

Home Quality Mark ONE

UK Technical Manual

Consultation



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TERMS AND CONDITIONS

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ABOUT THIS DOCUMENT

This publication is the technical manual for the Home Quality Mark™. Its primary purpose is to support the assessment and rating of new homes by licensed Home Quality Mark assessors, in accordance with the scheme processes and procedures⁽¹⁾; and in doing so enable BRE Global Ltd to make a certification decision in accordance with BS EN ISO/IEC 17065:2012, the international standard to which it is accredited by UKAS⁽²⁾.

The technical manual also acts as a reference for any stakeholder involved in the procurement of a new home which is being (or has been) assessed against the standard. This includes home owners and occupiers, clients and housing developers, the financial sector, comparison websites, project team members and the wider stakeholder group.

In undertaking an assessment and determining an HQM rating the HQM assessor must use this technical manual alongside the assessment tools provided and with reference to the scheme Operations Manual (SD5070).

The Home Quality Mark ONE UK scheme manual which includes country-specific criteria for England, Scotland and Wales has been released for the purpose of the draft manual consultations

Online and downloadable versions of UK and country-specific manuals for Scotland, Wales and England will be available from www.homequalitymark.com upon the final release of HQM ONE scheme manual

Changes to this document

This technical manual is subject to revision and can be reissued from time-to-time by BRE Global Limited. A schedule of the publication date for each issue of this manual is provided below. A detailed list of all additions and deletions is available separately on request to BRE.

| Scheme Document No. | Issue No. | Date of Issue |
|---------------------|-----------|---------------|
|---------------------|-----------|---------------|

INTRODUCTION TO THE HOME QUALITY MARK

What is the Home Quality Mark?

The Home Quality Mark (HQM) is a voluntary, customer focused and third party assessment and certification scheme. It recognises new homes where performance meets best practice standards that is often significantly above that required by regulation. It defines a rigorous evidence based, relevant and independent voluntary standard for new homes built on tried and tested processes commonly used in the UK and internationally.

Through a simple and accessible rating system supported by a number of performance indicators representing key home occupier priorities, HQM:

- Gives consumers a means of comparing new homes in terms of their likely running costs and environmental footprint as well as providing a measure of a healthier and more ethically constructed home. It helps them to make informed choices when buying or renting ;
- Enables house-builders to evaluate their operations and differentiate their new homes by supporting performance claims and articulating the benefits of new homes to their customers and others;
- Enables public and private sector landlords to set priorities and monitor performance against these in new build properties throughout the design and construction phases, ensuring that the properties they take on, meet their expectations and the needs of their tenants.
- Enables the financial service providers to more accurately reflect in their lending or affordability criteria the contribution of a new home running costs to the home owner's financial outgoings. This helps to inform lending decisions by taking into account the likely reduction in expenditure for customers living in better performing homes.
- Provides planners, designers, communities and other stakeholders reassurance that sustainability and quality objectives of developments are being realised and robustly monitored.

HQM builds on best practice in the housing sector, drawing together a range of complimentary quality and performance standards and combining this with the latest scientific research. In doing so it provides a rigorous, credible and achievable performance label of new homes that reflects a broad range of industry, occupier and societal expectations.

HQM is a UK scheme. However, many criteria are interpreted in terms of national standards, regulations and practices to allow the scheme to be used efficiently to assess new homes in England, Scotland and Wales

HQM is developed and operated by BRE and is part of the BREEAM⁽³⁾ family of quality and sustainability standards. As such, it benefits from over 27 years of experience in the evaluation and certification of performance in homes and other buildings within the UK and internationally.

What makes a HQM home different?

Our homes are important to us. In the UK we typically spend well over 50% of our time in and around them and they represent the biggest single financial commitment in terms of their purchase or rental and running costs. They have a major impact on our health and wellbeing as well as saying a lot about us as individuals, our priorities and our interests.

HQM measures performance across a wide range of financial, wellbeing, environmental and social issues giving an overview of whole home performance and its potential impact on the occupier in a way that other standards are unable to do.

A home that has a certified HQM rating will stand out because;

- There is a greater level of confidence in the performance and quality of the home.
- The home has been built to enhance performance beyond that required by regulation and standard practices.
- The home and its surroundings have been built to consider issues that are important to the homeowner and the environment and wider society but are not covered by regulations, so reducing the risks of unintended consequences occurring as a result of focussing on a single issue.

HQM enables consumers to make a smart choice based on their personal priorities and provides home builders and others with the tools to differentiate their new homes by providing;

- A rating, scored out of 5 levels
- Indicators of performance, ranked on a 5 point scale.

The rating gives an overall picture of the homes quality, with level 5 being an outstanding home of this era. The indicators focus on specific aspects of interest to home occupants in three key areas, including living costs (my costs), health & wellbeing (my wellbeing) and environmental footprint (my footprint);

My Cost

Providing an indication of the overall costs of living in the home. This takes account of;

- Energy Costs
- Durability of Materials
- Maintenance
- Performance of the home in extreme weather
- Access to transport and amenity
- Higher quality homes



This indicator could influence mortgages, insurance and financing for development.

My Wellbeing

Provides an indication of how the home will impact the occupier's health and wellbeing. This takes account of;

- Quality of living space (indoor air, temperature, light and noise)
- Local amenity



My Footprint

Provides an indication of how the home will impact the environment in its construction and use. This takes account of;

- Local and Global emissions in use
- Impact of the homes construction
- Protecting and enhancing ecology



The overall rating and indicators are presented as a HQM 'scorecard'. This scorecard provides those buying and renting new homes with an easy to understand comparator of householder costs, positive impacts on health and wellbeing, and environmental footprint and an all- round indicator of quality.

HQM Application

What can HQM assess?

The HQM can be used to assess the life cycle environmental, social and economic impacts of new build homes in England, Wales, and Scotland only. Technical manuals are available for each country which details country-specific criteria and benchmarks applicable in the respective territory. At present the HQM manual for Northern Ireland is not being released. This is because the Northern Ireland Technical Building Regulations require energy efficiency of new homes to be assessed using the SAP 2009 methodology. To certify assessments of homes under HQM they must be assessed using SAP 2012, the current version of the SAP methodology at the time of writing. We will be looking at releasing the HQM for NI in the near future.

For the purpose of the HQM, a home is defined as a self-contained residential unit designed to accommodate a single household. It will therefore contain all the spaces that the household requires for living, sleeping, food preparation and hygiene. This definition of a home is the same as that used to define a 'dwelling' in The Building Regulations 2010, Approved Document L1A 2013 edition.

A new-build home is one that is a new standalone structure or a part of one that will come into operation and use for the first time after its completion.

The HQM is not appropriate for the refurbishment of existing homes or for new build projects containing rooms for multiple residential purposes such as student and key worker accommodation, care homes, sheltered housing or other multi-residential building types. The BREEAM UK Domestic Refurbishment and BREEAM UK Non-Domestic New Construction schemes can be used to assess these types of project respectively. Please refer to the technical manuals for these schemes for a detailed description of their scope and applicability before proceeding. Further details of these schemes and the technical manuals can be found at www.breeam.com

When does the HQM assessment take place?

Timing the engagement with the HQM is essential for ensuring seamless integration with the procurement process for a new home. This requires careful and timely consideration of assessment issues by the stakeholders in the design and construction process to ensure they can be properly addressed without impacting on costs or performance in other areas. Without this engagement with the supply chain the ability to achieve the desired rating for the new home is likely to be compromised and the benefits that the HQM can bring to a project not realised.

A HQM assessment is a two stage process to ensure that opportunities are identified during the design stage (interim assessment and certificate) and implementation is confirmed during construction (final assessment and certificate).

While final certification occurs at the post-construction stage, to ensure the specified level of performance is achieved in the most cost-effective way and consumers are given the highest degree of confidence in the HQM rating, interim assessment and certification at the design stage is highly recommended. An interim stage certificate shows with confidence the predicted assessment rating of the home based on the design intent and specification.

Prior to an application for a certified assessment and rating, a pre- assessment can be carried out in the early stages of the design to estimate the likely HQM performance. Although the HQM is voluntary, a pre- assessment will often be useful to support an outline or detailed planning application or tender bid by demonstrating the likely performance of the proposals. Users should note that pre- assessments are not formal assessments certified by BRE Global and there is no such thing as an uncertified HQM rating, therefore HQM performance based on a pre- assessment is not verified and a rating and performance must not be claimed and communicated as such.

Ensuring Trust in the Mark

It is important that developers and their customers can have trust in the integrity and rigour of HQM. As an accredited third party certification body, we ensure robustness and fairness are key aspects that underpin the scheme. HQM provides confidence in two ways:

Creation and operation of the Mark

The credibility and consistency of the HQM assessment and rating is a fundamental part of the scheme. As the UK's leading building science centre BRE is owned by the BRE Trust a registered charity that works to improve the quality and sustainability of our buildings and built environment for the wider public benefit, promoting best practice and developing knowledge and understanding throughout the sector. BRE is independent from those interest groups involved in the design and construction of new homes.

BRE is highly respected as a world leading authority in building performance research, testing, evaluation, standard setting and certification with over 95 years of experience operating both within the UK and internationally. The 'science-based' content and independent application in accordance with recognised International Standards⁽⁴⁾ underpin both the creation and operation of HQM. BRE Global, the BRE's certification body and operators of HQM, is accredited by the United Kingdom Accreditation Service (UKAS) against these standards to ensure independence, competence and impartiality.

A key aspect of this impartiality is the open and accountable governance structure. Key operational aspects of HQM (as with all our assurance activities) is overseen by an independent Governing Body to ensure impartiality is maintained in the operation of the scheme. The Governing Body represents a breadth of stakeholder interests to ensure, among other things, that BRE Global acts in a manner that is beyond reproach, operates our processes correctly, treats our customers fairly and is always acting for the public good.

In addition to the Governing Body and the expertise and experience of BRE as an building science and research centre, we collaborate with a range of industry stakeholder groups, professional experts and users. This collaboration ensures our standards are open to external and independent scrutiny and the voice of HQM users and stakeholders is reflected in the scheme's operation and evolution.

Process of certification

Independence is a key feature of HQM as it provides confidence to the consumer. Assessors are trained and licensed by BRE to undertake the HQM assessment and determine a rating. To view a current list of HQM assessors visit www.greenbooklive.com

The HQM assessor will evaluate the design, specification and construction of a new home using the criteria and methodologies defined in this technical manual and its supporting assessment tools.

Once an assessment is complete and has achieved a positive outcome in the BRE Global quality assurance procedure, one certificate will be issued per home. The certificate provides formal verification that the HQM assessor has completed their

assessment in accordance with the requirements of the scheme and its quality standards. In turn providing confidence to the consumer (or any other interested party) in the HQM rating and performance of the new home.

Anyone wishing to verify a certified assessment and rating of a new home against the HQM can do so by either checking its HQM certificate, which will contain the scheme's certification mark, or by searching the project listings on Green Book Live⁽⁵⁾.

OVERVIEW OF HQM TECHNICAL CONTENT

This section provides an overview of the detailed technical assessment issues and supporting guidance, which makes up the majority of this manual. This detail is separated into three core parts;

HQM assessment issues and criteria - This section includes the technical sections and all the assessment issues and criteria that make up the HQM scheme (see below for more detail).

HQM evidence requirements - This section provides guidance to assessors and project teams on the types and forms of evidence required to demonstrate compliance with the HQM criteria. It should be read in conjunction with the evidence section in each individual assessment issue.

Appendices - The Appendices provide supporting information on HQM scoring and rating methodology and benchmarks, and supporting guidance for HQM application and compliance including post-construction stage assessment issue exceptions.

HQM assessment issues and criteria

The 36 assessment issues that define HQM are categorised into three sections:

- Our surroundings on page 7 - includes issues that address the ability of homes to work with current and future surroundings.
- My Home on page 49 - includes issues that address the provision of living spaces that are comfortable, healthy, cost effective and have reduced environmental impacts.
- Delivery on page 153 - includes issues that focus on the delivery of construction quality. It encourages knowledge sharing and co-operation between the designer, constructor, client and householder and encourages the provision of post-handover support to occupiers.

Each assessment issue has a number of 'credits' available and this number reflects the issues importance relative to other issues in the scheme. The HQM assessor awards the appropriate number of credits where it is demonstrated that the new home meets the issue criteria. The sum of these credits determines the rating and performance against each of the HQM indicators (refer to Appendix A on page 225 for a description of the scoring and rating methodology and benchmarks).

Each of the assessment issues that define HQM is structured as follows:

- **Aim:** This outlines the intention of the issue.
- **Benefit:** This describes the key benefits and values for the householder.
- **Context:** This outlines why the issue is relevant to the development of quality homes in sustainable communities.
- **Credit Summary:** This summarises the key topics being assessed in the issue including the credits available and groups criteria by topic.
- **Criteria:** This details the criteria the issue assesses and the relevant number of HQM credits that can be awarded. All criteria marked as minimum requirement must be met to achieve an HQM certification. Criteria marked as prerequisite must be met to gain any credits within that issue.
- **Methodology:** This details any methodologies to follow or use in achieving and determining compliance with the criteria and the number of credits to award.
- **Compliance Notes:** These notes provide additional guidance that supports the application and interpretation of the assessment criteria, including how to assess compliance in specific situations.
- **Evidence:** This outlines typical examples of the type of information that must be provided by the developer and given to the HQM assessor. This enables the assessor to independently verify the development's performance against the assessment criteria and award the relevant number of credits. See also Appendix C - HQM evidence requirements on page 236.
- **Checklists, Tables & Illustrations:** includes any supporting assessment information and guidance in the form of checklists, tables and illustrations.
- **Definitions:** This contains the definitions of terminology used throughout the issue.

HQM ASSESSMENT ISSUES

| HQM sections, category, assessment issues and available credits | | | |
|---|--------------------------------|--|--|
| Section | Category | Assessment Issue | No. Credits Available |
|  Our surroundings | Transport and Movement | 01 Accessible Public Transport | 15 |
| | | 02 Alternative Sustainable Transport Options | 17 |
| | | 03 Local Amenities | 16 |
| | Safety and Resilience | 04 Ecology | 36 |
| | | 05 Recreational Space | 22 |
| | | 06 Flood Risk | 19 |
| | | 07 Managing the Impact of Rainfall | 19 |
| | | 08 Security | 09 |
|  My Home | Comfort | 09 Indoor Pollutants | 12 |
| | | 10 Daylight | 13 |
| | | 11 Internal and External Noise | 04 |
| | | 12 Sound Insulation | 09 |
| | | 13 Temperature | 17 |
| | | 14 Ventilation | 13 |
| | | Energy and Cost | 15 Energy and cost |
| | 16 Decentralised Energy | | 08 |
| | 17 Impact on Local Air Quality | | 15 |
| | Materials | 18 Responsible sourcing of construction products | 25 |
| | | 19 Environmental Impact from Construction Products | 25 |
| | | 20 Life Cycle Costing of Construction Products | 12 |
| | | 21 Durability of Construction Products | 07 |
| | Space | 22 Drying Space | 03 |
| 23 Access and Space | | 11 | |
| 24 Recyclable Waste | | 10 | |
| Water | 25 Water Efficiency | 17 | |
| | Quality Assurance | 26 Project Preparation | 06 |
| 27 Commissioning and Testing | | 11 | |
| 28 Inspections and completion | | 16 | |
|  Delivery | | Construction impacts | 29 Responsible Construction Management |
| | 30 Construction Energy Use | | 05 |
| | 31 Construction Water Use | | 05 |
| | 32 Site Waste Management | | 15 |
| | Customer Experience | 33 Aftercare | 04 |
| | | 34 Home Information | 00 |
| 35 Smart Homes | | 08 | |
| 36 Post Occupancy Evaluation | | 10 | |

OUR SURROUNDINGS

This section discusses the following.

| | |
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| Transport and Movement | 8 |
| 01 Accessible Public Transport | 9 |
| 02 Alternative Sustainable Transport Options | 14 |
| 03 Local Amenities | 19 |
| Outdoors | 22 |
| 04 Ecology | 23 |
| 05 Recreational Space | 24 |
| Safety and Resilience | 31 |
| 06 Flood Risk | 32 |
| 07 Managing the Impact of Rainfall | 38 |
| 08 Security | 45 |

TRANSPORT AND MOVEMENT

This section discusses the following.

| | |
|---|-----------|
| 01 Accessible Public Transport | 9 |
| 02 Alternative Sustainable Transport Options | 14 |
| 03 Local Amenities | 19 |

01 ACCESSIBLE PUBLIC TRANSPORT

Max credits

15

Indicators (Average)



Aim

To give consumer choice by recognising and encourage developments with good proximity to public transport networks, in turn promoting ease of access for occupants.

Benefit

- Promotes active travel, helping to improve people’s health.
- Future proofing developments for changes in transport practices and for variation in demographics including an ageing population.
- Reduces occupants’ carbon footprint.
- Provides cost savings when compared to the cost of owning and running a car⁽⁶⁾.

Context

Transport accounts for a quarter of UK greenhouse gas emissions, significantly affecting air quality. Public transport helps address transport-related greenhouse gas emissions. The emissions from trains and buses per passenger mile can be up to eight times lower than car travel. According to the National Planning Policy Framework planning should “make the fullest possible use of public transport, walking and cycling, and focus on significant development in locations which are or can be made sustainable”.

For Scotland:

Part of Scotland’s vision, as described in the National Planning Framework 3, is to “make better use of our existing infrastructure, and have improved transport links to facilitate our ambition for growth and our commitment to an inclusive society.”



Credit Summary

| Criterion number | Title | Credits |
|-------------------------|---------------------------|------------------|
| crit 1, crit 2, crit 4 | 01 Accessibility Index | up to 12 credits |
| crit 4 | 02 Improved local service | for 3 credits |
| Total credits available | | 15 |

Criteria

01 Accessibility Index

up to 12 credits

crit 1 Homes are awarded credits based on the accessibility to public transport nodes. Credits are awarded based on the Public Transport Accessibility Index (AI) as shown in Table 1.

Table 1 Public Transport Accessibility Index (AI) scores and associated number of credits

| Credits | AI Score in Rural Locations | AI Score in Urban Locations |
|---------|-----------------------------|-----------------------------|
| 4 | 1 | 2 |
| 6 | 2 | 4 |
| 8 | 4 | 8 |
| 12 | 6 | 12 |

crit 2 The Accessibility Index is determined by entering the following information in to the HQM Transport calculator:

crit 2.a: The distance (m) from the homes main entrance to each compliant public transport node via safe pedestrian route. In cases where the site boundary crosses a pedestrian route of an existing network and is not controlled by the developer, guidance should be sought from the local authority to apply the appropriate measures.

crit 2.b: The public transport types serving the compliant transport node, e.g. bus or rail

crit 2.c: The average number of services stopping per hour at each compliant node during peak and off peak times.

crit 2.d: Home information is provided for local transport networks or nodes.

crit 3 During off-peak hours weekday (09:30-16:00 and 19:00-06:30) and off-peak weekend (between 06:30-19:00), the service level of public transport should not reduce to less than a quarter of the week day on-peak service (06:30-09:30 and 16:00-19:00). For rural locations services between midnight and 5am are exempt from this requirement.

02 Improved local service

for 3 credits

crit 4 Where:

crit 4.a: An increase in the local service provision for the development has been negotiated with local travel companies;

crit 4.b: This will lead to an increase the existing AI by at least 1.00 compared to AI score benchmarks (see Table 1).

Methodology

Accessibility Index

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 detailed description of the PTAL methodology see the 'Measuring Public Transport Accessibility Levels Summary'⁽⁷⁾ document.

Distance to transport node

Distance should not be measured 'as the crow flies' and must be measured via a safe pedestrian route from the main entrance of the home (communal entrance of the building for an apartment block) to the nearest compliant transport node.

Multiple transport nodes

Where there is more than one transport node serving the home, located at different proximities, e.g. one node at 400m and another at 600m, then each node should be assessed.

Services that operate from more than one node within proximity of the home, i.e. two separate bus stops served by the same bus, must be considered only once - at the node in closest proximity to the home. Different services at the same node can be considered as separate.

Calculating the 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 peak times, off-peak and off-peak weekends divided by the number of hours within that period.

For example: in rural locations within proximity of a bus stop with 12 stopping services during the peak periods (i.e. the 6 hours of peak time as defined in Table 1 on the previous page, the average number of services is $12/6 = 2$ services per hour at peak times (equivalent to an average service frequency of approximately 30 minutes).

Multiple services

Where a transport node is served by more than one service going to a local urban centre, the frequency between services can be used as the frequency for assessment. For example, where there are three services, each with a 30 minute frequency but each follows on 10 minutes after the other, the frequency used for assessment purposes would be 10 minutes.

Bidirectional routes

Routes will be bidirectional; however for the purpose of calculating the index, consider only the direction with the highest frequency (in accordance with the PTAL methodology).

Homes in Greater London

The Transport for London Planning Information Database allows users to search for a specific London location by street name, coordinates or postcode and then calculate the Accessibility Index (AI) for that location. The Total AI is confirmed for the point of interest (POI) within the summary report, which can be downloaded and used as evidence of compliance for the assessed building. See here.

Compliance Notes

| Criterion Reference | Compliance Note | |
|---------------------|--|---|
| crit 1, crit 2 | CN1 Phased or multiple home development | See Appendix D - Post-construction stage assessment issue exceptions on page 243. |
| All | CN2 For homes being assessed as part of a larger development | The AI can either be calculated for each home or where the client does not want to assess the AI for each home, the calculation should assume the 'worst case', i.e. by using the home which is furthest away from each transport node to determine the AI. |

Evidence

| Criterion Reference | Title | Design Stage | Post Construction Stage |
|---------------------|---------------------|---|-------------------------|
| crit 1-crit 2 | 01 General Evidence | One or more of the appropriate evidence types listed in Appendix C - HQM evidence requirements on page 236 can be used to demonstrate compliance with these criteria. | |
| crit 1 | 02 AI calculation | A copy of the completed AI calculator and documentary evidence supporting the data used to complete the calculator or TFL output. | |

| Criterion Reference | Title | Design Stage | Post Construction Stage |
|---------------------|-------|--|-------------------------|
| | | Calculation of frequency of services peak, off peak and off peak weekend | |
| crit 2 | 03 AI | Provide evidence demonstrating that the nodes can be accessed via a calculation safe pedestrian route. | |

Checklists, Tables & Illustrations

None.

Definitions

Accessibility Index

A measure that provides an indicator of accessibility and density of the public transport networks for an individual home. The index can be influenced by the proximity and diversity of the public transport network and the frequency of service at the accessible node.

Compliant public transport nodes

Urban

A compliant node includes any bus service with a stop within 400m and any railway station within 800m of the assessed building's main entrance, measured via a safe pedestrian route (not 'as the crow flies').

Rural

A compliant node includes any bus service with a stop within 800m and any railway station within 1600m 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. Only local services should be assessed and any national public transport services should be excluded from the analysis, unless such a service can be said to provide a local commuter service.

Rural locations

A rural location is defined as being any settlement or land that does not meet the definition of urban below.

Safe pedestrian routes

Pedestrian routes on the development site, within control of the developer are deemed to be safe and accessible for all pedestrian users (including people with disabilities, the elderly and children), where they take into account physical limitation of those who may use them, for example providing steps appropriately supported by sloped access and dropped curbs positioned at crossing points. These routes and associated spaces are appropriately sized, with good visibility of the route ahead. Alongside these principles they should also meet the following requirements:

1. Where required, lighting design must be in accordance with BS 5489-1:2013 Lighting of roads and public amenity areas⁽⁸⁾ (rural areas are exempt from this requirement).
2. At crossing points there must be appropriate pedestrian crossings (e.g. zebra or pelican crossings) in place or a clear line of sight for at least 50m in each direction on roads with a 30mph speed limit or 100m in each direction on roads with a speed limit of greater than 30mph).
3. On roads with a speed limit of 30mph (or higher) there is a clearly defined footpath.
4. All footpaths provided should be at least 900mm wide. In rural areas, on single track roads, a grass verge is acceptable in place of a footpath.
5. In clearly defined home zones, it is acceptable for the pedestrian's routes to use the road.

Pedestrian routes that are outside of the development site and therefore not within the control of the developer do not need to meet the above requirements, however it must be demonstrated that there is a pedestrian route, which is not shared with vehicular traffic, from the site boundary to the transport node (e.g. via pavements, footpaths, pedestrian crossings). The route shall be signposted.

Urban locations

An urban area with a population of 10,000 people or more, located within a tract of predominantly built-up land. This definition applies to the expected post-development population.

Credit Summary

| Criterion number | Title | Credits |
|---------------------------------|--|---------------------|
| crit 1 | 01 Home information | Minimum requirement |
| crit 2-crit 4 | 02 Cycle storage | up to 6 credits |
| crit 5-crit 7 | 03 Cycle networks | for 4 credits |
| crit 8 | 04 Electric vehicle charging points | for 4 credits |
| crit 10 on the next page-crit 7 | 02 Alternative Sustainable Transport Options | for 3 credits |
| Total credits available | | 17 |

Criteria

| 01 Home information | Minimum requirement | |
|--|---|-------------------------|
| crit 1 Home information needs to be provided as part of or all of the criteria in this issue. Please see 34 Home Information on page 206. | | |
| 02 Cycle storage | up to 6 credits | |
| crit 2 Where cycle storage is provided for individual homes or in a communal setting, credits can be awarded based upon the size of the home and the number of cycle spaces provided, as detailed in Table 2. | | |
| crit 3 Compliant cycle storage is associated with the home or within close proximity to the homes entrance (communal entrance of the building for an apartment block). | | |
| Table 2 Number of cycle spaces per home and the associated credits | | |
| Home size | 3 credits | 6 credits |
| Studios or 1 bedroom | One cycle space for every two homes is provided (where the assessment is only covering one home then one cycle space is required) | 1 cycle space per home |
| 2 and 3 bedrooms | One cycle space per home | 2 cycle spaces per home |
| 4 bedrooms and above | Two cycle spaces per home | 4 cycle spaces per home |
| Where the cycle storage is provided in a communal location, the number of communal spaces provided must be demonstrated to meet the above requirements for all homes served by the communal location. | | |
| crit 4 There is a safe pedestrian route from the cycle storage to the entrance of the home (communal entrance of the building for an apartment block). | | |
| 03 Cycle networks | for 4 credits | |
| crit 5 During preparation of the brief, the design team consult with the local authority on the state of the local cycling network and how the development could improve it. | | |
| crit 6 The design team has agreed to and will implement one proposition chosen with the local authority. The proposition supported by the development is additional to existing local plans and has a significant impact on the local cycling network. | | |
| crit 7 The home is connected to a safe cycle route via a safe pedestrian route. | | |
| 04 Electric vehicle charging points | for 4 credits | |

crit 8 Where a minimum of 3kw electric recharging is provided for individual homes or in a communal setting, credits can be awarded based upon the percentage of parking spaces provided with electric recharging points, as detailed in Table 2. e.

Table 3 Percentage of electric recharging stations and number of credits available

| | 1 credit | 2 credits | 3 credits |
|--|----------|-----------|-------------|
| Percentage of parking space with electric charging points(including private and communal) | 20% | 40% | 60% or more |

crit 9 One credit can be awarded where 7 kw charging or more is provided for 5 % or more of the individual home charging points and 5% or more for the communal setting charging points.

05 Car clubs

for 3 credits

crit 10 The home is within proximity of a compliant Car Club on the facing page.

Methodology Compliance Notes

| Criterion Reference | Compliance Note | |
|-----------------------------------|--------------------------------|--|
| crit 2 | CN1 Cycle storage locations | <p>Cycles may be stored in any of the following locked structures:</p> <ol style="list-style-type: none"> 1. Garage or shed 2. Internal private spaces, such as dedicated space in a utility room 3. External or internal communal cycle store 4. Proprietary system. <p>Communal cycle storage should meet the following:</p> <ol style="list-style-type: none"> 1. Spaces in racks, that are covered overhead and where the racks are fixed to a permanent structure (building or hardstanding). <p>Where the location is external to the home, access from the bike storage area to a pedestrian or cycle route is not permitted through the home.</p> |
| crit 3 on the previous pagecrit 2 | CN2 Cycle storage requirements | <p>The distance between each cycle rack and surrounding obstructions (e.g. walls) allows for bikes to be easily stored and accessed. Cycle racks must be a minimum of:</p> <ol style="list-style-type: none"> 1. 2m long × 0.75m wide for one bike 2. 2m long × 1.5m wide for two bike 3. 2m long × 2.5m wide for four bikes 4. If hanging systems or proprietary system are provided, the space requirements are flexible but the system must allow each cycle to be removed independently. <p>Cycle storage in communal locations has adequate lighting. The lighting must be controlled during daylight hours.</p> |
| crit 7 | CN3 Cycle route | <p>A compliant cycle route should meet one or more of the following:</p> <ol style="list-style-type: none"> 1. Cyclists can share the road with vehicles on single track roads. 2. Cyclists can share the road with vehicles on roads with low |

| Criterion Reference | Compliance Note | |
|-----------------------------------|---|--|
| | | <p>traffic volumes and speeds (20mph).</p> <ol style="list-style-type: none"> Shared cyclist and pedestrian routes need to be a minimum of 3m wide. Dedicated cycle lanes (segregated or unsegregated from roads), with one-way cycle lanes being a minimum of 1.5m wide and two-way cycle lanes a minimum of 3m wide)⁽¹¹⁾. |
| crit 8 on the previous pagecrit 7 | CN4 Charge points type | <p>Charge points types :</p> <ol style="list-style-type: none"> On-street residential charging Rapid charging Destination or top-up charging <p>To ensure their charge points are open for use to as many customers as possible, all charge point network operators should ensure they:</p> <ul style="list-style-type: none"> Use standard plugs or Type 2 connectors Use the latest Open Charge Point Protocol (OCPP) Are interoperable with other networks and or offer a pay-as-you-go option Provide an app and website to help customers locate available charge points Have a clear pricing structure |
| crit 2 | CN5 Phased or multiple home development | See Appendix D - Post-construction stage assessment issue exceptions on page 243. |

Evidence

| Criterion Reference | Title | Design Stage | Post Construction Stage |
|---------------------|---------------------|---|-------------------------|
| crit 2 | 01 General Evidence | One or more of the appropriate evidence types listed in Appendix C - HQM evidence requirements on page 236 can be used to demonstrate compliance with these criteria. | |

Checklists, Tables & Illustrations

None.

Definitions

Adequate Lighting

Internal lighting should provide an illuminance (lux) level appropriate to the tasks undertaken. This can be demonstrated through a lighting design strategy that provides illuminance levels in accordance with the SLL Code for Lighting 2012⁽¹²⁾ and any other relevant industry standard.

External lighting is designed to provide illuminance levels that enable users to perform outdoor visual tasks efficiently and accurately, especially during the night. To demonstrate this, external lighting provided is specified in accordance with BS5489-1:2013 Lighting of roads and public amenity areas⁽¹³⁾.

The lighting must be controlled to avoid operation during daylight hours, where there is sufficient daylight in or around the facility.

Car Club

Car clubs should have the following features:

- Accessible to the occupants. The car club should be within 650m walking distances from the home via a safe pedestrian route.
- Cars can be rented by the hour and day

- Fuel and insurance are included
- They benefit from self-service reservation, pick-up, and return
- Available 24hr
- Dedicated parking space
- Have, or will have by the time the development is complete, sufficient provision of hybrid or electric cars to cater to the expected demands of the whole development.

Close Proximity

Within 50m of the homes entrance (communal entrance of the building for an apartment block), or alternatively no further from the homes entrance (communal entrance of the building for an apartment block) when compared to the nearest car parking space. This should be measured via the available pedestrian route and not 'as the crow flies'.

Safe pedestrian routes

Pedestrian routes on the development site, within control of the developer are deemed to be safe and accessible for all pedestrian users (including people with disabilities, the elderly and children), where they take into account physical limitation of those who may use them, for example providing steps appropriately supported by sloped access and dropped curbs positioned at crossing points. These routes and associated spaces are appropriately sized, with good visibility of the route ahead. Alongside these principles they should also meet the following requirements:

1. Where required, lighting design must be in accordance with BS 5489-1:2013 Lighting of roads and public amenity areas (rural areas are exempt from this requirement).
2. At crossing points there must be appropriate pedestrian crossings (e.g. zebra or pelican crossings) in place or a clear line of sight for at least 50m in each direction on roads with a 30mph speed limit or 100m in each direction on roads with a speed limit of greater than 30mph).
3. On roads with a speed limit of 30mph (or higher) there is a clearly defined footpath.
4. All footpaths provided should be at least 900mm wide. In rural areas, on single track roads, a grass verge is acceptable in place of a footpath.
5. In clearly defined home zones, it is acceptable for the pedestrian's routes to use the road.

Pedestrian routes that are outside of the development site and therefore not within the control of the developer do not need to meet the above requirements, however it must be demonstrated that there is a pedestrian route, which is not shared with vehicular traffic, from the site boundary to the transport node (e.g. via pavements, footpaths, pedestrian crossings). The route shall be signposted.

Walking distance

Walking distance for the purpose of this issue is 650m via a safe pedestrian route. This should be measured via the route and not 'as the crow flies'.

03 LOCAL AMENITIES



Aim

To ensure occupants have access to a range of key amenities in the local area and to reduce the need to travel and dependency on private transport.

Benefit

- Helps to reduce the need for travel, reducing occupiers' carbon footprint and costs.
- Encourages active travel, helping to improve people's health.
- Promotes community cohesion and sense of place as well as changing shopping patterns and demographics.

Context

With the increase in out-of-town shopping centres and the increasing dependency on private transport to get around, there has been a decline in town centres that provide everyday amenities within a walkable distance or via good public transport options. Where new homes are planned for an area they should be supported by appropriate local amenities, saving occupants travel time, money and helping to promote community cohesion and a sense of place⁽¹⁴⁾. In designing places for the future, planners should make sure that communities and their residents have the space to grow, in particular, to develop a distinctive character, to shape the place so that it better meets local needs, and have scope to change as populations age and shift and new patterns of work and social life emerge.⁽¹⁵⁾



Credit Summary

| Criterion number | Title | Credits |
|-------------------------|-------------------------------|----------------|
| crit 1 | 01 Key local amenities | for 11 credits |
| crit 2-crit 3 | 02 Beneficial local amenities | for 5 credits |
| Total credits available | | 16 |

Criteria

01 Key local amenities for 11 credits

crit 1 Three or more of the following amenities are located within walking distance of the home, via safe pedestrian routes:

crit 1.a: Administrative services, e.g. post office, bank or cash point etc.

crit 1.b: Health services, e.g. GP, health centre, pharmacy, etc.

crit 1.c: Small scale retail services, e.g. grocers, butchers, corner shops, etc.

02 Beneficial local amenities for 5 credits

crit 2 crit 1 has been achieved.

crit 3 Two or more of the following amenities are located within 30 minutes of the home via safe pedestrian routes (calculated using the assumed walking speed) or via public transport:

crit 3.a: Purpose built recreation or leisure facilities

crit 3.b: Primary or early education facilities or school, e.g. nursery or primary school

crit 3.c: Large scale retail, e.g. restaurants, cinemas, clothes shops, etc.

crit 3.d: One or more community facilities, e.g. community hall or a library, etc.

Methodology

None.

