is zero and the global warming potential (GWP) is less than 5.
Solid refrigerant	The credit can be awarded by default where a solid refrigerant is used.
CO_2 as a refrigerant	When CO_2 is used as a refrigerant, the refrigerant recovery system credit can be awarded by default.

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Total refrigerant charge less than 5 kg	The credit can be awarded by default where the total refrigerant charge used in the building is less than 5kg.
Multiple split systems	For installations of small multiple hermetic systems only, where the refrigerant charge in each unit is less than 5kg but the total refrigerant charge in the building is greater than 5kg, the credit can be awarded by default. This is on the basis that the risk of a large refrigerant leak is minimised and individual leaks from each system will be small i.e. <5kg.
High-risk parts	High-risk parts of refrigeration plant typically include the pipe work and compressor. Evaporator or condenser coils can be omitted from the coverage of the system.
Manual refrigerant recovery system	The provision of any manual system, including manual storage cylinders on site, does not comply with the criteria of this issue.

Schedule of Evidence Required

Req.	Design Stage	Post Construction Stage
1	A copy of the specification clause or design plan confirming: • Absence of refrigerants in the development.	Assessor's building/site inspection and photographic evidence confirming: • Absence of refrigeration plant.
2&3	A copy of the specification clause or letter from the M&E engineer confirming: • Type of leak detection system(s). • Scope of the system(s) • Where relevant, containment strategy for such equipment.	Assessor's building/site inspection and photographic evidence confirming: • Installation of leak detection system(s) • Installation of automatic refrigerant recovery equipment • Pre-set threshold level for automatic pump down.
4,5&6	A copy of the specification clause or letter from the M&E engineer confirming: • Type, scope and operation of automatic refrigerant recovery equipment • Details of the plant room enclosure where the refrigeration plant is installed • Alarm threshold for triggering automatic pump down.	

Additional Information

Relevant definitions

Moderately airtight enclosure: this can be defined as an enclosure that does not produce a draught or significant fresh air ingress that would dilute any leaked refrigerant gas (dilution may prevent detection).

Refrigerant Leak Detection: a permanently installed multi-point sensing system; this may be aspirated or have multiple sensor heads linked to a central alarm unit or BMS. Various sensor types are available including infra-red, semi-conductor or electro-chemical. Please see below for further guidance on the coverage of refrigerant leak detection systems.

Refrigerant Recovery: The process of removing refrigerant from a system and storing it in an airtight container.

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Leak detection systems/devices

- Handheld detectors (which include semi-conductor and corona discharge types) do not comply with BREEAM criteria.
- Corona discharge detectors are not suitable where flammable refrigerants are used, or in potentially explosive atmospheres.
- Indicator dyes: these consist of fluorescent or coloured dyes added to the refrigerant to show leakage sites. The use of the dye should be approved by the compressor manufacturer. Some compressor manufacturers do not approve the use of indicator dyes, in which case either an alternative type of equipment should be used, or an alternative type of leak detection specified.
- Halide torch detectors: this type of detection is only appropriate for chlorine-based substances such as CFCs and HCFCs, and should not be used in areas where naked flames are prohibited. Compounds which do not contain chlorine, e.g. HFCs, cannot be detected by this method. When awarding this credit in instances where these detectors are in use, the assessor should confirm that the refrigerant is chlorine based.
- Electronic leak detectors: these must be designed to detect a certain type of, or multiple types of, refrigerant, i.e. CFC, HFC, HCFC, etc.
- Standing hold test: systems based on monitoring pressure drops within the pipe work are not necessarily compliant with the BREEAM criteria. There are natural fluctuations to the pressure of the refrigerant due to changes in volume and temperature of the system, and to the ambient temperature of the surroundings. Low pressure and high pressure switches, which are standard equipment on refrigerant plant, are therefore not sufficient to award the credit. Other methods exist, such as pressurising the system with a high pressure, dry nitrogen gas for a period of time and then identify whether or not the pressure drops during this time. However, this requires systems to be shut down for a period of time (usually overnight or longer).
- Systems NOT based on the principle of detecting or measuring the concentration of refrigerant in air: Such systems (for example based on sensing the presence of refrigerant vapour in liquid-carrying pipes) are now commercially available.

Refrigerant pump down

The specification of automatic refrigerant pump down can further limit potential losses and damage to the environment and have subsequent economic benefits to the building owner. Under the United Kingdom 1990 Environmental Protection Act unwanted refrigerant and refrigerating system oil are classified as either controlled or hazardous waste. Not only is it an offence to discharge them to the environment, but there are procedures regarding transport, storage, transfer of ownership and ultimate disposal. Article 16 of EC regulation 2037/2000 specifies that used CFCs and HCFCs must be recovered for destruction or recycling/reclamation.

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Issue ID	Issue Title	No. of credits available	Minimum standards
Pol 3	Refrigerant GWP – Cold Storage	1	No

Aim

To reduce the contribution to climate change from refrigerants with a high global warming potential.

Assessment Criteria

The following demonstrates compliance:

1. All refrigerant types used in cold storage systems have a global warming potential (GWP) of less than 5.

2. The requirement applies to refrigerants used in systems integral to the building, including where specified:
    a. Cold storage enclosures.
    b. Cold store services including: Chilled water pipework, refrigerant pipework and ductwork etc
    c. Fixed cold or chilled storage cabinets
    d. Fixed cold drink coolers.

Compliance Notes	
New Build	There are no additional or different criteria to those outlined above specific to new build projects.
Refurbishment	There are no additional or different criteria to those outlined above specific to refurbishment projects.
Extensions to existing buildings	There are no additional or different criteria to those outlined above specific to the assessment of extensions to existing buildings.
Domestic-scale refrigeration equipment & small plug-in chillers	The scope of this BREEAM issue excludes domestic-scale refrigeration equipment and small 'plug-in' chillers and therefore plant not integral to the building.
GWP data not available	Where GWP data is not available, the credit cannot be awarded by default.
No cold food storage	For developments where the tenant or end use function is known and cold food storage is not required, then this issue does not need to be assessed.

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Schedule of Evidence Required

Req.	Design Stage	Post Construction Stage
1&2	A marked-up design plan highlighting the cold food storage areas/plant in the building. A copy of the specification clause confirming either: • Type(s) of refrigerant to be used. **AND** Manufacturer's information confirming: • GWP of each refrigerant.	A letter from the design team/developer confirming: • The refrigerant type specified remained unchanged. **OR** Where a change occurred, written confirmation from the design team confirming: • Type of refrigerant(s) used. **AND** Manufacturer's information confirming: • GWP of each refrigerant.

Additional Information

Relevant definitions

Please refer to BREEAM issue Pol 1.

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Issue ID	Issue Title	No. of credits available	Minimum standards
Pol 4	NO_x emissions from heating source	3	No

Aim

To encourage the supply of heat from a system that minimises NO_x emissions, and therefore reduces pollution of the local environment.

Assessment Criteria

The following demonstrates compliance:

1. Where manufacturer's details demonstrate that the plant installed to meet the building's space heating demand has dry NO_x emission levels as follows:
    a. One credit where the dry NO_x emissions from delivered space heating energy are ≤100 mg/kWh (at 0% excess O_2).
    b. Two credits where the dry NO_x emissions from delivered space heating energy are ≤70 mg/kWh (at 0% excess O_2).
    c. Three credits where the dry NO_x emissions from delivered **space heating** energy are ≤40 mg/kWh (at 0% excess O_2). And emissions from delivered **water heating** energy are 100 mg/kWh or less (at 0% excess O_2).

    The emissions should be estimated under normal operating conditions (not standby).

Compliance Notes	
New Build	There are no additional or different criteria to those outlined above specific to new build projects.
Refurbishment	If the heating demand for the refurbished building is being met by an existing system, then the NO_x emission level for the existing system must be assessed against the criteria of this issue.
Extensions to existing buildings	The rule above for refurbishment projects also applies to new build extensions to existing buildings.
Highly insulated building	Where the heating load for a highly insulated/exemplar environmental building is less than or equal to 7% of the heat load for a Building Regulations-compliant building of the same size and type, 1 credit can be awarded regardless of the primary fuel used. Figures used for calculations of the percentage of total heat demand must be based on the output from an *approved energy modelling software*.
NO_x data provided in different units	Where data is provided in different units, or at a level of excess oxygen greater than zero, the manufacturer/supplier should be asked to convert this to comply with the BREEAM criteria. Alternatively, the assessor may correct these using the correction factors provided in the Additional Information section.

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Grid electricity	Where some of the building's space heating is fuelled by electricity from the National Grid, however small the incidence is on the overall consumption, the credits will not be achievable as power stations emit NO_x at an average rate of approximately 1200 mg/kWh. This figure is a UK average and therefore also applies to areas with a higher proportion of renewable sources like Scotland.
Electricity from a renewable source	Where electricity used by the heating system is sourced from a zero emission renewable source such as PVs, wind etc, there are no resulting emissions. This source of heating can therefore be counted as having zero NO_x emissions.
Heat pumps	Heat pumps powered by grid electricity indirectly produce emission rates higher than those required by BREEAM and are therefore typically unable to achieve any credits under Pol 4. However, the energy saved by using certain types of heat pumps is recognised in BREEAM issue Ene 1 and the reduced emissions are recognised under BREEAM issue Ene 5.
District heating	District heating systems that incinerate waste usually have NO_x emission rates higher than the levels set to achieve any BREEAM credits.
Heat recovery	Heat recovery can be considered as having zero NO_x emissions for the purpose of this issue.
Combined Heat & Power	Refer to the additional guidance section for guidance on calculating NO_x emission levels from CHP.
Biomass	Whilst Biomass systems are recognised as low carbon systems, they can produce a significant amount of NO_X and so may not achieve this credit; however they can score highly in the Energy section of BREEAM. Biomass systems are also recognised as reducing the impact of fossil fuel depletion by employing a renewable combustion fuel source.
More than one heating system	Refer to the additional guidance section for guidance on calculating NO_x emission levels where heat is provided by more than one system.
Green Tariff	Commitments to use a Green tariff to supply electricity to heat the building or power heat pumps are not recognised in this issue due to the uncertainty that this electricity will be zero emission.

Schedule of Evidence Required

Req.	Design Stage	Post Construction Stage
1	A copy of the specification clause confirming: • Type of heating system(s) installed. For each system specified, a letter, email or literature from the manufacturer(s) confirming: • Dry NOx emissions rate in mg/kWh. If more than one system is providing heat, design team calculations confirming: • The average NOx emission rate.	Assessor's building/site inspection and photographic evidence confirming: 3. Heating system(s) installed. **OR** A letter from the design team or main contractor confirming: • No changes to the specification.

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Additional Information

Relevant definitions

Approved energy modelling software: Refer to BREEAM issue Ene 1 for a definition.

NO_x emissions: are pollutant gases produced by the combustion of fossil fuels. NO_x reacts with heat and sunlight to produce ozone that can cause serious respiratory problems. It also reacts with water to produce acid rain which has a detrimental effect on ecosystems.

Dry NO_x Levels: the NOx emissions (mg/kWh) resulting from the combustion of a fuel at 0% excess oxygen levels.

Calculating NO_x emission levels from Combined Heat & Power (CHP) systems
Where CHP systems are present or specified, only the heat-related emissions are considered for the assessment of this issue. The NO_x emissions are allocated to heat and electricity in line with the respective power outputs. This is done using a NO_x emission rate for the electrical output equivalent to the current rate for grid electricity, and allocating the remaining NO_x to the heat output. Only the heat-related component is then compared with the credit scale. The following formula should be used to determine this:

$X = (A - B) / C$

Where:

X = NO_x emissions per unit of heat supplied (mg/kWh heat)
A = NO_x emissions per unit of electricity generated (mg/kWh^{elec}) i.e. the NO_x emitted by the CHP system per unit of electricity generated. This figure should be obtained from the installer/supplier of the system.
B = NO_x emissions per unit of electricity supplied from the grid (mg/kWh^{elec}) this should be assumed to be $1200mg/kWh^{elec}$
C = Heat to Electricity Ratio of the CHP scheme.

The above methodology determines the net NO_x emissions from CHP-generated electricity compared with 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 heat is provided by more than one system, an average NO_x emission rate should be used based on the ratio of power outputs from each source, i.e. multiply the emissions of each boiler by the percentage of heat demand it supplies and total these values. This is likely to be the case where a CHP system has been sized on the base power demand rather than the heat demand and therefore a secondary heating system is required. The following formula can be used:

Average NO_x Emission Rate = $(N_1 \times (H_1/H_T)) + (N_2 \times (H_2/H_T)) \ldots\ldots + (N_n \times (H_n/H_T))$

Where:
N_1 = NO_x emissions rate for source 1
N_2 = NO_x emissions rate for source 2
N_n = NO_x emissions rate for source n
H_T = Total heat output from all sources
H_1 = Heat output from source 1
H_2 = Heat output from source 2
H_n = Heat output from source n

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 ppm, mg/MJ, mg/m^3 or wet NO_x. It should be noted that these conversion factors assume worst case efficiencies and

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are likely to give conservative answers. This could have the effect of lowering the number of credits achieved.

- Figures in mg/m^3 should be multiplied by 0.857 in order to gain emissions in mg/kWh. A conversion may also be necessary for data not calculated at 0% excess oxygen (see below).

- Figures in parts per million (ppm) should be multiplied by 1.76 in order to obtain mg/kWh. A conversion may also be necessary for data not calculated at 0% excess oxygen. (see below)

- 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 (below).

- This Issue's criteria are based on *dry NOx* values – almost all manufacturers will quote emissions in *dry NOx*. However if wet NOX figures are supplied, these should be converted to *dry NOx*. This can be done by multiplying the wet NOX figure by 1.75.

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 % excess oxygen this emission was measured. 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 BREEAM, the following conversion factors can be used for the most frequently used rates supplied by manufacturers:

% Excess O_2	Conversion (c)
3 %	x 1.17
6%	x 1.40
15%	x 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.

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Issue ID	Issue Title	No. of credits available	Minimum standards
Pol 5	Flood Risk	3	No

Aim

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

Assessment Criteria

The following demonstrates compliance:

Two credits

1. Where the assessed development is situated in a flood zone that is defined as having a low annual probability of flooding.

2. A site specific Flood Risk Assessment (FRA) confirms that there is a low risk of flooding from all sources.

Or one credit

1. Where the assessed development is situated in a flood zone that is defined as having a medium or high annual probability of flooding **AND**

2. A site specific Flood Risk Assessment (FRA) confirms to the satisfaction of the local authority and statutory body that the development is appropriately flood resilient and resistant from all sources of flooding **AND**

3. The ground level of the building, and access to it and the site, are designed (or zoned) so they are at least 600mm above the design flood level of the flood zone in which the assessed development is located (see note 6 & 7).

One additional credit

1. Where attenuation measures are specified to ensure that the peak rate of run-off from the site to the watercourses (natural or municipal) is no greater for the developed site than it was for the pre-development site. This should comply with the *Interim Code of Practice for Sustainable Drainage*[65] systems published by CIRIA, or for at least a 1 year and 100 year return period event with a 6 hour duration.

2. The capacity of the attenuation measures must include an allowance for climate change; this should be made in accordance with current best practice[66].