Compliance Notes

| Criterion Reference | Compliance Note | |
|---------------------|--|--|
| crit 1-crit 3 | CN1 Local amenities | The number of local amenities can include several different amenities from the same group; however it cannot include more than one of the same type of amenity. For example a post office and a cash machine (both administrative amenities) can be counted, however having two cash machines cannot be counted twice. |
| crit 1-crit 3 | CN2 Collective amenities | One type of amenity may also exist within or as part of another amenity, e.g. a grocery store in a petrol station, cash point or pharmacy in a supermarket etc. It is not a requirement of this issue that each amenity is 'standalone'. |
| crit 1-crit 3 | CN3 Phased or multiple home development | See Appendix D - Post-construction stage assessment issue exceptions on page 243. |
| crit 1-crit 3 | CN4 For homes being assessed as part of a larger development | For homes being assessed as part of a larger development the 'worst case' can be used to determine the number of credits awarded, i.e. by using the home which is furthest away from each local amenity. |

Evidence

| Criterion Reference | Title | Design Stage | Post Construction Stage |
|---------------------|------------------|---|-------------------------|
| crit 1-crit 3 | General evidence | One or more of the appropriate evidence types listed in Appendix C - HQM evidence requirements on page 236 can be used to demonstrate compliance with these criteria. | |

Checklists, Tables & Illustrations

None.

Definitions

Assumed walking speed

Walking speed for the purpose of this issue must be assumed to be 3mph (1 mile every 20 minutes).

Community facilities

Internal spaces which are inclusive to the majority of users who will occupy the home or development. The facility will serve to facilitate community activities.

Safe pedestrian routes

Pedestrian routes on the development site, within control of the developer are deemed to be safe and accessible for all pedestrian users (including people with disabilities, the elderly and children), where they take into account physical limitation of those who may use them, for example providing steps appropriately supported by sloped access and dropped curbs positioned at crossing points. These routes and associated spaces are appropriately sized, with good visibility of the route ahead. Alongside these principles they should also meet the following requirements:

1. Where required, lighting design must be in accordance with BS 5489-1:2013 Lighting of roads and public amenity areas⁽¹⁶⁾ (rural areas are exempt from this requirement).
2. At crossing points there must be appropriate pedestrian crossings (e.g. zebra or pelican crossings) in place or a clear line of sight for at least 50m in each direction on roads with a 30mph speed limit or 100m in each direction on roads with a speed limit of greater than 30mph).
3. On roads with a speed limit of 30mph (or higher) there is a clearly defined footpath.
4. All footpaths provided should be at least 900mm wide. In rural areas, on single track roads, a grass verge is acceptable in place of a footpath.
5. In clearly defined home zones, it is acceptable for the pedestrian's routes to use the road.

Pedestrian routes that are outside of the development site and therefore not within the control of the developer do not need to meet the above requirements, however it must be demonstrated that there is a pedestrian route that allows access to the local amenity.

Walking distance-urban

Walking distance for the purpose of this issue is 650m via safe pedestrian routes. This should be measured via the route and not 'as the crow flies' from the main entrance of the home (communal entrance of the building for an apartment block) to the amenity.

Walking distance-rural

Walking distance for the purpose of this issue is 1300m via safe pedestrian routes. This should be measured via the route and not 'as the crow flies' from the main entrance of the home (communal entrance of the building for an apartment block) to the amenity.

OUTDOORS

This section discusses the following.

| | |
|------------------------------------|-----------|
| 04 Ecology | 23 |
| 05 Recreational Space | 24 |

04 ECOLOGY

The proposed Ecology criteria for this scheme is subject to separate consultation and has not been included in this manual.

The BREEAM UK Strategic Ecology Framework (SEF) is currently being implemented across HQM and others within the BREEAM family of schemes, as they are updated. This involves development of the assessment issues, and appropriate alignment across BREEAM schemes and built environment lifecycle stages.

Stakeholders were informed separately to ask for their feedback on this. Please go to www.breeam.com/sef for the proposed ecology technical content and for more information about its separate consultation.

05 RECREATIONAL SPACE

Max credits

22

Indicators (Average)

| | | |
|---|---|---|
|  |  |  |
| My cost | My wellbeing | My footprint |

Aim

To provide occupants with access to outdoor recreational space, promoting community cohesion, activity and wellbeing.

Benefit

- Encourages activities that can have physical, mental and social benefits for occupants.
- Increases social cohesion and sense of place in the local community⁽¹⁷⁾.
- Encourages cost savings and reduced environmental impact through the provision of growing space⁽¹⁸⁾ and access to recreational spaces.
- Adds to the desirability of the home helping to increase its value and appeal⁽¹⁹⁾.

Context

The provision of recreational space promotes society’s interaction with the outdoor environment. This is important because it increases people’s awareness of the benefits that recreational space can provide (i.e. promoting exercise, reducing stress levels etc.)⁽²⁰⁾. The provision of recreational space is a key consideration in the National Planning Policy Statement⁽²¹⁾ as a result of the direct benefits to the community as identified above, but also through indirect benefits such as alleviating flood risk. Furthermore the health benefits of recreational space are beginning to be recognised by organisations such as the NHS; improving the health of communities could in turn result in significant cost savings and disruption both to individuals and society more generally⁽²²⁾.



Credit Summary

| Criterion number | Title | Credits |
|-------------------------|--------------------------------|---------------------|
| crit 1 | 01 Home information | Minimum requirement |
| crit 2 | Accessible Recreational Spaces | for 4 credits |
| crit 3 | 03 Private space | up to 6 credits |
| crit 4 | 03 Communal space | up to 4 credits |
| crit 5-crit 6 | 04 Management strategy | for 3 credits |
| crit 7-crit 9 | 05 Growing space | for 2 credits |
| crit 10-crit 11 | 06 Expert input | for 1 credit |
| crit 12-crit 13 | 07 Initial planting | for 2 credits |
| Total credits available | | 22 |

Criteria

01 Home information Minimum requirement

crit 1 Home information needs to be provided as part of or all of the criteria in this issue. Please see 34 Home Information on page 206.

Accessible Recreational Spaces for 4 credits

crit 2 The home is within walking distance of Recreational Spaces.

03 Private space up to 6 credits

crit 3 Private external space is provided that is clearly associated with the home. Where balconies or roof terraces are being specified these should be minimum 1.5 m in depth. Credits are awarded for private external space based on the areas detailed in Table 4 below.

Table 4 Private external space requirements

| Apartments | 1 credit | 3 credits | 6 credits |
|-----------------------------|---|---|---|
| Number of bedrooms per home | | | |
| Up to two or studios | Balcony or roof terrace 4m ² | 6m ² | 8m ² |
| Three to four | 1m ² per additional bedroom | 1m ² per additional bedroom | 1m ² per additional bedroom |
| Five and above | | 1m ² per additional bedroom | 1m ² per additional bedroom |
| Homes | 1 credit | 3 credits | 6 credits |
| Number of bedrooms per home | | | |
| Up to two | Balcony or roof terrace 20m ² | 30m ² | 50m ² |
| Three to four | 25m ² | 35m ² | 65m ² |
| Five and above | 30m ² | 40m ² | 100m ² |

03 Communal space up to 4 credits

crit 4 The home is within close proximity to communal space. Credits are awarded for communal space based on the areas detailed in Table 5 on the facing page.

Table 5 Communal external space requirements. At least 20m2 must be provided in all cases.

| Flat or Apartments | 2 credit | 4 credits |
|----------------------|------------------------|-----------------------|
| Town Urban Centre | 5 % of the total GDA | 7.5% of the total GDA |
| Other | 10% of the total GDA | 15% of the total GDA |
| Homes | 2 credit | 4 credits |
| Town or Urban Centre | 7.5 % of the total GDA | 10 % of the total GDA |
| Other | 15 % of the total GDA | 20 % of the total GDA |

04 Management strategy

for 3 credits

crit 5 crit 4 is achieved.

crit 6 Suitable management and maintenance arrangements are in place for communal spaces before practical completion of the project (this can form part of the Ecology Management Strategy).

05 Growing space

for 2 credits

crit 7 The local authority and local growing initiatives or groups (where present) have been consulted to determine the demand for and suitable types of growing space in the local area.

crit 8 The outputs of the consultation feed into the provision of dedicated growing space.

crit 9 Where growing space is provided in a communal area, suitable management and maintenance arrangements are in place.

06 Expert input

for 1 credit

crit 10 crit 7-crit 9 are achieved.

crit 11 Expert advice is sought at the design stage to inform the design and layout of the growing space.

07 Initial planting

for 2 credits

crit 12 crit 7-crit 9 are achieved.

crit 13 Growing space is planted with edible species ready for the handover phase, which:

crit 13.a Are suitable to the location and season.

crit 13.b Will require low maintenance.

Methodology

Private external space requirements

In the case of a flat or apartment, balconies can be added together to accumulate total amount of private external space. For example: up to two bedroom home would be awarded 3 credits for providing two balconies at 3 m² each, to have total of 6 m².

Compliance Notes

| Criterion Reference | Compliance Note | |
|----------------------|--|--|
| crit 4 | CN1 Communal spaces | Where credits have been awarded for private space or growing space, the area of private or growing space provided cannot contribute towards the area of communal space - this must be provided in addition. For the purposes of this issue only external communal spaces are considered. |
| crit 5 above -crit 6 | CN2 Suitable management and maintenance arrangements | Suitable management and maintenance arrangements can include any of the following: <ol style="list-style-type: none"> The appointment of a management and maintenance company covering 3 years after occupation |

| Criterion Reference | Compliance Note | |
|------------------------|-----------------------------|--|
| | | <ol style="list-style-type: none"> 2. Responsibilities for management and maintenance are agreed with the local authority 3. Responsibilities for management and maintenance are agreed with a community association. |
| crit 8 | CN3 Dedicated growing space | <p>The growing space provided should, where applicable:</p> <ol style="list-style-type: none"> 1. Be a clearly designated growing space, e.g. use of planting or fencing around the perimeter or in the case of communal areas contain signage 2. Ideally be south facing and not in an area that is heavily shaded 3. Contain suitable soil conditions and depths 4. Sheltered from the wind on the perimeter, e.g. trees, hedges or other boundary protection 5. Designed to be accessible to all users, for example through the provision of raised beds 6. Be located near to a rain water collection system, such as a rainwater butt. <p>Growing space can be provided in private plots or in a communal location on the development site. Where communal growing space is provided it should be:</p> <ol style="list-style-type: none"> 1. Located within 500m of the entrance from all homes on site⁽²³⁾. 2. A minimum of 50m² for every 10 homes⁽²⁴⁾. 3. Have clear ownership arrangements, e.g. the communal space is clearly divided into sub plots allocated to homes on the development site. |
| crit 11 | CN4 Expert input | <p>Expert input may be provided by a suitably qualified ecologist or a landscape architect, a representative from a local growing initiative or group or a local wildlife expert (see 04 Ecology on page 23). The expert advice should include:</p> <ol style="list-style-type: none"> 1. Additional design advice relating to compliant growing spaces. 2. Species suitable for initial planting, taking account of the local weather and soil conditions. 3. How growing space can complement the biodiversity within the area, for example providing additional habitat. <p>Where expert input has been provided by a suitably qualified ecologist or a local wildlife expert complete BF1678, Section B Comprehensive route Part 1 and Section B Foundation route respectively.</p> |
| crit 13 | CN5 Low maintenance | <p>Low-maintenance plants can survive in the local conditions with minimal external input. For example where:</p> <ol style="list-style-type: none"> 1. Little or no watering is required outside of natural rainfall 2. They can withstand local wind speeds 3. Little or no pruning is required 4. Minimal physical exertion is needed to obtain the harvest. <p>Some examples of low maintenance crops that may be appropriate include apple trees, tomato plants and, strawberry plants etc.</p> |
| crit 4-crit 6 and crit | CN6 Phased or development | See Appendix D - Post-construction stage assessment issue exceptions |

| Criterion Reference | Compliance Note | |
|---------------------|-------------------|--------------|
| 8-crit 13 | of multiple homes | on page 243. |

Evidence

| Criterion Reference | Title | Design Stage | Post Construction Stage |
|---------------------|--|---|---|
| crit 2-crit 13 | 01 General Evidence | One or more of the appropriate evidence types listed in Appendix C - HQM evidence requirements on page 236 can be used to demonstrate compliance with these criteria. | |
| crit 7 | 02 Consultation outputs | Documentary evidence of the consultation process, including the content and the findings from this. | Written confirmation from the designer. |
| crit 11 | 03 BF1678 - Guidance for relating an ecology survey to the Home Quality Mark | Where expert input has been provided by a suitably qualified ecologist or a local wildlife expert, a completed version of BF1678 - Guidance for relating an ecology survey to the Home Quality Mark, Section B Comprehensive route Part 1 and Section B Foundation route respectively, must be submitted. | |

Checklists, Tables & Illustrations

None.

Definitions

Close proximity

For the purposes of this issue, close proximity is defined as a location no more than 100m from the main entrance to the home (communal entrance of the building for an apartment block) via a safe pedestrian route.

Communal space

Space that is accessible to the occupants of several homes and clearly associated with the development. Each individual space contributing to the total area of communal space should be over 50m².

Growing space

For the purposes of HQM growing space can be considered as any one or more of the following:

- Allotments
- Community gardens or community orchards
- Roof top growing space
- Raised beds dedicated for growing food (this is a particularly useful approach where the soil conditions are poor as they can be artificially filled with good quality soil)
- Greenhouse or polytunnel
- Intensive green roofs and walls

Intensive green roofs

Intensive green roofs are designed to be accessible for food growing. Intensive green roofs will require deeper soil levels to support shrubs, perennials and even trees. Beds for growing can be incorporated into the roof at the time of design and construction or they can be added as containers after construction. Loading capacity for green roofs should be addressed at the design stage⁽²⁵⁾.

Private space

Space that is accessible only to the occupants of an individual home and is accessible directly from an entrance to the home.

Recreational Spaces

For the purpose of HQM public recreational spaces can include the following where they over 1 hectare in size and are within 1km of the home via safe pedestrian route:

1. Green park spaces - an area of grass, trees, or other vegetation set apart for recreational or aesthetic purposes and that is publicly owned and allows public access during the hours of daylight.
2. Woodland
3. Nature reserves, SSSI etc.

OR The following where they are within 650m of the home:

1. Play park
2. Sports fields
3. Tennis courts⁽²⁶⁾

Safe pedestrian routes

Pedestrian routes on the development site, within control of the developer are deemed to be safe and accessible for all pedestrian users (including people with disabilities, the elderly and children), where they take into account physical limitation of those who may use them, for example providing steps appropriately supported by sloped access and dropped curbs positioned at crossing points. These routes and associated spaces are appropriately sized, with good visibility of the route ahead. Alongside these principles they should also meet the following requirements:

1. Where required, lighting design must be in accordance with BS 5489-1:2013 Lighting of roads and public amenity areas⁽²⁷⁾ (rural areas are exempt from this requirement).
2. At crossing points there must be appropriate pedestrian crossings (e.g. zebra or pelican crossings) in place or a clear line of sight for at least 50m in each direction on roads with a 30mph speed limit or 100m in each direction on roads with a speed limit of greater than 30mph).
3. On roads with a speed limit of 30mph (or higher) there is a clearly defined footpath.
4. All footpaths provided should be at least 900mm wide. In rural areas, on single track roads, a grass verge is acceptable in place of a footpath.
5. In clearly defined home zones, it is acceptable for the pedestrian's routes to use the road.

Pedestrian routes that are outside of the development site and therefore not within the control of the developer do not need to meet the above requirements, however it must be demonstrated that there is a pedestrian route, which is not shared with vehicular traffic, from the site boundary to the transport node (e.g. via pavements, footpaths, pedestrian crossings). The route shall be signposted.

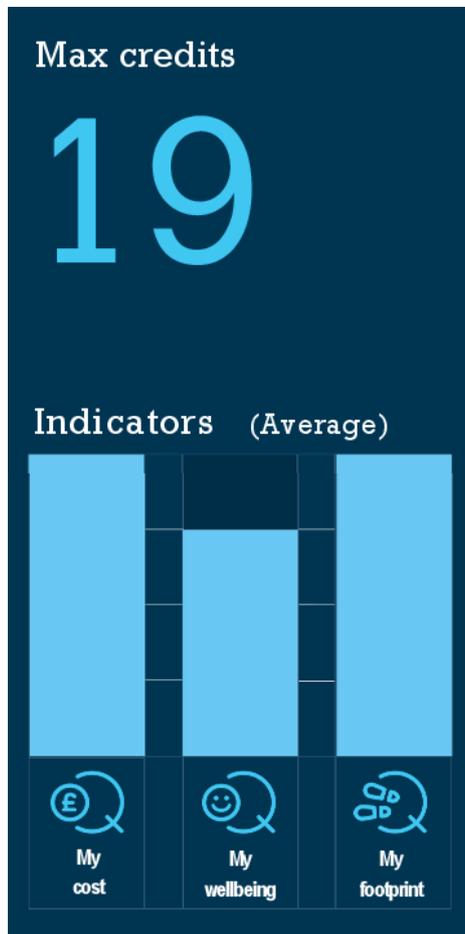
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SAFETY AND RESILIENCE

This section discusses the following.

| | |
|---|-----------|
| 06 Flood Risk | 32 |
| 07 Managing the Impact of Rainfall | 38 |
| 08 Security | 45 |

06 FLOOD RISK



Aim

To reduce the risk of flooding for occupants and neighbours through the consideration of location, master-planning and design of new homes.

Benefit

- Encourages measures to protect the home to reduce the cost impact if a flooding event does occur and potentially increase attractiveness and value of the home.
- Helps protect the environment against the risk of pollution arising from the release of harmful substances found in the home during a flood event.

Context

In the winter months of 2013/2014 severe weather across the UK resulted in widespread flooding, during which thousands of households were impacted and claims are expected to be around £427.5 million (28). The Met Office has predicted that under future climate change projections, the UK may see an increase in flood risk from various sources including precipitation, rivers, drains and rising ground water’.

The best way to prevent flooding is to locate housing developments in areas with a low risk of flooding. However, land availability coupled with the current demand to provide more housing may make this impractical. In these scenarios, installation of appropriate surface water management flood resistance and resilience measures is the key to reducing the environmental, social and economic impact of a flooding event. Designing-in these measures can help reduce the impact of a flooding event and the need for costly remedial or retrofit works.



Credit Summary

| Criterion number | Title | Credits |
|-------------------------|-----------------------------------|---------------------|
| crit 1 | 01 Home information | Minimum requirement |
| crit 2-crit 5 | 00 Flood Risk Assessment | Minimum requirement |
| | 02 Flood Consequence Assessment | Minimum requirement |
| crit 6-crit 9 | 03 Flood risk (follow 03A or 03B) | up to 19 credits |
| crit 7 | 03A Low risk | for 19 credits |
| crit 8-crit 9 | 03B Medium or high risk | for 17 credits |
| Total credits available | | 19 |

Criteria

01 Home information Minimum requirement

crit 1 Home information needs to be provided as part of or all of the criteria in this issue. Please see 33 Home Information.

For England and Scotland:

00 Flood Risk Assessment Minimum requirement

crit 2 A site-specific flood risk assessment (FRA) is undertaken in accordance with current best practice national planning guidance. The flood risk assessment (FRA) must take all current and future sources of flooding into consideration.

crit 3 The flood risk of the new home is communicated to the purchaser of the home before they make a decision on whether to buy the home

For Wales:

02 Flood Consequence Assessment Minimum requirement

crit 4 A site-specific flood consequence assessment (FCA) is undertaken in accordance with current best practice national planning guidance. The flood consequence assessment must take all current and future sources of flooding into consideration.

crit 5 The flood risk of the new home is communicated to the purchaser of the home before they make a decision on whether to buy the home

03 Flood risk (follow 03A or 03B) upto19 credits

crit 6 Where a site-specific flood risk assessment (FRA) flood consequence assessment (FCA) confirms the development site is situated in a flood zone that is defined as having a low annual probability of flooding (Table 6 on page 36) from all sources of flooding (in accordance with current best practice national planning guidance). The flood risk assessment flood consequence assessment must take all current and future sources of flooding into consideration.

03A Low risk for 19 credits

crit 7 Where a site-specific flood risk assessment (FRA) flood consequence assessment (FCA) confirms the development site is situated in a flood zone that is defined as having a low annual probability of flooding (Table 6 on page 36) from all sources of flooding (in accordance with current best practice national planning guidance). The flood risk assessment flood consequence assessment must take all current and future sources of flooding into consideration.

03B Medium or high risk for 17 credits

crit 8 Where a site-specific flood risk assessment flood consequence assessment confirms the development site is situated in a flood zones by country that is defined as having a medium or high annual probability of flooding and is not in a functional flood plain (in accordance with current best practice national planning guidance). The flood risk assessment flood consequence assessment must take all current and future sources of flooding into consideration.

crit 9 To increase the resilience and resistance of the development to flooding, one of the following must be achieved:

crit 9.a: The ground level of all habitable parts of the home and access to both the site and homes, are designed so that they are at least 600mm threshold above the design flood level of the flood zone by country in which the development site is located

crit 9.b: The final design of the building and the wider site reflects the recommendations made by an appropriately qualified professional in accordance with BS 85500:2015(29).

Methodology

None.

Compliance Notes

| Criterion Reference | Compliance Note | |
|---------------------|--|---|
| crit 6-crit 9 | CN1 Alternative standards and recommendations from an appropriate statutory body | <p>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 (this includes a recommendation given by the statutory body even where such a recommendation cannot be or is not statutorily enforced).</p> <p>Where the local authority (or other statutory body) has set more rigorous criteria than those above, these must be met in order to achieve the relevant credits.</p> |
| crit 6-crit 8 | CN2 Existing flood resilience measure | <p>In an area protected by existing flood resilience measures (designed to withstand a certain magnitude of flooding) the appropriate number of flood risk credits can be awarded where the resilience measures reduce the risk to 'low' or 'medium' and the following condition is met:</p> <p>The relevant agency confirms that, as a result of such resilience measures, the risk of a flood event occurring from a particular source is reduced to low or medium risk. If firm confirmation is not provided then the credits cannot be awarded.</p> <p>Please note that flood risk from all sources must be 'low' or 'medium' for credits to be awarded.</p> <p>A statutory body's local or regional office may be able to provide more information on existing resilience measures in the area in which the assessed development is located.</p> |
| crit 6-crit 8 | CN3 Third party defences | <p>There are many landscape features that are owned by third parties and which act as a flood defence by default, e.g. embankments carrying a road or railway, walls etc. For some, such as embankments and unless the assessor or project team have reason to believe otherwise, it can be assumed that they will remain in place and intact for the lifetime of the development.</p> <p>For others, such as walls, or where there may be other doubts, seek assurance that they have a design life and remaining service life expectancy at least equal to that of the homes.</p> |
| crit 6-crit 8 | CN4 Level of detail required in the FRA for smaller sites | <p>For developments of less than 1 ha (10,000m²), the level of detail required in an acceptable FRA will depend on the size and density of build. This will range from a brief report for small, low-density developments, to a more detailed assessment for a high-density development of 2000-10,000m².</p> |

| Criterion Reference | Compliance Note | |
|---------------------|---|---|
| | | <p>For example, for very small developments (2000m² and less), an acceptable FRA could be a brief report carried out by the contractor's engineer confirming the risk of flooding from sources of flooding, including information obtained from the Environment Agency, water company or sewerage undertaker, other relevant statutory authorities, site investigation and local knowledge.</p> <p>Where a site is located in an area that has critical drainage problems (as notified to the local planning authority by the Environment Agency), this compliance note is not applicable and a full Flood Risk Assessment must be completed where credits are sought.</p> |
| crit 4-crit 9 | CN5 Functional flood plain | <p>Credits for locating the assessed development in a flood zone of 'medium or high annual probability' cannot be awarded where the homes are located in the functional flood plain.</p> <p>A functional flood plain is defined in the current best practice national planning guidance. If the building being assessed is, or has been, defined as a 'water-compatible development', confirmation should be provided from the local planning authority that they are satisfied with the proposals before credits can be awarded.</p> |
| crit 9 | CN6 600mm threshold | <p>It is accepted that for homes located in medium and high risk flood zones, areas of the car park and site access may be allowed to flood and therefore fall below the 600mm threshold. In such cases credits are still achievable provided one safe access route to the site and the ground floor of the habitable parts of the home can be maintained (i.e. they are 600mm above the design flood level) to ensure the homes and the site do not become an 'island' in the event of a flood.</p> <p>Where the development has been permitted and the ground levels of the topography and infrastructure immediately adjacent to the development site fall below the 600mm threshold, credits can still be awarded, provided there are no other practical solutions for access to the site above this level, and the assessed homes (and access to them) on the development site meet 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.</p> |
| crit 9 | CN7 Phased or multiple home development | See Appendix D - Post-construction stage assessment issue exceptions on page 243. |

Evidence

| Criterion Reference | Title | Design Stage | Post Construction Stage |
|---------------------|---------------------|--------------|---|
| All | 01 General Evidence | | One or more of the appropriate evidence types listed in Appendix C - HQM evidence requirements on page 236 can be used to demonstrate compliance with these criteria. |

Checklists, Tables & Illustrations

Table 6 Flood zone 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 HQM assume upper probability of flooding no greater than that specified for England Zone 2. | 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—* *for the purposes of HQM assume the same lower and upper probability of flooding as that specified for England Zone 3a. Zone C2—* *for the purposes of HQM assume the same as that for England Zone 3b. | Medium to high risk areas Annual probability of watercourse, tidal or coastal flooding: greater than 0.5% (1:200). |

Please note: Northern Ireland PPS15 does not categorise flood risk zones and there are no similar publicly available flood maps covering Northern Ireland (NI). Assessments in NI will therefore need to rely on site-specific flood risk assessment (FRA), or other relevant data or surveys, to determine the extent of flood risk for a specific development, and use the same definitions as those outlined for England. The Northern Ireland Department of Environment or Rivers Agency may offer further advice or recommendations in this respect www.doeni.gov.uk and www.riversagency.ni.gov.uk

Definitions

Appropriately qualified professional

For the purposes of this issue, a professional or team of professionals with qualifications and experience to recommend relevant site-specific flood prevention measures. Suitable professionals may be found in a variety of disciplines, such as engineering, landscape design or hydrology or a combination.

Where complex flooding calculations and prevention measures are required, this must be a specialist hydrological engineer.

Current best practice national planning guidance

These are current at the time of publication:

- Planning Practice Guidance - Flood Risk and Coastal Changes - England;
- Planning Policy Statement 15 - Northern Ireland;

- Scottish Planning Policy 7 - Scotland; and
- Technical Advice Note 15 - Wales.

Design flood event

A design flood event is a historic or notional flood event of a given annual probability, against which the suitability of a proposed development is assessed and mitigation measures, if any, are designed.

Design flood level

The maximum estimated water level during the design storm event including an allowance for climate change in line current best practice national planning guidance. The design flood level for a site can be determined through either known historical data or modelled for the specific site.

Flood risk assessment (FRA) Flood consequence assessment (FCA)

This is 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 to the site and elsewhere.

A FRA should be prepared according to relevant planning policy and technical guidance documents. The FRA must account for future climate change and detail any necessary adaptation measures where or if required.

Where more than five years have passed since the FRA was carried out, evidence would be required to demonstrate that the basis of the FRA has not changed in that time.

Flood zones by country

See Table 6 on the previous page.

Habitable parts of the home

All spaces (e.g. living and dining rooms, kitchens, bathrooms, bedrooms etc.) that are integral for the occupants to continue living in the home in the event of a flood occurring.

Sources of flooding

The FRA must detail the risk of flooding from the following sources:

1. Streams and Rivers: Flooding that can take place from flows that are not contained within the channel due to high levels of rainfall in the catchment.
2. Coastal or Estuarine: Flooding that can occur from the sea due to a particularly high tide or surge, or a combination of both.
3. Groundwater: Where the water table rises to such a height where flooding occurs. This is most common in low-lying areas underlain by permeable rock (aquifers), usually due to extended periods of wet weather.
4. Sewers and highway drains: Combined, foul or surface water sewers and highway drains that are temporarily overloaded due to excessive rainfall or blockage.
5. Surface water: The net rainfall falling on a surface (on or off the site) which acts as run-off which has not infiltrated into the ground or entered into a drainage system.
6. Infrastructure failure: Canals, reservoirs, industrial processes, burst water mains, blocked sewers or failed pumping stations.

07 MANAGING THE IMPACT OF RAINFALL

Max credits

19

Indicators (Average)

| | | |
|---------|--------------|--------------|
| | | |
| My cost | My wellbeing | My footprint |

Aim

To encourage the management of rainfall from new developments in order to help reduce the risk of flooding, as well as the impact on the local environment and that downstream of the site and improving run-off water quality.

Benefit

- Reduction in costs and disruption through reduced risks of flooding damage to the property and surroundings
- Helps acceptance of new development in the community and improves cohesion.
- Encourages methods to clean run-off, thus protecting the environment against transfer of pollutants found on hard surfaces (e.g. oil).

Context

This issue builds upon the requirements within ‘Sustainable Drainage systems: non-statutory technical standards’, for the design, maintenance and operation of sustainable drainage systems⁽³⁰⁾.

Flooding in the United Kingdom is an increasing occurrence due to a range of factors including; development encroachment in areas prone to flooding, decreasing permeability of the landscape through increased hard surface areas, and increased rainfall. Flooding is likely to become more severe as a result of climate change. Development can impact flood risk through increased run-off especially from hard surfaces. The Met Office has predicted a very significant increase in the incidence of flooding over the next century as a result of climate change⁽³¹⁾.

The rate of run-off has a major impact on the local environment through variations in water levels, flow rates and water quality. More widely, the overall volume of water run-off is a key factor in controlling flooding risks downstream. Passive solutions such as Sustainable Urban Drainage Systems (SuDS) can be used to manage volume and rate of run-off.



crit 6 Any additional predicted volume of run-off for this event is prevented from leaving the site by using infiltration or other sustainable Urban Drainage Systems (SuDS) techniques.

03 Water quality

for 3 credits

crit 7 The water quality credits are only available where at least 3 credits are sought in the comprehensive route.

crit 8 An appropriately qualified professional is appointed to carry out, demonstrate or confirm the development site's compliance with crit 9-crit 11 below.

crit 9 In areas with a low risk source of watercourse pollution, an appropriate level of pollution prevention treatment (See CN9 on page 43) is provided using appropriate sustainable Urban Drainage Systems (SuDS) techniques.

crit 10 Where there is a high risk of contamination or spillage of substances such as petrol and oil (see CN10 on page 43 for a list of areas), separators (or an equivalent system) are installed in surface water drainage systems.

crit 11 All water pollution prevention systems have been designed and installed in accordance with the recommendations of documents such as relevant industry best practice or where applicable the SuDS manual⁽³²⁾.

04 Designing for maintenance and operation

for 2 credits

crit 12 Agreements put in place for the ownership, long term operation and maintenance of all SuDS for the design life of the development.

Methodology

Calculations

Calculating peak rate of run-off

Peak rate of run-off calculations should be carried out for the range of storm durations up to and including the 6 hour 1-year and 100-year return period storm events. The peak rate of run-off for the storm event will then be the 'worst case' run-off rate for the range of storm durations. Calculations should include an allowance for climate change; this should be made in accordance with current best practice national planning guidance.

Key publications that should be referred to for guidance on calculating the peak rate of run-off include:

1. The SuDS Manual
2. Preliminary rainfall run-off management for developments
3. National planning policy guidance or statement for the specific country
4. IH Report 124, Flood estimation for small catchments (Marshall and Bayliss, 1994)
5. Flood Estimation Handbook (Centre for Ecology and Hydrology, 1999)

Greenfield sites of less than 50 ha

The calculation of greenfield run-off rates must be in accordance with IH Report 124, Flood estimation for small catchments (Marshall and Bayliss, 1994). The pro-rata method on the size of catchment detailed in Table 4.2 in The SuDS Manual, CIRIA C697 (2007) must be followed.

Greenfield sites of 50 ha to 200 ha

The calculation of greenfield run-off rates must be in accordance with IH Report 124, Flood estimation for small catchments (Marshall and Bayliss, 1994). Flood Estimation Handbook (Centre for Ecology and Hydrology, 1999) can be used for these sites as an alternative, where there is a preference to do so, but only if the catchment is considered to be suitable for its application.

Greenfield sites of more than 200 ha

The calculation of greenfield run-off rates must be in accordance with the Flood Estimation Handbook (Centre for Ecology and Hydrology, 1999) and any subsequent updates. Where the Flood Estimation Handbook is not considered appropriate for the development, IH Report 124 can be used.

Brownfield sites

The calculation of brownfield run-off rates should be as follows:

- If the existing drainage is known then it should be modelled using best practice simulation modelling, to determine the 1-year and 100-year peak flow rates at discharge points (without allowing surcharge of the system above cover levels to drive greater flow rates through the discharge points)
- If the system is not known, then the brownfield run-off should be calculated using the greenfield run-off models described above but with Soil Type 5.

Calculating volume of run-off

Refer to Chapter 4, Section 4.5.5 of The SuDS Manual (CIRIA C697, 2007) for guidance on calculating the additional volume of run-off created by the development for the 1 in 100 year, 6 hour storm event. Calculations should include an allowance for climate change; this should be made in accordance with current best practice national planning guidance.

Calculating the reduction in impermeable area

1. Calculate the surface area within the development site pre-development and post-development which does not allow water to pass into the ground.

2. Calculate the reduction in impermeable area:

$$\frac{\text{pre-development impermeable area} - \text{post-development impermeable area}}{\text{pre-development impermeable area}} \times 100$$

Scope of assessment

Development Site

There are a number of options for assessment:

1. The individual home and its associated hardstanding areas can be assessed independently where the run-off is being dealt with on a home-by-home basis (i.e. each home has its own dedicated sub-catchment that serves only that home).
2. Where assessing groups of homes within a larger development, the drainage assessment must incorporate the local sub-catchment serving all of those homes and there must be a single drainage strategy for all the homes within the group.
3. Where assessing the run-off from a larger site consisting of a number of non-residential buildings or homes, the assessment must take into account the drainage from the local sub-catchment serving all those non-residential buildings or homes. Note that proportioning cannot be used to calculate the percentage of run-off discharging into the local sub-catchment resulting from just the assessed homes.
4. Where highways form part of development site, refer to Highways that form part of development site

Highways that form part of development site

The following guidance should also be used where applicable:

1. Where new non-adoptable highways are built, all of the area of the highway must be included in the development site area.
2. Where homes are built beside existing highways or where adoptable highways are built that are part of development site, the area of the highway does not need to be included in the development site area.
3. Where the drainage serving both the adoptable or non-adoptable highway (be it existing or new) and housing combines before leaving the site boundary, it is not regarded as an 'adoptable' highway for the purposes of this scheme. In this instance the development site area must include the highway.

The same development site area must be consistently used throughout the issue when completing the assessment of this issue.

Compliance Notes

| Criterion Reference | Compliance Note | |
|---------------------|---|---|
| crit 2-crit 6 | CN1 Discharges directly to a tidal estuary or the sea | <p>crit 2-crit 6 on page 40 can be deemed to be met and 12 credits achieved by default if the site discharges rainwater directly to a tidal estuary or the sea.</p> <p>The site must discharge run-off directly into the Tidal estuary or the sea, if these criteria are to be awarded by default. Typically, this would mean that drainage pipes would only carry run-off from the site and that they would not need to cross privately owned land outside the boundary of the development before reaching the sea. Please see Tidal estuary on page 44.</p> |
| crit 2-crit 6 | CN2 Discharges directly to a surface water body | <p>Where the drainage system discharges directly to a surface water body (e.g. reservoir) that can accommodate uncontrolled surface water discharges without any impact on flood risk from that surface water body, crit 2-crit 6 on page 40 can be deemed to be met and 12 credits are achieved by default. Typically, this would mean that drainage pipes would only carry run-off from the site and that they would not need to cross privately owned land outside the boundary of the development before reaching the surface water body.</p> <p>Where this compliance note is used to demonstrate compliance, please contact BRE Global Ltd with the details of your chosen solution to demonstrate compliance before proceeding.</p> |
| crit 4 | CN3 Peak rate of run-off | <p>Where the pre-development or greenfield peak rate of run-off for the site would result in a requirement for the post-development flow rate to be less than 5L/s at a discharge point, a flow rate of up to 5L/s may be used where required to reduce the risk of blockage.</p> |
| crit 4-crit 6 | CN4 Derelict Sites | <p>If the site has been derelict for over five years, the Appropriate Consultant must assess the previous drainage network and make reasonable assumptions to establish probable flow rates and volumes. To do this they should use best practice simulation modelling, to determine the 1-year and 100-year peak flow rates at the relevant discharge points. To complete the calculations, a site visit prior to development will be required unless accurate data already exist from a previous survey. The resultant professional report can then be used to determine the pre-development volumes and rates of run-off. Without this professional input, the site must be deemed greenfield pre-development, assuming Soil Type 5 for the calculation of the pre-development site run-off.</p> |
| crit 4-crit 11 | CN5 Sustainable Urban Drainage Systems (SuDS) | <p>Where SuDS are specified, they should be designed in accordance with the CIRIA SuDS manual.</p> |
| crit 4-crit 11 | CN6 Alternative standards set by a statutory body | <p>Where a statutory body (or local authority) has set more or less onerous requirements or equivalent alternative requirements, these requirements must be met in order to achieve the relevant credits.</p> <p>Below are examples of standards set by statutory bodies:</p> <ol style="list-style-type: none"> 1. Minimum flow rate or maximum storage requirement set by the statutory body: Where the statutory authority has exercised their statutory powers and set specific minimum flow rate and maximum storage requirements that are less onerous than the specific rate of run-off standard, the statutory requirements will take precedent over the rate of |

| Criterion Reference | Compliance Note | |
|---------------------|---|--|
| | | run-off requirements within this issue. |
| | | 2. Maximum flow rate set by the statutory body: If a maximum flow rate is set that can be discharged, the peak rate of run-off requirement within the rate of run-off requirement will still apply unless the maximum flow rate set is more onerous (lower rate) than the HQM. |
| | | In both the above examples, all other criteria will still be applicable. Evidence should be provided to confirm that this is the case and should be formal documentation from the statutory authority. This should include evidence such as planning approvals, conditions or correspondence from a statutory body setting out specific requirements, i.e. sewerage undertaker, Environment Agency etc. |
| | | For guidance where alternative standards set by a statutory body are not covered here, please contact HQM technical support. These scenarios will be reviewed on a case-by-case basis. |
| crit 4-crit 11 | CN7 Phased or multiple home development | See Appendix D - Post-construction stage assessment issue exceptions on page 243. |
| crit 5-crit 6 | CN8 Rainwater harvesting | BS 8515 Rainwater harvesting systems: Code of Practice, Annex A (33) should be followed where rainwater harvesting systems are used for stormwater control. To ensure flood risk is not increased if the rainwater harvesting system is, for some reason, not utilised, the exceedance flow route capacity provided in accordance with CIRIA report C635 should ignore the beneficial effect of the rainwater harvesting system. |
| crit 9 | CN9 Appropriate level of pollution prevention treatment | In all cases an appropriately qualified professional should use their professional judgment to determine the most appropriate strategy for minimising watercourse pollution. |
| crit 9-crit 10 | CN10 Areas that are a source of pollution | For the purpose of assessing the watercourse pollution credit, areas that present a risk of watercourse pollution include vehicle manoeuvring areas, car parks, waste disposal facilities, delivery and storage facilities or plant areas. |
| crit 2-crit 6 | CN11 Impermeable area | This includes all areas on the development site that do not allow water to pass into the ground. Impermeable footpaths less than 1.5 m wide which have free drainage to soft landscaped areas on both sides may be excluded. |

Evidence

| Criterion Reference | Title | Design Stage | Post Construction Stage |
|---------------------|-----------------------------------|---|--|
| crit 1-crit 12 | 01 General Evidence | One or more of the appropriate evidence types listed in Appendix C - HQM evidence requirements on page 236 can be used to demonstrate compliance with these criteria. | |
| crit 2 | 02 Impermeable area calculations | Pre-development and post-development impermeable area calculations and change in impermeable area calculation | |
| crit 4- | 03 Rate of run-off calculations | Calculation results for the pre-development, greenfield and post-development peak rate of run-off. | |
| crit 5-crit 6 | 04 Volume of run-off calculations | Calculation results for the pre-development, greenfield and post-development volume of run-off. | |
| crit 12 | 05 Maintenance agreement | No 'specific' evidence applies at Design Stage | Agreements for the ownership, long term operation and maintenance of all specified SuDS. |

Checklists, Tables & Illustrations

None.

Definitions

Appropriately qualified professional

For the purposes of this issue, a professional or team of professionals with the skills and experience to champion the use of SuDS within the overall design of the development at an early stage.

The professional or team of professionals must be capable of understanding the site's particular surface water management needs and opportunities. In addition, they must have knowledge and experience in using SuDS-based solutions to influence the holistic design of a development's drainage system and provide the robust hydraulic design calculations referred to in key guidance documents such as The SuDS manual (CIRIA C697, 2007) and Preliminary rainfall run-off management for developments (EA/Defra, 2007).

Suitable professionals may be found in a variety of disciplines, such as engineering, landscape design or hydrology or a combination.

Geotechnical advisers or specialists may be required for SuDS techniques that allow infiltration.

Current best practice national planning guidance

These are current at the time of publication:

- Planning Practice Guidance - Flood Risk and Coastal Changes- England
- Planning Policy Statement 15 - Northern Ireland
- Scottish Planning Policy 7 - Scotland
- Technical Advice Note - Wales.

Discharge point

The discharge point is the point at which the run-off from the site leaves the site boundary and enters a watercourse.

Greenfield run-off rate

The rate of run-off that would occur from the site in its undeveloped and therefore undisturbed state.

Greenfield volume of run-off

The volume of run-off that would occur from the site in its undeveloped and therefore undisturbed state.

Pre-development

The state of the site under assessment immediately prior to purchase of the site by the client or developer (or, where the client has owned or occupied the site for a number of years, its current state).

Treatment

Improving the quality of water by physical, chemical or biological means.

Tidal estuary

A tidal estuary is defined as a semi-enclosed coastal body of water which has a free connection with the open sea and within which seawater is measurably diluted with fresh water derived from land drainage. An estuary should be unconstrained tidal waters, i.e. there should be no barriers or constricted shorelines that would restrict the free flow of water into the open sea in any conditions. The impact on the total volume of run-off from the site (and other sites which may in future discharge into the estuary) should be insignificant in terms of the overall water levels in the estuary. Tidal rivers (i.e. where no or limited measurable seawater content is present during normal tidal movements) cannot be included as part of the estuary for the purposes of HQM.

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.

Volume of run-off

The volume of run-off that is generated by rainfall occurring on the site. This is typically measured in cubic metres. Additional predicted volume of run-off is the difference between the volumes of run-off; pre-development, greenfield and post development.

08 SECURITY

Max credits

9

Indicators (Average)

| Indicator | Relative Value (Average) |
|--------------|--------------------------|
| My cost | High |
| My wellbeing | Very High |
| My footprint | Low |

My cost My wellbeing My footprint

Aim

To promote the design of developments where people feel safe and secure, and where crime and the fear of crime does not undermine quality of life or community cohesion.

Benefit

- Reduce the costs and disruption associated with crime for the occupiers.
- Improve the health and wellbeing of the occupiers by limiting stress from the fear of crime.
- Help limit costs for the police.

Context

Feelings of safety and security are essential to successful, sustainable communities. Freedom from crime and the fear of crime has a major impact on the quality of life.

The Crime Survey for England and Wales (CSEW) shows the likelihood of being a victim of crime has fallen considerably over time; around 14 in 100 adults were victims in the latest survey year (ending June 2017) compared with around 24 in 100 adults a decade ago (in the survey year ending March 2007)

In Scotland, property crime is measured by the Scottish Crime and Justice Survey (SCJS) which involves theft or damage to personal or household property (including vehicles). In 2014-15, it is estimated that around 13% of adults in Scotland were a victim of property crime.

For Scotland:

This issue builds upon the requirements of Technical Handbook 2016 Domestic - Safety (Section 4.13 Security).

For England:

This issue builds upon the requirements of Approved Document Q-Security-Dwellings⁽³⁴⁾. The approved document sets out reasonable standards for doors and windows to resist physical attack by a casual or opportunist burglar by being both sufficiently robust and fitted with the appropriate hardware. This issue takes into account a wider scope.



Credit Summary

| Criterion number | Title | Credits |
|-------------------------|-----------------------------------|---------------------|
| crit 1 | 01 Home information | Minimum requirement |
| crit 2 | 02 Approved document Q compliance | Minimum requirement |
| crit 3 | 03 Security needs assessment | prerequisite |
| crit 4-crit 5 | 01 Home information | for 9 credits |
| Total credits available | | 9 |

Criteria

01 Home information **Minimum requirement**

crit 1 Home information needs to be provided as part of or all of the criteria in this issue. Please see 34 Home Information on page 206.

For Wales:

02 Approved document Q compliance **Minimum requirement**

crit 2 Approved Document Q (England) must be complied with.

03 Security needs assessment **prerequisite**

crit 3 A Suitably Qualified Security Specialist (SQSS) conducts an evidence-based Security Needs Assessment (SNA) during or prior to Concept Design (RIBA Stage 2 or equivalent).

04 Security features **up to 9 credits**

crit 4 The Suitably Qualified Security Specialist (SQSS) develops a set of recommendations or solutions during or prior to Concept Design (RIBA Stage 2 or equivalent). These recommendations or solutions aim to ensure that the homes, and external areas within the site's boundary are designed and specified to address the issues identified in the preceding SNA.

crit 5 The recommendations or solutions proposed by the Suitably Qualified Security Specialist (SQSS) are implemented (see CN2 below):

Table 8 Percentage of recommendation implemented

| Percentage of recommendations implemented | Credits |
|---|---------|
| 50 | 4 |
| 100 | 9 |

Methodology

None.

Compliance Notes

| Criterion Reference | Compliance Note | |
|---------------------|----------------------------------|--|
| crit 3-crit 4 | CN1 Late consultation with SQSS. | Where a SQSS was consulted at a later stage than RIBA stage 2, these credits may still be achievable. If the SQSS confirms that the implementation of security measures have not been restricted, impaired or are possible as a result of their later involvement (i.e. everything that would have been recommended can still be implemented), then the credits can still be awarded (provided all other compliance requirements are met). |
| crit 5 | CN2 Implementing | When confirming whether the recommendations or solutions set out |

| Criterion Reference | Compliance Note | |
|---------------------|---|--|
| | recommendations or solutions | by the SQSS have been implemented at the post construction stage, it may be necessary for the HQM Assessor to use one or more of the following evidence types, supplied by the design team: Desk-based evidence, e.g. manufacturer's literature or certificates etc. Site-based evidence, e.g. site inspection report or photographs etc. |
| crit 4 | CN3 Recommendations made by a SQSS | Where a facility or function (required by the design brief, local authority and other parts of HQM) increases the security risk, the recommendations from a SQSS should seek to reduce the security risk but without significantly diminishing the facility or function. There shall be no recommendation to remove a facility or function. e.g. if an allotment forms part of the design brief, the SQSS should not recommend it is removed or significantly diminished on the basis that it may be a security risk. They should instead make recommendations to improve the security of the allotment. |
| crit 5 | CN4 Phased or multiple-home development | See Appendix D - Post-construction stage assessment issue exceptions on page 243. |

Evidence

| Criterion Reference | Title | Design Stage | Post Construction Stage |
|---------------------|---------------------|--------------|---|
| crit 3 | 01 General Evidence | | One or more of the appropriate evidence types listed in Appendix C - HQM evidence requirements on page 236 can be used to demonstrate compliance with these criteria. |

Checklists, Tables & Illustrations

None.

Definitions

Architectural Liaison Officer (ALO)

An ALO is the same as the Crime Prevention Design Advisor and is the title given to the same role in some police forces, www.securedbydesign.com.

Crime Prevention Design Advisor (CPDA)

A Crime Prevention Design Advisor is a specialist crime prevention officer, trained at the Home Office Crime Reduction College, who deals with crime risk and designing out crime advice for the built environment. In addition to physical security measures, the officer will consider defensible space, access, crime and movement generators, all of which can contribute to a reduction in crime and disorder, www.securedbydesign.com.

Designing Out Crime Officer (DOCO)

A DOCO was previously known as an ALO or CPDA, www.securedbydesign.com.

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 and Community Safety Group and other Government Departments. The Association of Chief Police Officers for England, Wales and Northern Ireland (ACPO) and the Association of Chief Police Officers for Scotland (ACPOS) endorse and support the Secured by Design programme.

Security Needs Assessment (SNA)

The project and site-specific assessment of security needs, including:

1. A visual audit of the site and surroundings, identifying environmental cues and features pertinent to the security of the proposed development.

2. Formal consultation with relevant stakeholders, including the local ALO, CPDA & CTSA (as applicable), in order to obtain a summary of crime and disorder issues in the immediate vicinity of the proposed development. Crime data are also publicly accessible at www.police.uk.
3. Identify security risks specific to the proposed development and its inhabitants or users.
4. Identify any detrimental effects the development may have on its surroundings and the existing community.

The purpose of the assessment is to aid decision-making and allow the identification and evaluation of security recommendations or solutions. Secured by Design may help the SQSS when developing the recommendations or solutions addressing the issues raised in the SNA. Any deviation from those recommendations shall be justified, documented and agreed with a suitably qualified security specialist.

Suitably Qualified Security Specialist (SQSS)

An individual achieving any of the following can be considered to be 'suitably qualified' for the purposes of compliance with HQM:

1. Crime Prevention Design Advisors (CPDA), Designing Out Crime Officers (DOCO) or Architectural Liaison Officers (ALO), or
2. A specialist registered with a HQM-recognised third party accreditation scheme for security specialists, or
3. A practising security consultant who meets the following requirements:
 - a. Minimum of three years relevant experience within the last five years. This experience must clearly demonstrate a practical understanding of factors affecting security in relation to construction and the built environment, relevant to the type and scale of the project being undertaken.
 - b. Hold a suitable qualification relevant to security.
 - c. Maintains (full) membership to a relevant professional body or accreditation scheme that meets the following:
 - i. Has a professional code of conduct, to which members must adhere; and
 - ii. ongoing membership is subject to peer review.

When appointing the suitably qualified security specialist, consideration should be given to the appropriateness of the individual to carry out the security needs assessment, based on the size, scope and security needs of the development.

Organisations, associations or scheme operators who wish to have their membership recognised as a 'third party accreditation scheme for security specialist's, should review their current status (and therefore their members) against the requirements above and, where they feel they are compliant, contact BRE Global with the relevant information or evidence.

Approved Document Q

Approved Document Q covers the standards for doors and windows to resist physical attack by a burglar. It includes standards on being both sufficiently robust and fitted with appropriate hardware. The approved document gives guidance for compliance with the Building Regulations for building work carried out in England. It also applies to building work carried out on excepted energy buildings in Wales as defined in the Welsh Ministers (Transfer of Functions)(No. 2) Order 2009.

MY HOME

This section discusses the following.

| | |
|--|------------|
| Comfort | 50 |
| 09 Indoor Pollutants | 51 |
| 10 Daylight | 59 |
| 11 Internal and External Noise | 64 |
| 12 Sound Insulation | 72 |
| 13 Temperature | 77 |
| 14 Ventilation | 83 |
| Energy and Cost | 89 |
| 15 Energy and cost | 90 |
| 16 Decentralised Energy | 100 |
| 17 Impact on Local Air Quality | 105 |
| Materials | 109 |
| 18 Responsible sourcing of construction products | 110 |
| 19 Environmental Impact from Construction Products | 119 |
| 20 Life Cycle Costing of Construction Products | 129 |
| 21 Durability of Construction Products | 132 |
| Space | 137 |
| 22 Drying Space | 138 |
| 23 Access and Space | 141 |
| 24 Recyclable Waste | 145 |
| Water | 149 |
| 25 Water Efficiency | 150 |

COMFORT

This section discusses the following.

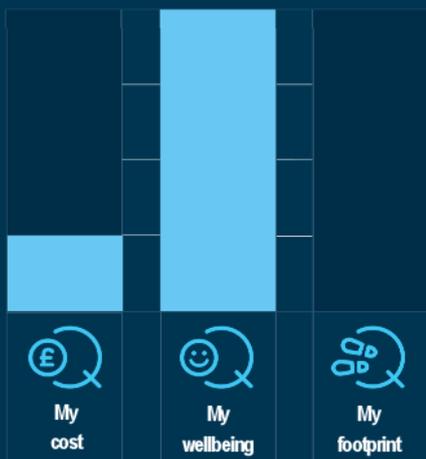
| | |
|---|-----------|
| 09 Indoor Pollutants | 51 |
| 10 Daylight | 59 |
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| 12 Sound Insulation | 72 |
| 13 Temperature | 77 |
| 14 Ventilation | 83 |

09 INDOOR POLLUTANTS

Max credits

12

Indicators (Average)



Aim

To maximise occupant comfort and minimise detrimental impacts on health arising from indoor air pollutants emitted from the building and its materials.

Benefit

- Reduce the risk of pollutants emitted from a new home adversely affecting an occupant's health and wellbeing.
- Raise awareness of indoor pollutants to occupants, so they can make better choices with building materials, decorative products, furnishings, cleaning products etc.

Context

Building materials, coatings and furnishings are significant sources of indoor air pollution, in particular, formaldehyde and volatile organic compounds (VOCs). A wide range of VOCs can be emitted from building materials, especially during the first two years of a new building (35). The amount of pollution emitted into indoor air can be reduced by selecting building materials, coatings and furnishings with low pollutant content and low emission performance.

Household products (e.g. air fresheners, cleaning fluids, polishes) and cosmetics (e.g. deodorants, powders, and bathing products) are also potential significant sources of indoor air pollution, but lie outside the scope of the HQM.



Credit Summary

| Criterion number | Title | Credits |
|-------------------------|--|-----------------|
| crit 1 | 01 Minimising emissions from space and water heating | Prerequisite |
| crit 2 | 02 Minimising the effects of cooking | up to 2 credits |
| crit 5 | | |
| crit 6 | 03 Minimising emissions from building product types | up to 4 credits |
| crit 7-crit 8 | 04 Minimising airborne formaldehyde from all sources | for 3 credits |
| crit 9-crit 10 | 05 Minimising airborne TVOCs (total volatile organic compounds) from all sources | for 3 credits |
| Total credits available | | 12 |

Criteria

01 Minimising emissions from space and water heating prerequisite

crit 1 All combustion appliances within a home must have flues that discharge outdoors.

02 Minimising the effects of cooking for 2 credits

Cooker hood

Naturally ventilated homes for 1 credit

crit 2 In each kitchen, a cooker hood is provided that is extractive (discharge air outdoors).

Mechanically ventilated homes

crit 3 In each kitchen, a cooker hood is provided that is re-circulating.

crit 4 Home information needs to be provided as part of this criteria (Please see 33 Home Information)

Cooking fuel for 1 credit

crit 5 Only cooking appliances with zero emissions from the fuel used to indoor air are specified (e.g. electric only appliances).

03 Minimising emissions from building product types up to 4 credits

crit 6 Credits are awarded where building product types meets the emission limits, testing requirements and additional requirements listed within Table 10 on page 56. The quantity of credits awarded is based upon how many building product types within Table 10 meet these requirements, (see Table 9).

Table 9 Quantity of building product types that need to meet the requirements in order to receive credits

| Quantity of building products types | Credits |
|-------------------------------------|---------|
| 1 | 1 |
| 3 | 2 |
| All | 4 |

04 Minimising airborne formaldehyde from all sources for 3 credits

crit 7 The formaldehyde concentration in indoor air is measured post construction (but pre-occupancy) and does not exceed 0.1 mg/m^3 ($100 \text{ } \mu\text{g/m}^3$), averaged over 30 minutes⁽³⁶⁾.

crit 8 Where levels are found to exceed these limits, measures must be undertaken to reduce the formaldehyde levels to within the above limits.

05 Minimising airborne TVOCs (total volatile organic compounds) from all sources

for 3 credits

crit 9 The TVOC concentration in indoor air is measured post construction (but pre-occupancy) and does not exceed 0.3 mg/m³ (300 µg/m³), averaged over 8 hours.⁽³⁷⁾

crit 10 Where levels are found to exceed these limits, measures must be undertaken to reduce the TVOC levels to within the above limits.

Methodology

Minimising emissions from building product types - calculation method

See Table 10 on page 56.

Scope of 'Minimising emissions from building product types'

Only products that are installed or applied in parts of the building where their emissions are likely to affect indoor air quality need to be assessed. For the purposes of this issue, this means any product installed or applied inside of the inner surface of the building's infiltration, vapour or waterproof membrane or, where not present, inside of the inner surface of the building envelope's interior facing thermal insulation layer.

Minimising airborne formaldehyde, and airborne TVOCs, from all sources - calculation method

Measurements should be made after completing the building and before its occupation. Before sampling, rooms should be intensively ventilated for 15 minutes and then outer doors and windows closed for at least 8 hours (or overnight) before sampling begins. This is the responsibility of the owner, developer or builder. The outer envelope of the building should remain closed (all windows, doors, trickle vents and other controllable openings) throughout the sampling process. All internal doors and openings within the building should be opened⁽³⁸⁾.

The indoor temperature must be uniform and at the level expected for occupation for the duration of the test. If necessary, the home should be heated before and during the test to ensure correct operation of the sampling tubes⁽³⁹⁾. Any heating action taken, and the temperature achieved in each location, should be noted in the test report. Active (pumped) sampling tubes for measuring formaldehyde and TVOCs should be placed in the main bedroom and in the main living area, at about head height (1.50m), at least 1m from a wall, and away from known sources of formaldehyde such as particle board or Medium Density Fibre board (MDF).⁽⁴⁰⁾ One sampling tube as a minimum should be placed in each room for each of the formaldehyde and TVOC measurements (i.e. two per room as a minimum if both parameters are being measured).

Sampling for formaldehyde should be in accordance with BS ISO 16000-3⁽⁴¹⁾. Sampling for TVOC should be in accordance with BS EN ISO 16017-1⁽⁴²⁾ or BS ISO 16000-6⁽⁴³⁾.

The sampling tubes should be exposed for an appropriate time and an appropriate flow-rate in accordance with ISO 16000-3, 16000-6 or 16017-1.⁽⁴⁴⁾, then sealed and returned, appropriately labelled, to an accredited laboratory for analysis. Reporting should be in accordance with BS ISO 16000-3⁽⁴⁵⁾, BS ISO 16000-6⁽⁴⁶⁾ or both.

Compliance Notes

| Criterion Reference | Compliance Note | |
|---------------------|---|--|
| crit 7-crit 10 | CN1 Accreditation of organisations performing sampling or laboratory analysis | All organisations used for sampling and analysis of indoor air or for analysis of emissions from building products must be accredited to ISO/IEC 17025 ⁽⁴⁷⁾ with specific accreditation covering: <ol style="list-style-type: none"> 1. Sampling: Pumped sampling for formaldehyde in air; pumped sampling for VOCs in air. 2. Chemical analysis: Determination of formaldehyde; determination of VOCs. |
| crit 6-crit 10 | CN2 Non-VOC emitting products | Inherently non-VOC emitting products such as brick, natural stone, concrete, ceramic tile, glass, metal surfaces, etc. do not need to be |

| Criterion Reference | Compliance Note | |
|---------------------|---|--|
| | | assessed and can be deemed fully compliant with the criteria, unless organic-based coatings, binders, or sealants are used in their production or finishes. |
| crit 6 | CN3 Paints used in wet areas | Evidence must be provided to show that paints used in wet areas protect against mould growth. Evidence could include appropriate test results (e.g. fungal or algal resistance testing) or manufacturer's product information or declaration. There are British standard tests which could be used: BS EN 15457 ⁽⁴⁸⁾ and BS EN 15458 ⁽⁴⁹⁾ . |
| crit 7 and crit 9 | CN4 Representative sampling of indoor air | Representative sampling of indoor air is permitted where there are multiple homes on a site that incorporate the same building products or materials specification. In such cases, at least 1 in 10 homes must be sampled in accordance with the Methodology section. Where there are differences in the size, type, layout or location of homes on a site, the representative sampling must cover each of the different home 'groups' found on the site (e.g. 1-bed apartment, 2-bed mid-terrace, 3-bed semi-detached, 4-bed detached, etc.). The accredited organisation performing the sampling should advise on grouping of homes and the most appropriate homes to sample on a site. |
| crit 6 | CN5 Self-declaration of emission levels from building products | Self-declaration by manufacturers of emission levels from building products is acceptable if testing has been performed by an independent accredited laboratory in accordance with CN1 on the previous page. |
| crit 6 | CN6 Third party certification schemes for emission levels from building products | Third party certification schemes for emission levels from building products can be used as evidence to demonstrate compliance with the criteria. Guidance Note 'GN22: BREEAM Recognised Schemes for VOC Emissions from Building Products' (available to assessors through BREEAM Projects) lists a number of such schemes that have been assessed to show equivalent or better performance than the criteria. If assessors, clients or scheme operators wish to seek recognition of other schemes not currently listed, please contact the HQM office (hqm@bre.co.uk) for details of the application process. |
| crit 7 and crit 9 | CN7 Minimising airborne formaldehyde and TVOCs from all sources (post construction) | Sampling and laboratory analysis should only be performed by organisations accredited to ISO/IEC 17025 ⁽⁵⁰⁾ (see CN1 on the previous page). The two functions may be carried out by different accredited organisations. Measurements should be made after completing the building, but before its occupation following the protocol set out in the Methodology on the previous page section. |
| crit 7 and crit 9 | CN8 Testing requirements for emission limits | The testing requirements for formaldehyde and TVOC emission limits are based on standardised emission test chamber methods. Compliance with the emission limits shall be demonstrated after 28 days in a test chamber or earlier, as stipulated in the relevant testing requirements standard. Compliance may be achieved by alternative means from those in Table 10 on page 56, providing this is agreed in advance by BRE Global. Perforator, flask, desiccator and other extraction based test methods are specifically excluded. The finished product as a whole must meet the emission limits. For example if a wood panel has a finish applied to it in the factory, the finished product would need to be tested and meet the emission limits for wood-based products in Table 11. Testing of individual components that make up the finished product is not required (apart from when the finish is a separate product that is applied on site). |
| crit 6 | CN9 Products used in small quantities for ad hoc purposes | All products specified for a project that fall within one of the product |

| Criterion Reference | Compliance Note | |
|---------------------|--|---|
| | | types listed in Table 10 on the next page must be assessed under this issue. However, it is accepted that it may be difficult to control the specification of some products (e.g. sealants) that are used in small quantities for ad hoc purposes such as ‘making good’. As such, any products used in this way do not need to be assessed for this issue. The HQM assessor should use their judgment to determine whether products being used or intended to be used for ad hoc purposes will be used in significant quantities and therefore need to be assessed for this issue |
| crit 6 | CN10 Furnishings | The scope of the ‘Minimising emissions from building product types’ credits do not extend to furnishings, e.g. desks or shelving; it focuses on the key internal finishes and fittings integral to the building. |
| crit 2 - | CN11 Minimising the effects of cooking-cooker hood | Where a system 2 ventilation system (as defined in Approved Document F (2010)), i.e. passive stack ventilation (PSV) is installed, this credit is not available. |
| crit 4 | | |

Evidence

| Criterion Reference | Title | Design Stage | Post Construction Stage |
|---------------------|--|--|---|
| All | 01 General Evidence | One or more of the appropriate evidence types listed in Appendix C - HQM evidence requirements on page 236 can be used to demonstrate compliance with these criteria. | |
| crit 6 | 02 Emissions from building products | Product emission test results demonstrating appropriate testing methods by an accredited laboratory. Where applicable for paints and varnishes, evidence of protection against mould growth. | |
| crit 7 | 03 Indoor air quality testing for formaldehyde | Refer to 01 General Evidence above | Results of indoor air quality testing for formaldehyde, demonstrating appropriate testing methods by an accredited laboratory. Where representative sampling is undertaken, details of the sampling strategy employed on the site, including any grouping of homes. |
| crit 9 | 04 Indoor air quality testing for TVOCs | Refer to 01 General Evidence above | Results of indoor air quality testing for TVOCs, demonstrating appropriate testing methods by an accredited laboratory. Where representative sampling is undertaken, details of the sampling strategy employed on the site, including any grouping of homes. |
| crit 8 and crit 10 | Remedial measures | Refer to 01 General Evidence above | Written confirmation from the project team of the remedial measures that have been undertaken |

Checklists, Tables & Illustrations

Table 10 Emission criteria by building product type

| Building Product type | Emission limits* | | | Testing requirement | Additional requirements |
|-----------------------------|--|--|--------------------------------|---|---|
| | Formaldehyde | Total volatile organic compounds (TVOCs) | Category 1A and 1B carcinogens | | |
| See CN2 | | | | See CN1 and CN8 | |
| Interior paints & varnishes | 0.06 mg/m ³ | 1.0 mg/m ³ | 0.001 mg/m ³ | BS EN 16402 (51) or BS EN ISO 16000-9 ⁽⁵²⁾ or PD CEN 16516 ⁽⁵³⁾ or CDPH Standard Method v1.1 (54) | Meet TVOC content limits. Paints used in wet areas (e.g. bathrooms, kitchens, utility rooms) should protect against mould growth (see CN3). |
| Wood-based products | 0.06 mg/m ³ (Non-MDF) 0.08 mg/m ³ (MDF) | 1.0 mg/m ³ | 0.001 mg/m ³ | BS EN ISO 16000-9 (55) or PD CEN 16516 ⁽⁵⁶⁾ or CDPH Standard Method v1.1 (57) or BS EN 717-1 (58) (formaldehyde emissions only) | N/A |
| Flooring materials | 0.06 mg/m ³ | 1.0 mg/m ³ | 0.001 mg/m ³ | BS EN ISO 10580 ⁽⁵⁹⁾ or BS EN ISO 16000-9 (60) or | N/A |

| Building Product type | Emission limits* | | | Testing requirement | Additional requirements |
|--|------------------------|--|--------------------------------|--|-------------------------|
| | Formaldehyde | Total volatile organic compounds (TVOCs) | Category 1A and 1B carcinogens | | |
| | | | | PD CEN 16516 ⁽⁶¹⁾ or CDPH Standard Method v1.1 (62) | |
| Ceiling, wall and insulation materials | 0.06 mg/m ³ | 1.0 mg/m ³ | 0.001 mg/m ³ | BS EN ISO 16000-9 ⁽⁶³⁾ or PD CEN 16516 ⁽⁶⁴⁾ or CDPH Standard Method v1.1 (65) | N/A |
| Interior adhesives & sealants (including flooring adhesives) | 0.06 mg/m ³ | 1.0 mg/m ³ | 0.001 mg/m ³ | BS EN 13999 (Parts 1-4) ⁽⁶⁶⁾ or BS EN ISO 16000-9 ⁽⁶⁷⁾ or PD CEN 16516 ⁽⁶⁸⁾ or CDPH Standard Method v1.1 (69) | N/A |

*Compliance with emission limits shall be demonstrated after 28 days in an emission test chamber or earlier as stipulated by the relevant testing requirements standard. The emission rate obtained from the chamber test method must be extrapolated to predict what the concentration would be in the air of the theoretical model or reference room (as detailed in the respective testing standard) and this extrapolated concentration compared with the emission limit in this table. Emission limits are for individual building products and not cumulative for all building products that are part of a building product type group.

Table 11 Maximum TVOC content for paints and coatings

| Product category | Free TVOC content of ready-to-use product (g/l) | Testing requirements (see CN1) |
|--|---|--|
| Interior matt walls and ceilings (Gloss <25@60°) | 10 | ISO 11890-2 or ISO 17895 or Calculation based on the ingredients and raw materials |
| Interior glossy walls and ceilings (Gloss >25@60°) | 40 | |

| | |
|--|-----|
| Interior trim and cladding paints for wood and metal | 90 |
| Interior trim varnishes and wood stains, including opaque wood stains | 65 |
| Interior minimal build wood stains | 50 |
| Primers | 15 |
| Binding primers | 15 |
| One-pack performance coatings | 100 |
| Two-pack reactive performance coatings for specific end use such as floors | 80 |
| Multi-coloured coatings | 80 |
| Decorative effect coatings | 80 |

Definitions

Category 1A and 1B carcinogens

Carcinogenic compounds detectable by the VOC emission testing requirements in Table 10 on page 56 and that are classified as category 1A or 1B carcinogens in accordance with Regulation EC No. 1272/2008 on classification, labelling and packaging of substances and mixtures⁽⁷⁰⁾, which are listed as Carcinogenic VOCs in Annex G.2 of Draft BS EN 16516⁽⁷¹⁾.

TVOC

Sum of the concentrations of identified and unidentified volatile organic compounds eluting between and including n-hexane and n-hexadecane on a gas chromatographic column (a capillary column coated with 5 % phenyl/95 % methyl-polysiloxane)⁽⁷²⁾.

10 DAYLIGHT

Max credits

13

Indicators (Average)

| | | |
|---|---|---|
|  |  |  |
| My cost | My wellbeing | My footprint |

Aim

To promote access to daylight, thereby improving the occupants' quality of life and reducing the amount of energy used to light the home.

Benefit

- Provides mental and physical benefits to the occupier.
- Helps lower energy costs and environmental impact by reducing the need for artificial light and makes the home more attractive to potential occupants.

Context

Evidence indicates that good daylight is one of the most sought-after qualities of a home. Daylight has important health benefits. Exposure to high levels of light during the day aids maintenance of circadian rhythms, especially in elderly people. This improves the quantity and quality of sleep and may benefit the cardiovascular system. Daylight has also been shown to improve mood and reduce depression and stress related symptoms, including seasonal affective disorder (SAD). Daylight provision is often associated with view out, which provides contact with the outside and a further benefit to mood.

HQM awards credits for meeting and improving upon the minimum acceptable average daylight factor suggested in BS 8206-2.



Credit Summary

| Criterion number | Title | Credits |
|-------------------------|--|-----------------|
| crit 1 | 01 Average daylight factor (kitchens) | for 5 credits |
| crit 2 | 02 Average daylight factor (living spaces) | up to 5 credits |
| crit 3 | 03 View of sky | for 3 credits |
| Total credits available | | 13 |

Criteria

01 Average daylight factor (kitchens) for 5 credits

crit 1 All kitchens achieve a minimum average daylight factor of at least 2%.

02 Average daylight factor (living spaces) up to 5 credits

crit 2 Credits will be awarded based upon the minimum average daylight factor achieved for all living rooms, dining rooms and studies (see Table 12 below).

Table 12 Minimum average daylight factors and associated credits

| Minimum average daylight factor | Credits |
|---------------------------------|---------|
| 1.5 % | 1 |
| 1.8 % | 3 |
| 2.0 % | 5 |

03 View of sky for 3 credits

crit 3 80% of the working plane in each kitchen, living room, dining room and study receives direct light from the sky.

Methodology

Calculation procedures

Average daylight factor

The average daylight factor can be calculated using the following equation:

Daylight Factor = $\frac{WF}{(A-R)}$ Where: W = total glazed area of windows or rooflights (not including frames) A = total area of all the room surfaces (ceiling, floor, walls and windows) R = area-weighted average reflectance of the room surfaces M = a correction factor for dirt T = glass transmittance factor θ = angle of visible sky

Guide values for a typical home with light-coloured walls are as follows (for more accurate values, refer to BS 8206 Part 2⁽⁷³⁾):

R = 0.5

M = 0.96 (vertical glazing that can be cleaned easily)

0.88 (vertical glazing with a balcony or overhang above)

0.92 (sloping glazing)

0.88 (horizontal glazing)

T = 0.68 (double glazing with low-emissivity coating)

0.6 (triple glazing)

Calculation procedures for the average daylight factor are detailed in BS 8206 Part 2 and in 'Site layout planning for daylight and sunlight: a guide to good practice'⁽⁷⁴⁾ These publications give a formula for calculating the average daylight factor. It is important that external obstructions are correctly modelled.