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Compliance Notes	
New Build	There are no additional or different criteria to those outlined above specific to new build projects.
Refurbishment	Refurbishment projects, where no new building or hard landscaping areas are developed, are likely to achieve the credit for attenuation of surface water run-off. In such instances, as a minimum, a Flood Risk Assessment must have been carried out and any identified opportunities to reduce surface water run-off as a result of the refurbishment works must be implemented.
Extensions to existing buildings	There are no additional or different criteria to those outlined above specific to the assessment of extensions to existing buildings.
Definition of flood zones	Please refer to the Additional Information section.
Sources of flooding	If the development is in Zone 1, the FRA must demonstrate that there is low risk of flooding from the following sources: • Fluvial (rivers) • Tidal • Surface water: sheet run-off from adjacent land (urban or rural) • Groundwater: most common in low-lying areas underlain by permeable rock (aquifers) • Sewers: combined, foul or surface water sewers.
Functional flood plain	The BREEAM credit for locating in a flood zone of 'medium or high annual probability' cannot be awarded where the building is located in the functional flood plain. PPS25[67] defines the functional flood plain as a 'zone [that] comprises land where water has to flow or be stored in times of flood'. If the building assessed is or has been defined as 'water-compatible development', please refer to the BREEAM office for guidance on assessing this BREEAM issue.
Environment Agency flood maps	The Environment Agency flood map and associated information is intended for guidance, and cannot provide details for individual properties. In addition the EA map only covers the likelihood of flooding from the rivers or sea and not all sources of flooding (listed above). EA flood maps cannot therefore be used as evidence to demonstrate compliance with the assessment criteria.
Pre-existing flood defences	In an area protected by existing flood defences (designed to withstand a certain magnitude of flooding) the appropriate number of credits can be awarded where the defences reduce the risk to 'low' or 'medium' **and** the following conditions are met: 1. The development **is not located** in an area where new flood defences have to be, or have been, constructed to minimise the risk of flooding to the site and its locality purely for the purpose of the development and/or its wider master plan 2. The development **is located** on a previously developed land (as defined by the criteria in BREEAM issue LE1 Re-use of land) and the appropriate statutory body confirm that, as a result of the existing defences, the risk of a flood event occurring is reduced to low or medium (as appropriate to the credit levels set in BREEAM). If firm confirmation is not provided then the credit cannot be awarded 3. The relevant agency confirms that, as a result of such defences, the risk of a flood event occurring is reduced to low or medium risk. A statutory body's local/regional office may be able to provide more information on existing defences in the area in which the assessed development is located.

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600mm threshold	It is accepted that, for buildings located in a medium flood zone, areas of the car park and site access may be allowed to flood and therefore fall below the 600mm threshold. In such cases the credit is still achievable provided safe access to the site and the ground floor of the building can be maintained (i.e. they are 600mm above the design flood level) to ensure the building/site does not become an 'island' in the event of a flood. Where the development has been permitted and the ground levels of the topography/infrastructure immediately adjacent to the site fall below the 600mm threshold, the credit can still be awarded, provided there are no other practical solutions for access to the site above this level and the assessed building, and access to it, meets the assessment criteria. As much of the external site area as possible (or as required by an appropriate statutory body) should be designed at or above the threshold.
Third-party defences	There are many defences, owned by third parties, which due to their location act as a flood defence by default e.g. motorway, railway embankments, walls etc. It can be assumed that embankments will remain in place for the lifetime of the development, unless the assessor or project team have reason to believe otherwise. For walls, assurance must be sought that the wall is likely to remain for the design life of the building.
Effectiveness of the water run-off attenuation measures	To ensure effective operation of the water run-off attenuation measures, the facilities must discharge half their volume within 24-48 hours (unless advised otherwise by a statutory body) of the storm event in readiness for any subsequent storm inflow.
Calculating peak rate of run-off	There are British Standards[68 & 69] that contain guidance on calculating the peak flow rate and determining the design flooding frequency. The assessor is not required to perform any calculation as this should be provided by the design team to demonstrate that they have sized the attenuation facilities to store the relevant volume of storm water necessary to achieve the credit.
Discharge to the sea or estuaries	If all run-off is discharged directly from the site to either the sea, the foreshore, estuaries covered by a shoreline management plan or designated wildlife/SSSI areas (as part of habitat management) then the credit can be awarded without the need to specify additional attenuation measures.
More stringent criteria	Where the local authority (or other statutory body) requires a greater attenuation than the percentages above, and/or a more onerous design flooding frequency than that recommended in BS EN752-4, then the higher criteria must be met in order to achieve the credit.
Recommendati-ons from an appropriate statutory body	None of the credits can be awarded where the assessed development has proceeded against the recommendation of the statutory body on the basis that the flooding implications are too great.

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Schedule of Evidence Required

Req.	Design Stage	Post Construction Stage
First & Second Credit		
1	A copy of a flood map or flood risk assessment confirming: • Flood zone or annual probability of flooding in the site location. Where appropriate, correspondence from the appropriate statutory body confirming: • Reduced annual probability of flooding due to existing flood defences.	As design stage, no further evidence is needed.
2	A copy of the Flood Risk Assessment.	Formal written correspondence from the design team confirming: • The FRA has not changed or required updating in the intervening period.
3	Site plans/sections confirming: • The design flood level for the site • The design ground level(s) for all developed areas of the site. • Safe access and escape routes	'As built' site plans/sections.
Additional SUDS Credit		
1&2	Site plans and a copy of the specification or consultants report confirming: • Type and storage volume (l) of the water run-off attenuation measures • Total area of hard surfaces (m^2) • Peak flow rate (l/s) for the design storm event • Additional allowance for climate change designed in to the system.	Assessor's building/site inspection and photographic evidence confirming: • Installation of water run-off attenuation measures • No changes to the evidence provided at the interim 'design' assessment stage. A letter from the design team or main contractor confirming: • No changes to the specification. Where changes have occurred, copies of as-built designs and calculations must be provided.

Additional Information

Relevant definitions

Appropriate Consultant: a consultant with qualifications and experience relevant to the calculation of surface water run-off and design SUDS and flood prevention measures. Where complex flooding calculations and prevention measures are required, this must be a specialist hydrological engineer.

Appropriate statutory body: this refers to either the Environment Agency in England and Wales, the Rivers Agency in Northern Ireland, the Scottish Environment Protection Agency in Scotland or the local authorities and internal drainage boards.

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

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Design flood level: 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.

Design flood event: an historic or notional flood event of a given annual flood probability, against which the suitability of a proposed development is assessed and mitigation measures, if any, are designed.

Design storm event: historic or notional weather conditions of a given annual probability, against which the suitability of a proposed development is assessed and mitigation measures, if any, are designed.

Flood event: A flooding incident characterised by its peak level or flow, or by its level or flow hydrograph.

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

Flood risk: the combination of the flood probability and the magnitude of the potential consequences of the flood event.

Flood risk assessment: 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. 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 www.communities.gov.uk.

Flood storage: The temporary storage of excess run-off or river flow in ponds, basins, reservoirs or on the flood plain during a flood event.

Flood zone: see table below for definition of flood zones.

Greenfield: a site which has either never been built on, or one which has remained undisturbed for five years or more.

Greenfield run-off rate: the rate of run-off that would occur from the site in its undeveloped and therefore undisturbed state.

Hard surfaces: these include roofs, car parks, access roads, pavements, delivery/service yards and external hard landscaping. Footpaths less than 1.5m wide which have free drainage to soft landscaped areas on both sides may be excluded.

ICoP (SUDS): 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 www.ciria.org.uk/suds/icop.htm

Infiltration: the passage of water into a permeable surface, such as soil, permeable paving, soakaways and so on.

Natural watercourses: any natural channel that conveys surface water.

Peak run-off rate (referred to as Q_p [m³/sec]): this 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.

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Pre-development: the state of the site under assessment immediately prior to purchase of the site by the client/developer (or, where the client has owned/occupied the site for a number of years, its current state).

Run-off: this is usually rainwater, but can also be groundwater or overspill from sewers and other sources.

Run-off rate: the rate of discharge of water from a surface.

Run-off attenuation measures: this covers the range of construction and equipment which can be employed to attenuate run-off from hard surfaces and roofs. Measures include: underground storage, oversized pipes, holding ponds, swales, reed beds, permeable paving, green roofs, local or centralised soakaways etc.

Peak flow rate: the peak rate of discharge of water from hard surfaces. For the purpose of calculating the peak flow rate volume, a 60 min duration of the design storm event should be used (unless a different duration is required by a statutory body).

Sewerage undertaker: this is a water company with statutory responsibility for sewerage and sewerage disposal and also surface water from roofs and yards of premises.

Shoreline Management Plan: SMPs provide a large-scale assessment of the risks associated with coastal processes and present a policy framework to reduce these risks to people and the developed, historic and natural environment in a sustainable manner.

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. 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.
- Run-off from roofs directed to a local soakaway or other holding facility such as tanks, ponds, swales etc.
- Green roofs.

Surface Water Run-off: 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.

Flood zones

Flood zones are defined in the relevant planning, policy and technical guidance documents for each country in the UK: PPS25 (England), TAN15 (Wales), SPP7 (Scotland), PPS15 (N. Ireland). Please note, PPS15 does not categorise flood risk zones and there are no similar publicly available flood maps covering Northern Ireland. Assessments in NI will therefore need to rely on site-specific flood risk assessments, or other relevant date/surveys, to determine the extent of flood risk for a specific development, and use the same definitions as those outlined for England (table below). The Northern Ireland Department of Environment or Rivers Agency may offer further advice or recommendations in this respect www.doeni.gov.uk/ and www.riversagencyni.gov.uk/

Whilst the definitions of flood zones and probabilities of flooding are generally the same throughout the UK, there are some differences. The definitions are outlined in the table below.

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Table 22 Definition of flood zones by country

Definition	England	Wales	Scotland
Low annual probability of flooding	**Zone 1** Less than 1 in 1000 chance of river and sea flooding (<0.1%)	**Zone A** Considered to be at little or no risk **Zone B** If site levels are greater than the flood levels used to define adjacent extreme flood outline.	**Little or no risk area** As defined for England
Medium annual probability of flooding	**Zone 2** Between 1 in 100 and 1 in 1000 chance of river flooding (1% – 0.1%) and between a 1 in 200 and 1 in 1000 chance of sea flooding (0.5% – 0.1%).	**Zone B** If site levels are not greater than the flood levels used to define adjacent extreme flood outline. **Zone C** Equal to or greater* than 0.1% (river, tidal or coastal flooding). * For the purposes of BREEAM assume upper probability of flooding no greater than that specified for England.	**Low to medium risk area** Watercourse, tidal or coastal flooding in the range 0.1% – 0.5% (1:1000 – 1:200).
High annual probability of flooding	**Zone 3a High Probability** 1 in 100 or greater chance of river flooding(>1%) and a 1 in 200 or greater chance of flooding from the sea (>0.5%). **Zone 3b The Functional Floodplain** Land where water has to flow or be stored in times of flood.	**Zone C1 & C2** * For the purposes of BREEAM assume the same lower and upper probability of flooding as that specified for England.	**Medium to high risk areas** Annual probability of watercourse, tidal or coastal flooding: greater than 0.5% (1:200)

Flood defences

Flood defences do not completely remove the risk of flooding, but they do reduce it. Building in areas where flood defences are present (and appropriately designed to withstand a certain magnitude of flooding) is therefore preferable to those built in medium/high risk areas without defences. However, for the purpose of this issue, it is still preferable to build in areas of low risk than encourage development of new flood defences in areas with a higher risk of flooding purely for the sake of new development.

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Issue ID	Issue Title	No. of credits available	Minimum standards
Pol 6	Minimising Watercourse Pollution	1	No

Aim

To reduce the potential for silt, heavy metals, chemicals or oil pollution to natural watercourses from surface water run-off from buildings and hard surfaces.

Assessment Criteria

The following demonstrates compliance:

1. Specification of Sustainable Drainage Systems (SUDs) or source control systems such as permeable surfaces or infiltration trenches where run-off drains are in areas with a relatively low risk source of watercourse pollution.

2. Specification of oil/petrol separators (or equivalent system) in surface water drainage systems, where there is a high risk of contamination or spillage of substances such as petrol and oil (see Compliance Notes for a list of areas).

3. All water pollution prevention systems have been designed and detailed in accordance with the recommendations of Pollution Prevention Guideline 3[70] and where applicable the SUDS manual[71].

4. A comprehensive and up-to-date drainage plan of the site will be made available for the building/site occupiers.

Compliance Notes	
New Build	There are no additional or different criteria to those outlined above specific to new build projects.
Refurbishment	There are no additional or different criteria to those outlined above specific to refurbishment projects.
Extensions to existing buildings	Please refer to the compliance note below regarding '*infill building on an existing site'*.
Areas that are a source of pollution	For the purpose of assessing this issue an area that presents a risk of watercourse pollution includes vehicle manoeuvring areas, car parks, waste disposal facilities, delivery and storage facilities or plant areas.
Areas where oil separators are required	The following site areas (where present) require oil separators in surface water drainage systems: • Car parks larger than 800m^2 or with 50 or more parking spaces • Smaller car parks discharging to a sensitive environment • Areas where goods vehicles are parked or manoeuvred • Vehicle maintenance areas • Roads • Industrial sites where oil is stored or used • Refuelling facilities

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SUDS and oil interception	In some instances, where the risk of contamination is infrequent and potential spills will be small, oil interceptors may not be required if appropriately designed Sustainable Urban Drainage systems are specified. Refer to PPG3 for additional guidance.
Infill building on existing site	Where the assessment is of an individual building on an existing site, i.e. infill development, the criteria apply to areas within the construction zone that present a risk of pollution, as well as any areas external to the construction zone that are affected by the new works i.e. drainage onto or from the proposed development.
Suitable level of treatment	In all cases the assessor should determine the operational use of the site in order to determine if the proposed surface water run-off strategy is suitable.
Rainwater run-off	This issue is not intended to cover the treatment of rainwater run-off except where there is a risk of significant pollution arising.
Underground/ covered areas	Where it can be demonstrated that there will be no drainage or wash down facilities that may lead water from inside the underground or covered area to natural watercourses, then such areas comply with the assessment criteria by default.
Roof plant	Roof top plant space must be considered where there is a risk from substances such as petrol or oil. Refrigerants are not assessed under this issue, as the only risk of pollution is to air and not the watercourse.
No areas at risk from pollution	Where it can be demonstrated that there are no external areas that present a pollution risk, e.g. parking, delivery, manoeuvring or servicing facilities (including individual parking spaces), external waste storage space or other hard standing areas AND there is no plant supported on the roof, then this credit can be awarded by default.
Permeable paving system	Where it can be demonstrated that a permeable paving system designed to retain silts and degrade oils has been used, then this will meet the assessment criteria of this issue for car parks and access roads.
Drainage plan	A comprehensive and up-to-date drainage plan of the site, which accurately identifies all drains, must be produced and handed over to the new occupier. If there is no in-house expertise to do this, a reputable drainage company should be used.

Schedule of Evidence Required

Req.	Design Stage	Post Construction Stage
1&2	Marked-up proposed site plan highlighting: • Low and high risk areas of the site. A copy of the specification or design plan confirming: • Type of pollution control systems specified.	Assessor's building/site inspection and photographic evidence confirming: • Installation of pollution control system(s).

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3&4	A letter from the design team confirming: • All water pollution prevention systems designed in accordance with PPG3 and the SUDS manual (where appropriate) • Outlining indicative examples of compliance with PPG3 and the SUDS manual • A copy of the drainage plan will be produced and handed over to the building occupier.	A letter from the design team or main contractor confirming: • Installation of systems in accordance with compliant design. • No changes to the evidence provided at the interim 'design' stage assessment. Assessor's building/site inspection and photographic evidence confirming: • Existence of the drainage plan in the building's O&M manual/file.

Additional Information

Relevant definitions

Appropriate statutory body: This refers to either the Environment Agency in England & Wales, the Environment and Heritage Service (EHS) in Northern Ireland or the Scottish Environment Protection Agency in Scotland.

Low risk areas: Low risk areas can be defined as areas where the risk of contamination or spillage of substances such as petrol and oil is reduced. For the purpose of this credit, roofs and small car parks may be considered as low risk areas.

Soakaways: A sub-surface structure designed to promote the infiltration of surface water in to the ground. As a general point, soakaways may be shallow and broad – as in a blanket under permeable paving, or deeper structures. Deeper, point source soakaways should be avoided for road and car-park drainage, but shallow structures providing infiltration in an extensive way (infiltration trenches and permeable paving) do not need oil separators. See Pollution Prevention Guideline (PPG) 3 "*Use and design of oil separators in surface water drainage systems*", Environment Agency/SEPA/Environment & Heritage Service, 2006 for further guidance.

Types of Oil Separator

- **Class 1 Separators:** These are designed to achieve a concentration of less than 5mg/l oil under standard test conditions. They should be used when the separator is required to remove very small oil droplets, such as those arising from car park run-off.

- **Class 2 Separators:** These are designed to achieve a concentration of less than 100mg/l oil under standard test conditions. They are suitable for dealing with discharges where a lower quality requirement applies and/or for trapping large spillages.

  Both classes can be produced as 'full retention' or 'by pass' separators:

- **Full retention separators** treat the flow that can be delivered by the drainage system, which is normally equivalent to the flow generated by a rainfall intensity of 50mm/hr.

- **Bypass separators** fully treat all flows generated by rainfall rates of up to 5mm/hr. Flows above this rate are allowed to bypass the separator. These separators are used when it is an acceptable risk not to provide full treatment for high flows.

Pollution Prevention Guideline 3 contains more detailed guidance on the selection and sizing of an appropriate type of separator.

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Issue ID	Issue Title	No. of credits available	Minimum standards
Pol 7	Reduction of Night Time Light Pollution	1	No

Aim

To ensure that external lighting is concentrated in the appropriate areas and that upward lighting is minimised, reducing unnecessary light pollution, energy consumption and nuisance to neighbouring properties.

Assessment Criteria

The following demonstrates compliance:

1. The external lighting strategy has been designed in compliance with Table 1 (and its accompanying notes) of the ILE Guidance notes for the reduction of obtrusive light, 2005[72], (see Additional Information below - Buildings located in Scotland must also refer to the Compliance Notes below for additional criteria).

2. All external lighting (except for safety and security lighting) can be automatically switched off between 2300hrs and 0700hrs. This can be achieved by providing a timer for all external lighting set to the appropriate hours.

3. If safety or security lighting is provided and will be used between 2300hrs and 0700hrs, this part of the lighting system complies with the lower levels of lighting recommended during these hours in Table 1 of the ILE's Guidance notes, for example by using an automatic switch to reduce the lighting levels at 2300 or earlier.

4. Illuminated advertisements, where specified, must be designed in compliance with ILE Technical Report 5 – *The Brightness of Illuminated Advertisements*[73].

Compliance Notes	
New Build	There are no additional or different criteria to those outlined above specific to new build projects.
Refurbishment	For refurbishment projects, in addition to any new external lighting specified, any existing lighting that will remain post development must be assessed against the criteria of this issue.
Extensions to existing buildings	If the scope of the assessment covers the new extension only, then it is only new lighting specified as part of that extended works that must be assessed against the criteria for this issue. If the new and existing building is being assessed as one, then the rule for refurbishments (above) applies to the existing building.
Entire new development	Where the assessment is of an entire new development, the criteria apply site-wide.
Individual building on existing site	Where the assessment is of an individual building on an existing site then only those areas affected by the works i.e. within the construction zone, must be assessed.

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No external lighting	If there is no external lighting on or around the assessed development the credit can be awarded by default.
Buildings located in Scotland	In addition to the criteria above, buildings located in Scotland must comply with the light pollution criteria in the guidance note '*Controlling Light Pollution and Reducing Lighting Energy Consumption*'[74]. This can be demonstrated via completion of the checklists in Annexes B and C of this document by a relevant member of the design team.
Safety lights	Flush stud lights used for safety purposes in vehicle manoeuvring areas may be excluded from the assessment.
Floodlighting, signage lighting	The guidance notes recommend the setting of a curfew, during which all non-essential external lighting is switched off. This will normally include floodlighting, signage and all lighting that is not required for safety or security.
Essential lighting between 2300 and 0700	Where essential lighting is provided between 2300 and 0700, i.e. for 24-hour operating buildings, the system is able to automatically switch to the lower levels of lighting recommended in the ILE Guidance notes for lighting during these hours (or provide these lower levels at all times).
Specific security criteria	Any light fittings in the areas outlined above that are specified to comply with specific security criteria/standards, and where those criteria and the BREEAM assessment criteria are not complementary, can be excluded from the assessment of this issue. In these circumstances the assessor must obtain evidence confirming that such criteria are applicable to the assessed development.

Schedule of Evidence Required

Req.	Design Stage	Post Construction Stage
1-4	A marked-up copy of the site plan showing: • Areas of the building and site that will be externally lit • Any nearby properties. A copy of the specification clause requiring, or external lighting design confirming: • The external lighting design in compliance with Table 1 of the ILE Guidance notes • Controls for all external lighting. • Illuminated advertisements designed in compliance with ILE Technical Report 5 (if relevant). In the case of the external lighting design, the M&E engineer or lighting designer must provided indicative examples of where and how the strategy complies with the assessment criteria.	Assessor's building/site inspection and photographic evidence confirming: • Cut-off luminaires, if provided, have been angled to limit spill light to potentially obtrusive directions. • External lighting controls A letter from the design team or main contractor confirming: • Installation of systems in accordance with compliant design. • No changes to the evidence provided at the interim 'design' stage assessment.

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Additional Information

Relevant definitions

Construction zone: For the purpose of this credit the construction zone is defined as the site which is being developed for the BREEAM assessed building and its external site areas i.e. the scope of the new works.

The ILE Guidance notes for the Reduction of Obtrusive Light, 2005 are available free of charge from the ILE website www.ile.org.uk.

Table 1 of ILE guidance
Table 1 of the ILE guidance and its accompanying notes outlines four sets of recommendations:

1. Limits to the average upward light ratio of the luminaires, to restrict sky glow.
2. Limiting illuminance at the windows of nearby properties for which light trespass might be an issue.
3. Limiting the intensity of each light source in potentially obtrusive directions beyond the site boundaries.
4. Limiting the average luminance of the building, if it is floodlit.

In each case the limiting values depend on the location of the site of the building (for example rural, urban or city centre). A calculation of illuminance (b) or intensity (c) is not required if all luminaires are cut-off types and angled so that light in potentially obtrusive directions is blocked.

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Issue ID	Issue Title	No. of credits available	Minimum standards
Pol 8	Noise Attenuation	1	No

Aim

To reduce the likelihood of noise from the new development affecting nearby noise-sensitive buildings.

Assessment Criteria

The following demonstrates compliance:

1. There are, or will be, existing *noise-sensitive areas or buildings* within 800m radius of the assessed development.

   Where there are or will be no *noise-sensitive areas or buildings* in the locality of the assessed development, the credit can be awarded by default.

2. A noise impact assessment in compliance with BS 4142:1997[75] has been carried out and the following noise levels measured/determined:

   a. Existing background noise levels at the nearest or most exposed noise-sensitive development to the proposed development; or at a location where background conditions can be argued to be similar.
   b. The rating noise level resulting from the proposed noise-source. This can be based upon reference to similar installations or sites, or determined by calculation.

   The noise impact assessment must be carried out by a *suitably qualified acoustic consultant* holding a recognised acoustic qualification and membership of an appropriate professional body (see relevant definitions in the additional guidance section).

3. Where the rating level of the noise source(s) from the site/building is equivalent to or less than the background noise level, the credit can be awarded.

4. Where the rating level of the noise source(s) from the site/building is greater than the background noise level, measures have been installed to attenuate the noise at its source to a level where it will comply with requirement 3.

Compliance Notes	
New Build	There are no additional or different criteria to those outlined above specific to new build projects.
Refurbishment	There are no additional or different criteria to those outlined above specific to refurbishment projects.
Extensions to existing buildings	There are no additional or different criteria to those outlined above specific to the assessment of extensions to existing buildings.
Part of a larger mixed-use development	If the development forms part of a larger mixed-use development, where noise sensitive buildings exist or will be developed, then the noise assessment must be carried out to ensure noise from the assessed building will not create a future problem.

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Assessed building is defined as *noise sensitive*	If the assessed building is itself defined as a *noise sensitive building* then a noise impact assessment must be carried out regardless of the assessed buildings locality to other *noise sensitive areas or buildings*.
Scope of the noise impact assessment	For the purposes of BREEAM the noise impact assessment relates only to building services plant; additional process-related noise does not have to be considered. Stand-by generating plant should also not be included.
Standard not appropriate / not applicable	Where a suitably qualified acoustician confirms that BS4142:1997 is not an appropriate standard of assessment for the proposed building/site, their assessment of the likelihood of complaint from noise impact can be accepted for the purpose of assessing this issue.

Schedule of Evidence Required

Req.	Design Stage	Post Construction Stage
1	Site plan highlighting: • All existing and proposed noise-sensitive buildings local to, and within, the site boundary • Proposed sources of noise from the new development • Distance (m) from these buildings to the assessed development.	Assessor's building/site inspection report and photographic evidence confirming: • All noise-sensitive buildings local to, and within, the site boundary • Proposed noise sources within the development • Distances (m) from these buildings to the assessed development.
2&3	A copy of the acoustician's report. The acoustician's qualifications and professional status. **OR** A copy of the specification clause requiring: • A noise assessment in compliance with BS 4142:1997 by a suitably qualified acoustician. **OR** A formal letter from the client or design team confirming that they will appoint an acoustician to carry out a noise assessment in compliance with BS 4142:1997	A copy of the acoustician's report with measurements based on installed and operating plant.
4	Acoustician's report with recommendations for noise attenuation measures. **AND** A marked-up design plan highlighting the specification of the acoustician's attenuation measures **OR** A formal letter from the client or design team confirming that: • If relevant, attenuation measures recommended by an appointed suitably qualified acoustician will be installed.	Assessor's building/site inspection report and photographic evidence confirming: • The existence of the specified noise attenuation measures. **OR** A formal letter from the acoustician confirming that all specified attenuation measures have been installed to the required standard.

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Additional Information

Relevant definitions

Suitably qualified acoustician: Refer to BREEAM issue Hea 13 for the relevant definition.

Noise sensitive area: landscapes or buildings where the occupiers are likely to be sensitive to noise created by the new plant installed in the assessed building, including:

- Residential areas
- Hospitals, health centres, care homes, doctor's surgeries etc.
- Schools, colleges and other teaching establishments.
- Libraries
- Places of worship
- Wildlife areas, historic landscapes, parks and gardens.
- Located in an area of Outstanding natural beauty or near a Site of Special Scientific Interest (SSSI).
- Any other development that can be considered noise sensitive.

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13.0 Innovation

Issue ID	Issue Title	No. of credits available	Minimum standards
Inn 1	Innovation	10	No

Aim

To provide additional recognition for a procurement strategy, design feature, management process or technological development that innovates in the field of sustainability, above and beyond the level that is currently recognised and rewarded within standard BREEAM issues.

Assessment Criteria

The following demonstrates compliance:

A maximum of 10 credits are available in aggregate from any combination of the following:

Up to 10 credits are available by meeting Exemplary Performance for existing BREEAM issues

1. Exemplary performance is demonstrated by meeting Exemplary Performance criteria for existing BREEAM Issues. Please refer to the table below for a list of BREEAM issues with defined exemplary performance criteria (this is also found in section 3.0 of the manual, *Scoring and Weighting*). For the specific Assessment Criteria please refer to the section of the technical guidance containing the relevant BREEAM issue.

Table 23 BREEAM issues with exemplary level criteria

Man 2 - Considerate Constructors
Hea 1 - Daylighting
Hea 14 - Office Space (BREEAM Retail & Industrial Schemes only)
Ene 1 - Reduction of CO2 emissions
Ene 5 - Low or Zero Carbon Technologies
Wat 2 -Water Meter
Mat 1 - Materials Specification
Mat 5 - Responsible Sourcing of Materials
Wst 1 - Construction Site Waste Management

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Up to two credits are available for the Comprehensive use of a *BREEAM Accredited Professional (AP)* or *Suitably Qualified BREEAM Assessor* (*SQA*) throughout project work stages

First credit

1. BREEAM performance objectives are agreed, (and must be achieved at final certification – see Compliance Notes below) no later than the end of the design brief stage (e.g. RIBA Stage B or equivalent procurement stage).

2. The appointed *BREEAM Accredited Professional* or *SQA* is given the opportunity to attend key design team meetings (see Compliance Notes below) held from the start of RIBA Stage B (Design Brief) up to and including Stage E (Technical Design) or equivalent, and is to be included on the circulation list for minutes from all meetings.

3. A Design stage assessment report is submitted to BRE for interim certification.

Second credit

4. The first credit is achieved.

5. The project is reviewed against BREEAM performance objectives by the appointed *BREEAM Accredited Professional* or *Suitably Qualified BREEAM Assessor* (*SQA*) no later than the end of the Pre-Construction stage (e.g. RIBA Stage H (Tender Action) or equivalent procurement stage).

6. The appointed *BREEAM Accredited Professional* or *SQA* is given the opportunity to attend key design team meetings held from the start of RIBA Stage F (Production Information) up to and including Stage K (Construction to Practical Completion) or equivalent, and is to be included on the circulation list for minutes from all meetings.

7. A Post Construction stage assessment report is submitted to BRE for final certification.

Additional credits are available for *Approved Innovations,* not currently recognised by an existing BREEAM issue

1. An application is made to, and approved by the BREEAM office using the Innovation Application Form (downloaded from the Assessor Extranet).