As an alternative to using the formula for the average daylight factor, computer simulation software can be used. It should use an overcast sky model with a minimum grid size of 250mm, extending over the whole working plane. Computer simulation is recommended for more complex room geometries, for example those with light shelves or redirecting glazing.

No-sky line

Plotting of the no-sky line or estimating the percentage of the working plane that receives direct light from the sky can be carried out using the equation below, using the guidance in Appendix D - Post-construction stage assessment issue exceptions on page 243, or using specialist computer simulation software.

Step 1:

Plotting of the no-sky line or estimating the percentage of the working plane that receives direct light from the sky can be carried out using the methodology below, where the obstruction is opposite the window. As an approximation, obstructions that are parallel to the window can be considered infinite. The no-sky line will then be parallel to the window at a distance 'd' from the window wall, which can be calculated as follows:

$d = \frac{xy}{y-h}$ Where: h = height of the window head above the working plane (0.85m above the floor) y = height of the obstruction above the window head x = distance from the window to the obstruction

Step 2:

Calculate the percentage (P) of d of the room depth.

$$P = \left(\frac{d}{\text{room depth}} \right) \times 100$$

Any room where $P \geq 80$ meets crit 3

This equation is intended for situations where the external obstruction is wide, directly opposite the window, and parallel to it. It will give worst case results in situations where the external obstruction is directly opposite the window but is discontinuous. It cannot be used where the external obstruction is not parallel to the window (for example an extension next door which projects from the line of the window wall). In these cases the guidance in Appendix D - Post-construction stage assessment issue exceptions on page 243, or specialist computer simulation software, should be used.

Where obstructions are not horizontal, parallel to the window or considered infinite, 'Site layout planning for daylight and sunlight: a guide to good practice' gives a more accurate methodology.

θ Angle of visible sky

The angle of visible sky θ is the angle subtended, in the vertical plane normal to the window, by the visible sky from the centre of the window.

For long obstructions parallel to the window:

Where:

$$\theta = 90 - a - b$$

$$\tan(a) = \frac{H}{D}$$

$$\tan(b) = \frac{T_w}{H_w}$$

H_w = the height of the window

T_w = the thickness of the wall

D = the distance from the window to the obstruction

H = the height of the obstruction above the mid-height of the window

Where external obstructions are of complex geometry and cannot be approximated by a continuous object, it is advisable to use the methodology in 'Site layout planning for daylight and sunlight: a guide to good practice'(BRE 2011). Individual trees can be ignored.

Compliance Notes

| Criterion Reference | Compliance Note | |
|---------------------|---|---|
| crit 1-crit 2 | CN1 Open-plan rooms | <p>Where two or more spaces (e.g. an open plan kitchen-dining-living room) form part of the same room (i.e. no solid partition is present to block the distribution of the daylight), calculate the average daylight factor for the whole room. Where two rooms form part of the same large space (e.g. an open plan kitchen-dining room), as no solid partition is present to block the distribution of the daylight, calculate the average daylight factor for the whole space (i.e. as one room).</p> <p>Credits must be awarded by comparing the average daylight factor for the whole space to the relevant assessment criteria.</p> |
| crit 1-crit 3 | CN2 Site or room level | <p>Calculations for this issue can be completed at either:</p> <ol style="list-style-type: none"> 1. Site level - calculations are completed for a set of selected worst case homes or rooms on the site. Credits are awarded to all homes based on the performance of these worst case rooms (or homes). To identify worst case rooms for the daylight calculation: <ol style="list-style-type: none"> a. Where rooms A and B have the same layout and window, and room A is more heavily obstructed (being on a lower floor, or with a greater angle of obstruction due to a larger or closer building opposite), then if room A complies, room B will too. Where rooms C and D have the same obstruction, room shape and size, but room D has a larger glazed area, then if room C complies, room D will too. Where rooms E and F have the same obstruction and window, but room F has smaller internal area, then if room E complies, room F will too. <p>OR</p> <ol style="list-style-type: none"> 2. Room level - calculations are completed for all relevant rooms on site. Credits are awarded according to the performance of the actual rooms. <p>This decision is left to the design team and is likely to be dependent on the particular site being assessed.</p> |
| crit 1-crit 2 | CN3 Sun pipes | <p>As a general rule, sun pipes should be treated as roof lights, i.e. if there are no obstructions use a θ of 180°. There are a wide range of light pipes on the market with different reflective linings and some include lenses or mirrors etc. If no transmission factor is stated, use $T = 0.5$ for a 1m length pipe and $T = 0.25$ for a 2m length pipe.</p> |
| crit 1-crit 2 | CN4 Two windows facing different obstructions | <p>When two or more windows in a room face different obstructions (e.g. vertical windows and roof lights) or differ in transmittance, the average daylight factor must be calculated separately for each</p> |

| Criterion Reference | Compliance Note | |
|---------------------|--------------------------------|---|
| | | window, and the results summed. |
| crit 1-crit 2 | CN5 Window below working plane | <p>If part of a window lies below the working plane, the average daylight factor for that part of the window must be calculated separately from the part of the window above the working plane.</p> <p>The average daylight factor for the part of the window below the working plane must be calculated and multiplied by an additional correction factor before being added to the average daylight factor for the part of the window above the working plane.</p> <p>The default correction factor is 0.15; Appendix C of 'Site layout planning for daylight and sunlight: a guide to good practice' gives additional correction factors for special situations.</p> |

Evidence

| Criterion Reference | Title | Design Stage | Post Construction Stage |
|---------------------|-----------------------------|---|-------------------------|
| crit 1-crit 3 | 01 General evidence | One or more of the appropriate evidence types listed in Appendix C - HQM evidence requirements on page 236 can be used to demonstrate compliance with these criteria. | |
| crit 1-crit 2 | 02 Daylighting calculations | Daylighting calculations. | |
| crit 3 | 03 View of sky calculations | View of sky calculations. | |

Checklists, Tables & Illustrations

None.

Definitions

11 INTERNAL AND EXTERNAL NOISE

Max credits

4

Indicators (Average)

| | | |
|--|---|---|
|  <p>My cost</p> |  <p>My wellbeing</p> |  <p>My footprint</p> |
|--|---|---|

Aim

To reduce noise disturbance to occupants in internal and external areas of homes by promoting low levels of sound from external noise sources and building services.

Benefit

- Improves health and wellbeing of the occupants
- Reduces costs to the local authority by reducing complaints
- Helps community cohesion

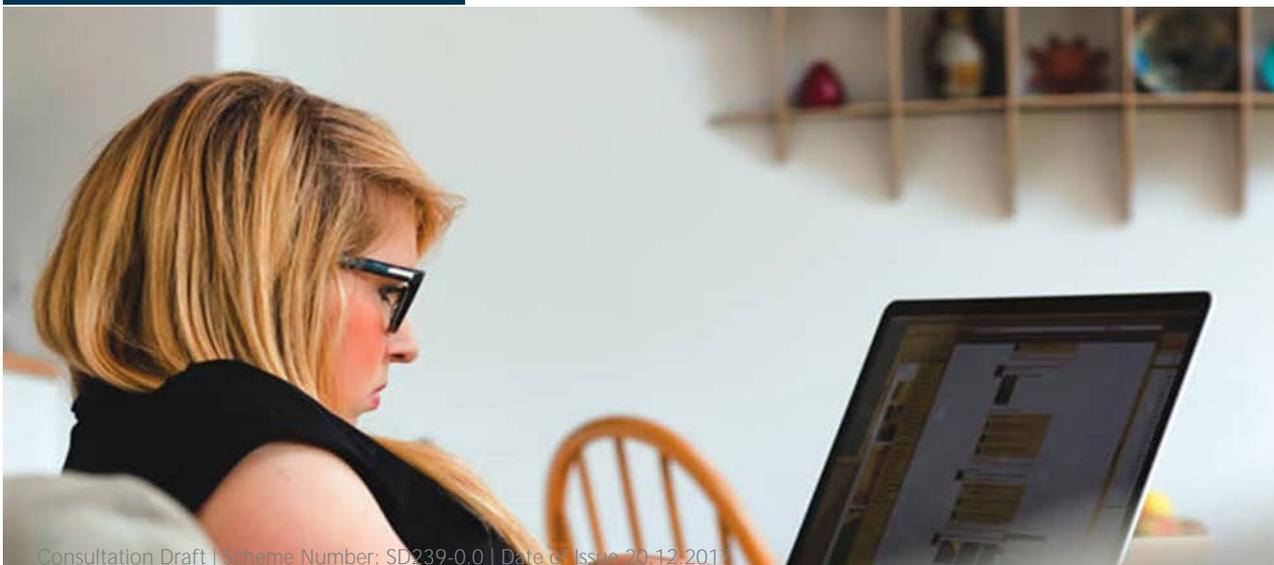
Context

An important underlying quality of any home is the management of noise to improve comfort, health and wellbeing. A home should provide a quiet environment to allow for effective rest and to enable people to use their home without compromising other sound sensitive spaces or activities. Managing internal noise levels ensures the internal comfort of occupants by limiting disturbance from all sources of environmental noise and integral building services.

It is widely recognised that noise exposure indirectly affects health and wellbeing, as it causes adverse feelings in most people affected and can cause physiological damage and disturbance for more sensitive members of society. It can also result in psychological stress, anxiety, irritability, sleep disorders and other biological effects. These in turn can increase other risk factors such as blood pressure and might even lead to clinical symptoms, including insomnia and cardiovascular diseases.

It is general practice to develop and demonstrate the noise control strategy to the satisfaction of the local planning authority. This is usually restricted to managing external noise sources through site layout and design but does not typically cover monitoring of the as-built performance. The lack of acoustic commissioning can mean there is potential for a performance gap.

The internal noise level criteria attempts to limit disturbance from all sources of environmental noise and integral building services. The external noise level criteria aims to lower the risk of disturbance from nearby noise sources such as the local road or rail network.



| Criterion number | Title | Credits |
|------------------------|--------------------------|-----------------|
| crit 1-crit 2 | 01 Internal noise levels | for 2 credits |
| crit 3-crit 4 | 03 External noise levels | up to 2 credits |
| Total credit available | | 4 |

Criteria

01 Internal noise levels

for 2 credits

- crit 1 A Suitably Qualified Acoustician (SQA) is appointed.
- crit 2 The home has been designed and built to meet the internal noise requirements outlined in Table 13 below in accordance with the methodology section, and this has been confirmed by a SQA.

Table 13 Internal noise levels

| Time of day | Habitable rooms $L_{Aeq,T}$ | Kitchens $L_{Aeq,T}$ | Open plan rooms that a kitchen is part of $L_{Aeq,T}$ |
|---------------------|--------------------------------|-------------------------|--|
| Day (07:00-23:00) | 35dB | 35dB | Lower target: 35dB Upper target: 45dB |
| Night (23:00-07:00) | 30dB (Bedrooms only) | 35dB | 35dB |

03 External noise levels

up to 2 credits

- crit 3 crit 1 has been met.
- crit 4 The noise levels of external functional spaces do not exceed the requirements in Table 14 below in accordance with the methodology section, which this has been confirmed by a SQA.

Table 14 Noise levels of external functional space

| Time of day | Credits | Requirements $L_{Aeq,T}$ |
|-------------------|---------|-----------------------------|
| Day (07:00-23:00) | 1 | 55dB |
| Day (07:00-23:00) | 2 | 50dB |

Methodology

Internal noise levels-habitable spaces and kitchens

For measurements of internal noise, the following procedures should be used:

- Generally the measurements of internal noise should be undertaken by a SQA. However, it may be convenient to do this at the same time as other testing such as pre-completion sound insulation testing required for HQM or regulatory purposes. In this case the measurements may be verified by the SQA, if they are made by others.
- At least one in ten homes on a development should be subject to on-site acoustic testing.
- The properties selected for testing shall be those considered by the SQA to be most exposed to environmental noise sources. The selection criteria should be outlined in the report from the SQA detailing the results of the measurements. Where it is not clear which properties would be most exposed to environmental noise, the number of properties tested should be increased to ensure the worst case is tested.
- Measurements should be made in at least one bedroom and one other habitable room for each home tested. The rooms selected should be those in which noise levels are expected to be greatest, and so generally on the façade most exposed to environmental noise.
- Windows should be closed for the measurements, but trickle vents (if required for the ventilation strategy) should be open during the measurements.
- External and internal doors should be shut during the measurements.

7. Noise from building services should be included in the measurements, where they are required for normal background ventilation and heating purposes, i.e. heat pumps, boilers, active ventilation systems etc.
8. Extract fans within nearby bathrooms, WCs and en-suites should be running when making measurements within bedrooms. The door between the room with the extract fan and bedroom should be shut.
9. Noise from occupants and white goods should not be included in the measurements.
10. If the rooms are not carpeted or furnished then the results of the measurements should be corrected in accordance with BS 8233:2014⁽⁷⁵⁾.
11. Measurements need not be made over the full day (07:00-23:00hours) 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 periods.
12. Measurement periods of less than 30 minutes may give representative values for internal noise levels and may be utilised where this is the case. However measurement periods shorter than 5 minutes should not be used. The actual duration of measurement shall be determined by the SQA and included within the measurement report.
13. Measurements should be taken in a minimum of three locations in rooms at a height of 1.2m above the floor level and at least 1m away from any surface.
14. Compliance with the day time criteria is through on-site measurement.
15. Compliance with the night-time criteria can be assumed for bedrooms, provided that they comply with the daytime criteria. This is subject to confirmation from a SQA that any building services noise will not elevate the room levels to above the limit. It may be convenient to quantify the building services noise through a short measurement during the day time period.
16. ANC Guidelines - Noise Measurement in Buildings Parts 1 and 2 may be used as a source of good practice for undertaking measurements within the home.

Internal noise levels—open-plan rooms that a kitchen is part of

For demonstrating compliance with the specified targets for kitchens which are part of an open plan room, two test conditions are required. The guidance contained above in points 1-3, 5-7 and 9-16 should be followed. In addition:

- The lower target (found in Table 13) should be achieved when the system is operating at the minimum rate* for continuous extract ventilation systems and for intermittent extract ventilation system, it should not be running.
- The upper target (found in Table 13) should be achieved when the system is operating at the boost rate* for continuous extract ventilation systems or the minimum rate* for intermittent extract ventilation. The noise associated with the upper target can be measured over a reduced time period compared to that for the lower target.
- To achieve the night time target (found in Table 13), the ventilation system should be operating at the minimum rate* for continuous extract ventilation systems and for intermittent extract ventilation system, it should not be running.

*for ventilation rates refer to table 5.1a Extract Ventilation rates and table 5.1b in Approved Document F or alternatively where 14 Ventilation: 03 Ventilation rates on page 84 is met, the rates achieved must be used.

Heating and ventilation systems, and supporting infrastructure (pipes, outlets, fans, pumps etc.) can increase noise levels within the home. The following building services have the potential to elevate noise levels, but their impact can generally be mitigated against through careful placement, design, system selection and appropriate commissioning of:

- Mechanical ventilation systems
- Heat pumps (split unit systems)
- Boilers and heating systems.

External noise levels

For measurements of noise in external functional spaces, the following procedures should be used:

1. Generally the measurements of external noise should be undertaken by a SQA. However, it may be convenient to do this at the same time as other testing such as pre-completion sound insulation testing required for HQM or regulatory purposes. In this case the measurements may be verified by the SQA if they are made by others.
2. Sufficient measurements should be made in order to determine a reasonable average for the external functional space. The number of measurement points should be determined by the SQA and take account of the general usable space.
3. It may not be necessary to measure the noise in every external functional space; in this case representative sampling as defined by the SQA would be appropriate.
4. Noise from environmental sources (e.g. traffic noise) should be included and also any mechanical or electrical plant associated with the home or the neighbouring properties such as the external units of a heat pump. Any plant should be running at normal operating duty.
5. Measurements need not be made over the full day (07:00-23:00hours) 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 periods.
6. Measurement periods of less than 30 minutes may give representative values for external noise levels and may be utilised where this is the case. However measurement periods shorter than 5 minutes should not be used. The actual duration of measurement shall be determined by the SQA and detailed within the measurement report.
7. If existing external noise level data are available, then calculations by a SQA may also be used to demonstrate compliance with the criteria. External data may take the form of existing noise survey data or local noise modelling or mapping. If this approach is used then the SQA must take into account any new noise sources introduced as part of the development or associated with the home itself and outline the modelling or calculation basis within their report.
8. Where noisy activities in the vicinity are occurring that would not be expected to be present when the home is occupied, e.g. construction activities then the measurements should be made in the absence of the noise source. This may mean that the activity is temporarily suspended for the testing, or the testing is done when the activity is not taking place.
9. Where measurements of environmental noise were required as part of the planning process, the noise levels within external functional spaces can be calculated by a SQA. Full account must be taken of any new sources introduced as part of the development, i.e. mechanical or electrical plant that have the potential to increase noise levels. The report detailing the assessment of external noise should detail the results of the previous survey and the calculation methods used.
10. The ANC Green Book: Environmental Noise Measurement Guide and BS 7445⁽⁷⁶⁾ are sources of available good practice and relevant definitions for the measurement of external noise.

Note: When determining the internal and external noise levels associated with the home a degree of tolerance is allowed to account for measurements of uncertainty and variability in sound levels as follows:

- For internal noise levels, a tolerance of + 3 dB is allowed for an individual room. However the targets in Table 14 on page 65 should be achieved by the average of rooms within each group.
- The targets in Table 14 on page 65 should be achieved by the average of all measurements considered necessary to evaluate the overall noise level of the external functional space as a whole.

Methodology

Internal noise levels-habitable spaces and kitchens

For measurements of internal noise, the following procedures should be used:

1. Generally the measurements of internal noise should be undertaken by a SQA. However, it may be convenient to do this at the same time as other testing such as pre-completion sound insulation testing required for HQM or regulatory purposes. In this case the measurements may be verified by the SQA, if they are made by others.
2. At least one in ten homes on a development should be subject to on-site acoustic testing.
3. The properties selected for testing shall be those considered by the SQA to be most exposed to environmental noise sources. The selection criteria should be outlined in the report from the SQA detailing the results of the measurements.

Where it is not clear which properties would be most exposed to environmental noise, the number of properties tested should be increased to ensure the worst case is tested.

4. Measurements should be made in at least one bedroom and one other habitable room for each home tested. The rooms selected should be those in which noise levels are expected to be greatest, and so generally on the façade most exposed to environmental noise.
5. Windows should be closed for the measurements, but trickle vents (if required for the ventilation strategy) should be open during the measurements.
6. External and internal doors should be shut during the measurements.
7. Noise from building services should be included in the measurements, where they are required for normal background ventilation and heating purposes, i.e. heat pumps, boilers, active ventilation systems etc.
8. Extract fans within nearby bathrooms, WCs and en-suites should be running when making measurements within bedrooms. The door between the room with the extract fan and bedroom should be shut.
9. Noise from occupants and white goods should not be included in the measurements.
10. If the rooms are not carpeted or furnished then the results of the measurements should be corrected in accordance with BS 8233:2014⁽⁷⁷⁾.
11. Measurements need not be made over the full day (07:00-23:00hours) 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 periods.
12. Measurement periods of less than 30 minutes may give representative values for internal noise levels and may be utilised where this is the case. However measurement periods shorter than 5 minutes should not be used. The actual duration of measurement shall be determined by the SQA and included within the measurement report.
13. Measurements should be taken in a minimum of three locations in rooms at a height of 1.2m above the floor level and at least 1m away from any surface.
14. Compliance with the day time criteria is through on-site measurement.
15. Compliance with the night-time criteria can be assumed for bedrooms, provided that they comply with the daytime criteria. This is subject to confirmation from a SQA that any building services noise will not elevate the room levels to above the limit. It may be convenient to quantify the building services noise through a short measurement during the day time period.
16. ANC Guidelines - Noise Measurement in Buildings Parts 1 and 2 may be used as a source of good practice for undertaking measurements within the home.

Internal noise levels—open-plan rooms that a kitchen is part of

For demonstrating compliance with the specified targets for kitchens which are part of an open plan room, two test conditions are required. The guidance contained above in points 1-3, 5-7 and 9-16 should be followed. In addition:

- The lower target (found in Table 13) should be achieved when the system is operating at the minimum rate* for continuous extract ventilation systems and for intermittent extract ventilation system, it should not be running.
- The upper target (found in Table 13) should be achieved when the system is operating at the boost rate* for continuous extract ventilation systems or the minimum rate* for intermittent extract ventilation. The noise associated with the upper target can be measured over a reduced time period compared to that for the lower target.
- To achieve the night time target (found in Table 13), the ventilation system should be operating at the minimum rate* for continuous extract ventilation systems and for intermittent extract ventilation system, it should not be running.

*for ventilation rates refer to table 5.1a Extract Ventilation rates and table 5.1b in Approved Document F or alternatively where 14 Ventilation: 03 Ventilation rates on page 84 is met, the rates achieved must be used.

Heating and ventilation systems, and supporting infrastructure (pipes, outlets, fans,

pumps etc.) can increase noise levels within the home. The following building services have the potential to elevate noise levels, but their impact can generally be mitigated against through careful placement, design, system selection and appropriate commissioning of:

- Mechanical ventilation systems
- Heat pumps (split unit systems)
- Boilers and heating systems.

External noise levels

For measurements of noise in external functional spaces, the following procedures should be used:

1. Generally the measurements of external noise should be undertaken by a SQA. However, it may be convenient to do this at the same time as other testing such as pre-completion sound insulation testing required for HQM or regulatory purposes. In this case the measurements may be verified by the SQA if they are made by others.
2. Sufficient measurements should be made in order to determine a reasonable average for the external functional space. The number of measurement points should be determined by the SQA and take account of the general usable space.
3. It may not be necessary to measure the noise in every external functional space; in this case representative sampling as defined by the SQA would be appropriate.
4. Noise from environmental sources (e.g. traffic noise) should be included and also any mechanical or electrical plant associated with the home or the neighbouring properties such as the external units of a heat pump. Any plant should be running at normal operating duty.
5. Measurements need not be made over the full day (07:00-23:00hours) 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 periods.
6. Measurement periods of less than 30 minutes may give representative values for external noise levels and may be utilised where this is the case. However measurement periods shorter than 5 minutes should not be used. The actual duration of measurement shall be determined by the SQA and detailed within the measurement report.
7. If existing external noise level data are available, then calculations by a SQA may also be used to demonstrate compliance with the criteria. External data may take the form of existing noise survey data or local noise modelling or mapping. If this approach is used then the SQA must take into account any new noise sources introduced as part of the development or associated with the home itself and outline the modelling or calculation basis within their report.
8. Where noisy activities in the vicinity are occurring that would not be expected to be present when the home is occupied, e.g. construction activities then the measurements should be made in the absence of the noise source. This may mean that the activity is temporarily suspended for the testing, or the testing is done when the activity is not taking place.
9. Where measurements of environmental noise were required as part of the planning process, the noise levels within external functional spaces can be calculated by a SQA. Full account must be taken of any new sources introduced as part of the development, i.e. mechanical or electrical plant that have the potential to increase noise levels. The report detailing the assessment of external noise should detail the results of the previous survey and the calculation methods used.
10. The ANC Green Book: Environmental Noise Measurement Guide and BS 7445⁽⁷⁸⁾ are sources of available good practice and relevant definitions for the measurement of external noise.

Note: When determining the internal and external noise levels associated with the home a degree of tolerance is allowed to account for measurements of uncertainty and variability in sound levels as follows:

- For internal noise levels, a tolerance of + 3 dB is allowed for an individual room. However the targets in Table 14 on page 65 should be achieved by the average of rooms within each group.
- The targets in Table 14 on page 65 should be achieved by the average of all measurements considered necessary to evaluate the overall noise level of the external functional space as a whole.

| Criterion Reference | Title | Design Stage | Post Construction Stage |
|---------------------|--------------------------|--|--|
| All | 01 General evidence | One or more of the appropriate evidence types listed in Appendix C - HQM evidence requirements on page 236 section can be used to demonstrate compliance. | |
| crit 2 | 01 Internal noise levels | <ol style="list-style-type: none"> 1. Calculations or assessment from the SQA taking into account the external noise level and contributions from intended building services (if any) showing that the noise limits presented in Table 13 on page 65 are likely to be achieved, or 2. Confirmation from an appropriate party that states; no noise-related planning conditions have been imposed and that the home will be naturally ventilated, but also does not have any heating or ventilation systems that have the potential to cause noise disturbance within the relevant spaces. | Testing results from the SQA demonstrating the noise limits presented in Table 13 on page 65 have been met in line with the methodology section. |
| crit 4 | 02 External noise levels | <ol style="list-style-type: none"> 1. Calculations or assessment from the SQA taking into account the external noise level and contributions from intended building services either associated with or close to the home showing that the noise limits presented in Table 14 on page 65 are likely to be achieved, or 2. Confirmation from an appropriate party that states no noise-related planning conditions have been imposed and that no additional noise sources, such as, electrical or mechanical plant are intended to be introduced in the vicinity. Or Evidence demonstrating that no external functional spaces exist | Testing results from the SQA demonstrating the noise limits presented in Table 14 on page 65 have been met in line with the methodology section. |

Checklists, Tables & Illustrations

Definitions

Suitably Qualified Acoustician (SQA)

An individual achieving all the following items can be considered to be 'suitably qualified' for the purposes of a HQM assessment:

1. Has a minimum of three years relevant experience (within the last five years). Such experience must clearly demonstrate a practical understanding of factors affecting acoustics in relation to construction and the built environment; including, acting in an advisory capacity to provide recommendations for suitable acoustic performance levels and mitigation measures.
2. An individual who holds a recognised acoustic qualification and membership of an appropriate professional body. The primary professional body for acoustics in the UK is the Institute of Acoustics.

An SQA may have to use their professional judgment to make decisions to ensure the appropriateness of the noise measurements for the homes or development type. The SQA is ultimately responsible for the noise testing results. Where an SQA is verifying the acoustic measurements or calculations carried out by another acoustician who does not meet the SQA requirements, they must, as a minimum, have read and reviewed the report and confirm in writing that they have found it to:

1. Represent sound industry practice
2. Be appropriate given the building being assessed and scope of works proposed
3. Avoid invalid, biased and exaggerated recommendations. Additionally, written confirmation from the third party verifier that they comply with the definition of an SQA is required

External Functional Spaces

For the purposes of this issue, this includes:

1. A private garden
2. A communal garden or courtyard
3. Balconies
4. Roof terraces
5. Patios

The above list is not exhaustive.

12 SOUND INSULATION

Max credits

9

Indicators (Average)



Aim

To reduce noise disturbances for occupants and neighbours by promoting good levels of sound insulation between neighbouring homes and different rooms within the home.

Benefit

- Improves community cohesion by limiting disturbances from and to neighbours
- Helps maintain a good quality of life for both occupants and neighbours
- Reduces complaints to local authorities, thus reducing their costs.

Context

Noise within homes can come from various sources, including building systems, occupants, equipment and external sources. Excessive noise can have a range of adverse effects on occupants including inconvenience and annoyance, loss of concentration, decreased productivity and sleep disturbance. Therefore, the management of noise within a home is important to maximise occupant comfort, occupant efficiency to provide privacy. As a result, sound insulation and layout is an important consideration in the design, operation and construction of homes. Good home acoustics should allow rooms to be used as intended, without compromising sound sensitive spaces or activities. Designing to specific acoustic performance standards for sound insulation, internal and external noise levels supports comfort for occupants.

Sound insulation is embedded within the current national building regulations, and minimum performance requirements are provided. The performance requirements vary across the UK but are found within Approved Document E (England and Wales)⁽⁷⁹⁾ and Section 5 (Noise) of the Technical Handbook Domestic (Scotland)⁽⁸⁰⁾. Within the relevant national building regulations, the issue of sound is split into two parts; firstly that of sound insulation between adjacent homes, and secondly between rooms within homes.



Credit Summary

| Criterion number | Title | Credits |
|-------------------------|-----------------------------------|-----------------|
| crit 1 | 01 Sound insulation between homes | up to 5 credits |
| crit 2-crit 3 | 02 Sound insulation between rooms | up to 4 credits |
| Total credits available | | 9 |

Criteria

01 Sound insulation between homes

up to 5 credits

crit 1 It must be demonstrated that the home achieves the targets set out in Table 15 for airborne (both requirement 1 and 2) and impact sound insulation taking into account both separating walls and floors between homes either through:

- A programme of pre-completion testing by a Compliant Test Body (see CN1 on the next page) in accordance with Methodology

OR

- Where all relevant building elements have been registered with Robust Details Limited; please see www.robustdetails.com for relevant constructions capable of achieving the performance targets given in Table 15 below.

Table 15 Sound insulation levels for separating walls and floors

| Credits* | Airborne sound insulation requirement 1 $D_{nT,w} + C_{tr}$ (dB) (minimum values) | Airborne sound insulation requirement 2 $D_{nT,w}$ (dB) (minimum values) | Impact sound insulation $L'_{nT,w}$ (dB) (maximum values) |
|----------|---|--|---|
| | Separating walls and floors | Separating walls and floors | Separating floors only |
| 1 | 48 | 56 | 56 |
| 3 | 50 | 58 | 54 |
| 5 | 53 | 60 | 52 |

* Credits should be awarded based on the worst performing wall or floor.

02 Sound insulation between rooms

up to 4 credits

crit 2 The targets set out in Table 16 below for airborne sound insulation are met, and this is demonstrated through testing within an acoustics laboratory in accordance with the methodology section.

Table 16 Sound insulation levels for internal walls and floors

| Credits* | Airborne sound insulation R_w (dB) (minimum values) |
|----------|---|
| 2 | 44 |
| 3 | 45 |
| 4 | 48 |

* Credits should be awarded based on the worst performing wall or floor.

crit 3 Suitably Qualified Acoustician (SQA) must pass on critical information to relevant construction professionals outlining key issues that have the potential to reduce sound insulation during the construction process, including as a minimum:

crit 3.a: Information on the means to ensure that sockets, switches, down lights and other services or other perforations maintain the acoustic performance where otherwise it may be compromised.

crit 3.b: Guidance relating to appropriate junction details at the head, foot and perimeter of the partition or floor.

Methodology

Sound insulation between homes

Where pre-completion acoustic testing is the preferred route for achieving the credits, as a minimum, one set of tests for every 10 homes in a group (houses, apartments or bungalows are defined as the groups) and each sub-group (typically these are different construction type groups) is required.

In the event of less than 10 properties, one set of tests is carried out.

Usually one unit should be “selected” to determine the number of tests required as follows:

Table 17 Number of tests forming a set of tests

| Group Type | Airborne tests, separating walls | Airborne tests, separating floors | Impact tests, separating floors | Total |
|---------------------|----------------------------------|-----------------------------------|---------------------------------|-------|
| Houses or bungalows | 2 | 0 | 0 | 2 |
| Apartments | 2 | 2 | 2 | 6 |

The actual number of tests possible may be limited by the layout, where this is the case then the compliant test body should clearly identify why the full number of tests was not feasible within the test report or covering correspondence.

Tests should be carried out in accordance with the test standards referenced by the relevant national regulations.

Sound insulation between rooms

Testing should be undertaken within an acoustic laboratory accredited by UKAS (or European equivalent) to BS EN ISO, EN ISO/IEC 17025⁽⁸¹⁾ with the relevant part of BS EN ISO 10140⁽⁸²⁾ included on their schedule of accreditation. The evidence submitted should include full details of the tested construction and this must match the construction intended for use at the development.

Compliance Notes

| Criterion Reference | Compliance Note | |
|---------------------|------------------------------------|--|
| crit 1 | CN1 Sound insulation between home | <ol style="list-style-type: none"> In the case of pre-completion acoustic testing, this should only be undertaken by a compliant test body. In the event of a test failure, documented evidence is required to show how widespread the issues are. This should include a report from a SQA identifying the issues, and an extended test series is also required to show how the root cause of the issues has been satisfactorily established. Post-remedial works testing is required to demonstrate that the requirements have been met, and clear statements should be included in the report stating what remediation works were undertaken. |
| crit 2 | CN2 Sound insulation between rooms | <p>In terms of laboratory acoustic testing, the test evidence should be from a laboratory accredited by UKAS (or European equivalent) for testing in accordance with BS EN ISO 10140-1, 2, & 5⁽⁸³⁾ (or previously BS EN ISO 140-3:1995⁽⁸⁴⁾)</p> <p>Checks must be undertaken to ensure that the laboratory test report evidence submitted relates to the proposed and built construction (including all key components such as stud type and make, joist type, principle dimensions, board and insulation type and make)</p> <p>When the construction matches one of the specifications for internal walls or floors outlined in the Scottish Government Building Standards Division publication "Example Construction and Generic</p> |

| Criterion Reference | Compliance Note | |
|---------------------|-------------------|--|
| | | <p>Internal Constructions for use with Section 5: Noise - of the Technical Handbooks" then the construction can be considered to achieve 43 dB, Rw, and further laboratory test evidence is not required unless a higher performance value is being claimed to achieve the higher credit scores.</p> <p>For England and Wales:</p> <p>The criteria applies to all internal walls and floors within a dwelling regardless of whether they are covered by the scope of Approved Document E - Resistance to the passage of sound (2003 Edition incorporating 2004, 2010, 2013 and 2015 amendments).</p> <p>For Scotland:</p> <p>The criteria applies to all internal walls and floors within a home regardless of whether they are covered by the scope of Section 5 (Noise) of the Technical Handbook 2017 Domestic.</p> |
| crit 1 | CN3 Detached home | Where a home is detached, crit 1 on page 73 does not need to be met and four credits can be awarded by default. |

Evidence

| Criterion Reference | Title | Design Stage | Post Construction Stage |
|---------------------|-----------------------------------|---|---|
| crit 1 | 01 Sound insulation between homes | <p>Where pre-completion acoustic testing will be carried out;</p> <p>A letter from the relevant party confirming the intent to:</p> <ol style="list-style-type: none"> 1. Meet the relevant sound insulation performance levels using the methodology prescribed. 2. Use a compliant test body to complete testing. <p>OR</p> <p>Where Robust Details will be used;</p> <ol style="list-style-type: none"> 1. Confirmation that the Robust Details chosen will achieve the required performance standards for sound insulation (as applicable). 2. Confirmation that the relevant plots are registered with RDL (the Purchase Statement). | <p>Where pre-completion acoustic testing has been carried out; copies of the sound insulation field test results or a letter of confirmation that the required sound insulation performance standards as detailed in the assessment criteria have been achieved.</p> <p>OR</p> <p>Where Robust Details have been used, completed Robust Details Ltd Compliance Certificate signed by the developer for all relevant constructions relating to the plots being assessed.</p> |
| crit 1 | 01 Sound insulation between homes | Intended layout demonstrating homes are detached | Confirmation that homes are detached. |
| crit 2 | 02 Sound insulation between rooms | <p>Confirmation of the intended construction and either:</p> <ol style="list-style-type: none"> 1. Laboratory test report <p>OR</p> | As for design stage, however review and compare against as-built. |

| Criterion Reference | Title | Design Stage | Post Construction Stage |
|---------------------|---------------------|---|-------------------------|
| | | 2. Confirmation of which construction is being used from "Example constructions and generic details". | |
| | | OR | |
| | | 3. Published manufacturer's data reference | |
| All | 03 General evidence | One or more of the appropriate evidence types listed in Appendix C - HQM evidence requirements on page 236 can be used to demonstrate compliance with these criteria. | |

Checklists, Tables & Illustrations

Definitions

Compliant Test Body

This includes companies which are:

1. UKAS accredited to undertake testing to BS EN ISO 140-4 & 7:1998 (Tests to these standards are accepted for the purposes of the HQM, although these standards have been superseded by BS EN ISO 16283-1:2014. Tests to BS EN ISO 16283-1:2014 will be accepted as well.); or
2. A member of the ANC pre-completion registration scheme; or
3. Organisations that can provide evidence that they are a member of a scheme that follow the relevant principles of BS EN ISO/IEC 17024 (Conformity assessment - General requirements for bodies operating certification of persons) in relation to acoustics; or
4. Organisations that can provide evidence that they comply with the requirements of BS EN ISO/IEC 17025 in relation to acoustics.