2. The Assessor confirms compliance with the criteria set out within the Innovation Application Form.

Compliance Notes	
New Build	There are no additional or different criteria to those outlined above specific to new-build projects.
Refurbishment	There are no additional or different criteria to those outlined above specific to refurbishment projects.
Extensions to existing buildings	There are no additional or different criteria to those outlined above specific to the assessment of extensions to existing buildings.
Shell Only	There are no additional or different criteria to those outlined above specific to shell only projects.
Fit Out only	There are no additional or different criteria to those outlined above specific to fit-out only projects.
Credit limit for Innovation section	A maximum of ten credits may be sought in the Innovation section (i.e. 3 credits for Exemplary performance / 2 credits for the use of a *BREEAM Accredited Professional* or *SQA* / 5 credits for the use of an *Approved Innovation*)
Key design team	Key design team meetings can be classed as all site and office meetings

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meetings	between representatives from at least three of the following parties: • Representatives of the Client / Developer • The Main Contractor • The Architect • Structural Engineers • Building Services Engineers • Cost Consultants • Environmental Consultants • Project Management Consultants Team meetings must be related to the building under assessment.
BREEAM performance objectives	If at Post Construction, BREEAM performance objectives (the target rating) set at the end of the Concept Stage have not been achieved, the credits awarded, at Design stage, for appointing the *BREEAM Accredited Professional* or *SQA* must be withheld in the final certification report.

Schedule of Evidence Required

Req.	Design Stage	Post Construction Stage
Exemplary Performance against existing BREEAM criteria		
1	As defined within existing BREEAM Issues	As defined within existing BREEAM Issues
Use of a *BREEAM Accredited Professional* or *Suitably Qualified BREEAM Assessor*		
1, 2, 4 & 6	A copy of a letter confirming the appointment of a *BREEAM AP* or *SQA* no later than completion of RIBA Stage B (Design Brief) or equivalent. This must confirm that the *BREEAM AP* or *SQA* will be invited to all key design team meetings. **AND** A completed Pre-Assessment Estimator/Report signed and dated by the *BREEAM AP* or *SQA* to correspond with no later than RIBA Stage B **AND** A copy of the project programme indicating the dates by which the key work stages (Preparation and Design) are to be completed. **AND** Documentary evidence in the form of meeting notes/minutes, recorded correspondence or schedules that can demonstrate BREEAM issues are a regular agenda item.	As Design stage, but with documentary evidence confirming that the *BREEAM AP* or *SQA* was given the opportunity to attend all key design team meetings between the dates corresponding to the start of RIBA Stage F and finish of Stage K, or equivalent.
5	An updated interim report (this does not need to be formally submitted to BRE but must be used as evidence).	As Design stage.

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3 & 7	The Interim Design stage assessment report.	The Post Construction stage assessment report.
Use of an *Approved Innovation* not covered by existing BREEAM criteria		
1 & 2	A copy of the approved Innovation Application Form from BREEAM office with approval reference number. **AND** Relevant evidence demonstrating compliance as set out in the Innovation Application Form.	As Design stage **AND** Documentation confirming that the project has achieved the *Approved Innovation* as described and quantified within the Innovation Application Form.

Additional Information

Relevant definitions

BREEAM Accredited Professional: An individual licensed by BRE Global for offering BREEAM Design Advice.

Suitably Qualified BREEAM Assessor: An individual that has completed a BREEAM non domestic assessment to certification (in any BREEAM non domestic scheme) using a 2006 or 2008 version and who has been a qualified BREEAM Assessor for no less than 2 years.

Approved Innovation: Any technology, method or process that can be shown to improve the sustainability performance of a building's design, construction, operation, maintenance or demolition and which is deemed as innovative by the BRE Global. See Innovation Application Form (available from the Assessor Extranet) or scoring and weighting section (section 3) of this technical guide.

Additional guidance:

Procedures to review proposed Innovations:

Applications for approval of Innovations can only be made by Licensed BREEAM Assessors with reference to a specific registered assessment. Applications will only be accepted when submitted on the Innovation Application Form (downloaded from the Assessor Extranet).

A flat rate charge will be levied to cover the costs of administering and reviewing the application. Details of this charge are set out in the BREEAM Certification and Licence Fee Sheet and are not refundable. In the light of experience from the reviewing of early submissions, this fee is subject to review. A separate application will be required for each proposed innovation credit.

The process for approving Innovations is as follows:

1. On receipt of a fully completed application, the BREEAM office will carry out an administrative review to ensure completeness. An acknowledgement will be sent by email giving a credit application reference number which should be used in all correspondence. This acknowledgement will be sent within 3 working days.

2. The application will be forwarded for review by either internal or external experts. All expert reviewers will be asked to declare any interest that they may have in the project concerned.

3. The expert review will independently assess the submission against the criteria outlined in the Eligibility criteria in the S*coring and Weightings* section. The review will result in a recommendation for or against approval, together with a justification for that decision. The expert review will be based on the descriptions and commitments made in the Innovation Application Form.

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4. The BREEAM Team will prepare a report setting out a clear recommendation based on the expert review.

5. BREEAM's Technical Director will review the report and make a final decision on whether to approve or reject the innovation.

6. The final decision will typically be communicated to the Assessor by email within a total of 4 weeks from receipt of the initial application.

Appeals against any decision can be made in accordance with BRE Global's published appeals procedures which are available on request. The decision made on any appeal is final. Appeals will be subject to a flat rate charge per application; in the instance of a successful appeal, the appeal fee will be refunded.

At final certification of the project, BRE will publish basic information on all approved Innovations included within the Post Construction stage assessment. This will be done in a way that is sensitive to applicant's intellectual property and commercial rights, who will be given a chance to comment on, and if necessary amend, entries before they are made public. *BREEAM Accredited Design Advisors* and *SQA*s will have access to a list of previously *Approved Innovations* published on the Assessor Extranet. This list will be updated regularly.

Innovations are considered to be so until information on the *Approved Innovation* is published. In the instance of similar Innovation being submitted concurrently by independent projects Assessors can expect the BRE to make a reasonable assessment of whether the later submission can still be held as Innovative as described in credit criterion.

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14.0 Technical Checklists

14.1 Technical Checklist A1: Man 2 Considerate Constructors

For each of the eight sections (below) the *Considerate Constructors Scheme* awards a score on a scale of 0 to 5 (with half points). The score achieved or required must be entered into boxes 1-8 below i.e. EITHER 0; 0.5; 1; 1.5; 2.0; 2.5; 3.0; 3.5; 4.0; 4.5; OR 5.0.

- When a firm commitment is made to achieve certification under the Considerate Constructors Scheme without reference to particular scores, a score of 3 should be entered in each of the boxes 1-8 below. This gives a total score of 24 in box 9 below and subsequently one credit can be awarded.
  - When a firm commitment is made to require the constructor to achieve certification AND a score greater than 3 is required in one or more sections, the scores required should be added in boxes 1 to 8 below and totalled accordingly.

Considerate Section	Score achieved		1
Environmentally Aware Section	Score achieved		2
Site Cleanliness Section	Score achieved		3
Good Neighbour Section	Score achieved		4
Respectful Section	Score achieved		5
Safe Section	Score achieved		6
Responsible Section	Score achieved		7
Accountable Section	Score achieved		8
TOTAL Considerate Constructors Score	(sum of 1-8)		**9**

Total CC score achieved is less than 24	0 credits
Total CC score is between 24 to 31.5 incl.	1 credit
Total CC score is between 32 and 35.5 incl.	2 credits
Total CC score is greater than ≥36	2 + Innovation credit

Assessor to award credits based on committed CCS Score and above table 10

Signed: ..... Date: .....

Name [PRINT]: ..... Organisation: .....

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14.2 Technical Checklist A2: Man 2 Considerate Constructors

Compliance with an alternative to the Considerate Constructors Scheme

- 1 credit can be awarded where the assessment stakeholder confirms in writing that the alternative scheme is to be independently assessed and the assessor confirms that the alternative scheme addresses all the mandatory items plus 50% of the optional items in Checklist A2 (complete box 1).
- 2 credits can be awarded where the assessment stakeholder confirms in writing that the alternative scheme is to be independently assessed and the assessor confirms that the alternative scheme addresses all the mandatory items plus 80% of the optional items in Checklist A2 (complete box 2).
- An additional innovation credit can be awarded where post construction, the site has complied in full with the alternative, independently assessed scheme, and the alternative scheme addresses all the mandatory and optional items in Checklist A2 (complete box 3).

POST CONSTRUCTION REVIEW
When certification can be demonstrated the actual items achieved in each section should be quoted.

Where the mandatory criteria + 50% of optional criteria are complied with/committed to ☐ 1

Score achieved: 1 credit

OR

Where the mandatory criteria + 80% of optional criteria are complied with/committed to ☐ 2

Score achieved: 2 credits

OR

Where post-construction ALL the mandatory and optional items are complied with. ☐ 3

Score achieved: Innovation credit (in addition to the two credits achieved for complying with the standard BREEAM assessment criteria).

The assessor must ensure that the commitment is specific to the BREEAM assessment criteria and not a general commitment to satisfy the above statements.

Total Credits for Alternative Independently Assessed Scheme ☐

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1) Considerate

Mandatory

Ref	Compliance	Guidance	P
a	Where introductory letters have been sent / are to be sent to all the neighbours.	See copies of letters to be sent or sent with a list of the addresses	
b	Where there is provision for parking on site OR Buses are provided from local transport nodes OR The nearest transport links are within 500m and run every 30 minutes OR An area offsite has been designated for site parking.	See copies of parking plan, check local vicinity for transport links.	
c	Where there are ramps and signs, indicating footpaths AND Where pathways are wide enough for wheelchair access AND Where pedestrians who are mobility impaired or who have sight/hearing difficulties can still gain access around the site boundary.	View on site.	
d	Where there are barriers and signposts indicating footpaths around the site. Where footpaths are clean Where the passageways are safe and protected.	View on site.	
e	Where all the road signs / names can be seen OR Where a road sign /name is obstructed a replacement has been erected.	Is there a temporary works plan highlighting these items. View on site.	

Optional

Ref	Compliance	Guidance	P
e	Does the site have a traffic plan?	Request a copy of the plan.	
f	Where site entrances / exits clearly marked AND These are clear for lorry/delivery drivers and other visitors to see.	View on site.	
g	Where there is a clearly signed site reception AND. Where appropriate, visitors are inducted into the site AND Where visitors are escorted to the member of staff they are visiting.	Check on arrival for the signs. See copy of the induction procedure.	
h	Where there are areas of high minority communities and English is not the first language, notices are printed in the common local language.	Check the area, local shops and members of the public, community centres for a minority culture community. Where this is present check for signs in the communities language.	
i	Where the site is near a school, community centre / or other building and delivery times are outside peak times.	School peak times considered to be 8-9.30am and 3-5pm Residential peak times 7-9am and 4-6pm. Other shops / industries may have regular deliveries, this should also be considered by the Contractor.	
j	Where the site manager is authorised to reimburse minor financial complaints.	Ask the site manager what authorisation he needs to reimburse financial complaints.	
k	Where the parish registry has been checked to establish the names of neighbours to personalise your letters.	List of names and addresses to be viewed on site.	
l	Where a map has been sent to suppliers indicating where they should access the site by a particular route.	Check a copy of the map sent to all suppliers with accompanying letter.	
m	Where the post box has been placed on the pavement to avoid the postman from entering the site.	View on site.	

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2) Environmentally Aware

Mandatory

Ref	Compliance	Guidance	P
a	Where site hours and noisy work restrictions are appropriate to the area.	Consider particularly areas near; -Houses -Schools - Hospitals -Industrial Units -Public Transport Nodes -City centres -Shopping facilities Copy of statement of intent, policy, agreement etc to be provided.	
b	Where the Contractor has made provisions to reduce the noise.	Are reasonable sound restrictions in force e.g. whispering generators, straw bales, sound barriers etc Has the Contractor demonstrated that noise/plant have been considered and measures implemented to reduce the disturbance?	
c	Where there is a written commitment from the Contractor to protect any sensitive ecological features such as plants and trees. AND This is demonstrated onsite. NOTE: Plants cannot be removed and replanted as part of this work.	Written commitment to be provided, along with a copy of "before and after" drawings. The commitment should include how the features will be protected and how the protection measures were determined. Temporary works procedures to include the appropriate protective measures. View on site.	
d	Where the site boundary is clearly and safely marked and appropriate to the environment. AND Where the colour of the hoarding has been considered in terms of the surrounding environment.	Ask site manager if any thought was given to the hoarding and the location of the site. Is the hoarding clearly /safely marked, clean, neat and well maintained?	
e	Where protected wild life issues in the local area have been addressed by the company.	Speak to the site manager about the local wildlife issues and how the site are addressing them and how they are monitored See evidence of drawings or specification clauses that back up the claims.	
f	Where the site has an environmental policy AND The site manager can relate the environmental policy to the procedures on his site AND The site staff are aware of the environmental policy and how it relates to their work	Request a copy of the policy. Ask the site manager what the policy includes and how this relates to the site. Ask members of staff at different levels how the policy relates to work at their level.	
g	Where there is a procedure and adequate equipment for protecting watercourses from site pollution (i.e. oils, paints and chemicals).	Bunds, absorbent material to soak up any spillages, must be present at risk areas on site. If there is a site specific environmental policy which commits to preventing water pollution and describes how this is to be on the site this point can be awarded.	
h	Where fuel oil spillage equipment is available.	View on site. Ensure the spillage equipment is located where spillages may occur to ensure a rapid response time.	
i	Have local suppliers and materials, and also recycled materials been considered?	If a list of recycled/local suppliers and materials has been produced the point can be awarded..	
j	Where there are restrictions on the effects of light pollution and all lights are directional and non-polluting	View on site. If there is a site specific environmental policy which sets restrictions on lighting, this point can be awarded.	
k	Where the site is segregating, recycling or re-using waste (including canteen and office waste).	This can be viewed on site. A company wide policy promising to segregate, recycle and re-use waste will NOT satisfy this credit. If there is a site specific environmental policy which commits to segregating, recycling and re-using waste then the inspector can award this point.	
l	Where the site has a system to monitor the amount of material waste produced, and provides feedback as to how much is recycled.	This can either be viewed on site. If there is a site specific environmental policy which commits to monitoring site waste and providing feedback on recycling, indicating how this is to be carried out, then this point can be awarded.	

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Ref	Compliance	Guidance	P
m	Where energy saving measures implemented on site.	Examples of this include: • low energy lighting • switching off equipment when not in use, • Installing thermostats • Installing timers, • choosing energy efficient equipment	
n	Are the carbon emissions from the site activities monitored?	Where a site specific environmental policy monitors the carbon emissions of site activities the point can be awarded.	
o	Where areas with dust problems are enclosed, or alternative methods of mitigating dust have been provided.	Check how dust mitigation has been considered with the Site Manager; check that this will be effective.	
p	Where sumps are provided in cases of heavy water run off.	View on site. If there is a site specific environmental policy which indicates how heavy water run off will be minimised and dealt with on site, this point can be awarded.	
q	Where a site with severe congestion has a delivery point remote from a site. Deliveries from the remote site can then be made in smaller vehicles at times to cause the least inconvenience.	View procedures on site. Where a site specific environmental policy addresses the problem of deliveries to a severely congested site, then the point can be awarded.	
r	Where permission has been obtained to use a fire hydrant or fire brigade to damp down.	Written permission to be provided.	
s	Where an impact minimisation strategy review is in place for the site.	The review should consider the impact of the site in environmental terms and how any adverse effects are being minimised.	
t	Where there is adequate space for new materials to be stored in secured covered areas to avoid damage, theft and to protect from weather.	View on site. Ensure that where space has been provided, it is being used correctly.	
u	Where visible stacked materials are sheeted out.	View on site.	

3) Clean

Mandatory

Ref	Compliance	Guidance	P
a	Where all accesses to the site are clean, mud free and safe.	View on site. Where a site specific policy indicates measure that will be implemented to maintain clean, mud free, safe accesses, then this point can be awarded.	
b	Where the roads adjacent to the site that are used by site vehicles are swept.	Evidence in the form of a contract with a road sweeping company. View on site.	
c	Where there is an area specified within the site boundary for the storage of materials and plant.	The area must be clean and dry where necessary, and the space should be sufficient for the materials / plant stored. For the material storage part, this could be replaced on congested sites by a "just in time" delivery policy View on site.	
d	Where there are dust prevention measures present.	Where there is a regular damping down of the roads during the hot weather AND Where dust sheets are provided where areas are being demolished. OR Where any other measures can be demonstrated to meet this point.	
e	Where materials and equipment are tidily stacked and protected / covered where necessary.	View on site.	
f	Where areas around the canteen, offices and skips are tidy and clean AND	View on site. Check all the areas ensure screening is in place where	

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Ref	Compliance	Guidance	P
	Areas are screened where necessary.	necessary.	
g	Where covered rubbish bins are available.	View on site. The inspector should ensure that where bins are provided they are spaced at intervals which will facilitate staff using them	
h	Where a free car cleaning service is offered, where dirt or dust is a problem.	View on site. Check procedures, notice boards, with staff to see if this is in operation.	
i	Where the wind direction is checked and the work pattern is varied to suit, if dust is a problem.	View whether dust is a problem on site, this should be checked in the driest season. If dust is a problem then ask the site manager how work is varied depending on the wind direction.	
j	Where a hard road is provided into the site to reduce mud problems.	View on site.	
k	Where site welfare facilities well maintained and clean?	View on site.	
l	Where areas around the site cleaned, including the collection of rubbish not related to site?	View on site.	
m	Where measures in place to deal with graffiti?	View on site.	

4) Good Neighbour

Mandatory

Ref	Compliance	Guidance	P
a	Where there is a single line entry complaints book.	Copy of the book to be provided or seen AND the book should be kept in an easily accessible place.	
b	Are complaints responded to immediately and dealt with correctly.	Look through the complaints book and check the responses. Ensure all complaints were dealt with and responded to in a polite, considerate and timely manner.	
c	Where there is light shielded from the neighbours.	Copy of the temporary works including lighting to be provided. These must either indicate light shielding or the site manager must demonstrate how the light shielding works or is not applicable.	

Optional

Ref	Compliance	Guidance	P
d	Where there are viewing boards in the hoardings AND They give a good impression.	Ask the site manger to explain why the views in the hoardings were chosen and how they best represent the site. Check that the areas that can be seen are tidy and clean.	
e	Where an arrangement is in place for a neighbour to act as a representative for a group.	Request to see a letter of confirmation that one local will act as a representative of the community or group.	
f	Where reasonable steps have been taken to ensure a minimum of false alarms.	For example • 24 hour security. Speak to the security guard. Ensure that the security guard know how to deal with alarms procedures both real and false. Check that this information is transferred to new staff. • Alarms are linked to a central office open 24hours which responds immediately. • Other measures to minimise false alarms can be considered on their merits and how appropriate they are to site criteria.	
g	Where the site and its surroundings are seen by the public as tidy AND Where the site and its surroundings are seen by the public as clean.	Ensure that there are no complaints about the site being untidy or dirty or that if there were this was quickly rectified and not repeated. Check on site that the views in the hoardings show a clean and tidy site.	

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h	Where there is a congested site, and there is a compound away from the site used for plant/ material storage.	Only applicable if the site is congested. Speak to the site manager about this extra storage and visit extra compound.	
i	Where local people are informed of site progress by the use of a notice board.	View on site.	
j	Where there are rewards for a neighbour's help.	View procedures or examples of what Is being done on site	
k	Where there is a model of the project to better show neighbours the exact implications of the project.	Where a model has been built and had been shown at local residents meetings OR Where there is a commitment to build a model for this purpose.	
l	Where there is a procedure for a member of staff to check the view in the viewing apertures at regular intervals.	Where there is a written procedure or commitment to regularly check the viewing apertures, or where the viewing apertures are to be changed at different stages of the project to ensure the best view is provided. During site visits, check the viewing apertures and ensure the view is safe, tidy, clean and inoffensive.	
m	Where there is a commitment to write and thank neighbours at the end of the contract for their forbearance.	A copy of this commitment should be provided or a copy of a standard letter that is always sent at the end of a project.	
n	Where, on completion of the project, the neighbours who have been affected by the work are given a feedback form, to indicate their concerns and mark the Contractors performance These results should then be used to improve your performance next time.	Where a copy of feedback form for neighbours can be provided. AND; Where there is a commitment to send these forms to affected neighbours. AND; Where there are procedures in place to monitor the results and implement changes for future work.	
o	Where extra sets of posters are prominently displayed illustrating how the site is being a good neighbour.	View on site.	
p	Where appropriate get involved with local community charities and initiatives.	Where there is evidence of such events having already occurred or where there are future arrangements or a commitment to do so.	
q	Where measures are in place to reduce negative displacement (e.g. pigeons).	View on site.	

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5) Respectful

Mandatory

Ref	Compliance	Guidance	P
a	Where there is a dress code specified in the induction.	Check the induction content for items related to dress code. N.B. This does not relate to PPE, this is to prevent "builders bum" syndrome	
b	Where there is an enforcement procedure i.e. someone does check that operatives are dressed considerately,	Check the induction content for these details. Ask how operatives who are not dressed "appropriately" are dealt with? Is the procedure rigorous Check the complaints book for any items on this issue and see how quickly they were dealt with.	
c	Where inappropriate behaviour is dealt with in site policy. AND; Where this is highlighted in the site induction.	Copy of the policy to be provided. Check the induction content for these details. Ask the site manager what the enforcement procedures are and how they are carried out. Check the complaints book for any items on this issue and see how quickly they were dealt with.	
d	Where there is a no offensive calendar policy.	Check how this policy is implemented.	

Optional

Ref	Compliance	Guidance	P
d	Does the site have female toilets. Does the site have disabled toilets.	View on site.	
e	Where operatives are prevented from having their breaks in view of the public.	Examples of how this might be achieved include: • A site canteen • A common room available for operatives to eat in. View on site.	
f	Where toilets are screened from public view.	View on site	
g	Where lockers are provided in the drying room.	View on site	
h	Are working usable showers available and suitable changing areas are available.	View on site.	
i	Where site personnel are discouraged from using local facilities in their site clothes.	Examples of how this might be achieved include : A canteen. Staggered breaks for different gangs. Provision of showers / wash rooms. Provision of lockers. A request to leave PPE on site. View on site. Check procedures with the Site Manager.	
j	Where there is a volume restriction on radio use or there is a radio ban.	Check if restrictions/ban is in place and how it is enforced.	
k	Where operatives are provided with suitable clothing with the companies logo.	Check company policy to do this and check with operatives on site that they have clothing with the company's logo.	
l	Provide operatives with a clip on ID card with photo.	Check company policy and procedures for issuing clip on ID cards. Check if there is a mandatory requirement for operatives to wear these when on site. Check operatives in site are wearing them.	
m	Where the site encourages only 1 person to visit the local shop at any one time.	Examples of how this can be achieved include : • Where there are facilities on site to buy newspapers, confectionary and snacks • Where breaks are staggered to prevent large groups of operatives visiting local shops together. • One person is nominated to go to the local shop for the team.	
n	Is there sufficient action taken regarding operatives' exposure to the sun?	Check company policy and procedure and if it is being implemented on site.	

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6) Safe

Mandatory

Ref	Compliance	Guidance	P
a	Where there are well lit warning signs for the benefit of the pedestrian and road user.	Check if the signs are indicated on the temporary works / other plans OR if they are being implemented on site.	
b	Where the temporary works are safe and are erected only after they have been checked by an experienced engineer.	See copy of the temporary works checking procedure, check the responsible engineer has the relevant qualifications. Check that the temporary works are checked by a visual or physical inspection on a regular basis. Carry out a site inspection.	
c	Are the temporary works near adjacent buildings likely to produce a security risk.	Ask if a risk assessment was carried out when designing the works and check if this was identified. View on site.	
d	Pedestrians have a suitable, safe and protected passage around the site boundary.	View on site.	

Optional

Ref	Compliance	Guidance	P
e	Is safe access to the site office provided by; good lighting AND Adequate barriers AND Uniform surfaces i.e. no trip hazards AND Being a minimum of 1m wide.	View on site.	
f	Where work has interrupted the pavement ensure ramps are provided.	View on site.	
g	Where the scaffolding is boxed in or taped where likely to obstruct pedestrians.	View on site.	
h	Where the hoarding or scaffold is properly lit externally at night?	View on site.	
i	Where scaffold netting is in place and well maintained.	View on site.	
j	Where emergency escape routes are well identified?	View on site.	
k	Are even the most minor accidents recorded.	Check first aid book for minor accidents. Minor considered to be e.g. small cuts (plaster only necessary), dust in eyes.	
l	Where others use the site and there is a regular fire drill.	Check times of drill and visit a day the drill should be carried out.	
m	Where there is a procedure to report serious incidents and near misses.	Copy of procedure to be provided. Procedure to cover internal QA reporting format, and notifying HSE.	
n	Where there is satisfactory out of hour's security.	Examples of satisfactory out of hours security include: • Locked gates. • Night lighting. • 24 hour on site security. • An alarm linked directly to a police station or 24 hour (local) off site security. • The security guard has an emergency number and knows who to call in an emergency.	
o	Where non English speaking operatives are tested during their induction, to ensure that their levels of reading, writing and speaking do not pose a safety risk to those that they work with.	This needs to be robust enough to ensure that in a health and safety risk environment, the operative would be capable of warning others or contacting help.	
p	Where temporary road crossings are in a suitable safe place.	Check: Road crossings away from corners. The design has been checked by a traffic expert. There is a risk assessment for these areas, are the remaining risks acceptable?	
q	Where the site office is well sign posted and easily accessible.	View on site.	
r	Where safety helmets are positioned close to the entrance to the site office.	View on site.	
s	Where the visitors book is to be filled in on all	View on site.	

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Ref	Compliance	Guidance	P
	occasions.		
y	Where safety and other criteria in connection with deliveries are given to suppliers.	Check this information is given to suppliers; AND Check that this is enforced at every delivery, not just a one off letter to the company at the beginning of the project.	
u	Where there is a procedure for recording operative concerns and near misses.	Check if this is in place and how it operates.	
v	Where all site hazards are advertised at the site entrance (s).	View on site. Check that the list of site hazards is complete.	
w	Where there is an initiative to provide incentives to promote and improve safety on site.	Check this document and how it is disseminated.	
x	There are clear fire points, an assembly station and fire drills take place.	View on site and ask for written proof of a fire drill procedure.	

7 Responsible

Mandatory

Ref	Compliance	Guidance	P
a	Where the Environmental Officer has been informed of your presence on site.	See a copy of the letter, informing the Environmental Officer of the project, including start and finish construction dates.	
b	Where there is well posted material indicating nearest Police Station and Hospital (with A&E facilities)	Are there posters indicating the nearest Police Office, Hospital with A&E facilities in key areas e.g. site reception, site canteen, main site office. Spot check managers, operatives, reception staff to check they know this information or at least where they would find it. Check Induction talk.	

Optional

Ref	Compliance	Guidance	P
c	Where a record of your immediate neighbours names and telephone numbers are known.	A copy of this list should be provided.	
d	Where all subcontractors first aiders are recorded in a formal document and a copy of this record provided.	Check for the formal document which has all sub-contractors first aiders registered.	
e	Where an in-house newsletter is distributed to the neighbours.	Where a copy of this letter can be provided and evidence that this has been distributed, e.g. accompanying letters, recorded minutes etc.	
f	Where a local person provides out of hours cover.	If there is 24 hour security this is automatically awarded. Where there is no 24 hour security, but someone is identified as living local to the site and can act quickly in the event of an emergency on site.	
g	Where the workforce hold CSCS (Construction Skills Certification Scheme) cards.	Where the company has procedures in place to ensure that the majority of their workers hold CSCS cards.	
h	Where your company is recognised as having either ISO 9001, 14001 or IIP status.	Evidence that this has been achieved must be provided.	
i	Where operatives skills and medical conditions are recorded.	Check records and /or procedures to demonstrate this.	
j	Where there are the appropriate number of first aiders and first aid equipment for the site.	The HSE produce guidance on the number of required first aiders for a site. A copy of the trained first aider list should be provided and their qualifications, ensure that the qualifications are all still valid (i.e. in the last 3 years). Check that each first aider have a box with basic equipment in. Check that each first aider has access to more equipment is necessary and that they know where this is.	
k	Where local schools have been contacted and asked to participate in visits, talks or competitions.	Evidence should be provided that this has or will be occurring e.g. copies of press cuttings, letters etc. If there are no schools within a 3km radius this is not applicable.	
l	Where the site has a static gate man, he is trained in first aid.	Check with the static gate man that he is trained, see his certificates and ensure they are current.	

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m	Where up to date information on site performance is posted in public view.	View on site. Check this is up to date and ask how regularly this is changed.	
n	Where you have a web page link to demonstrate your commitment to being a considerate neighbour throughout the construction project.	The link must highlight what the scheme includes and it aim.	
o	Where procedures are in place to enable the employment of disabled operatives.	A copy of the procedure should be provided in order to award the point.	

8) Accountable

Mandatory

Ref	Compliance	Guidance	P
a	Where there are posters in a public space displaying your local scheme for considerate construction and the main bodies involved.	Posters must identify the client, consultant, architect, and contractor. Posters must be well distributed over the site, as well as in the public eye.	
b	The scheme is mentioned in the site induction.	Check documentation.	
c	There has been a safety inspection and report, and any points raised have been dealt with.	Check report and view on site.	

Optional

Ref	Compliance	Guidance	P
d	Where an inspection has been carried out by HSE.	Only applicable if HSE have carried out an inspection, Where there are recommendations, there is a commitment to implement them.	
e	Where the company sign board is prominently displayed with telephone number / Web Site / Email address.	View on site.	
f	Where the site personnel and sub-contractors are familiarised with the local / national scheme at induction or other.	Check if induction procedures cover this item and if not how operatives are aware that they are involved in the scheme.	
g	Where the Client is aware of the Scheme.	This can be demonstrated by a letter or endorsement etc.	
h	Where frames and Perspex covers for posters advertising this Scheme are provided.	View on site.	
i	Where a suggestion box is provided for the general public.	View on site. This must be in a place accessible to the general public AND well advertised.	
i	Where all site signage and posters are illuminated at night.	View on site.	
j	Where a 24 hour hotline is provided and this is displayed to the public.	View on site. Check how this is manned and how phone calls, queries, complaints are dealt with.	
k	Where your operatives/subcontractors are given points for infringement of your safety and considerate standards. Record these on a card held by the operative. X points and you're out.	Check if this system is operating. 'X' must be decided by the company, however the aim is to encourage operatives to work safely and considerately. This point can also be awarded where there is an incentive scheme for exemplar behaviour.	
l	Training/toolbox talks are provided for site operatives.	Ask for copies of a schedule of talks.	
m	The site has a record of social/community activities.	See documentation to check compliance.	