Suitably Qualified Acoustician (SQA)

An individual achieving all the following items can be considered to be 'suitably qualified' for the purposes of a HQM assessment:

1. Holds a degree, PhD or equivalent qualification in acoustics or sound testing.
2. Has a minimum of three years relevant experience (within the last five years). Such experience must clearly demonstrate a practical understanding of factors affecting acoustics in relation to construction and the built environment; including, acting in an advisory capacity to provide recommendations for suitable acoustic performance levels and mitigation measures.
3. An individual who holds a recognised acoustic qualification and membership of an appropriate professional body. The primary professional body for acoustics in the UK, is the Institute of Acoustics.

A SQA may have to use their professional judgment to make decisions to ensure the appropriateness of the noise measurements for the home or development type. The SQA is ultimately responsible for the noise testing results.

Where a suitably qualified acoustician is verifying the acoustic measurements or calculations carried out by another acoustician who does not meet the SQA requirements, they must, as a minimum, have read and reviewed the report and confirm in writing that they have found it to:

1. Represent sound industry practice
2. Be appropriate given the building being assessed and scope of works proposed
3. Avoid invalid, biased and exaggerated recommendations. Additionally, written confirmation from the third party verifier that they comply with the definition of a Suitably Qualified Acoustician is required.

13 TEMPERATURE

Max credits

17

Indicators (Average)



Aim

To minimise the risk of uncontrollable high temperatures occurring as a result of current and projected future climate scenarios by recognising early consideration in the design process..

Benefit

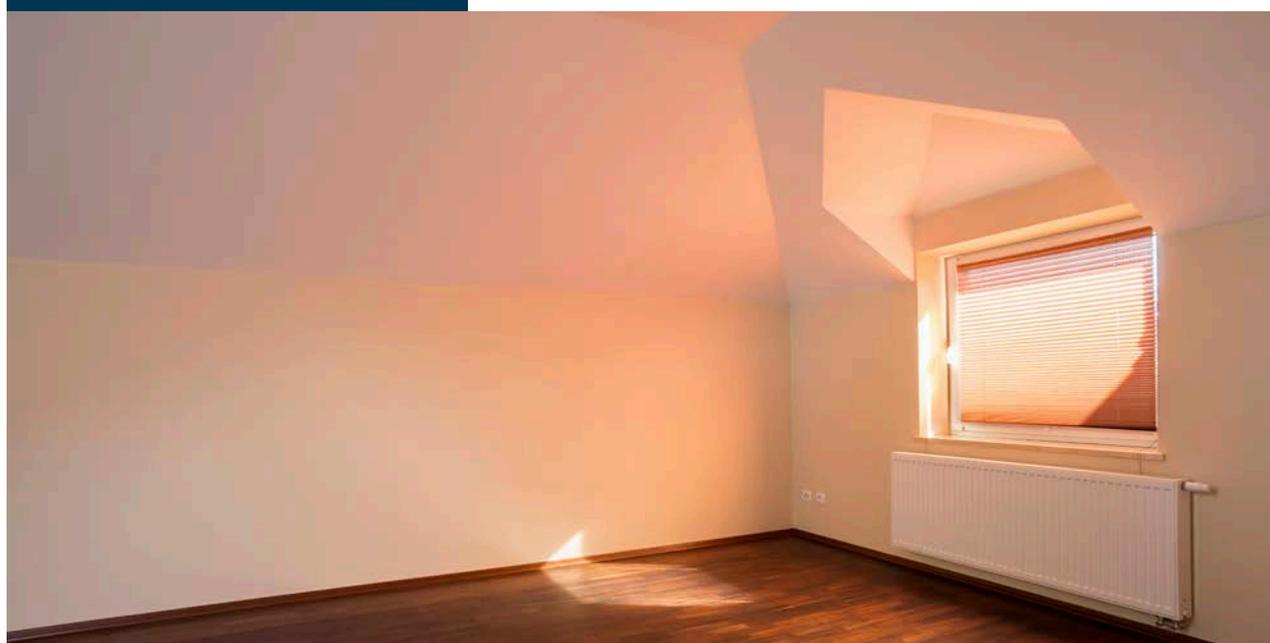
- Reduces the risk to occupant comfort, health and wellbeing from uncontrollably high indoor temperatures.
- Encourages future proofing by recognising resilience to climate change, protecting the home's long-term value
- Reduces the impact on the environment and running costs from wasted heat or additionally required air-conditioning.

Context

A key part of ensuring a comfortable home environment is ensuring effective temperature regulation and reducing the risk of excessive or prolonged exposure to high temperatures (i.e. overheating).

Homes are becoming increasingly at risk of overheating ⁽⁸⁵⁾, due to a number of reasons including : climate change, increased urbanisation, high-rise construction and more stringent energy efficiency measures ⁽⁸⁶⁾. New homes are at particular risk due to their increasingly air tight and well insulated building fabric, which results in comparatively low levels of air change and hence, a lack of controllability over temperature. If the risk of a home overheating is not managed appropriately, the results can be very harmful to health and may lead to fatal consequences for more vulnerable occupants⁽⁸⁷⁾.

As such this issue recognises effective temperature regulation that allows for seasonal changes, occupier preferences and global climate change, which are expected throughout the lifetime of the home.



Credit Summary

There are two routes to assessing this issue; foundation and comprehensive routes. These routes represent varying degrees of rigour. The route selected will depend on whether or not compliant thermal modelling has been undertaken. More credits are available through the more rigorous comprehensive route, recognising that compliant thermal modelling represents current industry best practice.

| Criterion number | Title | Credits |
|-------------------------|--|---------------------|
| crit 1 | 01 Home information | Minimum requirement |
| crit 2 | 02 Temperature analysis | Minimum requirement |
| crit 3–crit 7 | 02 Routes of rigour (follow 02A or 02B) - Temperature analysis | up to 17 credits |
| crit 3 | 02A Foundation route - HQM temperature tool | up to 11 credits |
| crit 4 to crit 8 | 02B Comprehensive route | up to 17 credits |
| Total credits available | | 17 |

Criteria

01 Home information

Minimum requirement

crit 1 Home information needs to be provided as part of or all of the criteria in this issue. Please see 34 Home Information on page 206).

02 Temperature analysis

Minimum requirement

crit 2 Thermal analysis has been carried out using either of the methodologies referred to in the foundation or comprehensive routes for this issue. A summary of the thermal analysis results and recommendations on the control of internal temperatures is provided for the use of the home occupant in line with the requirements in the home information issue.

Note: Credits for this issue do not need to be met for the purposes of complying with this minimum requirement.

02 Routes of rigour (follow 02A or 02B) - Temperature analysis

up to 17credits

02A Foundation route - HQM temperature tool

up to 11credits

crit 3 Up to 12 credits are awarded according to the outputs in the online assessment tool generated from the home's HQM high temperature tool and HQM SAP XML outputs (see Methodology, where a threshold temperature less than 22°C is achieved, in line with the following:

crit 3.a: 7 credits using current weather data files, and;

crit 3.b: 4 credits using projected climate change weather data, where crit 3.a has also been met.

02B Comprehensive route

up to 17credits

Current conditions

for 11 credits

crit 4 Thermal modelling has been carried out using software in accordance with CIBSE AM11⁽⁸⁸⁾ Building Performance Modelling.

crit 5 The software used to carry out the simulation at the detailed design stage provides full dynamic thermal analysis.

crit 6 The modelling demonstrates that:

crit 6.a: For air-conditioned buildings: Summer operative temperature ranges in the home are in accordance with the criteria set out in CIBSE Guide A Environmental design⁽⁸⁹⁾, Table 1.5

crit 6.b: For homes that are predominantly naturally ventilated or free running: The home is designed to limit the risk of overheating, in accordance with the adaptive comfort methodology referred to in Section 4.2 of CIBSE TM59 Design methodology for the assessment of overheating risk in homes.

crit 6.c: For homes that are predominantly mechanically ventilated: The home is designed to limit the risk of overheating, in accordance with Section 4.3 of CIBSE TM59.

Predicted climate change environment

for 6 credits

crit 7 crit 4-crit 6 are achieved.

crit 8 The thermal modelling demonstrates that the relevant requirements set out in crit 6 are achieved for a projected climate change environment (see Definitions on page 81).

Methodology

Foundation route

The information used to determine the threshold temperature output is based on the Standard Assessment Procedure (SAP) inputs from the HQM SAP XML file and additional inputs from the temperature bolt-on XML file produced by the HQM high temperature reporting tool.

To generate the threshold temperature for each assessed home using the foundation route, follow the below:

1. Obtain the HQM SAP XML file for the assessed home from the SAP assessor. This is the same file used for generating credits for Energy and Cost on page 89.
2. Complete the HQM high temperature reporting tool and produce the 'temperature bolt-on XML' file for each home
3. Select the assessed home within the Energy and Cost part of the HQM assessment tool
4. Upload the HQM SAP and temperature bolt-on XML files and select **Calculate score**
5. Go to the 'Temperature' part of the HQM assessment tool and refresh the page to reveal both threshold temperatures and the number of credits scored.

The calculation methodology to determine the threshold temperature is described in the HQM Temperature supporting document.

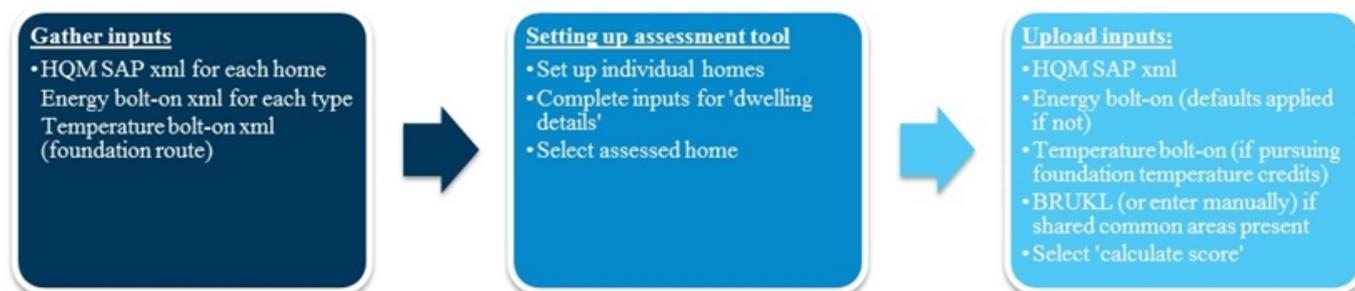


Figure 1 Process map for generating outputs for credits in this issue.

Comprehensive route

The comprehensive route in this issue requires the completion of compliant full dynamic simulation modelling. Please see crit 4-crit 8, the compliance notes and relevant definitions for further details of this route.

Projected climate change weather data

Dynamic thermal simulation software packages currently provide the facility for building designs to be assessed under external climatic conditions specific to geographic location. Industry standard weather data for the UK is available in the form of Test Reference Years (TRYs) and Design Summer Years (DSYs) provided by CIBSE.

This weather data enables thermal analysis of building designs under current climatic conditions, yet no account is taken of projected variations in weather data that will occur during the building's life cycle as a result of climate change. The following

probabilistic DSY weather data files should be used to establish the projected climate change environment against which the design is evaluated:

Free running buildings

- Time period: 2050s
- Emissions scenario: Medium (A1 B)

Mechanically ventilated or mixed mode buildings

- Time period: 2030s
- Emissions scenario: Medium (A1 B).

The above weather files represent the minimum requirements to perform thermal modelling under a climate change scenario and subsequently demonstrate compliance. Where design teams feel that added consideration of building occupant risk or sensitivity to overheating is necessary, weather files can be used that exceed the minimum requirements outlined above. The time periods indicated above have been selected to represent the building services life cycle likely to be present in each building services strategy type. A shorter time period is chosen for mechanically ventilated or mixed mode building types due to consideration of mechanical servicing equipment lifespan (before major upgrade or replacement is required), and to avoid over-specification of plant which could lead to inefficient operation.

A range of alternative probabilistic weather files produced in accordance with the UK climate impacts programme (UKCIP) 2009 projections have been produced to be compatible with simulation software packages. These weather files provide the opportunity to evaluate the impact of varying climate change scenarios on building design performance throughout its life cycle.

Projected climate change weather files are currently available in TRYs and DSYs and according to three projected time periods; 2030s, 2050s and 2080s, and for each period, two ‘emissions scenarios’ are available; Medium Emissions (A1B) and High Emissions (A1 F1).

The PROMETHEUS project at Exeter University has produced a number of future weather files specific to different locations across the UK, created using the UKCP09 weather generator. Weather files produced under the PROMETHEUS project are available at emps.exeter.ac.uk

Compliance Notes

| Criterion Reference | Compliance Note | |
|---------------------|---|---|
| crit 4 | CN1 Comprehensive route - Smaller and more basic building designs | Under the comprehensive route, for smaller and more basic building designs with less complex heating or cooling systems, an alternative less complex means of analysis may be appropriate (such methodologies must still be in accordance with CIBSE AM11). |
| crit 6 | CN2 Ventilation type | Where it is reasonable to assume windows can be continuously left open, mechanically ventilated homes can be considered as predominantly naturally ventilated and crit 6.b should be followed, for the purposes of assessing overheating risk in crit 6. For example, where there are no security risks, sources of noise nuisance or air pollution (e.g. from traffic) that prevent windows from being left open. Where it is not reasonable to assume that windows can be left open, crit 6.c should be followed for mechanically ventilated homes.. |
| crit 8 | CN3 Adapting for future | Where thermal comfort criteria are not met for the projected climate change environment, the project team demonstrates how the building has been adapted, or designed to be easily adapted in the |

| Criterion Reference | Compliance Note |
|---------------------|---|
| | future using passive design solutions in order to subsequently meet the requirements under crit 8 |

Evidence

| Criterion Reference | Title | Design Stage | Post Construction Stage |
|---------------------|------------------------------|--|--|
| All | 01 General Evidence | One or more of the appropriate evidence types listed in Appendix C - HQM evidence requirements on page 236 can be used to demonstrate compliance with these criteria. | |
| crit 3 | 02 HQM high temperature tool | A copy of the completed HQM high temperature tool and documentary evidence supporting the data used to complete the tool. | As per design stage, but based on as-built evidence. |
| crit 4-crit 8 | 03 Thermal modelling output | A copy of the thermal modelling output and documentary evidence supporting the data used to complete the model. AND System specifications demonstrating that the worst case scenario will be met | As per design stage, but based on as-built evidence. |

Checklists, Tables & Illustrations

None.

Definitions

Passive design

Passive design uses layout, fabric and form to reduce or remove mechanical cooling, heating, ventilation and lighting demand. Examples of passive design include optimising spatial planning and orientation to control solar gains and maximise daylighting, manipulating the building form and fabric to facilitate natural ventilation strategies and making effective use of thermal mass to help reduce peak internal temperatures.

HQM high temperature reporting tool

This is a reporting tool that feeds into a calculation methodology to identify a home's threshold temperature. This has been developed by BRE solely for use within the foundation route of the Temperature issue of the HQM assessment. The intention of this tool and accompanying calculation methodology is to support the offering of capped credits to homes whose circumstances make them less likely to be at risk of overheating during summer months, where full dynamic thermal analysis is not completed.

It assesses and scores the building on key factors that affect overheating risk on a whole house basis, and should not be treated as a detailed tool to identify the presence or absence of localised overheating.

The identified threshold temperature for the home uses data from SAP outputs and additional bolt-on inputs relating to the following topics:

- Surroundings
- Provision of mechanical ventilation
- Capacity for natural ventilation
- Solar gains
- Heat gains from communal heating
- User factors.

The calculation methodology to determine the threshold temperature is described in the HQM Temperature supporting document.

Please note: this tool and accompanying calculation methodology will produce an estimated output founded on basic information inputs. To establish the overheating risk of a home, BRE Global would always recommend completing full dynamic thermal modelling in accordance with best practice.

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 or cooling loads, overheating risks and control strategies to be assessed.

For guidance on carrying out dynamic thermal modelling for homes, please refer to CIBSE TM59.

Threshold temperature

The calculated mean 24-hour internal temperature during the warmest summer months, including an increment related to the thermal mass.

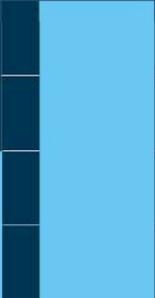
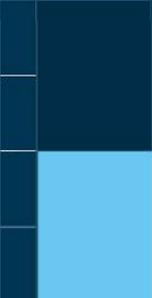
For details of how the threshold temperature is calculated, please refer to the HQM temperature guidance note.

14 VENTILATION

Max credits

13

Indicators (Average)

| | | |
|---|---|---|
|  |  |  |
|  |  |  |
| My cost | My wellbeing | My footprint |

Aim

To achieve a good level of internal air quality in the home to avoid environments that could be detrimental to health and wellbeing of occupants.

Benefit

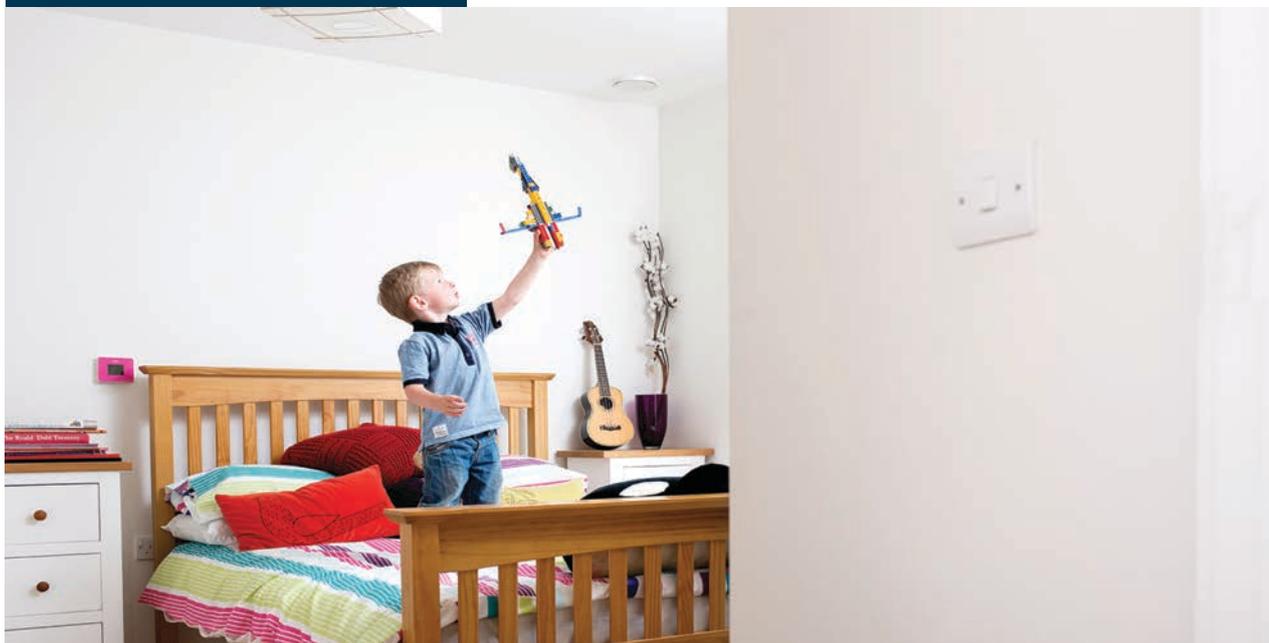
- Encourages designs that reduce the risk of pollutant and the negative health impacts associated with this.
- Encourages design that reduces moisture build up in the home and associated respiratory health risks
- Ensures that ventilation systems are easy to control, thus improving effectiveness, occupant understanding and reducing costs.
- Improved maintenance access to maintain high performance levels from mechanical and mixed-mode ventilation systems.

Context

It is widely accepted that the quality of the indoor environment can impact occupant health.

The quality of the indoor environment is a complex combination of both externally and internally generated pollutants, which may be compounded by occupant behaviour. Personal preferences also have a significant impact on the acceptability of ventilation levels. The design of the ventilation system must therefore be robust, and controllable by the occupants, so that a healthy internal environment can be achieved and maintained.

Increasing levels of building airtightness means that the ventilation system must be capable of providing effective continuous ventilation to all areas of a home, for all levels of likely occupancy and without nuisance to avoid issues of poor air quality, stuffiness and high pollutant levels including VOCs and mould spores.



Credit Summary

| Criterion number | Title | Credits |
|-------------------------|-----------------------------|---------------------|
| To add | 01 Home information | Minimum requirement |
| crit 2-crit 3 | 02 Ventilation air intakes | for 4 credits |
| crit 4-crit 9 | 03 Ventilation rates | for 5 credits |
| crit 10-crit 14 | 04 Maintenance and controls | for 4 credits |
| Total credits available | | 13 |

Criteria

01 Home information

Minimum requirement

- crit 1 Information sign securely fixed to the rear of a boiler, meter or airing cupboard door (or another door of similar permanence) covering the following:
- Location of all components of the ventilation system and the controls and their design intent
 - How to operate the system including any automatic or manual control functions and guidance relating to how systems should be operated during summer and winter
 - How to maintain good IAQ in the home through background ventilation (e.g. never leaving trickle vents completely shut, not shutting off a MVHR system) and what happens if good IAQ is not maintained within the home, i.e. the impact on people's health
 - The purpose of boost ventilation

02 Ventilation air intakes

for 4 credits

crit 2 crit 1 has been achieved.

crit 3 The home's ventilation air intakes should avoid drawing in pollution in accordance with CIBSE TM21⁽⁹⁰⁾.

03 Ventilation rates

Minimum requirement

For England and Wales: For System 3 and System 4 (see Definitions)

crit 4 The specified ventilation system has the capacity to continuously achieve:

- The applicable minimum ventilation rate (see Methodology) during continuous operation

crit 5 Home information explaining that the ventilation rate set on the fan is the rate required for building regulations compliance and that the ventilation system specified has the capability of being set to a greater rate. Contact details are to be included in the information sign required for crit 1 should the home occupant feel the rate needs to be increased.

for 4 credits

crit 6 to crit 3 have been achieved.

crit 7 For England and Wales: The following is achieved according to the specified ventilation system:

For System 1 and System 2 (see Definitions on page 87):

- The total equivalent area of background ventilators is sized in accordance with the relevant local building regulations for ventilation, and based on assumed worst case occupancy, i.e. two occupants in all bedrooms (see CN2 on page 86).

For System 3 and System 4 (see Definitions on page 87) the specified ventilation system has the capacity to continuously achieve:

- The applicable minimum ventilation rate (see Methodology on the facing page) during continuous operation
- A boost air flow rate of at least 25% greater than the applicable minimum ventilation rate.

- crit 8 For Scotland :The mechanical ventilation system specified has the capacity to continuously achieve:
1. The applicable minimum ventilation rate (see Methodology) during continuous operation
 2. A boost air flow rate of at least 25% greater than the applicable minimum ventilation rate.
- crit 9 within the Internal and External Noise issue has been achieved (see 11 Internal and External Noise on page 64).

04 Maintenance and controls

Minimum requirement

For England and Wales:

Ventilation controls for System 1 and System 2 (if appropriate)(see Definitions):

- crit 10 Extractor fans in wet and drying rooms shall be controlled by a humidity sensor (which may be built into the extractor fan unit) in accordance with manufacturer's literature, in addition to a light switch control where required by building regulations (e.g. rooms with WCs).

Ventilation controls for System 3 and System 4 (if appropriate)(see Definitions):

- crit 11 A ventilation system that has the ability to be manually boosted by the home occupant when required i.e. increase in humidity levels in the bathroom due to showering or bathing activities taking place and an information sign explaining when to activate and deactivate the boost function OR
- A ventilation system that has the ability to be automatically activate boost mode when there are increased humidity levels in the bathroom due to showering or bathing activities taking place. The system should prevent activation as a result of abnormally high levels of naturally occurring background humidity (such as can occur on a humid summer's evening) for 4 credits
- crit 12 to crit 9 are achieved.
- crit 13 Any required maintenance of any part of the ventilation system can be completed safely by the occupant.
- crit 14 For mechanical continuous ventilation systems (e.g. MVHR, MEV), controls are provided that enable sufficient control of the background continuous ventilation rate to meet varying occupancy levels without having to enable 'boost' mode.

Methodology

Applicable minimum ventilation rate

1. Identify the minimum ventilation rate for the home according to:
 - a. Number of bedrooms (see Table 18 on page 87), AND
 - b. Size of the home.
2. Identify the applicable minimum ventilation rate. This is the larger of the two minimum ventilation rates calculated in step 1 above.
3. Ensure the design of the ventilation system has the capacity to achieve the applicable minimum ventilation rate determined above.
4. At post construction, test the ventilation system to ensure that the applicable minimum ventilation rate has been achieved (in accordance with the criteria).

Minimum ventilation rate - according to number of bedrooms

To calculate the minimum ventilation rate according to the number of bedrooms, please refer to Table 18 on page 87.

Minimum ventilation rate - according to size of the home

1. Calculate the area m² of floor space of all habitable rooms:
 - a. Living rooms
 - b. Dining rooms
 - c. Bedrooms
 - d. Any other habitable rooms.
2. Calculate the total area m² of floor space of all rooms identified above
3. Calculate minimum ventilation rate according to size as below:

$$MVR = 0.6 \times TFS$$

Where:

MVR = minimum ventilation rate according to size (L/s)

TFS = total m^2 of floor space of all habitable rooms

Compliance Notes

| Criterion Reference | Compliance Note |
|---|--|
| CN1 Safely by the occupant | <p>Any specified ventilation system requiring maintenance must be designed to allow occupants to easily complete the work in a safe manner, to prevent systems becoming redundant or being unable to function to their designed intention.</p> <p>As a minimum, the occupant must be able to complete the required maintenance for any specified ventilation system in accordance with manufacturer’s instructions and any other safety regulations.</p> <p>The accessibility and practicalities required to allow for ‘easy’ completion of any maintenance are key considerations. As these are likely to be dependent on the system installed, HQM does not prescribe these, but sets out below the minimum aspects that must be considered:</p> <ol style="list-style-type: none"> 1. The needs for access must consider the likely lifetime of each component (i.e. ducts 25+ years, etc.) 2. Location and accessibility of all system components 3. Location of access points to all ‘built in’ components 4. Occupants should not require specialised tools in order to carry out any required maintenance. <p>The assessor must be satisfied that the design has considered the above and is in keeping with the aim of this issue.</p> |
| CN2 Ventilation rates for System 1 and System 2 | <p>In order to size the required area of background ventilators, a correction should be made to the standard areas listed in the respective building regulations for England, Wales and Northern Ireland to account for the assumed worst case occupancy levels, in accordance with the guidance notes given in the respective regulations. No correction is necessary for projects in Scotland.</p> |

Evidence

| Criterion Reference | Title | Design Stage | Post Construction Stage |
|---------------------|---|---|---|
| All criteria | 01 General Evidence | One or more of the appropriate evidence types listed in Appendix C - HQM evidence requirements on page 236 can be used to demonstrate compliance with these criteria. | |
| crit 7 | 02 Inspection checklist and air flow measurement test sheet | Written commitment from the developer to achieve the requirements of crit 7 on page 84. | Completed and signed copies of part 1 and part 3 of the 'Inspection checklist and air flow measurement test sheet' from the |

| Criterion Reference | Title | Design Stage | Post Construction Stage |
|---------------------|-------|--------------|---|
| | | | Domestic Ventilation Compliance Guide ⁽⁹¹⁾ demonstrating that the requirements of crit 7 on page 84 have been met. |

Checklists, Tables & Illustrations

Table 18 Minimum ventilation rate - according to number of bedrooms

| Number of bedrooms | Assumed occupancy (where credits are sought) | Minimum ventilation rate (L/s) (where credits are sought) | Assumed occupancy (rounded to the nearest whole number for the minimum requirement) | Minimum ventilation rate (L/s) (for the minimum requirement) |
|--------------------|---|---|---|--|
| 1 | 2 | 15 | 2 | 15 |
| 2 | 4 | 21 | 4 | 19 |
| 3 | 6 | 29 | 5 | 25 |
| 4+ | 8 + 2 additional occupants per additional bedroom | 37 + 8L/s per additional bedroom | 7 + 1.5 additional occupants per additional bedroom | 31 + 6L/s per additional bedroom |

Definitions

Building regulations for ventilation

The following table lists the building regulations applied for ventilation in each of the four countries of the UK:

| Country | Ventilation regulations |
|-------------------|--|
| Scotland | Technical Handbook 2016 Domestic - Environment |
| Northern Ireland | Technical Booklet K (Ventilation), October 2012 |
| England and Wales | Approved Document F: Means of Ventilation, 2010 edition (incorporating further 2010 and 2013 amendments) |

Habitable rooms

This is a room used for home purposes, but which is not solely a kitchen, utility room, bathroom, cellar or sanitary accommodation.

Number of bedrooms

The as-built number of bedrooms should be used for the purpose of calculations and must be consistent with other issues assessed based on the number of bedrooms.

System 1

As defined in Approved Document F (2010)⁽⁹²⁾, a system 1 ventilation system is background ventilators and intermittent extract fans.

System 2

As defined in Approved Document F (2010), a system 2 ventilation system is passive stack ventilation (PSV).

System 3

As defined in Approved Document F (2010), a system 3 ventilation system is continuous mechanical extract (MEV).

System 4

As defined in Approved Document F (2010), a system 4 ventilation system is continuous mechanical supply and extract with heat recovery (MVHR).

Ventilation

This is defined as the supply and removal of air (either by natural or mechanical means, or both) to and from a space or spaces in a building.

Ventilation rate

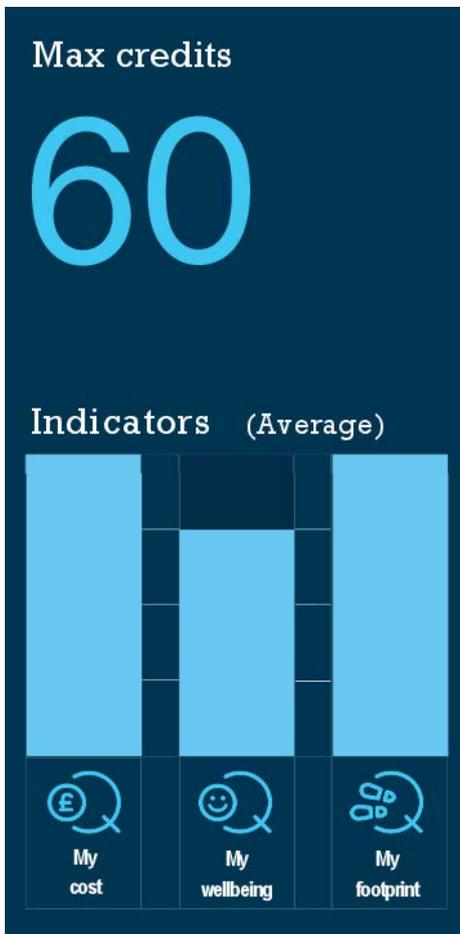
The ventilation rate is a measurement of the speed of air movement given in litres per second

ENERGY AND COST

This section discusses the following.

| | |
|---|------------|
| 15 Energy and cost | 90 |
| 16 Decentralised Energy | 100 |
| 17 Impact on Local Air Quality | 105 |

15 ENERGY AND COST



Aim

To improve energy performance and reduce costs associated with the running of the home and encourage increased rigour in calculating these.

Benefit

- Reduce energy costs.
- Support health and wellbeing by keeping homes comfortable and warm.
- Reduce the environmental impact of the home by reducing Carbon emissions.

Context

It is well established that the energy efficiency of homes has significant impacts on human health with estimates of around 2.5 million households in England alone, suffering from fuel poverty (2015) ⁽⁹³⁾. It is also a major contributor to global CO₂ emissions with homes contributing a significant proportion of the UK's total carbon emissions (13% of UK greenhouse gas emissions in 2015⁽⁹⁴⁾).

This makes reducing CO₂ emissions and energy costs a key challenge for homes in the UK and an essential part of meeting the Government's target to reduce CO₂ emissions by 80% by 2050⁽⁹⁵⁾ (against 1990 levels).

This issue focuses on encouraging energy efficient design and construction, and ensuring that homeowners and tenants are well informed on how their home should be operated so that the home's energy performance potential can be realised in practice.



Credit Summary

| Criterion number | Title | Credits |
|-------------------------|----------------------------|---------------------|
| crit 1 | 01 Home information | Minimum requirement |
| crit 2 | 02 Energy performance | up to 40 credits |
| crit 3-crit 4 | 03 Towards carbon negative | up to 6 credits |
| crit 5 | 04 Cost | up to 14 credits |
| Total credits available | | 60 |

Criteria

01 Home information

Minimum requirement

crit 1 Home information needs to be provided as part of or all of the criteria in this issue. Please see 34 Home Information on page 206.

02 Energy performance

up to 40 credits

crit 2 Credits are awarded according to the home energy performance ratio (HEPR) generated scored in the online assessment tool, in line with Table 19 below.

Table 19 HEPR benchmark scale

| Credits | HEPR |
|---------|-------|
| 1 | 0.023 |
| 2 | 0.045 |
| 3 | 0.068 |
| 4 | 0.090 |
| 5 | 0.113 |
| 6 | 0.135 |
| 7 | 0.158 |
| 8 | 0.180 |
| 9 | 0.203 |
| 10 | 0.225 |
| 11 | 0.248 |
| 12 | 0.270 |
| 13 | 0.293 |
| 14 | 0.315 |
| 15 | 0.338 |
| 16 | 0.360 |
| 17 | 0.383 |
| 18 | 0.405 |
| 19 | 0.428 |
| 20 | 0.450 |
| 21 | 0.473 |
| 22 | 0.495 |
| 23 | 0.518 |
| 24 | 0.540 |
| 25 | 0.563 |
| 26 | 0.585 |
| 27 | 0.608 |
| 28 | 0.630 |
| 29 | 0.653 |
| 30 | 0.675 |
| 31 | 0.698 |

| Credits | HEPR |
|---------|--|
| 32 | 0.720 |
| 33 | 0.743 |
| 34 | 0.765 |
| 35 | 0.788 |
| 36 | 0.810 |
| 37 | 0.833 |
| 38 | 0.855 |
| 39 | 0.878 |
| 40 | 0.900 AND zero net regulated CO ₂ emissions |

03 Towards carbon negative**up to 6 credits**

- crit 3 The home achieves a HEPR ≥ 0.9 and zero net regulated CO₂ emissions.
- crit 4 Credits are awarded according to the online assessment tool output for the percentage of the home unregulated operational energy consumption (as calculated in SAP - Section 16, including for energy bolt-on inputs) that is generated by carbon neutral on site or near site sources, in line with Table 20 below. The output is based on the input files entered for the 15 Energy and cost criteria.

Table 20 Towards carbon negative benchmark scale

| Credits | Percentage of the building's unregulated operational energy consumption |
|---------|---|
| 1 | 10% |
| 2 | 20% |
| 3 | 40% |
| 4 | 60% |
| 5 | 80% |
| 6 | > 100% (i.e. carbon negative) |

04 Cost**up to 14 credits**

- crit 5 Credits are automatically awarded according to the outputs scored for cost, in line with Table 21 below.