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14.3 Technical Checklist A3: Man 3 Construction Site Impacts

a. Monitor, report and set targets for CO_2 production of energy use arising from site activities		
Compliance requirement	**Tick**	**Evidence/Reference**
Monthly measurements of energy use will be/has been recorded and displayed on site.		
Appropriate target levels* of energy consumption will be/were set and displayed (targets could be annual, monthly, or project targets).		
As a minimum, monitoring will/did 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.		
The design/site management team will/did nominate an individual who will be responsible for the monitoring and collection of data.		
* Notes: • Targets for energy consumption during the construction process should be set using Constructing Excellence' Environmental KPI benchmarks. These documents do not specify targets but facilitate projects in setting appropriate targets. www.constructingexcellence.org.uk/zones/kpizone/default.jsp • BREEAM does not require targets to be met but is encouraging the process of setting, monitoring and reporting against targets.		
b. Monitor and report CO_2 or energy arising from commercial transport to and from the site		
Compliance requirement	**Tick**	**Evidence/Reference**
A site monitoring system will be/was in place to monitor and record deliveries*. This system will/did record: • The number of deliveries • The mode of transport • The km/miles travelled for all deliveries		
If the design team or contractor confirms that the project is aiming to achieve the '*Construction Site Transport, measures for traffic movements and distances*'[4] then this aspect has been achieved automatically. The information obtained for this item can also be used to satisfy the Constructing Excellence' Environmental KPI on transport.		
The design/site management team will/did nominate an individual responsible for the monitoring and collection of data.		

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Notes:

- 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).
- 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.
- This information can then be used to estimate a total figure for kg of CO_2 for the project. BREEAM does not require this information to be converted to CO_2 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_2 emissions there are tables provided at the end of this checklist which can be used to do this.

c. Monitor, report and set targets for water consumption arising from site activities

Compliance requirement	Tick	Evidence/Reference
Monthly measurements of water consumption will be/were recorded and displayed on site.		
Appropriate target* levels of water consumption will be/were set and displayed (targets could be annual, monthly or project targets).		
As a minimum, monitoring will/did 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.		
The design/site management team will/did nominate an individual responsible for the monitoring and collection of data.		

Notes:

- Targets for water consumption during the construction process should be set using Constructing Excellence' Environmental KPI benchmarks. These documents do not specify targets but facilitate projects in setting appropriate targets. www.constructingexcellence.org.uk/zones/kpizone/default.jsp
- BREEAM does not require targets to be met but is encouraging the process of setting, monitoring and reporting targets.

d. Adopt best practice policies in respect of air (dust) pollution arising from site activities

Compliance requirement	Tick	Evidence/Reference
The site will/did adopt best practice procedures in relation to minimising air/dust pollution. This should include: • 'dust sheets' • regular proposals to damp down the site in dry weather • covers to skips etc.		
This information will be/was disseminated to site operatives.		

Notes:

- Further information can be obtained from BRE/EA publications 'Control of Dust from Construction and Demolition Activities'[4] and Pollution Control Guide Parts 1-5[5] provide good practice guidelines on construction related pollution.

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e. Adopt best practice policies in respect of water (ground and surface) pollution occurring on the site		
Compliance requirement	**Tick**	**Evidence/Reference**
The site will/did adopt best practice procedures in relation to minimising impact, as outlined in the following documents. PPG 1 - General guide to the prevention of pollution. Environment Agency PPG 5 - Works in, near or liable to affect watercourses. Environment Agency PPG 6 - Working at demolition and construction sites. Environment Agency		
This information will be/was disseminated to site operatives.		

f. A main contractor with an environmental materials policy		
Compliance requirement	**Tick**	**Evidence/Reference**
The main contractor operates an environmental materials policy, used for sourcing of construction materials to be utilised on site. The policy should cover/promote the following: • Use of local materials (where possible) • Use of responsibly sourced materials • Re use of materials • Use of materials with a high recycled content • Waste minimisation and recycling • Use of non-toxic materials & refrigerants with a low global warming potential • Use of materials with a low embodied impact • Use of durable materials		
Post construction: indicative examples have been provided to demonstrate the policy in action.		

g. A main contractor that operates an Environmental Management System*		
Compliance requirement	**Tick**	**Evidence/Reference**
The main contractor operates an Environmental Management System covering their main operations. The EMS must be either: • Third party certified, to ISO14001/EMAS or equivalent standard. OR • The structure of the EMS is in compliance with British Standard 8555 2003 and has reached phase four of the implementation stage, 'implementation and operation of the environmental management system', and completed phase audits one to four, as defined in BS8555.		

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h. 80% of site timber is reclaimed, re-used or responsibly sourced		
Compliance requirement	**Tick**	**Evidence/Reference**
80% of timber used during construction, including formwork, site hoardings and other temporary site timber used for the purpose of facilitating construction, will be/was procured from sustainably managed sources, independently certified by one of the top two levels as set out in the Responsible Sourcing of Materials Issues (BREEAM issue Mat 5) in the Materials section of this document.		
Additionally 100% of all site timber will be/was legally sourced.		
Notes: • 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.		

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Assessor Information

Monitoring Site Transport CO_2

The following tables are taken from the DEFRA '*Guidelines for Company Reporting on Greenhouse Gas Emissions*' and COPERT II emission factors, and can be used to convert the information gathered from monitoring deliveries into total kg CO_2.

Table 24 Standard road transport fuel conversion factors

Fuel used	Total units used	Units	x	kg CO_2 per unit	Total kg CO_2
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 25 Standard road transport fuel conversion factors

Size of car and distance units	Total units travelled	Units	x	kg CO_2 per unit	Total kg CO_2
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

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Table 26 Standard Road Transport Fuel Conversion Factors

Size of car and distance units	Total units travelled	Units	x	kg CO_2 per unit	Total kg CO_2
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 27 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_2
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.

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14.4 Technical Checklist A4: LE3 Land of Low Ecological Value

Section 1: Ecological features of the site		
Instruction: criteria 1.1-1.5 can be used to determine the presence of existing ecological features across the total site. However, if YES is recorded against **any** question in Section 1 for the *construction zone,* then it cannot be defined as *land of low ecological value* and the credit cannot be awarded. If the *construction zone* records a NO against **all** 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 ☐ NO ☐
1.2	Are there any ponds, streams or rivers on, or running through the site?	YES ☐ NO ☐
1.3	Is there any marsh or other wetland present on the site?	YES ☐ NO ☐
1.4	Are there any meadows or species-rich grassland present on the site?	YES ☐ NO ☐
1.5	Is there any heath land such as heather present on site?	YES ☐ NO ☐
Section 2: Type of land to be used for the new building		
Instruction: 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 then the *construction zone* can be defined as *land of low ecological value*. This credit can then be awarded, as long as all features of ecological value (as defined in Section 1) in the surrounding site and boundary area are adequately protected from damage.		
2.1	Does the *construction zone* consist of land which is entirely within the footprint of existing building(s) or building(s) demolished within the past 2 years?	YES ☐ NO ☐
2.2	Does the *construction zone* consist of land which is entirely covered by other construction such as hard surfaces, car parking or such constructions which have been demolished within the past two years?	YES ☐ NO ☐
2.3	Does the *construction zone* consist of land which is contaminated by industrial or other waste to the extent that it would need decontamination to facilitate development?	YES ☐ NO ☐
2.4	Does the *construction zone* consist of land which is a mixture of either existing building(s), hard surfaces and/or contaminated land?	YES ☐ NO ☐
2.5	Does 80% of the land within the *construction zone* comply with statements 2.1, 2.2 or 2.3 and the remaining 20% of the footprint of the *construction zone* extend into land which has been either: a. Used for single-crop arable farming for at least 5 years, OR b. Consists of regularly cut lawns and sports fields	YES ☐ NO ☐

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14.5 Technical Checklist A5: Mat 5 Responsible Sourcing of Materials

Table 28 Checklist of criteria for Tiers 1-4

Tier	Criteria	Examples of compliant schemes	Checklist of documentation required
1	Third party certification scheme with CoC and rigorous stakeholder consultation (at both standard setting and during implementation) Scheme must have developed standards which meet the criteria outlined in Table 30 below.	FSC CSA SFI with CoC PEFC Reused materials, Schemes compliant with BES6001:2008 (or similar) Excellent* and Very Good* Performance Ratings (Note; the EMS required to achieve these ratings must be independently certified)	**Design** One of the following indicating that the material will comply with the relevant certification scheme. o Letter of intent from supplier OR o Purchase order from the supplier including CoC number (if the material has been ordered) or BES6001:2008 Certificate number OR o Chain of Custody (CoC) or BES6001 certificate (if material has already been supplied) **Post Construction** • A copy of the CoC certificate and/or BES6001:2008 certificate for all appropriate materials/elements. AND • Delivery notes for all appropriate materials/elements.
2	Third party certification scheme with CoC and stakeholder consultation. Scheme must have developed standards which meet the criteria outlined in Table 3 below.	Schemes compliant with BES6001:2008 (or similar) Good* and Pass* Performance Ratings (Note; the EMS required to achieve these ratings must be independently certified)	As above.

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Tier	Criteria	Examples of compliant schemes	Checklist of documentation required
3	Certification Scheme for timber Environmental Management System at **extraction & process stages** - see Table 29 below for description of stages.	ISO 14001 EMAS Evidence of BS8555 (for SME's) MTCC Verified** SGS TFT	**Design** <u>Timber</u> One of the following indicating that the material will comply with the relevant certification scheme. o Letter of intent from supplier OR o Purchase order from the supplier including CoC number (if the material has been ordered) OR o Chain of Custody (CoC) certificate (if timber has already been supplied) <u>Non timber materials</u> One of the following indicating that the material will comply with the relevant EMS standards (see issue for further information). • EMS (or equivalent) certificate from the manufacturers at the process and extraction stages OR • Signed letter from the manufacturers at the process and extraction stages confirming EMS (or equivalent) certification details OR • Letter of intent from the developer to use a manufacturer at the process and extraction stages, who has an EMS (or equivalent), if supplier is not yet appointed.

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Tier	Criteria	Examples of compliant schemes	Checklist of documentation required
3			**Post Construction** • Delivery notes for all appropriate elements <u>Timber</u> • CoC certificate for all appropriate elements <u>Non timber materials</u> One of the following indicating that the material will comply with the relevant EMS standards (see issue for further information). • EMS certificate (or equivalent) from the manufacturers at the process and extraction stages OR • Signed letter from the manufacturers at the process and extraction stages confirming EMS (or equivalent) certification details In addition: • Delivery notes for all appropriate elements
4	Environmental Management System at **process stages** for other materials - see Table 29 below for description of stages.	EMAS ISO 14001	**Design** One of the following indicating that the material will comply with the relevant EMS standards (see issue for further information). • EMS (or equivalent) certificate from the manufacturers at the process stage OR • Signed letter from the manufacturers at the process stage confirming EMS (or equivalent) certification details OR • Letter of intent from the developer to use a manufacturer at the process stage, who has an EMS (or equivalent), if supplier is not yet appointed.

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Tier	Criteria	Examples of compliant schemes	Checklist of documentation required
			Post Construction One of the following indicating that the material will comply with the relevant EMS standards (see issue for further information). • EMS certificate (or equivalent) from the manufacturers at the process stage OR • Signed letter from the manufacturers at the process stage confirming EMS (or equivalent) certification details.

* Performance ratings for schemes compliant with BES6001:2008 (or similar) can only be used to demonstrate compliance with the criteria of this issue where certification covers the key process and supply chain processes for the material being assessed.

** 'Verified' is the name of a scheme

To view a list of products approved to BES6001:2008 (including copies of their certificates) visit: www.greenbooklive.com/page.jsp?id=169

Where ANY non certified timber is used (even if only a small quantity) the following must also be provided in ALL cases:

- Written confirmation from the timber supplier(s) (or at the design stage of assessment, the developer where a supplier is not yet appointed) confirming that all timber species and sources used in the development are not listed on any of the CITES appendices for endangered and threatened species (see issue for further information).
- Written confirmation from the timber supplier(s) (or at the design stage of assessment the developer where a supplier is not yet appointed) confirming that all timber is to be legally sourced (see issue for further information).

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Table 29 Diagram of how the required EMS relates to the process and extraction phases

Stage of production process	Extraction	Process	Manufacture
Materials	Stone Aggregate (sand, limestone etc.) Hematite Bauxite Clay Raw materials - other	Bricks Cement or alternative Glass Metals Other materials (plastic etc) Pre-cast concrete	Concrete / blocks Composites
Points available	1.5 points	1 point	

As this issue is looking at responsible sourcing, currently the manufacture stage is not considered.

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NOTE TO ASSESSORS

This list is included for information, you are not expected to evaluate whether a scheme complies with this criteria. All new schemes claiming to meet the criteria listed below will be evaluated by BRE, and will be included in the list of compliant schemes where appropriate.

Table 30 Features of a top tier (1) comparable certification scheme: Standard setting

When setting standards for a materials certification scheme the following should be addressed in order to be considered comparable to Tier 1/2 of this issue.

- The scheme must include a third party chain of custody certification scheme covering all stages of the product throughout the supply chain
- The scheme must verify that all local and national legislative criteria are met.
- The process for policy and standards development is transparent, clear and accessible.
- The scheme is independent and standards are developed in a way which balances the interests of all stakeholders. This should be done through a rigorous consultation process which makes best use of the stakeholder knowledge, methodically and comprehensively considering all feedback and after such consideration, aims to implement all feasible stakeholder suggestions
- The scheme is inclusive, striving to involve all interested people and groups in the development of the scheme's policies and standards.
- Monitoring and assessment must be integral to the scheme and conducted appropriate to the scale and intensity of the industry/ materials assessed by the scheme. This requirement is likely to be fulfilled by the incorporation of an EMS such as ISO14001 or BS8555 for SME's.
- The scheme should contain principles by which the scheme should be governed. These should be specific to industry/materials but should also be composed of the fundamental issues related to the environment. These issues should focus on specific practices associated with sourcing virgin and other materials.
- The scheme should assess that initiatives are in place to ensure continuous performance and environmental improvement.
- The scheme should provide for small to medium sized business as well as larger businesses. SME's grouping together to achieve group certification should be an option. This could, for example, take place on a regional or other relevant basis.
- The scheme should include a mechanism to revise the standard within a defined, suitable time frame to ensure that the current knowledge or upcoming robust scientific or other professional evidence can be incorporated (in good time) into the standard as an update. It should ensure that all updates are well adapted to the local/regional and/or global conditions.
- The scheme should also aim to consider social and economic aspects widening the scope to sustainability under the umbrella of a Corporate Social Responsibility (CSR). This is in line with the future aims of BREEAM and could be assessed within this issue in the future.

NOTE: The scheme may be generic for the materials industries or specific for individual materials sectors.

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Differences between Tier 1&2

Tiers 1 and 2 follow the standard setting process outline above, however there are differences in the rigour of the two schemes which is why they fall into two different categories. These are outlined below:

1. The top tier category schemes comprehensively address a consultation process with local community. This is done at source via a management company, as the focus is on sustainable project management at source.
2. The top tier category must have no reservations/uncertainty/pending charge or indictment identified by any professional bodies in the relevant materials sectors.