Table 21 Cost output benchmark scale

| Credits | Cost output |
|---------|-------------|
| 1 | 0.064 |
| 2 | 0.129 |
| 3 | 0.193 |
| 4 | 0.257 |
| 5 | 0.321 |
| 6 | 0.386 |
| 7 | 0.45 |
| 8 | 0.514 |
| 9 | 0.579 |
| 10 | 0.643 |
| 11 | 0.707 |
| 12 | 0.771 |
| 13 | 0.836 |
| 14 | 0.9 |

The four countries of the UK have their own building regulations for energy and

while they use the same methodology and approved calculation software, each country has different definitions of the notional building and they set different requirements for regulatory compliance, i.e. baseline performance. This is accounted for in the HEPR calculation methodology through the 'translator curves' defined for each country. Therefore, the HEPR and the HQM credits are determined by comparing the assessed buildings modelled operational energy performance relative to the regulatory baseline for the country in which the building is located (see definitions). This can result in slightly different credits being achieved for the same home in different countries. For more information please see Guidance Note 28.

Methodology

The HQM energy engine will complete the calculations required to assess against crit 2-crit 5 on the previous page of this issue. The energy calculations must be carried out at the individual home level. Energy averaging cannot be applied. The below image summarises the process for generating outputs for credits in this issue. Detailed steps are outlined after the image.

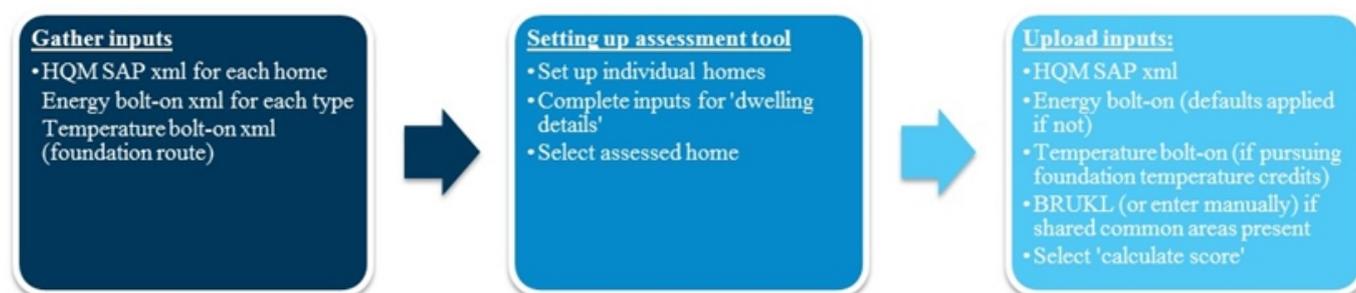


Figure 2 Process map for generating outputs for credits in this issue.

Gathering inputs

1. Obtain HQM SAP XML files for each individual dwelling, from approved SAP software via an accredited energy assessor (see definition).
2. Where bolt-on inputs are available (see Table 22 on page 95), complete the 15 Energy and cost Microsoft Excel tool available from BREEAM Projects.
3. Generate the bolt-on XML file within the excel tool. The same file can be used for multiple homes where the bolt-on inputs are the same. Otherwise, this process has to be repeated to produce a bolt-on XML file for every variation present.
4. Where heated common areas are present, obtain the BRUKL output file (see Heated common areas on the next page for more details).
5. Where credits are being pursued via the foundation route for the Temperature issue, complete the 'Temperature' excel tool available from BREEAM Projects. As with the energy bolt-on XML file, the same file can be used for multiple homes where the bolt-on inputs are the same. Otherwise, this process has to be repeated to produce a bolt-on XML file for every variation present. This file is not needed to generate outputs for 15 Energy and cost but the inputs from the energy files are required to calculate the temperature outputs, when using the foundation route for the Temperature issue.

Setting up the assessment tool

6. Set up all of the individual homes in the 'Dwellings' section of the online assessment tool.
7. Complete the inputs for the 'dwelling details' section of the online assessment tool, to ensure shared common areas are taken into account if they are present (see Heated common areas on the next page).

Uploading and entering inputs

8. Select the assessed dwelling within the 15 Energy and cost part of the assessment tool.
9. Upload the HQM SAP XML file that corresponds within the selected home.
10. Where available, upload the energy bolt-on XML file that corresponds with the selected home. Defaults will be assumed for the bolt-on inputs where an energy bolt-on XML file is not uploaded (see Guidance note 28).
11. Where common areas have been confirmed as present, inputs for these areas will be visible. Enter the number of homes per common area then either upload the corresponding BRUKL input file or enter the inputs in manually.
12. Where targeting credits via the foundation route in the Temperature issue, upload the temperature bolt-on XML file.
13. Select 'calculate score' and outputs will be generated for 02 Energy performance, 03 Towards carbon negative and 04 Cost.
14. Repeat the process for each assessed dwelling.

To upload files, users can either 'choose file' and select the appropriate file or drag and drop the file directly.

Further help

If an upload error is received, the error message should give you an indication of what file has a problem. Please check the SAP and bolt-on inputs to ensure there are no discrepancies and check the knowledge base for solutions to common problems. If the source of the error cannot be identified, please send the following to HQM@bre.co.uk, where applicable: the affected XML files, details of the error message, SAP input files, completed excel tools and any screenshots or details that may be useful.

Please also see BREEAM Projects for further guidance, such as webinars, and Guidance Note 28 'HQM Energy and Cost Methodology' (GN28). GN28 provides details of the calculation methodologies used to determine the outputs required to demonstrate compliance with 15 Energy and cost .

Heated common areas

Where homes are served by heated common areas (assessed under ADL2a), these must be included in the energy calculations.

In these cases, a copy of the BRUKL Output Document: Compliance with Building Regulations output document for the heated common area must be input into the calculations and linked to the relevant homes (i.e. those served by the heated common area).

For the purposes of the HQM assessment, the performance of the heated common areas will be distributed equally across the total number of homes served by this area and reflected in the individual home's outputs.

Compliance Notes

| Criterion Reference | Compliance Note | |
|---------------------|--------------------------------------|---|
| All | CN1 Low and zero carbon technologies | <p>Low or zero carbon technologies (LZCTs) that can be used to offset CO₂ emissions arising from regulated and, in the case of crit 3 and crit 4 unregulated energy consumption. Any contribution from LZCTs present in the HQM SAP XML files, are automatically accounted for in the online assessment tool outputs.</p> <p>The LZCT technology can be installed on site or near site (see definitions) where a private wire arrangement is in place. 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.</p> |

| Criterion Reference | Compliance Note | |
|---------------------|---|---|
| All | CN2 Building assessed as part of a larger development | Where the building under assessment forms part of a larger development and either a new or existing LZCT installation is provided for the whole site, then the amount of LZCT energy generation counted for in this issue, and subsequent CO ₂ emissions saved, should be proportional to the building's energy consumption compared to the total energy consumption for the site. |
| All | CN3 SAP - Section 16 | Section 16 of SAP extends the SAP calculations to account for CO ₂ emissions associated with unregulated operational energy consumption. It calculates the CO ₂ emissions from appliances and cooking. Section 16 also allows for site-wide electricity generating technologies. Outputs from section 16 should be used to determine the percentage of the building's unregulated operational energy consumption figure required for towards Carbon negative part of the criteria. |
| All | CN4 Phased or multiple home development | See Appendix D - Post-construction stage assessment issue exceptions on page 243. |

Evidence

| Criterion Reference | Title | Design Stage | Post Construction Stage |
|---------------------|------------------------------|---|---|
| All | 01 General Evidence | One or more of the appropriate evidence types listed in Appendix C - HQM evidence requirements on page 236 can be used to demonstrate compliance with these criteria. | |
| All | 02 HQM energy reporting tool | A copy of the completed HQM energy reporting tool and documentary evidence supporting the data used to complete the tool. | As per design stage, but based on as-built evidence |
| All | 03 SAP outputs | Copies of the SAP output documents | As per design stage, but based on as-built evidence |
| All | 04 BRUKL outputs | Copies of the BRUKL output document where relevant, see Methodology on page 93 | |

Checklists, Tables & Illustrations

Checklists, Tables & Illustrations

Table 22 Bolt-on inputs

| Bolt-on topics | Required data |
|-------------------|---|
| Internal lighting | For each lamp: <ul style="list-style-type: none"> - Quantity - Lumens - Power (Watts) |
| Hot water | For all baths and showers: <ul style="list-style-type: none"> - Number of fittings - Showers: Flow rate of each fitting - Baths: Volume of each fitting (to capacity). |
| Appliances | The kWh/annum or kWh/cycle figure (taken from the EU energy label) for each of the following appliances (where specified): |

| Bolt-on topics | Required data |
|----------------|---|
| | <ul style="list-style-type: none"> - Fridge - Freezer - Fridge/freezer - Washer/dryer - Washing machine - Tumble drier - Dishwasher - Oven. |

Definitions

Accredited energy assessor

A person registered with an accredited energy assessment scheme provider. The scheme provider will be licensed by the relevant Government department to accredit competent persons in the energy assessment of non-domestic or domestic buildings for the purposes of demonstrating compliance with the Building Regulations in the country of origin. The energy assessor should be appropriately accredited for the building being assessed.

For England and Scotland:

For a full list of approved accreditation schemes or organisations for energy assessors and links to registers of accredited energy assessors, visit: www.ndepcregister.com (non-domestic), www.epcregister.com (domestic)

For Scotland:

For a full list of approved accreditation schemes or organisations for energy assessors and links to registers of accredited energy assessors, visit: www.scotland.gov.uk

For a full list of approved accreditation schemes or organisations for energy assessors and links to registers of accredited energy assessors, visit: www.epbniregisternd.com (non-domestic), www.epbniregister.com (domestic)

Approved building energy calculation software

Software approved for the purpose of demonstrating compliance with the energy efficiency and carbon emission requirements of the building regulations.

For England, Scotland and Wales:

For domestic buildings, this refers to approved SAP software a list of which can be found at the following www.bre.co.uk/sap2012

For England and Wales:

For non-domestic buildings, this refers to approved SBEM software's (and its interface iSBEM, as well as third party software approved by the relevant Government department), a list of which can be found at the following: www.ncm.bre.co.uk

For Scotland:

For non-domestic buildings, this refers to approved SBEM software's (and its interface iSBEM, as well as third party software approved by the relevant Government department), a list of which can be found at the following: www.scotland.gov.uk

BREDEM

The Building Research Establishment Domestic Energy Model (BREDEM) is a calculation methodology to estimate the energy consumption of a home based on its characteristics. It complies with the principles given in BS EN 13790:2008. Energy performance of buildings. Calculation of energy use for space heating and cooling⁽⁹⁶⁾.

The output of a BREDEM calculation is in the form of estimated fuel requirements for various end uses, which can be converted readily into fuel costs or CO₂ emissions using suitable conversion factors. BREDEM is therefore suited to various energy modelling tasks, such as stock modelling and the assessment of the potential benefits of energy efficiency improvements.

Building regulations for energy

For England

The current building regulations applied for energy in England are:

- Domestic: Approved Document L1A: Conservation of fuel and power in new dwellings, 2013 edition - for use in England
- Non-domestic: Approved Document L2A: Conservation of fuel and power in new buildings other than dwellings, 2013 edition - for use in England

For Scotland:

The current building regulations applied for energy in Scotland are:

- Domestic: Technical Handbook 2013 Domestic, Section 6 Energy
- Non-domestic: Technical Handbook 2013 Non-Domestic, Section 6 Energy

For Wales:

The current building regulations applied for energy in Wales are:

- Domestic: Approved Document L1A: Conservation of fuel and power, New dwellings, July 2014 - for use in Wales
- Non-domestic: Approved Document L2A: Conservation of fuel and power, New buildings other than dwellings, July 2014 - for use in Wales

The current building regulations applied for energy in Northern Ireland are:

- Domestic: Technical Booklet F1 (Conservation of fuel and power in dwellings), October 2012
- Non-domestic: Technical Booklet F2 (Conservation of fuel and power in buildings other than dwellings), October 2012

Carbon negative

A building or site that generates, surplus to its own energy demand, an excess of renewable or carbon neutral energy and exports that surplus via the national grid to meet other, off-site energy demand, i.e. the building is a net exporter of zero carbon energy.

Surplus in this respect means the building or site generates more energy via renewable or carbon neutral sources than it needs to meet its own regulated and unregulated energy needs.

This definition of carbon negative focuses only on energy and carbon dioxide emissions resulting from the operational stage of the building life cycle, as this is the stated aim of this assessment issue. It does not take into account the embodied carbon, in terms of carbon fixing, or emissions resulting from the manufacture or disposal of building materials and components. These impacts and benefits are dealt with in Environmental impact of construction products.

Carbon neutral

Carbon neutral means that, through a transparent process of calculating building operational emissions, reducing those emissions and offsetting residual emissions, net carbon emissions equal zero. This includes carbon emissions from both regulated and unregulated energy consuming plan and systems. Also see the definition of zero net regulated carbon (CO₂) emissions.

Cost output

The cost output is unique to the HQM and is calculated by the HQM energy engine using modelled outputs from approved building energy calculation software, against which cost credits are awarded.

It is an output based on the energy cost factor metric taken from the SAP assessment.

When calculating the cost output, a home's actual performance is compared against the relevant national building regulations compliance standard (i.e. a baseline), and the comparison is expressed as a percentage improvement.

The percentage improvement is then compared against a best practice performance level for modelled stock of house types, and then 'translated' into a cost output.

A description of how to obtain a home's cost output is summarised in Methodology on page 93. Greater detail of how the cost output is defined and calculated is provided in the Guidance note 28.

Energy demand

The building energy provided for end uses in the building such as space heating, hot water, space cooling, lighting, fan power and pump power. Energy demands are the same as room loads. One of the outputs from the Building Regulations Output Document is for heating and cooling energy demand only, not for any other building energy uses. Heating and cooling energy demands are influenced by factors including building fabric heat loss, air permeability, glazing and shading.

Home energy performance ratio (HEPR)

A metric that is unique to the HQM that is calculated by the HQM energy engineering modelled outputs from approved building energy calculation software, against which HEPR credits are awarded.

It is a ratio that defines the performance of a HQM assessed home in terms of its:

1. Heating and cooling energy demand (the fabric performance)
2. Primary energy consumption (system efficiency)
3. Total resulting CO₂ emissions.

For each metric, the homes actual performance is compared against the relevant National Building Regulations compliant standard (i.e. a baseline), and the comparison expressed as a percentage improvement.

The percentage improvement for each metric is then compared against a best practice performance level for modelled stock of house types, and then 'translated' into a ratio of performance for each metric. These ratios are then weighted for each metric and added together to determine a single overall HEPR.

A description of how to obtain a home's HEPR is summarised in Methodology on page 93. Greater detail of how the HEPR is defined and calculated is provided in the HQM energy guidance document.

Low or zero carbon technologies (LZCT)

A low or zero carbon technology provides a source of energy generation from renewable energy sources or from a low carbon source such as combined heat and power (CHP) or a ground source heat pump (GSHP).

Near-site LZCT

A low or zero carbon source of energy generation located near to the site of the assessed building. The source is most likely to be providing energy for all or part of a local community of buildings, including the assessed building, e.g. decentralised energy generation linked to a community heat network or renewable electricity sources connected via private wire.

On-site LZCT

A low or zero carbon source of energy generation which is located on the same site as the assessed building.

Primary energy

Energy from fossil fuel and renewable sources that has not undergone any conversion or transformation process. Primary energy is transformed by the means of energy generation used and its transmission to the building.

Private wire arrangement

In the context of the HQM for low or zero carbon technology installations, a private wire arrangement is where any electricity generated on or near 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 can only be allocated against an individual installation or building.

Regulated energy

This is building energy consumption resulting from the specification of controlled, fixed building services and fittings, including space heating and cooling, hot water, ventilation and lighting.

Standard assessment procedure (SAP)

The standard assessment procedure (SAP) is the methodology used by the Government to assess and compare the energy and environmental performance of homes. Its purpose is to provide accurate and reliable assessments of home energy performances that are needed to underpin energy and environmental policy initiatives.

SAP works by assessing how much energy a home will consume, when delivering a defined level of comfort and service provision. The assessment is based on standardised assumptions for occupancy and behaviour.

This enables a like-for-like comparison of home performance. Related factors, such as fuel costs and emissions of carbon dioxide (CO₂), can be determined from the assessment.

SAP quantifies a home's performance in terms of: energy use per unit floor area, a fuel-cost-based energy efficiency rating (the SAP Rating) and emissions of CO₂ (the Environmental Impact Rating). These indicators of performance are based on estimates of annual energy consumption for the provision of space heating, domestic hot water, lighting and ventilation. Other SAP outputs include estimates of appliance energy use, the potential for overheating in summer and the resultant cooling load.

The Simplified Building Energy Model (SBEM)

SBEM is software developed for DCLG by BRE. SBEM is a computer program that provides an analysis of a building's energy consumption. It calculates monthly energy use and carbon dioxide emissions of a building (excluding homes) based on a description of the building geometry, construction, use and HVAC and lighting equipment.

SBEM is accompanied by a basic user interface, iSBEM. There also exists alternative approved software 'front-end' interfaces for SBEM (see definition of Approved building energy calculation software).

Unregulated energy

This is the energy consumption of the home that is not 'controlled', i.e. energy consumption from aspects of the home on which building regulations do not impose a requirement.

For the purposes of the HQM assessment, this includes energy associated with lighting, appliances and cooking.

Zero net regulated carbon (CO₂) emissions

The annual building net regulated CO₂ emissions (kg CO₂/m²/yr) arising as a result of annual energy consumption from fixed building services, i.e. space heating and cooling, domestic hot water, ventilation and lighting, also referred to as controlled services and fittings, as a result of requirements imposed on such systems by the building regulations. In aiming to achieve a zero regulated carbon status, the building energy modelling can take account of contributions of energy generated from on-site and near-site renewable and low carbon installations. Energy generated and supplied from off-site renewable and low carbon installations cannot be used to meet this definition.

16 DECENTRALISED ENERGY

Max credits

8

Indicators (Average)



Aim

To maximise the cost and carbon saving benefits of generation from low and zero carbon technologies (LZCTs) by encouraging best practice when selecting, installing and allowing for easy retrofit of LZCTs.

Benefit

- Reduce the home's running costs.
- Promote good quality installation to reduce the chance of defects.
- Protect consumers from fluctuating energy costs and incentives by making them less reliant on national grid electricity.
- Assist in reducing peak demands on the centralised energy supply network.

Context

There can be significant differences between how well LZCTs perform in practice when compared with their specification, due to inappropriate technologies being specified and inconsistent quality of installation⁽⁹⁷⁾. These differences can lead to the cost and carbon benefits associated with LZCTs and consumer trust being undermined.

Good practice in relation to the selection of LZCTs, improving on requirements in Building Regulations Part L1A, and carrying out appropriate timely feasibility studies all help to make the most of the benefits from LZCTs Schemes recognised by UK Government and industry, including Microgeneration Certification Scheme (MCS) and CHPQA, are recognised as valid ways of monitoring the quality of design and installation. In circumstances where it is not appropriate to install LZCTs up front, it is good practice to facilitate its later installation by ensuring easy retrofit at a later date.

LZCTs are developing rapidly with continuous improvements in performance and reductions in upfront costs. Innovative solutions are expected to emerge that are not specifically acknowledged within this issue. As a result, there is flexibility to acknowledge technologies not covered by schemes referenced.



Credit Summary

| Criterion number | Title | Credits |
|-------------------------|---|---------------------|
| crit 1 | 01 Home information | Minimum requirement |
| crit 2 | 02 Feasibility study | Prerequisite |
| crit 2 | 03 Implementation of feasibility study findings | up to 8 credits |
| crit 3-crit 4 | 03A Infrastructure | for 4 credits |
| crit 5-crit 6 | 03B Installation | for 8 credits |
| Total credits available | | 8 |

Criteria

| | |
|--|---|
| 01 Home information | Minimum requirement |
| crit 1 | Home information needs to be provided as part of or all of the criteria in this issue. Please see 34 Home Information on page 206. |
| 02 Feasibility study | Prerequisite |
| crit 2 | An independent assessment prepared by an appropriately qualified professional (AQP) is carried out to establish the most feasible recognised local (on-site LZCT or near-site LZCT) low or zero carbon (LZC) energy sources for the home or development, as well as any suitable infrastructure for future retrofit (see Methodology and Table 23 below). |
| 03 Implementation of feasibility study findings | up to 8 credits |
| 03A Infrastructure | for 4 credits |
| crit 3 | crit 2 above has been achieved. |
| crit 4 | Where the feasibility study confirms the installation of LZCTs is not currently a viable option, appropriate infrastructure is installed to allow the future retrofit of LZCTs in accordance with the feasibility study recommendations outlined in Table 23 below. |

Table 23 Infrastructure for future installation

| Infrastructure installed for | Provided for future installation as part of recommendations |
|------------------------------|---|
| Photovoltaics (PV) | <ol style="list-style-type: none"> 1. Architectural drawings and electrical diagrams detailing the proposed and installed system components. 2. Designated area for mounting the inverter and balance of system components. 3. Designated conduit area for the DC cable run from the proposed array location to the proposed inverter location. 4. Designated conduit area for the AC cable run from the proposed inverter location to electrical service panel. 5. Labelled slot for monitoring and metering equipment. 6. Labelled slot for a circuit breaker or a pre-install circuit breaker. 7. Confirmation of the space and load (weight) capability, e.g. loft floors, gable walls etc. are strong enough for panel retrofit. 8. If applicable, confirmation that the landscape planting uses low-growth trees and bushes, to avoid any potential shading issues in future. |
| Solar thermal | <ol style="list-style-type: none"> 1. Architectural drawings and plumbing diagrams detailing the pre-installed and proposed system components. 2. Designated area adjacent to the twin coil cylinder for mounting the balance of system components or pumping package. |

| Infrastructure installed for | Provided for future installation as part of recommendations |
|------------------------------------|---|
| | <ol style="list-style-type: none"> 3. Designated conduit area from utility room to the attic space below the proposed array space. 4. An electrical outlet near the designated wall area. 5. A solar bypass valve on the cold water feed of the water heater. 6. If applicable, confirmation that the landscape planting uses low-growth trees and bushes, to avoid any potential shading issues in future. |
| District heating ⁽⁹⁸⁾ | <ol style="list-style-type: none"> 1. Heating and hot water systems sized based on a maximum flow temperature of 70°C and a return temperature of 40°C. 2. Designated area for the hydraulic interface unit (HIU). 3. Provision of an electrical outlet and lighting near the designated wall area and a fused spur on a dedicated circuit to feed the HIU. 4. Heating system primary pipework arranged and shown on schematics to facilitate the future connection to the DH pipework. For example, main flow and return primary pipework to be routed from the designated area into the building heat emitter system. 5. Designated area for pipework conduit. |
| For LZCT options not covered above | Please contact BRE Global. |

03B Installation**for 8 credits**

- crit 5 crit 2 on the previous page has been achieved.
- crit 6 Where LZCTs are designed and installed in line with the feasibility study findings in and meet the following:
- crit 6.a: Produce energy from renewable sources and meet all other ancillary requirements as defined by Directive 2009/28/EC⁽⁹⁹⁾
- crit 6.b: There is a direct supply of energy produced to the home under assessment.
- crit 6.c: Complies with one of the following:
- crit 6.c.i: Technologies covered by MCS and under 50kWe or 45kWth must be MCS (or equivalent) certified products installed by MCS (or equivalent) certified installers.
- crit 6.c.ii: Combined heat and power (CHP) schemes above 50kWe must be certified under the CHPQA standard. CHP schemes fuelled by mains gas are eligible to contribute to performance against this issue
- crit 6.c.iii: An equivalent certification scheme (CN2 on the facing page)

Methodology

Feasibility study

The feasibility study referred to in crit 2 on the previous page should cover the following as a minimum:

1. Energy generated from LZCT per year.
2. Carbon dioxide savings from LZCTs per year.
3. Life cycle cost of the potential specification, accounting for payback.
4. Local planning criteria, including land use and noise.

5. Feasibility of exporting heat or electricity from the system.
6. Take into account any available green tariffs (Feed-In Tariff and Renewable Heat Incentive) and other grants.
7. All technologies appropriate to the site and energy demand of the development.
8. Reasons for excluding other technologies.
9. Where appropriate to the building type, connecting the proposed home to an existing local community CHP system or source of waste heat or power OR specifying a building or site CHP system or source of waste heat or power with the potential to export excess heat or power via a local community energy scheme.

Compliance Notes

| Criterion Reference | Compliance Note | |
|---------------------|--|--|
| All criteria | CN1 Phased or multiple home development | See Appendix D - Post-construction stage assessment issue exceptions on page 243. |
| crit 6 | CN2 Alternative certification schemes LZCTs options ⁽¹⁰⁰⁾ (101) | Where MCS or CHPQA certification is not available, the design team must investigate the availability of alternative accreditation schemes in line with the Directives listed above, or an equivalent country or regional directive or standard. Where an alternative accreditation scheme exists it should be used for the purpose of verifying compliance of the specified LZCT. If no alternative accreditation scheme exists, the design team must demonstrate they have investigated the competence of the installer selected to install the LZCT and are confident that they have the skill and competence to install the technology appropriately. |
| crit 6 | CN3 Air source heat pumps | Air source heat pumps can only be considered as a renewable technology when used in heating mode. Refer to Annex VI of Directive 2009/28/EC for more detail on accounting for energy from heat pumps. |

Evidence

| Criterion Reference | Title | Design Stage | Post Construction Stage |
|---------------------|--|---|-------------------------|
| All | 01 General Evidence | One or more of the appropriate evidence types listed in Appendix C - HQM evidence requirements on page 236 can be used to demonstrate compliance with these criteria. | |
| All | 02 Feasibility study | A copy of the feasibility study and a summary of the required criteria in line with Methodology. | |
| crit 3 to crit 6 | 03 Installation and commissioning certificates | Copies of the relevant architectural drawings, plumbing and electrical diagrams. | |

Checklists, Tables & Illustrations

None

Definitions

Appropriately qualified professional (AQP)

For the purposes of carrying out a feasibility study for this issue, an AQP is someone with substantial expertise or a recognised qualification for undertaking assessments, designs and installations of low and zero carbon solutions in the domestic buildings sector. They are not someone who is professionally connected to a particular low or zero carbon technology, manufacturer or installer. In order to complete the design and specification of the mechanical and electrical details, the individual will have acquired the relevant industry training and qualifications.

Competent Persons Scheme (CPS)

Competent Person Schemes (CPS) allow individuals and enterprises to self-certify that their work complies with the Building Regulations as an alternative to submitting a building notice or using an approved inspector. A Competent Person must be registered with a scheme that has been approved by The Scottish Government. Schemes authorised by the Scottish Government, the Building Standards Division website at www.certificationregister.co.uk The Scottish

Government for developments in Scotland or The Department for Communities and Local Government (DCLG) for developments in England and Wales. Schemes authorised by The Scottish Government or DCLG are listed on their respective websites at: www.communities.gov.uk for England and Wales, and www.certificationregister.co.uk for Scotland. The Department for Communities and Local Government (DCLG) for projects in England and Wales. Schemes authorised by DCLG are listed on its website at www.communities.gov.uk.

Near-site LZCT

A low or zero carbon source of energy generation located near to the site of the assessed building. The source is or will be providing energy for all or part of a local community of buildings, including the assessed home, e.g. decentralised energy generation linked to a community heat network or renewable electricity sources connected via private wire.

On-site LZCT

A low or zero-carbon source of energy generation which is located on the same site as the assessed home.

Recognised evaluation tools and methodologies

Tools and methodologies recommended by the relevant professional bodies and trade associations.

17 IMPACT ON LOCAL AIR QUALITY

Max credits

15

Indicators (Average)

| | | |
|---|---|---|
|  |  |  |
| My cost | My wellbeing | My footprint |

Aim

To promote the use of heating and hot water generating appliances with minimal impact on local air quality.

Benefit

- Reduces the impact on local air quality helping to protect human health.
- Reduces the risk of impact on sensitive ecosystems.

Context

The quality of the air we breathe impacts our health and those in our community, particularly the young. There are significant numbers of premature deaths and diseases associated with poor air quality. The World Health Organisation estimates that there are 500,000 premature deaths across Europe per year associated with, or as a result of poor air quality⁽¹⁰²⁾.

Combustion processes in vehicle engines, power generation, homes and industry generate air pollutants, including carbon dioxide, nitrous oxides (NO_x), sulphur oxides (SO_x) and small particulates, (particles smaller than 10 and 2.5 microns, respectively). These emissions are managed by local authorities through the Local Air Quality Management (LAQM) framework, as part of the Environment Act (1995).

While the main sources of air pollutants are dominated by road transport and large combustion plants; homes and the choice of heating and hot water systems do have an impact. NO_x levels vary considerably across the UK, with levels in urban areas and close to major roads being many times greater than in rural areas. This means that emissions from heating systems will have a much greater impact in areas where NO_x emissions are already high. This issue considers fuel types and if a site is connected to the gas grid.



Credit Summary

| Criterion number | Title | Credits |
|-------------------------|--------------------------------|------------------|
| crit 1-crit 2 | 01 Impact on local air quality | up to 15 credits |
| Total credits available | | 15 |

Criteria

01 Impact on local air quality **up to 15 credits**
for 15 credits

crit 1 Where all heating and hot water within a home is supplied by non-combustion appliances such as appliances powered by electricity.

up to 10 credits

crit 2 All installed plant must meet the following emission levels (Table 24 and Table 25). The measurements must be provided by manufacturers, following the labelling requirements of the European directive 2009/125/EC (for local space heaters⁽¹⁰³⁾, solid fuel local space heaters⁽¹⁰⁴⁾, boilers and combination heaters⁽¹⁰⁵⁾ and solid fuel boilers⁽¹⁰⁶⁾)

Table 24 Maximum NO_x emission levels by appliance type and fuel

| Appliance type and unit | Fuel | NO _x | | | |
|---|--------------------------------------|-------------------------------------|--------------------------------------|--------------------------------------|---------------------------------------|
| | | 7 credits (Low pollution locations) | 7 credits (High pollution locations) | 10 credits (Low pollution locations) | 10 credits (High pollution locations) |
| Boiler (mg/kWh) | Gas | 27 | 27 | 24 | 24 |
| Boiler (mg/kWh) | Oil | 56 | 56 | 55 | 50 |
| Boiler (mg/m ³) | Biomass and solid fossil fuel | 130 | | 70 | |
| Cogeneration or heat pumps using external combustion (mg/kWh) | Gas | 34 | 34 | 30 | 30 |
| Cogeneration or heat pumps using external combustion (mg/kWh) | Oil | 96 | 56 | 70 | 50 |
| Cogeneration - using internal combustion engine (mg/kWh) | Gas | 119 | | | |
| Cogeneration - using internal combustion engine (mg/kWh) | Oil | 140 | | | |
| Local Space Heaters (mg/kWh) | Gas and oil | 76 | | | |
| Closed fronted local space heaters (mg/m ³) | Biomass, solid fuel and wood pellets | 130 | | | |

Table 25 Maximum particulate matter and volatile organic compound (VOC) emissions for appliances using for biomass, solid fuel and wood pellets

| Appliance type and unit | Fuel | 7 Credits (low pollution locations) | | 7 Credits (high pollution locations) | | 10 Credits (low pollution locations) | | 10 Credits (high pollution locations) | |
|-----------------------------|---------|-------------------------------------|-----|--------------------------------------|-----|--------------------------------------|-----|---------------------------------------|-----|
| | | PMs | VOC | PM | VOC | PM | VOC | PM | VOC |
| Boiler (mg/m ³) | Biomass | 14 | 7 | 6 | 7 | 11 | 5 | 4 | 5 |

| Appliance type and unit | Fuel | 7 Credits (low pollution locations) | | 7 Credits (high pollution locations) | | 10 Credits (low pollution locations) | | 10 Credits (high pollution locations) | |
|---|-------------------------------|-------------------------------------|-----|--------------------------------------|-----|--------------------------------------|-----|---------------------------------------|-----|
| | | PMs | VOC | PM | VOC | PM | VOC | PM | VOC |
| Boiler (mg/m ³) | Solid fossil fuel | 19 | | | | 17 | | | |
| Closed face local space heater (mg/m ³) | Wood pellets | 26 | 26 | 20 | 20 | 22 | 22 | 10 | 10 |
| Closed face local space heater (mg/m ³) | Biomass and solid fossil fuel | 50 | 50 | | | 25 | 25 | | |

PMs = particulate matter and VOC = volatile organic compounds. For the purposes of HQM, PM and VOC emissions are only relevant to the assessment of biomass and solid fuel fired technologies.

Methodology

To identify whether the site is in a low or high pollution area, see uk-air.defra.gov.uk.

- Select data type = Background
- Select a layer to view = NO_x (as NO₂) annual mean
- Select a year = 2015
- Use “Draw Area” to draw a line around the site boundary for the development.
- The tool then displays the results for the selected area.
- Use the “Max” value displayed for the Area Selected to determine whether the site is in a low or high pollution area
- Take a screenshot which shows the area of the development and the max NO_x for an area and retain for audit purposes.

For all locations repeat the above where

- Select a layer to view = PM10
- Take a screenshot which shows the area of the development and the max PM10 for an area and retain for audit purposes.

Compliance Notes

| Criterion Reference | Compliance Note | |
|---------------------|---|--|
| All | CN1 Phased or multiple home development | See Appendix D - Post-construction stage assessment issue exceptions on page 243 |
| All | CN2 Open-flued appliance | No credits may be awarded for open flue appliances used for heating or hot water. |
| All | CN3 District Heating | Where a project is connected to a district heating system which is outside the scope of the project or the wider development (for example phased developments), the system does not need to be included in the assessment. This is on the basis that the development's design team do not have control over the specification of the system. Where the development's design team do have control over the specification of the system, then it must be assessed. |
| All | CN4 Multiple appliances (including appliances for secondary or back-up heating) | Where multiple appliances are specified, the number of credits awarded is determined by the appliance with the lowest number of credits. |

| Criterion Reference | Compliance Note | |
|---------------------|---|--|
| | and hot water) | |
| | CN5 Appliances fuelled by biomass, solid fossil fuel and wood pellets | The number of credits awarded to an appliance is determined by the worst performing of PM, VOCs and NO _x for an appliance. If for example the NO _x and PM requirements are achieved for the 7 credit (low pollution location) scale but the VOC requirements are not then no credits can be awarded. |
| crit 2 | CN6 Combustion appliances not listed (including secondary and back-up appliances) | No credits can be awarded for combustion appliances that are not listed in Table 24 and Table 25 Note: Emergency back-up heating and hot water systems are outside the scope of this issue and should not be assessed. |

Evidence

| Criterion Reference | Title | Design Stage | Post Construction Stage |
|---------------------|---------------------|---|-------------------------|
| All | 01 General Evidence | One or more of the appropriate evidence types listed in Appendix C - HQM evidence requirements on page 236 can be used to demonstrate compliance with these criteria. | |

Checklists, Tables & Illustrations

None.

Definitions

High pollution location

Any developments where any portion of the site is within a local authority AQMA are automatically considered to be high pollution locations.

For developments that are wholly outside of an AQMA, the following levels define high pollution locations :

NO_x = >15µg/m³ averaged over a year

PM10 = >10µg/m³ averaged over a year

Please refer to the methodology section to identify whether a site is in a low or high pollution location.

Where the ambient emission level for either pollutant exceeds the high threshold the development is considered to be in a high pollution area.

Low pollution location

Any location that does not meet the definition of a high pollution location.

Open-flued appliance

An open-flued appliance is one which draws its combustion air from the room or space within which it is installed and which requires a flue to discharge its products of combustion to the outside air.

MATERIALS

This section discusses the following.