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14.6 Technical Checklist A6: Guidance for relating ecologist's report to BREEAM

Before completing this form please read the following:

1. This guidance document is to be used for BREEAM 2008 assessments, where an ecologist has been appointed and produced an ecology report as part of a proposed development.
2. As an ecologist may have been appointed to carry out ecological site surveys and produced an ecology report without being aware that a BREEAM assessment has been, or is to be conducted, the purpose of this document is to help assist assessors relate the contents of such a report to the land use and ecology criteria of BREEAM.
3. The assessor is to request that the appointed ecologist complete all sections of this guidance and return it to the BREEAM assessor along with all relevant documentation required to demonstrate compliance with the BREEAM criteria.
4. The assessor is to use this completed document in conjunction with the latest version of the relevant BREEAM technical guidance manual and information provided by the developer / client to carry out the assessment of the land use and ecology BREEAM issues.

- There are 6 sections (sections A - F) in this document.
- Section A requires contact details for the ecologist and developer / client.
- Section B1 determines whether the appointed ecologist is '*suitably qualified*' (under BREEAM); and if not, section B2 determines whether the report has been verified by an ecologist who is '*suitably qualified*'.
- Section C determines whether the findings of the report have been based on data collected from site surveys conducted at appropriate times of the year to determine whether different species are evident.
- **If 'no' is recorded for either Section B or C then the contents of the ecology report cannot be used to determine compliance with the BREEAM criteria.**
- Section D provides the BREEAM assessor with the necessary information to complete the assessment of the ecology related BREEAM issues.
- Section E provides details of the documentation / information required by BREEAM as evidence of compliance.
- Section F requires the signature of the appointed ecologist who has completed this document.

Please note: it is only the appointed qualified and licensed BREEAM assessor who can award or withhold a credit for all BREEAM assessments.

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Section A: Contact Details

Ecologist's Details

Company name:

Company address:

Contact name:

Contact telephone number:

Ecology report reference:

Developer / Client Details

Company name:

Company address:

Contact name:

Contact telephone number:

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Section B1: Ecologist's Qualifications

1. Do you hold a degree (or equivalent qualification, e.g. N/SVQ level 5) in ecology or related subject?

   Yes ☐ No ☐

   If yes, please provide details……
   …….....
   …….....

2. Are you a practising ecologist with a minimum of 3 years relevant experience within the last 5 years? *Relevant experience must clearly demonstrate a practical understanding of factors affecting ecology in relation to construction and the built environment and will include acting in an advisory capacity to provide recommendations for ecological protection, enhancement and mitigation measures, e.g. ecological impact assessments.*

   Yes ☐ No ☐

   If yes, please provide details……..…
   ……
   ……
   ……
   ……
   ……
   ……

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3. Are you bound by a professional code of conduct and subject to peer review*?

*i.e. a **full member** of one of the following organisations will be deemed suitable: 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).*

Yes ☐ No ☐

If yes, please provide details……...
…….

* *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.*

If 'no' has been answered for any question in Section B1 then the BREEAM requirement for a '*suitably qualified ecologist*' has not been met. The ecology report CANNOT be used to assess the BREEAM Ecology issues unless it is verified by an individual who is '*suitably qualified*' (see section B2 below).

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Section B2: Report Verification

Details on verifying an ecology report for a BREEAM assessment:

1. The individual verifying the report must provide written confirmation that they comply with the definition of a '*suitably qualified ecologist*' (as detailed in Section B1 above).

2. The verifier of the report must confirm in writing they have read and reviewed the report and 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
   - avoid invalid, biased, and exaggerated statements.

Written confirmation from the third party verifier on all the points detailed under 1 and 2 above (for section B2) must be included in an appendix to this guidance (see section E).

If the appointed ecologist does not meet the criteria of a '*suitably qualified ecologist*' and the report has not been verified by an individual who does meet these criteria, then the report CANNOT be used as evidence of compliance with the ecology related BREEAM.

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Section C: Site Survey

1. Have the findings of the ecology report been based on data collected from a site survey(s)? *The site visit(s) and survey(s) must be conducted at appropriate times of the year when it is possible to determine the presence, or evidence of the presence, of different plant and animal species.*

   Yes ☐ No ☐

   If yes, please provide details to justify this (e.g. date(s) and scope of site survey(s))
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   ……
   ……
   ……
   ……
   ……
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   ……
   ……
   ……
   ……
   ……

   If 'no' has been answered to question 1 of Section C then the ecology report CANNOT be used to determine compliance with the criteria of the relevant BREEAM ecology issues.

   Note to suitably qualified ecologist and BREEAM assessor: the contents of the ecology report must be representative of the site's existing ecology prior to the commencement of initial site preparation works, i.e. before RIBA stage K, Construction to Practical Completion, and after RIBA stage B, Design Brief.

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Section D: Site Survey Details

LE3 Ecological value of land and protection of ecological features

1. Is the land within the '*construction zone*' deemed by the *suitably qualified ecologist* to be of low ecological value?

   The construction zone is defined as any land on the site which is being developed (and therefore disturbed) for buildings, hard standing, landscaping, site access, plus a 3m boundary in either direction around these areas. It also includes any areas used for temporary site storage and buildings.

   Yes ☐ No ☐

   If yes, please provide a brief statement explaining how it has been deemed to be of low ecological value:
   ……
   ……
   ……
   ……
   ……
   ……
   ……

2. Are there any features / areas of ecological value that fall within the site, but outside the *construction zone*?

   If you have deemed this area to be of low ecological value then there will be no features of ecological value to protect. However, if there is a feature(s) or area(s) of low ecological value you wish to advise be retained and enhanced, e.g. a species-poor hedgerow to a species-rich hedgerow, then full details of the protection and enhancement advice should be entered under LE5 Enhancing site ecology.

   Yes ☐ No ☐

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If yes, please provide a brief statement outlining the advice / recommendations given for protecting **all** existing features and areas of ecological value:
……
……
……
……
……
……
……
……

LE4 Mitigating ecological impact

3. Are you able to provide the following information for before and after construction:
   - habitat types
   - An estimate of the number of floral species present per habitat type (based on appropriate census techniques and confirmed planting regimes)?

Yes ☐ No ☐

a. If yes a brief description of the landscapes and habitats surrounding the development site
……
……
……
……
……
……
……

b. The total site area (in m^2). *This will be the same before and after development.*

……

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c. Please fill in the table below with site details before development[1]:

Habitat Type*	Area of type (m_2)	No. of plant species per habitat type

d. Please fill in the table below with site details after development[1]:

Habitat Type*	Area of type (m_2)	No. of plant species per habitat type

* Habitat types will include natural areas, e.g. various grasslands and woodlands; as well as areas of the built environment, e.g. buildings, hard landscaping. The area of each habitat type when added together must always equal the total area of the development site.

[1] *Note to assessor (and ecologist where requested to carry our calculations); the information contained in tables c. and d. above can be used to calculate both LE4 Mitigating ecological impact and LE5 Enhancing site ecology issues.*

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4. Has the client / developer requested you to carry out the calculation for LE4 Mitigating ecological impact and /or LE5 Enhancing site ecology (where relevant)?

   The calculations must be carried out in line with the methodology provided in the current version of the relevant BREEAM scheme's technical guidance manual.

   Yes ☐ No ☐

   If yes, please provide all stages of calculations and state what the total change in ecological value is:

   a. Calculation of *ecological value* before development:

      ……

      ……

      ……

      ……

      ……

   b. Calculation of *ecological value* after development:

      ……

      ……

      ……

      ……

      ……

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c. Change in *ecological value* (c = b – a):

……

……

……

……

……

LE5 Enhancing site ecology

5. Has the client / developer required you to provide advice and make recommendations for enhancing site ecology?
Note: these are to include, and go beyond, compliance criteria for all current EU and UK legislation relating to protected species and habitats.

Yes ☐ No ☐

If yes, please provide a brief statement outlining the advice / recommendations given on enhancing and protecting the ecological value of the site:

……..

……..

……..

……..

……..

……..

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LE6 Long term impact on biodiversity

6. Were you appointed prior to commencement of development work activities on site?

   Yes ☐ No ☐ Don't know ☐

7. Has the client / developer given you the responsibility to confirm whether all current EU and UK legislation relating to protection and enhancement of ecology has been (or will be) complied with during the design and construction process?

   Yes ☐ No ☐

If yes, please provide details on all current EU and UK legislation that relates to the site:

…….....

…….

…….

…….

…….....

…….

…….

…….

…….....

…….

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8. Has the developer / client appointed you to produce an appropriate landscape/site ecology management plan covering at least the first 5 years after project completion?

   Yes ☐ No ☐

   EITHER:

   a. If yes, and the management plan has already been produced does it include the following:
      - management of any protected features on site
      - management of any new, existing, or enhanced habitats
      - a reference to the current or future site level Biodiversity Action Plan?

      Yes ☐ No ☐

   OR

   b. If yes, but the management plan is still to be produced (due to it being too early in the design/construction phase), have you provided the following information to the developer / client:
      - scope of management plan
      - key responsibilities, and with whom these responsibilities lie, e.g. owner, landlord, occupier?

      Yes ☐ No ☐

   If you have answered 'yes' to either question 8a or 8b please provide a brief explanation outlining the details

   …….

   …….

   …….

   …….

   …….

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9. Has the client / developer required you, as part of your responsibilities, to provide recommendations and advice to minimise detrimental impacts on site biodiversity?

   Yes ☐ No ☐ N/A ☐

   If yes, or not applicable, please briefly explain your reasoning:

   ……..

   ……..

   ……..

   ……..

   ……..

10. Do your responsibilities to the client / developer include providing advice and recommendations for the protection of ecological features?

    Yes ☐ No ☐ N/A ☐

    If yes, or not applicable, please briefly explain your reasoning:

    ……..

    ……..

    ……..

    ……..

    ……..

    ……..

    ……..

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11. Do your responsibilities to the client / developer include providing advice on the creation of a new ecologically valuable habitat, which is appropriate to the local area and is either nationally, regionally, or locally important, or supports nationally, regionally, or locally important biodiversity?

Yes ☐ No ☐ N/A ☐

If yes, or not applicable, please briefly explain your reasoning:

……..

……..

……..

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……..

……..

12. Do your responsibilities to the client / developer include providing advice and recommendations on when site works are to be avoided so as to minimise the disturbance to wildlife?

Yes ☐ No ☐ N/A ☐

If yes, or not applicable, please briefly explain your reasoning

……..

……..

……..

……..

……..

……..

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Section E: Schedule of Evidence

Copies of the following documentation are required to support the above statements and act as evidence of compliance with the BREEAM ecology criteria:

- The *suitably qualified ecologists* site/project specific report
- Written confirmation from the verifier of the ecology report (where necessary)
- Any supplementary documentation e.g. maps, plans, drawings, letters / emails of correspondence, etc.

Please include these details along with the appropriate reference to each document in the table below:

Document	Reference

Section F: Statement of Verification

I confirm the information provided on this document is truthful and accurate at the time of completion.

Name of ecologist: …….

Signature of ecologist:: …….

Date: …….

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15.0 Schedule of Changes to the Standard

This document details the changes made to the 2008 version of this BRE Environmental and Sustainability Standard, the table also outlines the issue no. (and therefore date) that the change came into affect.

Issue number	Date of issue
1.0	24/6/2008
2.0	14/08/2008
3.0	01/05/2009

Key (Type of Change)	
A	Administrative change e.g. typo, re-wording of text, minor addition to the text.
C	An addition/insertion, deletion or alteration to the scope, assessment criteria, Compliance Notes, evidence required or relevant definitions.
AG	An addition/insertion, alteration or deletion to the additional guidance and supporting information/references.

Issue ID / Section	Type	Change	Issue no.
Scope	A	The text in the '*stages of assessment'* section relating to the timing of the post construction assessment has been **changed from:** "*A PCS assessment is carried out after practical completion of the building works, before handover and occupation of the building.*" **To:** "*A final PCS assessment is completed and certified after practical completion of the building works.*"	3.0
Technical sections	C	The following **presentational changes** have been made to the technical sections: The credit criteria boxes and compliance requirements have been **merged** to create one section for each issue called "*Assessment Criteria*". The header and footers in the technical sections have been **amended**. The issue ID information, numbers of credits available and minimum standards requirements now appear only at the top of each BREEAM issue requirement (as opposed to the header on every page under issues 1.0 and 2.0).	3.0
References	AG	The references section for each issue has been moved to a compiled references section at the back of the assessment manual. References used in the assessment criteria text are numbered and correspond to a number in the new references section. In addition, other publications are referenced by BREEAM issue for further reading/guidance in a new section *Additional Sources of Information*.	3.0
Innovation	C	A new section titled Innovation has been **added** (section 13). This section summarises the three methods of achieving innovation credits in BREEAM.	3.0

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Issue ID / Section	Type	Change	Issue no.
Scoring & weighting	C	The text in the Innovation part of the scoring and weighting sections has been modified to reflect the insertion of Section 13 Innovation.	3.0
Man 1	C	Second credit - seasonal commissioning: Requirement b) has been **added** to list of criteria for simple systems. This brings the criteria for simple systems in line with those for complex systems with respect to actions following on from the initial seasonal commissioning review.	3.0
Man 1	C	The compliance note concerning '*commissioning manager (simple systems)' has* been **modified** to remove the ambiguity over the monitor / manager role.	3.0
Man 2	C	The exemplary level criteria for this issue have been **re-worded** for clarity and consistency with the main BREEAM criteria. The requirement itself i.e. CCS benchmark to achieve the innovation credit, remains unchanged.	3.0
Man 12	C	The RIBA stages terminology has been **updated**. The reference to figure 6 in ISO 15686-part 1 in requirement 4 was incorrect and has been **changed** to ISO 15686-part *5*.	3.0
Hea 6	C	A definition of '*separate occupant control'* has been added.	3.0
Hea 11	C	A definition of '*separate occupant control'* has been added.	3.0
Hea 13	C	Text **added** to the compliance note '*areas used for speech'* outlining how to assess the second credit when a building type contains no *areas used for speech*.	3.0
Ene 1	C	The compliance note '*Extensions to existing buildings'* has been **modified** to avoid confusion over the scope of the energy modelling and therefore CO_2 Index for the purposes of BREEAM.	3.0
Ene 5	C	A compliance note and relevant definition has been **added** concerning the types of biofuels that BREEAM will and will not recognise with respect to this BREEAM issue.	3.0
Ene 5	C	The compliance note '*Calculation of the CO_2 emissions saved'* has been **amended** to provide more clarity on the assumptions that should be used when modelling the building without the specified renewable technologies to determine the percentage reduction in CO_2 emissions.	3.0
Ene 6	C	The compliance note '*Where some design measures are not relevant*', and therefore compliance criteria, has been **modified** to reflect situations where the installation of partitioning between delivery and goods storage area is impractical on the grounds of the buildings proposed operation.	3.0
Tra 3	C	The wording in the compliance note '*Building users'* has been **amended** to clarify further, that it is the number of staff that will work within the building that should be used to determine the number of compliant cycle facilities that must be provided to achieve the credit.	3.0
Tra 3	C	The wording in the compliance note '*compliant changing facilities and lockers'* has been **changed from**: '*For each shower provided, there is a minimum of 1m^2 of changing space adjacent to the shower(s) with hooks for hanging clothes.*' **To:** '*The assessor can use their judgement to determine whether the changing area is appropriate given the number of cycle storage spaces/showers provided. As guidance to aid the assessor, where a shower/changing cubicle is provided there should be a minimum of*	3.0