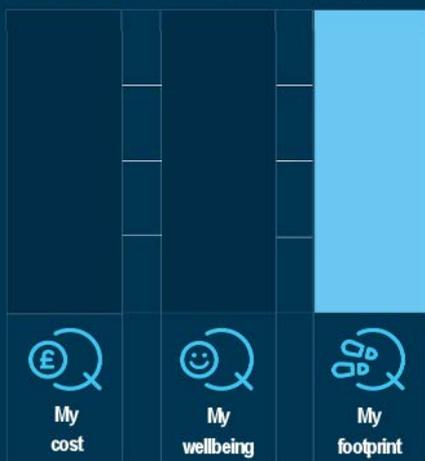
| | |
|---|------------|
| 18 Responsible Sourcing of Construction Products | 110 |
| 19 Environmental Impact from Construction Products | 119 |
| 20 Life Cycle Costing of Construction Products | 129 |
| 21 Durability of Construction Products | 132 |

18 RESPONSIBLE SOURCING OF CONSTRUCTION PRODUCTS

Max credits

25

Indicators (Average)



Aim

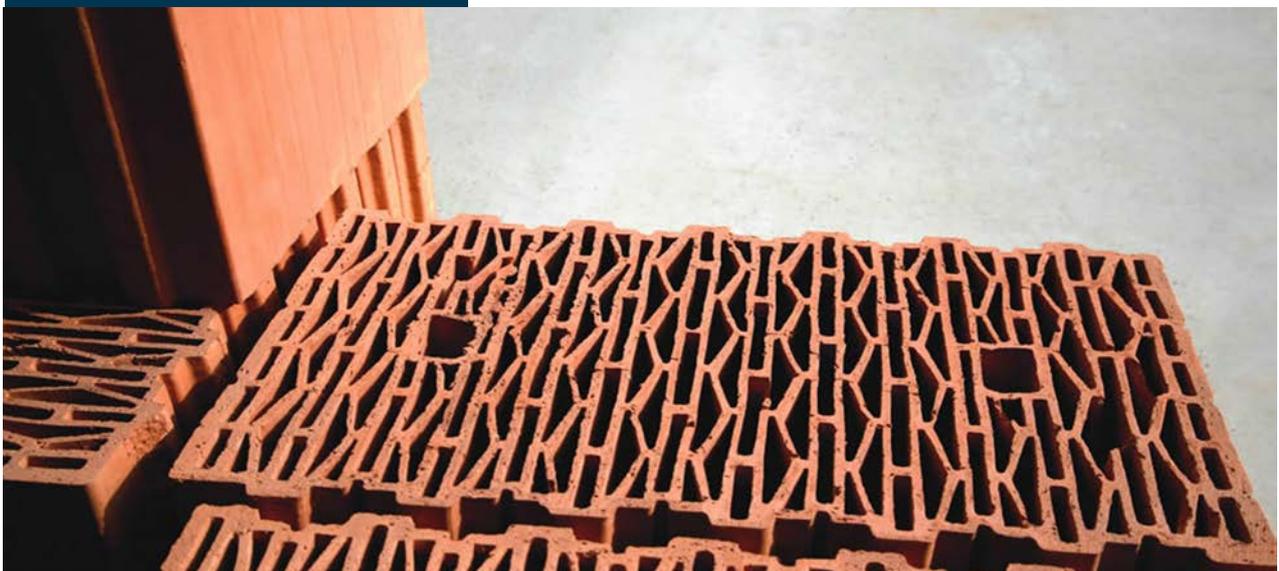
To encourage the selection of construction products where sustainable development principles have been implemented across the supply chain including extraction, processing and manufacture of the constituent materials and components.

Benefit

- Promotes economic, social and environmentally responsible practices in the supply chain and manufacturing of construction products and reduces impacts of housebuilding
- Encourages the use of credible and comparable schemes to evaluate responsible sourcing practices.
- Helps manufacturers and developers to demonstrate they are managing their business in a fair and ethical manner
- Helps consumers understand the environmental, economic and social issues in the supply chain of the construction products used in their home.

Context

The manufacturing of construction products typically involve a long and complex supply chain that results in wide range of impacts. These may be environmental (e.g. toxicity or biodiversity), economic (e.g. corruption) or social (e.g. slave labour, equality) or issues that affect all three, such as climate change. The complete supply chain of construction products may extend globally into regions where tracking them is particularly challenging. Responsible sourcing certification schemes (RSCS) present a mechanism for the robust and holistic reporting of the impact of construction products. Using construction products covered by a credible RSCS provides confidence to specifiers that risks have been avoided or minimised in the chosen products.



Credit Summary

There are 2 routes to assessing this issue; Foundation route, and Comprehensive route on page 118. These routes represent varying degrees of rigour. The route selected will depend on whether quantity information is available. More credits are available through the more rigorous comprehensive route.

| Criterion number | Title | Credits |
|-------------------------|---|------------------|
| crit 1 | 01 Legally harvested and legally traded timber | prerequisite |
| crit 2 | 02 Product procurement policy | for 2 credits |
| crit 3 | 03 Responsible sourcing of construction products assessment | up to 23 credits |
| Total credits available | | 25 |

Criteria

01 Legally harvested and legally traded timber prerequisite

crit 1 All timber and timber based products used in the buildings meet the definition of Legally harvested and traded timber on page 118

02 Product procurement policy for 2 credits

crit 2 By the end of RIBA stage 2 (or equivalent), the client or developer has a documented policy and procedure that :

crit 2.a: sets out procurement requirements for all suppliers and trades to adhere to relating to the responsible sourcing of construction products.

crit 2.b: is disseminated to all relevant internal and external personnel and

crit 2.c: included within the construction contract to ensure that they are enforceable on the assessed project.

crit 2.d: encourages the specification of products with responsible sourcing certification over similar products without certification.

03 Responsible sourcing of construction products assessment up to 23 credits

crit 3 The home has been assessed to either the foundation route, comprehensive route or a combination of the two routes in accordance with the methodology. Credits are awarded according to Table 26.

Table 26 Credit allocation table

| % of available points achieved | Credits |
|--------------------------------|---------|
| ≥ 5 | 5 |
| ≥ 10 | 7 |
| ≥ 15 | 9 |
| ≥ 20 | 11 |
| ≥ 25 | 13 |
| ≥ 30 | 15 |
| ≥ 35 | 17 |
| ≥ 40 | 19 |
| ≥ 45 | 21 |
| ≥ 50 | 23 |

Methodology

Documented product procurement policy

This may be prepared and adopted at an organisational level or be site or project specific. It is recommended (but not a requirement) that the documented policy follows the principles of BS 8900-1:2013⁽¹⁰⁷⁾ Managing sustainable development of

organisations - Guide or BS 8903:2010⁽¹⁰⁸⁾ Principles and framework for procuring sustainably - Guide. This policy may form a part of a broader Sustainable Procurement Plan or be in the form of a standalone document

Responsible sourcing of construction products assessment

To determine the number of credits achieved for crit 3 on the previous page, the HQM Responsible Sourcing of Construction Products tool must be completed with all relevant information based on the route followed (see Definitions on page 117 for more information on the different routes). The foundation route must be followed where quantity information is not available. Follow comprehensive route where quantity information is available.

It may be the case that across an assessment there will be a combination of routes for products. For example, foundation route may be used for timber or timber based category and comprehensive route for the metal category. Only one route can be used per material category.

The responsible sourcing score is calculated at the whole building level. This means that a separate calculation is required for each building to determine the responsible sourcing score and associated credits. Where the building comprises more than one home (e.g. semi-detached, clustered, terrace and apartments) specific calculations are not required for each home—the building's score and credit award is used for each home in the building.

For all routes, the HQM materials tool is used according to the following steps.

Step 1: Complete all required inputs in the 'Overview details' tab in the HQM Tool

Step 2: Complete the 'Input' tab by following the steps below

For each construction product in the building* that is in scope (see Scope of assessment on the facing page):

*For semi-detached, clustered, terrace and apartment homes types, 'the building' means the whole building or block and landscaping associated with it. For detached homes, 'the building' means the detached home only and landscaping associated with it.

For the foundation route, only the following steps are required: Step 2.1, Step 2.3, Step 2.5, Step 2.6, Step 2.7 and Step 2.9. For the foundation route and comprehensive route, Step 2.4 is optional.

Step 2.1. Estimate if the quantity is above the cut-off volume (see Cut-off volume thresholds and exclusions). If it is, enter the construction product in the HQM materials tool and assign it a 'location and use' category, then proceed to the next step. If not, the construction product need not be assessed.

Step 2.2. (Comprehensive route only): Estimate the quantity (mass or volume. See Quantities precision on page 117) in the building.

Step 2.3. Obtain the BREEAM recognised responsible sourcing certification schemes (RSCS) certificate or environmental management system (EMS) certificate, if any (see Checking responsible sourcing certificates). Compare the certification with BREEAM Guidance Note 18 (GN18): BREEAM Recognised Responsible Sourcing Certification (available to assessors through BREEAM Projects) and obtain the certification scheme point score and enter the score in the tool. Where the construction product:

- Has no certification, it is non-compliant with the broken chain requirements (see Broken chain on page 118) or the certification type is not listed in Guidance Note 18, the score is 0.
- Is a reused product, obtain the score from Guidance Note 18 for these products.

Step 2.4. (Optional, if not followed go to Step 2.5): Where a constituent construction product has a better certification score (see Checking responsible sourcing certificates on page 116) than the overall construction product and it complies with the broken chain requirements, the following steps should be followed:

Step 2.4.1. Identify the material categories that make up an estimated $\geq 80\%$ of the constituent construction product's volume.

Step 2.4.2. Include each identified materials category in the HQM materials tool (by creating new entries).

Step 2.4.3. If $\geq 5\%$ of the volume is unaccounted for in Step 2.4.1, include the 'Other' material category.

Step 2.4.4. (Comprehensive route): For each material category following the comprehensive route and identified in Step 2.4.1, enter the building-wide quantity into the HQM materials tool. This may be based on a % of the overall construction product’s quantity estimated in Step 2.1.

Step 2.4.5. For each material category (including ‘Other’), enter the constituent’s certification score identified in Step 2.4 into the HQM materials tool.

Step 2.5. Identify the materials category(ies) that make up an estimated ≥ 80% of the product’s volume (excluding quantities entered for Step 2.4.1, if applicable).

Step 2.6. Include each identified materials category in the HQM materials tool (by duplicating the entry made in Step 2.1).

Step 2.7. If ≥ 5% of the volume is unaccounted for in Step 2.5 (and Step 2.4.1, if applicable), include the ‘Other’ material category.

Step 2.8. (Comprehensive route only): For each material category following the comprehensive route and identified in step 2.5, enter the building-wide quantity into the HQM materials tool. This may be based on a % of the overall construction product’s quantity estimated in Step 2.1.

Step 2.9. For each material category (including ‘Other’), enter overall construction product’s certification score (from step 2.3) into the HQM materials tool.

Refer to Guidance Note 24 for further explanation of this method and worked examples.

Step 3. For each home in the building:

Step 3.1 Once all required inputs in the ‘Overview’ tab have been completed, create an XML file

3.2. Upload the XML file created under step 3.1 into BREEAM Projects online HQM assessment tool. Click calculate score. The online tool will indicate score achieved and award credits according to Table 26 on page 111. For semi-detached, clustered, terraced and apartment building types, the same credit result is used for each home in the building.

Scope of assessment

Table 27 below, based on the New Rules of Measurement (NRM) classification system, indicates the building elements that must be included in the scope of the assessment. Including these elements (and only these) is necessary to ensure an appropriate level of comparability. All construction products that are installed as part of one or more of these building elements are in-scope and must be included in the HQM materials tool. For each building element the respective ‘Location and use’ category, for use in the HQM materials tool, is provided in the table.

For external works building elements, only construction product (and their quantities) that are for the private use of the building occupants should be included in the scope.

Table 27 Scope of assessment, common building element designation, location and use categories

| RICS NRM Level 2 Element | RICS NRM Level 3 Sub-element | BREEAM ‘Location and use’ category | To be included |
|--------------------------|------------------------------|-------------------------------------|-------------------------------------|
| 1 Substructure | | | |
| 1 | Substructure 1 | 7. Structure, primary and secondary | ✓ |
| | 2 | Standard foundations | ✓ |
| | 3 | Specialist foundation systems | ✓ |
| | 4 | Lowest floor construction | ✓ |
| | 5 | Basement excavation | N/A |
| | 6 | Basement retaining walls | 7. Structure, primary and secondary |
| | 7 | | ✓ |
| 2 Superstructure | | | |

| RICS NRM Level 2 Element | RICS NRM Level 3 Sub-element | BREEAM 'Location and use' category | To be included | |
|--------------------------|------------------------------|---|-------------------------------------|---|
| 1 | Frame | 1 Steel frames | 7. Structure, primary and secondary | ✓ |
| | | 2 Space decks | | ✓ |
| | | 3 Concrete casings to steel frames | | ✓ |
| | | 4 Concrete frames | | ✓ |
| | | 5 Timber frames | | ✓ |
| | | 6 Other frame systems | | ✓ |
| 2 | Upper Floors | 1 Floors | 3. Floor (including floor finishes) | ✓ |
| | | 2 Balconies | | ✓ |
| | | 3 Drainage to balconies | 11. Other | ✓ |
| 3 | Roof | 1 Roof structure | 6. Roof (including roof finishes) | ✓ |
| | | 2 Roof coverings | | ✓ |
| | | 3 Specialist roof systems | | ✓ |
| | | 4 Roof drainage | | ✓ |
| | | 5 Rooflights, skylights and openings | 2. Door, window | ✓ |
| | | 6 Roof features | 6. Roof (including roof finishes) | ✓ |
| 4 | Stairs and Ramps | 1 Stair and ramp structures | 7. Structure, primary and secondary | ✓ |
| | | 2 Stair and ramp finishes | 3. Floor (including floor finishes) | ✓ |
| | | 3 Stair, ramp balustrades and handrails | 11. Other | ✓ |
| | | 4 Ladders, chutes, slides | | ✓ |
| 5 | External Walls | 1 External enclosing walls above ground floor level | 8. External wall | ✓ |
| | | 2 External enclosing walls below ground level | 7. Structure, primary and secondary | ✓ |
| | | 3 Solar, rain screening | 8. External wall | ✓ |
| | | 4 External | | ✓ |

| RICS NRM Level 2 Element | RICS NRM Level 3 Sub-element | BREEAM 'Location and use' category | To be included |
|--|------------------------------|--|--|
| | | soffits | |
| | 5 | Subsidiary walls, balustrades, handrails, railings and proprietary balconies | 11. Other ✓ |
| | 6 | Façade access, cleaning systems | ✓ |
| 6 | 1 | External windows | 2. Door, window ✓ |
| | 2 | External doors | ✓ |
| 7 | 1 | Walls and partitions | 5. Internal partition, internal walls (including finishes) ✓ |
| | 2 | Balustrades and handrails | 11. Other ✓ |
| | 3 | Moveable room dividers | 5. Internal partition, internal walls (including finishes) ✓ |
| | 4 | Cubicles | ✓ |
| 8 | 1 | Internal doors | 2. Door, window ✓ |
| 3 Internal Finishes | | | |
| 1 | 1 | Finishes to walls | 5. Internal partition, internal walls (including finishes) ✓ |
| 2 | 1 | Finishes to floors | 3. Floor (including floor finishes) ✓ |
| | 2 | Raised access floors | ✓ |
| 3 | 1 | Finishes to ceilings | 1. Ceiling (including ceiling finishes) ✓ |
| | 2 | False ceilings | ✓ |
| | 3 | Demountable suspended ceilings | ✓ |
| 4 Fittings, Furnishings and Equipment | | | |
| 1 | 2 | Domestic kitchen fittings, fixed furniture and equipment | 11. Other ✓ |
| 5 Services | | | |
| N/A | | | |
| 6 Complete Buildings and Building Units | | | |
| To be broken down into other classifications. | | | |
| 8 External Works | | | |
| 2 | 1 | Roads, paths | 10. Hard landscaping ✓ |

| RICS NRM Level 2 Element | RICS NRM Level 3 Sub-element | BREEAM 'Location and use' category | To be included |
|--------------------------|------------------------------|---|----------------|
| Paths and Pavings | 2 | and pavings Special surfacings and pavings | ✓ |

The material categories, for use in the HQM materials tool, must be in accordance with Table 28 below. For each construction product, identify the closest matching category.

Table 28 Materials categories

| Material category | Uniclass equivalent code |
|---|--------------------------|
| 1. Timber or timber-based | P5 |
| 2. Concrete or cementitious | P2* |
| 3. Metal | P4 |
| 4. Stone or aggregate | P1, P3* |
| 5. Clay-based | P33 |
| 6. Gypsum | P232 |
| 7. Glass | P314 |
| 8. Plastic, polymer, resin, paint, chemicals and bituminous | P7, P34 |
| 9. Animal fibre or skin, cellulose fibre | P6 |
| 10. Other | |

*Except subsets listed separately.

Checking responsible sourcing certificates

Confirmation of manufacturers and suppliers claims should be sought from the relevant responsible sourcing scheme provider. Many of the organisations who administer these schemes will, via their website, list companies and products that have been certified against their standards, including the scope of any such certification. Some schemes, including BES 6001 via www.greenbooklive.com, will provide downloadable copies of the relevant certificate, which can in turn be used as evidence for this issue.

Broken chain

To recognise responsible sourcing certification where it does exist in the supply chain, while reducing the risks associated with a broken chain, it is permissible to use the upstream certification score in the HQM materials tool where the downstream risk to responsible sourcing is considered to be low. Specifically, it is acceptable for the following types of organisations in the supply chain (that are downstream of the organisation with certification) not to have their own responsible sourcing certification:

1. Organisations that only handle or transport, or
2. Organisations that only fabricate, assemble or install and are using a recognised quality management system to ensure the mixing and substitution of the certified upstream source with uncertified sources has not occurred

And

3. Are operating in a jurisdiction that can demonstrate relatively robust and well enforced environmental, social and economic controls. For example:
 - States which are members of the EU
 - States that have declared adherence to the OECD Guidelines for Multinational Enterprises.

Cut-off volume thresholds and exclusions

Any construction product which clearly accounts for less than 0.1m³ per 100m² GIFA (see definitions) can be excluded from the assessment. The volume considered should be taken as the construction product's overall external

dimensions, including any internal voids or air spaces. Minor fixings (e.g. brackets nails, screws etc.), adhesives, seals and ironmongery would normally fall below this threshold.

Quantities precision

The degree of tolerance accepted for estimating quantities is $\pm 20\%$ of the final installed quantity.

It is not necessary for the assessor to submit calculations in order to justify estimates. In particular, the cut-off estimation for many construction products that are clearly below the cut-off volume - may be done without the need for any calculations at all

Compliance Notes

None.

Evidence

| Criterion Reference | Title | Design Stage | Post Construction Stage |
|---------------------|--|--|---|
| All | 01 General evidence | See Appendix C - HQM evidence requirements on page 236 for a list of general evidence types that can be used to demonstrate compliance with the relevant criteria for this issue. | |
| crit 1 | 02 Legally harvested and legally traded timber | Evidence that all timber and timber based products used in the building meet the definition of 'legally harvested and legally traded timber'. | |
| crit 2 | 03 Documented product procurement policy | <ul style="list-style-type: none"> - A copy of the documented product procurement policy. - Evidence that the policy was developed before the end of RIBA stage 2 - Evidence that the policy is disseminated, or a written commitment to do so. - Evidence that the policy is included in the construction contract, or a written commitment to do so. - Evidence that there is a policy to encourage the specification of products with responsible sourcing certification | <ul style="list-style-type: none"> - Evidence that the policy was disseminated. - Evidence that the policy was included in the construction contract. |
| crit 3 | 04 Responsible sourcing of construction products | <ul style="list-style-type: none"> - A copy of the completed HQM materials tool. - A copy of all responsible sourcing certificates. - A copy of all EMS certificates. - For affected certified construction products, evidence on how the broken chain requirements are met. | |

Checklists, Tables & Illustrations

None.

Definitions

BREEAM recognised responsible sourcing certification schemes (RSCS)

These are third party schemes evaluated by BRE Global for recognition under BREEAM. Refer to BREEAM Guidance Note 18 (GN18): BREEAM Recognised Responsible Sourcing Certification (available to assessors through BREEAM Projects). Refer to the BREEAM website for information on the evaluation criteria and the process for the evaluation and acceptance of schemes, including application and appeals.

Broken chain

Where a construction product (or constituent construction product) is certified but is supplied via one or more downstream organisations that have no relevant certification. In this situation, unless the broken chain requirements are met, the certification is not accepted by BREEAM.

Comprehensive route

The comprehensive route provides a more accurate measurement of the risks in the building design associated with construction products by taking account of the quantity of each construction product within a location and use category. It requires quantities to be entered into the HQM materials tool rather than using the lowest 'location and use' category score per material category. The improvement in rigour justifies the comprehensive route having the potential to produce better scores than the foundation route.

Constituent construction product

A manufacturer specific construction product (i.e. with a manufacturer reference number) that is not specified by the designer or selected by the constructor but is used in the manufacture of a specified construction product.

Construction product

A manufacturer specific construction product (i.e. with a manufacturer reference number) that is specified by the designer (e.g. architect, engineer, interior designer, quantity surveyor, landscape architect etc.) or selected by the constructor (principal or sub-contractor), and installed on the project.

Foundation route

The foundation route does not require the quantities of each construction product to be entered into the HQM materials tool. This reduces the time taken per construction product but, because the varying quantities of each construction product in the building cannot be taken into account when the credit score is calculated, the lowest 'location or use' category score per material category is used for the overall materials category score.

Gross Internal Floor Area (GIFA)

Gross internal floor area as defined by the RICS (www.rics.org).

Legally harvested and traded timber

HQM follows the UK Government's definition of 'legally harvested and traded timber', as outlined in the Central Point of Expertise on Timber (CPET) 5th Edition report⁽¹⁰⁹⁾ on the UK Government Timber Procurement Policy.

To be considered 'legally harvested and traded timber' all sources of timber used on a project assessed under the HQM scheme must fulfil the requirements set out by CPET available from: www.gov.uk/guidance.

New Rules of Measurement (NRM)

NRM provides a standard set of measurement rules and essential guidance for the cost management of construction projects and maintenance works. For more information visit www.rics.org. IMPACT Compliant tools currently use NRM classification as a default.

Responsible sourcing of construction products

A graded scale to reflect the rigour of the certification scheme used to demonstrate responsible sourcing, forming the basis for awarding credits in this issue. Refer to Guidance Note 18 available in the Resources section of the BREEAM website for an up-to-date table of responsible sourcing certification schemes recognised by BRE Global Ltd for the purposes of a HQM assessments.

Reused construction products

Construction products 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 construction product (e.g. cleaning, cutting, fixing to other construction products).

19 ENVIRONMENTAL IMPACT FROM CONSTRUCTION PRODUCTS

Max credits

25

Indicators (Average)



Aim

To reduce the burden on the environment from construction products by recognising and encouraging the selection of products with a low impact (including embodied carbon) over the life cycle of the building.

Benefit

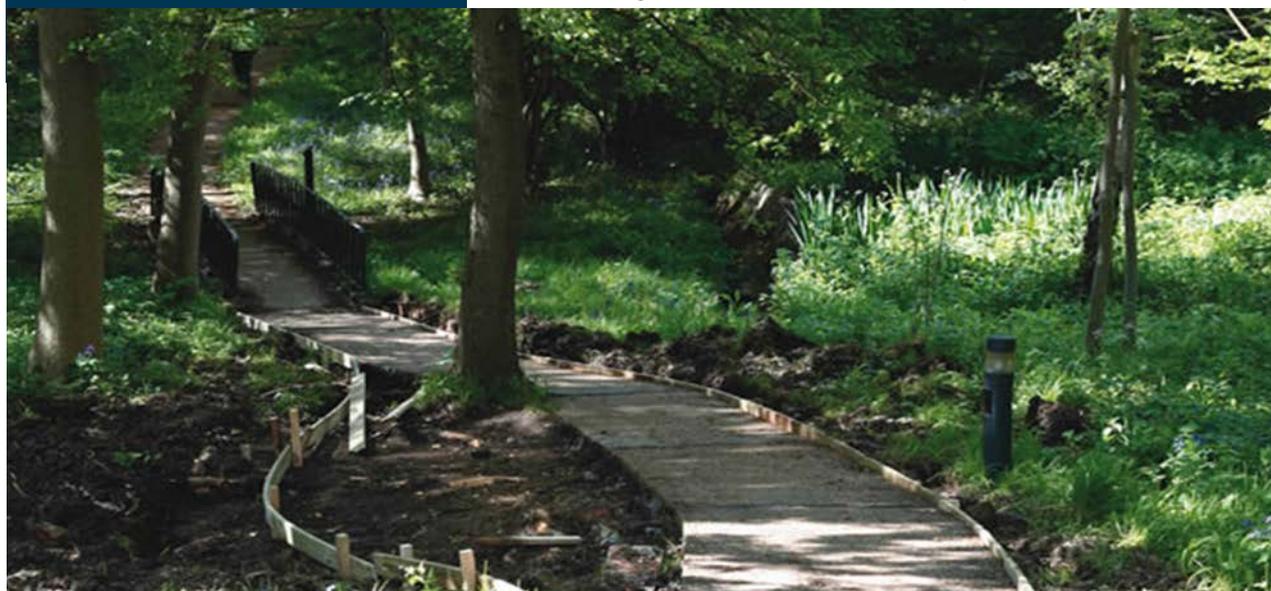
- Helps consumers understand the overall environmental impact of their home.
- Encourages a holistic approach to assessment of carbon by ensuring all carbon emissions including the home's structure is taken into account not just operational emissions.
- Encourages measures to optimise manufacturing of construction products to reduce impacts to reduce impact of housebuilding

Context

The introduction and tightening of Part L into the Building Regulations has led to reductions in the CO₂ from operational energy consumption of homes. As a result, it is becoming increasingly important to reduce embodied CO₂ emissions within the home's structure

Life cycle analysis (LCA) is a tool to measure and evaluate the environmental burdens associated with a product system or activity by assessing the energy and raw materials used and impacts released to the environment over the life cycle. LCA can help understand the relative impact of materials based on its use and specified quantities therefore assist in decision-making by identifying designs with the least environmental impact over the whole life of the building.

Environmental Product Declarations (EPDs) provide quantifiable and product specific environmental data that is third party verified. Increasing numbers of EPDs are being produced by product manufacturers. Using products covered by an EDP can help gain further accuracy in LCA and understanding the home's environmental impact.



Credit Summary

There are two routes to assessing this issue; Foundation route and Comprehensive route on page 123. These routes represent varying degrees of rigour. Both routes are accepted for calculating the home's environmental impact. The foundation route uses a tool that requires basic design information to be entered and is appropriate for standard or simple designs. The comprehensive route requires the use of an IMPACT compliant tool and more detailed design information and can be used for any home. This gives greater accuracy and hence a higher score can be awarded where this route is followed.

| Criterion number | Title | Credits |
|-------------------------|--|------------------|
| crit 1-crit 2 | 01 Product procurement policy and | 2 credits |
| crit 2 | 02 Product environmental information | up to 4 credits |
| crit 3-crit 4 | 03 Routes of rigour (follow 03 or 03) - Building life cycle assessment | up to 19 credits |
| crit 3 | 03A Foundation Route | up to 7 credits |
| crit 4 | 03B Comprehensive Route | up to 19 credits |
| Total credits available | | 25 |

Criteria

01 Product procurement policy and

2 credits

- crit 1 By the end of RIBA stage 2 (or equivalent), the client or developer has a documented product procurement policy (see Methodology on the facing page) policy and procedure that
- crit 1.a: sets out procurement requirements for all suppliers and trades to adhere to relating to the sourcing of construction products with lower environmental impact.
 - crit 1.b: is disseminated to all relevant internal and external personnel and
 - crit 1.c: is included within the construction contract to ensure that they are enforceable on the assessed project.
 - crit 1.d: encourages specification of products with Environmental Product Declaration (EPD) over similar products without EPDs

02 Product environmental information

up to 4 credits

- crit 2 Where a range of products specified at the Design Stage (DS) and installed by the Post Construction Stage (PCS) are covered by verified EPD (see Methodology on the facing page). Credits are awarded according to Table 29 below. Only two EPDs per material type can be counted.

Table 29 Environmental Product Declaration (EPD) credit allocation. Credits are awarded on the basis of the number of products covered across product categories

| Number of EPD | Credits |
|---------------|---------|
| 4 | 1 |
| 6 | 2 |
| 8 | 3 |
| 10 | 4 |

03 Routes of rigour (follow 03 or 03) - Building life cycle assessment

up to 19 credits

One of the following routes have been used to determine the home's impact

03A Foundation Route

up to 7 credits

crit 3 The home is assessed using the HQM Environmental Impact of Construction products tool in accordance with Methodology below. This route is suitable for the assessment of standard, simple homes or buildings. Credits are awarded based on the home's impact benchmark achieved according to Table 30 below

Table 30 Building life cycle assessment credit allocation table

| Homes Impact Benchmarks* (Ecopoints per Occupant) | Houses | | Apartments | | Credits | |
|--|--------------|---------------------------|-------------|--------------|------------------|---------------------|
| | Detached | Terraced, Semi, Clustered | Low rise | High rise | Foundation route | Comprehensive Route |
| Threshold benchmark | ≤ 117 | ≤ 86 | ≤ 96 | ≤ 140 | 1 | 5 |
| | ≤ 115 | ≤ 84 | ≤ 93 | ≤ 137 | 1 | 6 |
| | ≤ 112 | ≤ 82 | ≤ 91 | ≤ 134 | 1 | 7 |
| | ≤ 109 | ≤ 80 | ≤ 89 | ≤ 131 | 2 | 8 |
| | ≤ 107 | ≤ 79 | ≤ 87 | ≤ 128 | 2 | 9 |
| | ≤ 104 | ≤ 77 | ≤ 85 | ≤ 126 | 3 | 10 |
| | ≤ 101 | ≤ 75 | ≤ 82 | ≤ 123 | 3 | 11 |
| | ≤ 99 | ≤ 73 | ≤ 80 | ≤ 120 | 4 | 12 |
| | ≤ 96 | ≤ 71 | ≤ 78 | ≤ 117 | 4 | 13 |
| | ≤ 93 | ≤ 69 | ≤ 75 | ≤ 114 | 5 | 14 |
| | ≤ 90 | ≤ 67 | ≤ 73 | ≤ 110 | 5 | 15 |
| | ≤ 86 | ≤ 65 | ≤ 70 | ≤ 107 | 6 | 16 |
| | ≤ 82 | ≤ 62 | ≤ 66 | ≤ 102 | 6 | 17 |
| | ≤ 77 | ≤ 58 | ≤ 62 | ≤ 96 | 7 | 18 |
| | ≤ 72 | ≤ 53 | ≤ 55 | ≤ 88 | 7 | 19 |

*The home's impact benchmark is a reference of average environmental impact for a home in the UK as calculated using an IMPACT compliant tool and average construction data for homes built since 2006. The unit used for comparison is BRE Ecopoints (based on a range of EN 15804 indicators) and national average occupancy for the type of home being assessed. Occupancy is based on the number of bedrooms, see Methodology below.

*Values in the table are rounded to the nearest integer so in some cases values may repeat. The HQM Tools use precise values for allocation of credits.

03B Comprehensive Route

up to 19 credits

crit 4 The home has been assessed using an IMPACT compliant tool in accordance with the methodology. Credits are awarded based on the home's impact benchmark achieved according to Table 30 above.

Methodology

Documented product procurement policy

This may be prepared and adopted at an organisational level or be site or project specific. It is recommended (but not a requirement) that the documented policy follows the principles of BS 8900-1:2013 Managing sustainable development of organisations - Guide⁽¹¹⁰⁾ or BS 8903:2010 Principles and framework for procuring sustainably - Guide⁽¹¹¹⁾. This policy may form a part of a broader Sustainable Procurement Plan or be in the form of a standalone document

Environmental Product Declaration (EPD) classification

Step 1 Classify each product EPD as per Table 33 on page 127.

Where a product and its associated EPD is comprised of more than one material, the EPD should be allocated to the material that makes up the larger volume of the product. Where

materials are present in equal quantities the assessor should decide which material category the EPD should be allocated to at their own discretion. Where an EPD covers more than one material, it must only be counted once.

Step 2 Check EPD certificates are valid (unexpired) at the point of specification and installation or delivery to site.

Step 3 Ensure EPD is compliant with ISO 14025⁽¹¹²⁾, ISO 21930⁽¹¹³⁾ or EN 15804⁽¹¹⁴⁾

Building life cycle assessment

To determine the number of credits achieved for the building life cycle assessment, either the foundation route or comprehensive route must be followed.

Foundation route

This route uses The HQM Environmental Impact of Construction Products tool and is suitable for the assessment of standard, simple homes or buildings. It is not suitable for non-standard or complex homes or buildings. If significant issues are encountered in modelling the actual design in the HQM tool, such as selecting constructions that are similar to those in the design or where the design requires greater control over the way quantities are entered, then the comprehensive route should be followed.

Method for detached, semi-detached, clustered and terrace home types

Each home or House Type on page 128 shall be modelled separately in the HQM materials reporting tool as follows:

Step 1: Identify the elements/ BREEAM Location use categories that form the home and are in-scope, based on the Scope of assessment on page 124.

Step 2: In a copy of HQM tool complete all required inputs in Crit 03-04 Overview tab

Step 3: In the crit 03-04 input tab, for each of the elements identified in step 1, select the elemental construction/ system classification description that is the most similar to the actual elemental construction. If an element has more than one type of construction, then select an elemental construction for each type.

Step 4: For each of the elemental constructions, enter the total quantity in the home (see Quantities precision and exclusions on page 124). Enter any further information required by the tool. Semi-detached, clustered and terrace only: For party elements (e.g. walls, foundations), adjust the quantity of these elements by multiplying by the home's % share of the overall building's Gross internal floor area (GIFA). For example, if the building's GIFA is 400m² and the home's is 100m² then the % share is 25%. See Gross Internal Floor Area (GIFA) on the facing page.

Step 5: Once all the required inputs are have been completed, create an XML file.

Step 6: Upload the XML file created in step 5 into the BREEAM Projects online HQM assessment tool. Click calculate score. The online tool will generate an Ecopoint score and allocate credits based on Table 30

Method for apartment home types

For apartments, to streamline the process, the complete building can be modelled in the HQM tool and then each home or house type's result produced as follows:

Step 1: Identify the elements/ BREEAM Location use categories that form the building and are in scope, based on the Scope of assessment.

Step 2: In a copy of the HQM tool, complete all required inputs in crit 03-04 Overview tab.

Step 3: In the crit 03-04 input tab, for each of the elements identified in step 1, select the elemental construction/ system classification description that is the most similar to the actual elemental construction. If an element has more than one type of construction, then select an elemental construction for each type.

Step 4: For each of the elemental constructions, enter the total quantity in the building. Enter any further information required by the tool.

Step 5: Once all required inputs have been completed, create an XML file

Step 6: Upload the XML file created in step 5 into the BREEAM Projects online HQM assessment tool. Click calculate score. The online tool will generate a Ecopoint score and allocate credits based on Table 30

The Ecopoints score is generated based on the home's share of the building's total GIFA (taking figured reported for home GIFA, total building GIFA, number of homes and number of bedrooms inputs in the tool). For example, if the building's GIFA is 400m² and the home's is 100m² then the % share is 25%.

Comprehensive route

All home types

The comprehensive route requires the use of an IMPACT compliant tool. See IMPACT compliant tool requirement below. It is suitable for simple and complex buildings. The complete building is modelled in the IMPACT compliant tool as follows:

Step 1: Using an IMPACT compliant tool, produce a building Life Cycle Assessment (LCA) model for the building (see IMPACT compliant tool requirement below). Ensure all of the in-scope elements are included, based on the 'Scope of assessment' section, below. The building elemental constructions shall be categorised in the IMPACT compliant tool as closely as possible to the classification system shown in Scope of assessment on the next page.

Step 2: Obtain the total Ecopoints result for the building, excluding the constructions (or parts thereof) in the following elements that are not located in or forming common areas : internal wall or partition, internal floor finish and internal wall finish, internal doors, ceiling finishes

Step 3: Obtain the total Ecopoints result for each home for just the constructions (or parts thereof) excluded in step 2 that are located in the home. All of the exclusions in step 2 should be allocated by this step.