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Issue ID / Section	Type	Change	Issue no.
		one square metre of changing space adjacent to the shower(s) with a bench seat and hooks for hanging clothes. Where there is more than one shower provided there should be a minimum of one square metre of changing space per shower, subject to a minimum changing area of four square metres. Where there are no showers specified, but there is a changing facility, there is a minimum of one square metre of changing space for every 10 cycle storage spaces, subject to a minimum of four square metres of changing area with a bench seat and hooks for hanging clothes.'	
Tra 8	C	The following has been **added** to the '***small buildings***' compliance note for this BREEAM issue: '*Also, requirement 3 'delivery areas are not be accessed through parking areas' can be relaxed for smaller sites if it can be confirmed that all deliveries to the building will be made by small vans and not heavy goods vehicles.*'	3.0
Wat 1	C	'*Purchase orders*' **added** to the list of evidence types that can be provided for demonstrating compliance with the criteria at the post construction stage of assessment.	3.0
Wat 2	C	The first exemplary level requirement has been **amended** to confirm the minimum percentage water demand that must be met by an individual item of water consuming plant or building area to achieve the innovation credit. A compliance note has also been **added** in support of this requirement.	3.0
Mat 1	AG	A note in the Additional Information section has been **added** concerning the Green Guide flooring category and Indoor Air Quality.	3.0
Mat 1	A	A note has been **added** to the schedule of evidence table concerning Green Guide element numbers.	3.0
Mat 5	C	BRE Global's responsible sourcing framework standard BES6001:2008 has been added to tiers 1 and 2 of table 13 *Responsible sourcing tier levels and criteria*. The Green Dragon Environmental Standard® **added** as an EMS compliant scheme (tiers 3 and 4 of table 13) for small companies. The schedule of evidence table for this issue has also been **updated** accordingly.	3.0
Mat 5	C	The text '*Future RSM certification schemes & standards*' in the additional guidance section has been **replaced** with text concerning the BRE Global responsible sourcing standard BES6001:2008.	3.0
LE1	C	The text in the schedule of evidence table for requirement 1 of this issue has been **changed from** "*previous land use*" **to** "*Type and duration of previous land use".*	3.0
LE4	C	The following text has been **added** to the compliance note '***Number of plant species'***: '*Where an ecologist has been appointed actual number of plant species (before and after construction), based on the ecologists site survey should be used to determine the change in ecological value.*'	3.0
LE3	C	The following text has been **added** to the compliance note '*Use of a suitably qualified ecologist*' as a **clarification**: '*Where a suitably qualified ecologist is employed and has, using their professional judgement, defined the site as land of low ecological value, this assessment/judgement overrides any assessment determined using checklist A4.*'	3.0

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Issue ID / Section	Type	Change	Issue no.
		The following has been **added** to the compliance note *'Site clearance prior to purchase of the site'* as a **clarification**: '*Where it is not possible for the ecologists to determine that the site was of low ecological value prior to the site clearance then the credit must be withheld.*'	
LE5	C	The compliance note '*Native Species'* has been **re-named** '*Plant Species'*. The text in the compliance note has been **modified from**: '*Only native floral/plant species and those with a known attraction or benefit to local fauna can be considered for the purpose of increasing the number of species on site, as well as general enhancement.*' **To:** '*Only native floral/plant species, and/or those contributing to a local or UK Biodiversity Action Plan or those with a known attraction or benefit to local fauna can be considered for the purpose of increasing the number of species on site, as well as general enhancement.* *The Natural History Museum has an online Postcode Plants Database which generates lists of native plants and wildlife for any specified postal district in the UK.* http://www.nhm.ac.uk/nature-online/life/plants-fungi/postcode-plants/index.html	3.0
Pol 8	C	Text has been **added** to the requirement concerning the relevant definition of a *suitably qualified acoustician.* This text refers to the definition provided in BREEAM issue Hea 13, for consistency.	3.0
Checklist A5	C	The checklist has been **updated** to reflect the inclusion of BES6001:2008 in to the responsible sourcing tiers.	3.0
Checklist A3	C	The wording in requirement f) of checklist A3 referred to the use of materials and refrigerants with a "high" global warming potential. This has been **changed** to read materials & refrigerants with a "low" global warming potential.	3.0
Man12	C	The wording of requirement 1 of the first credit has been changed from '*A Life Cycle Cost (LCC) analysis has been carried out based on the feasibility study proposals during RIBA Work Stages B (feasibility) and C (outline proposals), or equivalent* **to** '*A Life Cycle Cost (LCC) analysis has been carried out based on the proposals developed during RIBA Work Stages B/C (feasibility study/outline proposals), or equivalent'*.	2.0
Man12	C	The wording for requirement 6 of the first credit has been **changed from** '*The model was updated during Stages D (detailed proposals) and E (final proposals), or equivalent.*' **to** '*The model was updated during RIBA Work Stages D/E (detailed/final proposals) or equivalent.*'	2.0
Hea5	C	The following text has been **added** to the compliance note 'Second credit': '*Where no external light fittings are specified within the construction zone, the criteria relating to external lighting do not apply and both available credits can be awarded on the basis of compliance with the internal lighting criteria.'*	2.0
Ene5	A	The word '*production*' **deleted** and the word '*reduction*' **inserted** in requirement 3 of the second and third credit and exemplary level criteria.	2.0
Ene5	C	Air Source Heat Pumps have been **added** to the list of heat pumps that can be considered as low or zero carbon technologies.	2.0

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Issue ID / Section	Type	Change	Issue no.
Ene5	C	In the compliance note 'List of recognised LZC technologies' the following text has been **deleted** '*The following technologies are recognised by the Department for Business, Enterprise and Regulatory Reform (BERR) as low or zero carbon (LZC) technologies under the Low Carbon Buildings Programme and would be deemed acceptable for BREEAM provided that the relevant percentage outputs are achieved:'* The following text has been **inserted** in its place*: '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'*.	2.0
Ene5	C	The following text has been **inserted** to the compliance note 'List of recognised LZC technologies': *'The list above is not a definitive list of technologies compliant with BREEAM, but a list of those technologies that may be considered to comply. If the assessor has a justified reason to doubt the low or zero carbon credentials/feasibility of the above technologies, when applied/installed on the development they are assessing, they can justifiably withhold the available BREEAM credits.'*	2.0
Ene5	C	The following text has been **deleted** from the 'Biomass community heating schemes' listing in the compliance note 'List of recognised LZC technologies': *'where the majority of the heat comes from biomass'.*	2.0
Tra1	C	The title of the following definition has been changed **from** '*Public Transport Accessibility Calculator*' **to** '*Tra1 Provision of Public Transport calculator*'.	2.0
Tra3	C	The compliant locker size has been **changed from** '*400mm x 200mm x 400mm*' **to** '*900mm X 300mm X 450mm or a locker with dimensions that provide an equivalent volume of storage space*'. The previous defined locker size is deemed to small to adequately store a cyclists equipment e.g. clothes, helmet, towel, bag etc.	2.0
Tra3	C	Two tier cycle stands **deleted** from the list of 'Non compliant cycle racks' in the Compliance Notes. This type of stand can comply with BREEAM's definition of 'Compliant cycle storage space'.	2.0
Tra8	C	The following compliance note as been **inserted** *'No vehicle delivery and manoeuvring areas: This BREEAM issue is not assessed where the development does not have a vehicle delivery and manoeuvring area. In such cases this issue will be filtered from the list of relevant credits by the assessor's spreadsheet tool.'*	2.0
Wat4	A	The word '*teach*' has been **deleted** from requirement 1, second bullet point. The word '*each*' has been **inserted** in its place.	2.0
Mat1	AG	Guidance has been **inserted** in to the additional guidance section describing how the Mat 1 calculator determines the number of credits achieved using the Green Guide ratings achieved for each of the specifications/elements assessed.	2.0
Mat 1	AG	The following 'relevant definition' has been **inserted**: *'Ecopoint: The Ecopoint used in the Green Guide online is single score that measures the total environmental impact of a product or process as a proportion of overall impact occurring in Europe - 100 Ecopoints is equivalent to the impact of a European Citizen. Green Guide ratings are derived by sub-dividing the range of Ecopoints/m^2 achieved by all specifications considered within a building element.'*	2.0

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Issue ID / Section	Type	Change	Issue no.
Mat5	C	The instructions, in the additional guidance section, on using the responsible sourcing calculator have been **updated**.	2.0
Mat 1, 2 & 6	C	The requirement to provide a Green Guide element reference number, in addition to the Green Guide rating, for each elemental specification **inserted** in to the 'Schedule of Evidence Required'. The element reference number is provided along with each Green Guide rating on the online version of the Green Guide to Specification.	2.0
Wst1	AG	The table of Construction Waste Groups has been **updated**.	2.0
Wst2	C	The following has been **added** to the list of secondary aggregate types: "*Municipal Solid Waste Treatment Residues*".	2.0
Pol4	C	The word *'maximum'* has been **deleted** from the criteria and criteria of this BREEAM issue. This change has been made to avoid doubt over the validity of a manufacturer's statement on the tested NO_x emissions of their products, which are often stated in 'average' dry NO_x emission levels.	2.0
Pol5	C	The following compliance note has been **inserted**: '*Functional flood plain: The BREEAM credit for locating in a flood zone of 'medium or high annual probability' cannot be awarded where the building is located in the functional flood plain. PPS25[9] defines the functional flood plain as a 'zone [that] comprises land where water has to flow or be stored in times of flood'. If the building assessed is or has been defined as 'water-compatible development', please refer to the BREEAM office for guidance on assessing this BREEAM issue*.'	2.0
Pol5	AG	Updated Reference: BS EN 752:1998 *'Drain and sewer systems outside buildings'* has been superseded by BS EN 752:2008.	2.0

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16.0 Additional Sources of Information

Information listed by BREEAM issue.

Man 1

- AG16/2002 - *Variable flow water systems: design, installation and commissioning guidance*
- *Photovoltaics in buildings - Testing, commissioning and monitoring guide*, S/P2/00290/REP.

Man 3

- Sustainability Action Plan (or Achieving Sustainability in Construction Procurement); Government Construction Client's Panel (GCCP), Office of Government Commerce (OGC).
- *Guidelines for Company Reporting on Greenhouse Gas Emissions*, Annex 6 Transport conversion tables, DEFRA 2002.
- *COPERT II Computer programme to Calculate Emissions from Road Transport - Methodology and Emissions Factors*, Technical report No 6. http://reports.eea.eu.int/TEC06/en
- Good Practice Guide (GPG) 273, *Computerised Routing and Scheduling for Efficient Logistics,* Freight Transport Association, 2000.
- BS8555 2003 *Environmental Management Systems – Guide to the phased implementation of an environmental management system including the use of environmental performance evaluation,* BSI 2003.
- http://www.smartwaste.co.uk

Man 4

- Construction (Design and Management) Regulations 1994.
- BRE Digest 474 *HOBO protocol - Handover of Office Building Operations*, 2003.
- CIBSE Building Log Book Toolkit (CD-ROM) 2003.
- Carbon Trust : www.thecarbontrust.co.uk/carbontrust/

Man 6

- http://www.homeoffice.gov.uk/

Man 7

- *Designed with care: design and neighbourhood healthcare buildings,* CABE, 2006. www.cabe.org.uk

Man 12

- BS/ISO 15686-5 *Service Life Planning – Life Cycle Costing* BSI.
- OGC guidance Achieving Excellence in Construction 7 – *Whole Life Costing and Cost Management*.
- OGC guidance Achieving Excellence in Construction 11 – *Sustainability*.
- Green Book – Treasury guidance *Appraisal and Evaluation in central government*. Crown Copyright 1997 and 2000.
- HM Treasury, *How to construct a public sector comparator - Technical Note No. 5*, Treasury Taskforce, London 1999.
- CCF *Whole Life Costing - A Clients' Guide, BRE report funded by DETR*. Clients Construction Forum London: 1999.
- BS/ISO 15686 Buildings *Service Life Planning - Part 1 - General Principles,* BSI 2000.
- *Applying facilities expertise in building design*, Jaunzens D, Warriner D, Garner U and Waterman A London: CRC Ltd.2001

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- BRE Digest 452 *Whole life costing and life cycle assessment for sustainable building design*, Bartlett E, Edwards S, CRC, 2000.
- OGC Common Minimum Standards for the procurement of built environments in the public sector, downloadable from: http://www.ogc.gov.uk/documents/Common_Minimum_Standards_PDF.pdf
- Treasury's Value for Money (VfM) Initiative for PFI projects. Treasury website: http://www.hm-treasury.gov.uk./documents/public_private_partnerships/additional_guidance/ppp_vfm_index.cfm

Hea 1

- Lighting Guide 10 *Daylighting and window design*, CIBSE, 1999.
- *Site layout planning for daylight and sunlight, A guide to good practice*, P. J. Littlefair, BRE Press, 1998.

Hea 2

- *Computers and Eyestrain*, E. Lawrence Bickford, O.D, The EyeCare Reports, 1996.

Hea 3

- Lighting Guide 10 *Daylighting and window design*, CIBSE, 1999.
- Lighting Guide 3 *The visual environment for display screen use*, CIBSE, 1996.

Hea 8

- CIBSE TM 21 *Minimising pollution at air intakes*, 1999.
- Guide B *Heating, Ventilating, Air Conditioning and Refrigeration*, CIBSE, 2005.
- Guide A *Environmental Design*, CIBSE, 1999.

Hea 10

- Report 345 *BRE's Environmental Design Guide for Naturally Ventilated and Daylit Offices*
- CIBSE Guide J *Weather, solar and illuminance data*, CIBSE, 2002.
- ClassCool, DfES; 2006: www.teachernet.gov.uk/iaq

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- DEFRA provides information and associated guidance on the Site Waste Management Plan Regulations 2008: www.defra.gov.uk/constructionwaste
- For help in finding local waste management companies and opportunities to reuse and recycle materials try BREMAP free of charge at: www.bremap.co.uk
- Both WRAP and Envirowise can provide advice and guidance on SWMPs: www.wrap.org.uk/construction and www.envirowise.gov.uk
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- Waste Management Regulations Scotland www.aggregain.org.uk/waste_management_regulations/waste_management_regulations_scotland/index.html

Wst 2

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- BREMAP and Salvo Materials Information Exchange can help identify sources of recycled and secondary aggregates: www.bremap.org.uk and www.salvomie.co.uk
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  - CLR 10: The Contaminated Land Exposure Assessment (CLEA) model: technical basis and algorithms.
- Further advice and technical publications are available for download from the Environment Agency's website: www.environment-agency.gov.uk, including;
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- The Institute of Ecology and Environmental Management www.ieem.org.uk
- The Institute of Environmental Management and Assessment www.iema.net.
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