Step 4: Adjust the Ecopoints score from step 2 by multiplying it by the home's % share of the total GIFA of all homes (but excluding areas in common). Where a home has sole use of an area in the building that is separated from the home (e.g. an internal parking or storage space), this area should be included in the home's GIFA.

For example, if the building's total GIFA is 400m² and the home's is 100m² then the % share is 25%. This manual calculation may not be required in all cases

Step 5: In a copy of the HQM tool complete all required inputs in Crit 03-04 Overview tab and crit 03-04 inputs tab and generate an XML file.

Step 6: Upload the XML file created in step 5 into the BREEAM Projects online HQM assessment tool. Click calculate score. The online tool will generate a Ecopoint score and allocate credits based on Table 30 on page 121.

Step 7: From the IMPACT compliant tool, export or extract all of the elemental construction descriptions (used in the model) and their respective classifications, quantities, total CO₂ and Ecopoints. Produce a simple Constructions Schedule according to the following example (note: the elemental construction descriptions in this example are not prescriptive). Depending on the IMPACT compliant tool used, the data required for this Constructions Schedule may be readily exportable.

Table 31 Example Constructions Schedule

| Elemental construction description | Classification | Quantity in the building or home | Total CO ₂ | Total Ecopoints |
|--|----------------|----------------------------------|-----------------------|-----------------|
| External wall type 1 (Brick, insulation, block, mortar, plasterboard, paint) | 2.5.1 | 1000m ² | 456 | 34 |
| East façade (Blogs System type 1) | 2.5.1 | 500m ² | 2222 | 555 |
| Foundation type 1 (RC 35) | 1.1.1 | 2000m ³ | 455 | 44 |

If required, the Constructions Schedule can be used by those who do not have access to the IMPACT compliant tool to compare what is modelled with other sources of design information (bills of quantities, drawings, specifications etc.), and to see the breakdown of environmental impact

Gross Internal Floor Area (GIFA)

The Gross Internal Floor Area (GIFA) reported for the home should match throughout the HQM assessment.

IMPACT compliant tool requirement

The following requirements apply when using IMPACT compliant tool :

1. The LCA data used must be the following version: 'IMPACT_CMP_15804 Dataset_V3'.
2. The data must be compliant with EN 15804.
3. All elemental constructions are to be created by the user from individual products using the closest matching product data in the tool. Pre-calculated element level constructions are not acceptable (such as Green Guide specifications).
4. Where default values for the following product parameters are known to differ from the design they should be adjusted accordingly: Thickness; Density; Adjustments; Site wastage; Service life. A precision of $\pm 10\%$ on actual values is acceptable.
5. The study period is set at 60 years.

Number of bedrooms

The number of bedrooms entered into the BREEAM Projects online HQM assessment tool must be consistent with other issues assessed based on the number of bedrooms. Where there are rooms that can be converted to bedrooms at a future date, these rooms should not be considered as bedrooms for the purpose of this issue.

Quantities precision and exclusions

Quantities are to be within $\pm 10\%$ of the actual quantities. Minor fixing (e.g. brackets nails, screws etc.), adhesive, seals and ironmongery items may be excluded

Scope of assessment

Table 32 below indicates the building elements that must be included in the model. Inclusion of these elements (and only these) is necessary to ensure an appropriate level of comparability with the benchmark home.

If following the Foundation route on page 122, the constructions available in the HQM materials reporting tool may cover more than one item identified in the table below. A completed HQM materials reporting tool (that includes one or more constructions for each building element identified as present in the building) is compliant with these scope requirements.

In addition, the table shows the classification codes that must be used for the comprehensive route, based on the New Rules of Measurement (NRM) classification system. For example, the code for 'Standard foundations' is '1.1.1'.

If an element is not present in the building, it does not need to be included in the model.

Table 32 Scope of assessment

| RICS NRM Level 2 Element | RICS NRM Level 3 Sub-element | BREEAM 'Location and use' category | To be included |
|--------------------------|---------------------------------|-------------------------------------|----------------|
| 1 Substructure | | | |
| 1 | Substructure 1 | 7. Structure, primary and secondary | ✓ |
| | 1 Standard foundations | | ✓ |
| | 2 Specialist foundation systems | | ✓ |
| | 3 Lowest floor construction | | ✓ |
| | 4 Basement excavation | N/A | |
| | 5 Basement retaining walls | 7. Structure, primary and secondary | ✓ |
| 2 Superstructure | | | |

| RICS NRM Level 2 Element | RICS NRM Level 3 Sub-element | BREEAM 'Location and use' category | To be included | |
|--------------------------|------------------------------|---|-------------------------------------|---|
| 1 | Frame | 1 Steel frames | 7. Structure, primary and secondary | ✓ |
| | | 2 Space decks | | ✓ |
| | | 3 Concrete casings to steel frames | | ✓ |
| | | 4 Concrete frames | | ✓ |
| | | 5 Timber frames | | ✓ |
| | | 6 Other frame systems | | ✓ |
| 2 | Upper Floors | 1 Floors | 3. Floor (including floor finishes) | ✓ |
| | | 2 Balconies | | ✓ |
| | | 3 Drainage to balconies | 11. Other | ✓ |
| 3 | Roof | 1 Roof structure | 6. Roof (including roof finishes) | ✓ |
| | | 2 Roof coverings | | ✓ |
| | | 3 Specialist roof systems | | ✓ |
| | | 4 Roof drainage | | ✓ |
| | | 5 Rooflights, skylights and openings | 2. Door, window | ✓ |
| | | 6 Roof features | 6. Roof (including roof finishes) | ✓ |
| 4 | Stairs and Ramps | 1 Stair and ramp structures | 7. Structure, primary and secondary | ✓ |
| | | 2 Stair and ramp finishes | 3. Floor (including floor finishes) | ✓ |
| | | 3 Stair, ramp balustrades and handrails | 11. Other | ✓ |
| | | 4 Ladders, chutes, slides | | ✓ |
| 5 | External Walls | 1 External enclosing walls above ground floor level | 8. External wall | ✓ |
| | | 2 External enclosing walls below ground level | 7. Structure, primary and secondary | ✓ |
| | | 3 Solar, rain screening | 8. External wall | ✓ |
| | | 4 External soffits | | ✓ |
| | | 5 Subsidiary | 11. Other | ✓ |

| RICS NRM Level 2 Element | RICS NRM Level 3 Sub-element | BREEAM 'Location and use' category | To be included | |
|--|---|--|--|---|
| | walls, balustrades, handrails, railings and proprietary balconies | | | |
| | 6 Façade access, cleaning systems | | ✓ | |
| 6 | Windows and External Doors | 1 External windows | 2. Door, window | ✓ |
| | | 2 External doors | | ✓ |
| 7 | Internal Walls and Partitions | 1 Walls and partitions | 5. Internal partition, internal walls (including finishes) | ✓ |
| | | 2 Balustrades and handrails | 11. Other | ✓ |
| | | 3 Moveable room dividers | 5. Internal partition, internal walls (including finishes) | ✓ |
| | | 4 Cubicles | | ✓ |
| 8 | Internal Doors | 1 Internal doors | 2. Door, window | ✓ |
| 3 Internal Finishes | | | | |
| 1 | Wall Finishes | 1 Finishes to walls | 5. Internal partition, internal walls (including finishes) | ✓ |
| 2 | Floor Finishes | 1 Finishes to floors | 3. Floor (including floor finishes) | ✓ |
| | | 2 Raised access floors | | ✓ |
| 3 | Ceiling Finishes | 1 Finishes to ceilings | 1. Ceiling (including ceiling finishes) | ✓ |
| | | 2 False ceilings | | ✓ |
| | | 3 Demountable suspended ceilings | | ✓ |
| 4 Fittings, Furnishings and Equipment | | | | |
| 1 | Fittings, Furnishings and Equipment | 2 Domestic kitchen fittings, fixed furniture and equipment | 11. Other | ✓ |
| 5 Services | | | | |
| N/A | | | | |
| 6 Complete Buildings and Building Units | | | | |
| To be broken down into other classifications. | | | | |
| 8 External Works | | | | |
| 2 | Roads, | 1 Roads, paths | 10. Hard landscaping | ✓ |

| RICS NRM Level 2 Element | RICS NRM Level 3 Sub-element | BREEAM 'Location and use' category | To be included |
|--------------------------|------------------------------|---|----------------|
| Paths and Pavings | 2 | and pavings Special surfacings and pavings | ✓ |

Table 33 Materials categories

| Material category | Uniclass equivalent code |
|---|--------------------------|
| 1. Timber or timber-based | P5 |
| 2. Concrete or cementitious | P2* |
| 3. Metal | P4 |
| 4. Stone or aggregate | P1, P3* |
| 5. Clay-based | P33 |
| 6. Gypsum | P232 |
| 7. Glass | P314 |
| 8. Plastic, polymer, resin, paint, chemicals and bituminous | P7, P34 |
| 9. Animal fibre or skin, cellulose fibre | P6 |
| 10. Other | |

*Except subsets listed separately.

Compliance Notes

None

Evidence

| Criterion Reference | Title | Design Stage | Post Construction Stage |
|---------------------|---|---|---|
| All | 01 General evidence | One or more of the appropriate evidence types listed in Appendix C - HQM evidence requirements on page 236 can be used to demonstrate compliance with these criteria. | |
| crit 1 | 02 Documented product procurement policy | <ul style="list-style-type: none"> - A copy of the documented product procurement policy. - Evidence that the policy was developed at the end of RIBA Stage 2 - Evidence that the policy is disseminated, or a written commitment to do so. - Evidence that the policy is included in the construction contract, or a written commitment to do so. - Evidence that there is a policy on EPD. | <ul style="list-style-type: none"> - Evidence that the policy was disseminated. - Evidence that the policy was included in the construction contract. |
| crit 2 | 03 Environmental Product Declaration certificates and details | <ul style="list-style-type: none"> - A schedule of specified products in the building with accepted EPD, and their product categories. - The EPD certificates. | |
| crit 3 | 04 Foundation Route | <ul style="list-style-type: none"> - The completed HQM materials tool. | |
| crit 4 | 05 Comprehensive Route | <ul style="list-style-type: none"> - The IMPACT compliant tool name. - The version of the data used in the IMPACT compliant tool for modelling the building. | |

| Criterion Reference | Title | Design Stage | Post Construction Stage |
|---------------------|-------|--------------|--|
| | | | <ul style="list-style-type: none"> - A copy of the IMPACT compliant tool model in its native format OR, if stored on the tool provider's online server, written permission for BRE to access the model. - A copy of the Constructions Schedule in XLS, XLSX or CSV format. |

Checklists, Tables & Illustrations

None.

Definitions

Comprehensive route

A detailed route that uses an IMPACT compliant tool to determine the Ecopoints for the home. Greater modelling detail is possible through this route compared with the foundation route. Therefore, more credits are available to recognise the level of rigour.

Ecopoints

Ecopoints are used as the metric for assessing this issue. It is an indicator that is made up of broad set of individual environmental indicators which are then combined into a single value. For more information about Ecopoints, visit www.bre.co.uk or contact BRE.

Environmental Product Declaration (EPD)

An EPD is an independently verified environmental label (i.e. ISO Type III label) according to the requirements of ISO 14025⁽¹¹⁵⁾

House Type

A house type should include homes that are identical in specification, design and location (end/ mid-terrace, ground or mid/ top floor).

High rise

High rise is considered to be a building that is 18 meters or over.

IMPACT (Integrated Material Profile and Costing Tool)

IMPACT is a specification and database for software developers to incorporate into their tools to enable consistent life cycle assessment (LCA) and life cycle costing (LCC). IMPACT compliant tools work by allowing the user to attribute environmental and cost information to drawn or scheduled items in the BIM. Further information about IMPACT is available from: www.impactwba.com

IMPACT compliant tool

An IMPACT compliant tool is a tool that has been tested for compliance with the IMPACT specification, and is listed here: www.impactwba.com

New Rules of Measurement (NRM)

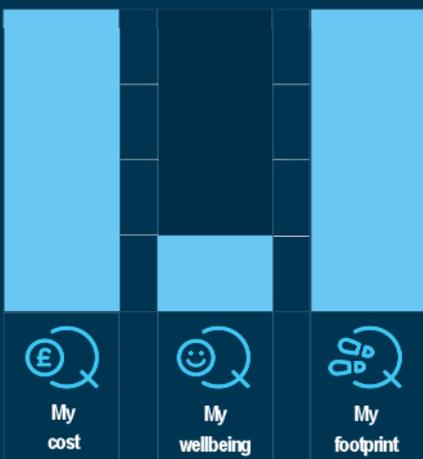
NRM provides a standard set of measurement rules and essential guidance for the cost management of construction projects and maintenance works. For more information visit www.rics.org. IMPACT Compliant tools currently use NRM classification as a default.

20 LIFE CYCLE COSTING OF CONSTRUCTION PRODUCTS

Max credits

12

Indicators (Average)



Aim

To encourage economic sustainability by recognising and encouraging the use and sharing of life cycle costing analysis data to reduce maintenance and operational costs and deliver whole life value

Benefit

- Reduce maintenance and operational costs for the homeowner.
- Better inform the homeowner and occupier of the running costs of the home.
- Better inform the homeowner of the relationship of purchase price to running costs.

Context

Life cycle cost (LCC) analysis is useful for the homeowner because it can provide valuable information on the maintenance and operational costs of the home before and after purchase. As a result, the homeowner will be better informed about the running costs of the home.

LCA issue presents opportunities for developers, registered social landlords and asset managers to prolong the life of the building. It will also help them to provide a comfortable, safe and well maintained environment for tenants and other residents in an efficient and economical manner.



Credit Summary

| Criterion number | Title | Credits |
|-------------------------|---|---------------|
| crit 1-crit 3 | 01 Homeowner's life cycle cost report | for 6 credits |
| crit 4 | 02 Component level life cycle cost optimisation | for 6 credits |
| Total credits available | | 12 |

Criteria

01 Homeowner's life cycle cost report for 6 credits

- crit 1 At the end of process stage 2/RIBA stage 2, a life cycle cost (LCC) analysis (to PD 156865:2008)⁽¹¹⁶⁾ is produced by a suitably qualified cost consultant (SQCC) at a level of detail suitable to inform the homeowner of key maintenance and operational costs. The scope is as defined in Assessment Scope below. It is kept updated up to the end of process stage 4/RIBA stage 4.
- crit 2 A homeowner's report, based on the most up-to-date LCC analysis (see crit 1), is available to potential homeowners prior to a commitment to purchase. The report includes a summary which requires no expert knowledge to understand and, as a minimum, includes:
- crit 2.a: Costs (current prices) broken down according to the items listed in Assessment Scope below, reported at intervals of 1 year, up to year 60.
- crit 2.b: A summary highlighting the most significant findings of the LCC analysis including significant planned maintenance, as determined by the cost consultant
- crit 3 A final version of the homeowner's report (see crit 2) is included within the 'Home Information' (see 34 Home Information on page 206). It must be updated based on the final LCC analysis at the end of process stage 4/RIBA stage 4 (see crit 1).

02 Component level life cycle cost optimisation for 6 credits

- crit 4 By the end of process stage 4/RIBA stage 4, a component level LCC appraisal (to PD 156865:2008) is carried out by an SQCC. Appropriate examples are provided by the design team to demonstrate how the component level LCC optimisation has been used to influence building and systems design or specification to reduce the overall maintenance and operational costs to the homeowner. The analysis is provided as a report to the client.

Methodology

Assessment Scope

The LCC shall include the following items from PD 156865:2008, Table 3.1 'UK LCC data structure and definitions'. Items not applicable to the home may be denoted 'N/A' in the LCC analysis and report.

2.0 Maintenance costs

- 2.1 Major replacement costs
- 2.4 Minor replacement, repairs and maintenance costs
- 2.5 Unscheduled replacement, repairs and maintenance costs
- 2.6 Grounds maintenance

3.0 Operation costs

- 3.1 Cleaning costs*
- 3.2 Utilities costs
- 3.3 Administrative costs*
- 3.4 Overhead costs*

*If outside the control of the homeowner or occupant, for example, when included in a service charge.

Methodology

None

Compliance Notes

| Criterion Reference | Compliance Note | |
|---------------------|--------------------------------|---|
| All | CN1 Pre-defined specifications | Where the building is constructed to a pre-defined standard specification, the LCC plan for this specification may be used to demonstrate compliance. |

Evidence

| Criterion Reference | Title | Design Stage | Post Construction Stage |
|---------------------|---|--|--|
| All | 01 General evidence | One or more of the appropriate evidence types listed in Appendix C - HQM evidence requirements on page 236 can be used to demonstrate compliance with these criteria. | |
| crit 1 | 01 Life cycle costing analysis | Evidence that a life cycle costing analysis was carried out by a SQCC at the end of RIBA stage 2 | |
| crit 2-crit 3 | 02 Homeowner's life cycle cost report | <ul style="list-style-type: none"> - A copy of the homeowner's report. - Evidence that it is available to potential purchasers, such as a website link or marketing materials. | A copy of the 'Home information' including the final homeowner's report. |
| crit 4 | 03 Component level life cycle cost optimisation | <ol style="list-style-type: none"> 1. A copy of the component level LCC optimisation report. 2. Evidence that the report was developed before the end of RIBA stage 4 | |

Checklists, Tables & Illustrations

None

Definitions

Component Level LCC analysis

A component level LCC is commonly used for cost planning specification choices of systems, elements and products during design development.

Life cycle cost (LCC)

The cost of an asset, or its parts throughout its life cycle, while fulfilling the performance requirements; a methodology for systematic economic evaluation of life cycle costs over a period of analysis, as defined in the agreed scope.

Process stage

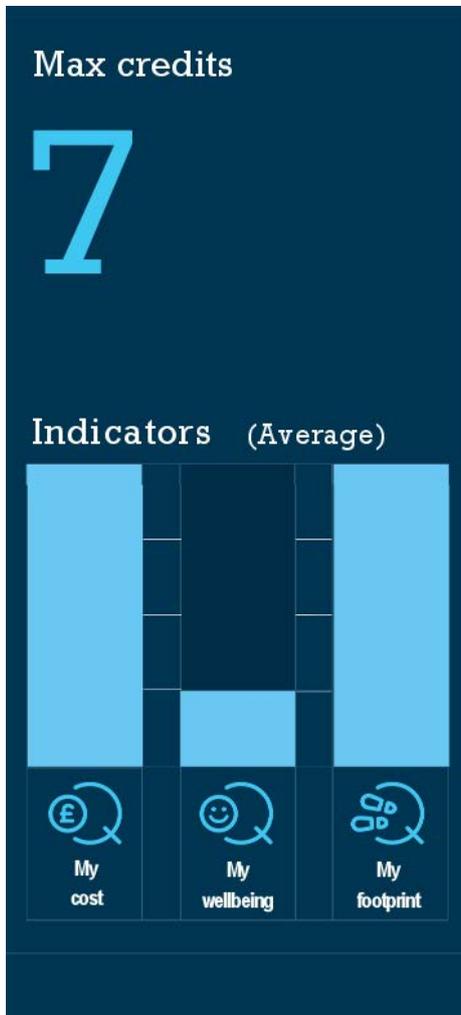
Process stages are referred to in the PD156865 guidance. This corresponds to the RIBA stages in the RIBA plan of work.

Suitably Qualified Cost Consultant (SQCC)

An individual achieving all the following items can be considered to be 'suitably qualified' for the purpose of a HQM assessment:

1. Holds a BA or BSc (Hons) degree or postgraduate or equivalent qualification in quantity surveying, construction economics, engineering or architecture.
2. Has a minimum of three years relevant experience (within last five years). The experience must clearly demonstrate a practical understanding of life cycle costing in construction and the built environment and show an ability to identify and demonstrate cost and performance enhancement measures

21 DURABILITY OF CONSTRUCTION PRODUCTS



Aim

To reduce the need for maintenance, repairs and frequency of replacement of materials resulting from damage to exposed elements of the building and landscape.

Benefit

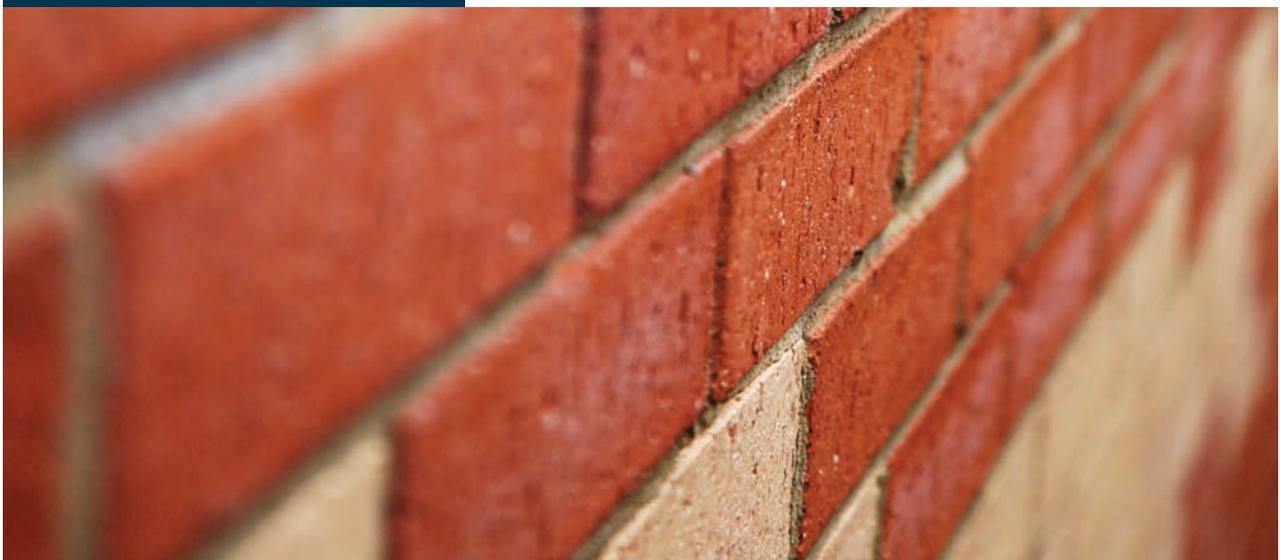
- Helps to reduce maintenance costs for occupiers, homeowners and facilities management.
- Helps developers to build new homes that are robust enough to last their intended lifetime.
- Helps demonstrate and communicate that construction products have been considered and specified according to site location to minimise replacement.
- Helps reduce disruption resulting from maintenance, repairs and replacements to occupiers and home owners.

Context

This issue encourages designers to consider the effects of climate on material durability and usage and to declare such considerations.

It is important to consider climate change, as it can significantly accelerate the deterioration of materials used in a building. The impact can be mitigated by good design and specification so that stakeholders can have increased confidence in the durability of their new home.

Consideration of any likely “wear and tear” within and around the home and measures to reduce this is also important. This can mean fewer material replacement or maintenance. The performance of a home within this issue is relative to the risk it is subject to. For example, performance in coastal areas would account for different factors to inner city locations.



Credit Summary

| Criterion number | Title | Credits |
|-------------------------|-----------------------|---------------|
| crit 1 | 01 Integral elements | for 5 credits |
| crit 2 | 02 Finishing elements | for 2 credits |
| Total credits available | | 7 |

Criteria

| | | |
|------------------------------|---|----------------------|
| 01 Integral elements | | for 5 credits |
| crit 1 | Appropriate measures to limit degradation have been incorporated into the design and specification of integral building elements at risk of severe material degradation (see Methodology below). | |
| 02 Finishing elements | | for 2 credits |
| crit 2 | crit 1 has been achieved. | |
| crit 3 | Appropriate measures to limit degradation have been incorporated into the design and specification of finishing building elements at risk of cosmetic material degradation (see Methodology below). | |

Methodology

General

The primary focus for assessing this issue is to determine how the selection of materials has mitigated degradation. Credits are not given for demonstrating how the factor that causes the degradation has been reduced (such as measures that reduce humidity).

The following steps outline the process to assess criteria:

Step 1. Identify from Table 34 below, the applicable elements that are relevant to the home.

Table 34 Applicable Elements

| Applicable building elements | |
|--|--|
| Integral elements | Surface elements |
| <ul style="list-style-type: none"> - Substructure: <ul style="list-style-type: none"> - foundations - lowest floor - basement and retaining walls - Superstructure: <ul style="list-style-type: none"> - external finishes - external fixings - external walls - external openings - stairs - roof - roof drainage - upper floors and balconies - internal walls - Services: <ul style="list-style-type: none"> - piped supply systems (within ownership boundary) - External works: | <ul style="list-style-type: none"> - External finishes: <ul style="list-style-type: none"> - cladding - render - Internal finishes: <ul style="list-style-type: none"> - floor coverings and finishes - wall finishes - skirting boards - architraves - trimmings - hinges and handles - sockets and switches - towel rails and radiators - Built-in fittings: <ul style="list-style-type: none"> - sanitary fittings - built-in wardrobes, cupboards and stores |

| Applicable building elements | |
|--|------------------|
| Integral elements | Surface elements |
| <ul style="list-style-type: none"> - boundary fences (within ownership boundary) - hardstanding, paving, car parking (within ownership boundary) | |

Step 2. Identify from Table 35 below, the factors that are likely to cause material degradation effects (listed in Table 36 below) in the identified applicable building elements (established from step 1).

Table 35 Factors to consider

| Factors to consider | |
|---|--|
| Integral elements | Surface elements |
| (Including, but not limited to the following) | (Including, but not limited to the following) |
| Environmental agents, including: <ul style="list-style-type: none"> - Solar radiation - Temperature variation - Humidity, water or moisture - Hard water - Extreme weather conditions: <ul style="list-style-type: none"> - high wind speeds - flooding - driving rain - snow - Biological agents, including: <ul style="list-style-type: none"> - vegetation - pests, insects - Pollutants, including: <ul style="list-style-type: none"> - air contaminants - ground contaminants - Social agents, including: <ul style="list-style-type: none"> - Malicious damage (e.g. graffiti, arson) | Environmental agents, including: <ul style="list-style-type: none"> - Hard water - Water, moisture Social agents, including: <ul style="list-style-type: none"> - Accidental damage - Abrasion (wear and tear) |

Step 3. Confirm that the design and specification incorporates ways to limit material degradation effects.

Table 36 Material degradation effects

| Material degradation effect | |
|--|---|
| Integral elements | Surface elements |
| (including, but not limited to the following) | (including, but not limited to the following) |
| <ul style="list-style-type: none"> - Corrosion - Limescale build-up - Dimensional change, e.g. swelling or shrinkage, thermal expansion - Rotting - Leaching - Melting - Salt crystallisation | <ul style="list-style-type: none"> - Blistering - Staining or marking - Fading or discolouration - Limescale build-up - Corrosion - Leaching - Scratches |

| Material degradation effect | |
|---|---|
| Integral elements | Surface elements |
| <ul style="list-style-type: none"> - Abrasion - Blockage - Fatigue, shatter and breakage - Combustion | <ul style="list-style-type: none"> - Dimensional change, e.g. swelling or shrinkage, thermal expansion |

Step 4. Assessors should use their professional judgment in determining whether the design team have adequately demonstrated that they have designed and specified materials or measures which will be effective in preventing unnecessary deterioration, thus reducing frequent replacements, repairs and maintenance throughout the life cycle of the home.

Appropriate measures must be in relation to performance beyond the guidance contained within the building regulations approved documents. This includes accounting for future changes in the risk associated with the factor, such as changes in assumptions around weather related to climate change predictions and influenced by the project's specific circumstances.

Step 5. At post construction stage, where the design and specification measures installed differ from the proposal at design stage, the assessor must ensure that these measures still meet the aims of the criterion.

Compliance Notes

| Criterion Reference | Compliance Note | |
|---------------------|------------------|--|
| All | CN1 Common areas | Where there are common areas associated with the home, the relevant integral and surface building elements within common areas should form part of the assessment of this issue. |

Evidence

| Criterion Reference | Title | Design Stage | Post Construction Stage |
|----------------------|-------------------------|---|---|
| All | 01 General evidence | One or more of the appropriate evidence types listed in Appendix C - HQM evidence requirements on page 236 can be used to demonstrate compliance with these criteria. | |
| crit 1 and crit 3 | 02 Appropriate measures | Appropriate measure documentation | As per design stage and based on as-built information |

Checklists, Tables & Illustrations

None.

Definitions

Appropriate measures

An appropriate measure is determined by reviewing the following information as a minimum:

- What factor the element will withstand;
- How the element has been designed to withstand it.
- Declared service life and design life
- A 'plain English' statement of how the design will help the building owner or occupier.
- A clear graphical or written description of the element's location in the home.
- Supporting information showing that the element is likely to do what is being claimed such as a combination of information listed within the manufacturer's technical specification literature, manufacturer's declaration of performance, third party certification or appropriate calculations provided by members of the design team where necessary.

Design life

Service life intended by the designer, which a product is anticipated to last.

Service life(117).

The period of time after installation during which a building, or its part, meets or exceeds the performance requirements

SPACE

This section discusses the following.

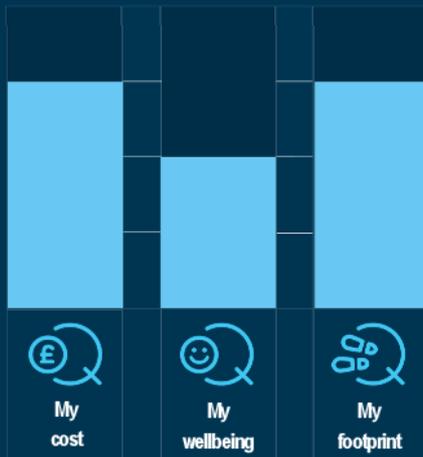
| | |
|----------------------------------|------------|
| 22 Drying Space | 138 |
| 23 Access and Space | 141 |
| 24 Recyclable Waste | 145 |

22 DRYING SPACE

Max credits

3

Indicators (Average)



Aim

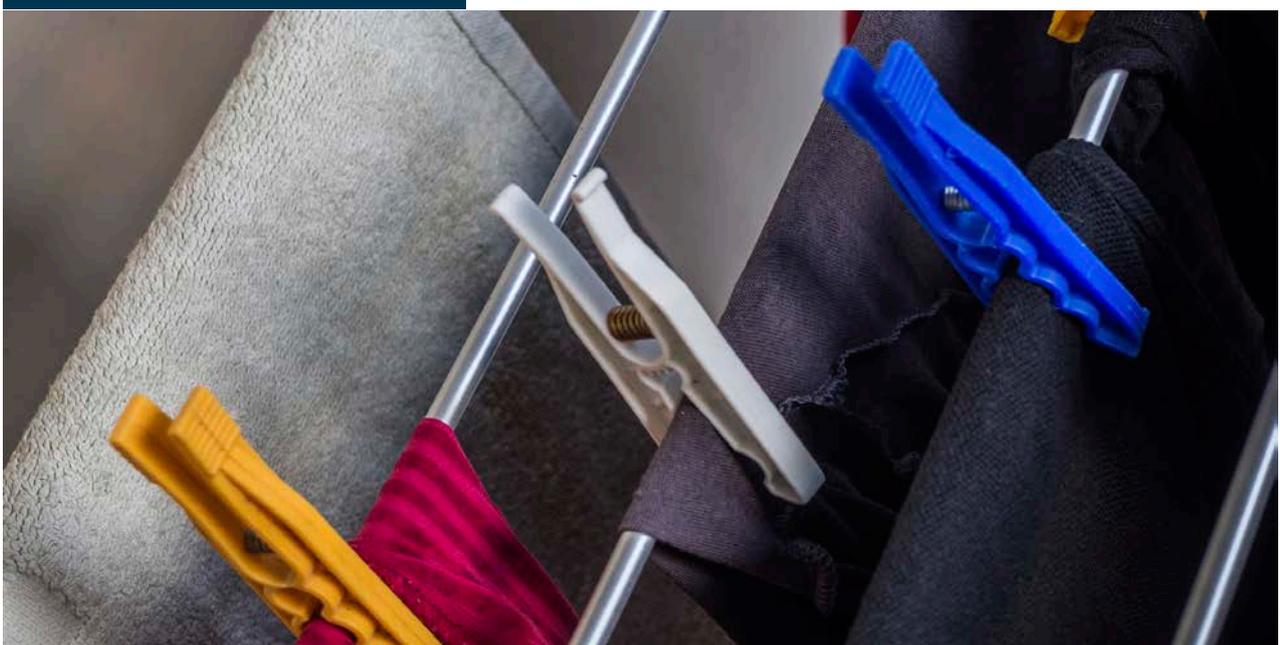
To provide sufficient and convenient drying space that does not negatively affect the air quality, and subsequently the health of the occupants and to reduce the need for mechanical drying.

Benefit

- Reduce energy costs and emissions associated with drying clothes mechanically
- Helps to protect the internal environment against moisture build up resulting in increased risks to health from mould growth, poor internal air quality and damage to the fabric of the home and its finishes.

Context

Providing adequate drying space has been identified by numerous organisations, including the World Health Organisation, as a key preventative measure for reducing indoor moisture levels⁽¹¹⁸⁾. This subsequently improves the wellbeing of the occupants by reducing the risk of condensation build up and mould growth associated with respiratory illnesses⁽¹¹⁹⁾. Providing adequate drying space also reduces the need to rely on using tumble dryers, thus reducing energy costs, carbon emissions and supporting the UK's long term goal of reducing greenhouse gas emissions by at least 80% compared to 1990 levels by 2050.



Credit Summary

| Criterion number | Title | Credits |
|-------------------------|-----------------------------------|---------------|
| crit 1 | 01 Adequate external drying space | for 1 credit |
| crit 2-crit 3 | 02 Adequate internal drying space | for 2 credits |
| Total credits available | | 3 |

Criteria

01 Adequate external drying space for 1 credit

crit 1 An adequate external drying space is provided. The drying space is secure and can accommodate a drying length of:

crit 1.a: 40m+ for a home with one to two bedrooms (e.g. Rotary Drier).

crit 1.b: 20m+ per bedroom for a home with three or more bedrooms.

02 Adequate internal drying space for 2 credits

crit 2 An adequate internal drying space is provided, i.e. drying cupboard. The drying space is secure and can accommodate a typical washing load, a minimum net volume of 1.75 m³.

crit 3 The provision of drying space does not compromise the ventilation strategy for the home (See 14 Ventilation on page 83) and will not increase the risk of damp and mould.

Methodology

None.

Compliance Notes

| Criterion Reference | Compliance Note |
|---------------------|---|
| crit 2 | <p>CN1 Adequate internal drying space</p> <p>Compliant drying space can take one of the following forms:</p> <ol style="list-style-type: none"> 1. A heated space with either: <ul style="list-style-type: none"> - Intermittent extract at a minimum rate of 30L/s; or, - Continuous extract at a minimum rate of 8L/s. <p>If the space is to be intermittently ventilated then the fan must be humidity controlled as a minimum.</p> <ol style="list-style-type: none"> 2. An independently heated and ventilated drying cupboard which may be sited within a bathroom, any other room, or a circulation space. Air must be extracted from this cupboard and not allowed to circulate into habitable rooms. <div style="border: 1px solid #ccc; padding: 10px; margin-top: 10px;"> <p>An unheated space not covered by Building Regulations may also be acceptable, where calculations by an appropriate member of the Chartered Institution of Building Services Engineers (CIBSE), or equivalent professional, confirms that ventilation throughout the year is adequate to allow drying in normal climatic conditions and to prevent condensation or mould growth.</p> </div> |
| crit 1 | <p>CN2 Adequate external drying space</p> <p>This is an enclosed space that:</p> <ol style="list-style-type: none"> 1. Is accessible only to the residents of the home |

| Criterion Reference | Compliance Note |
|---------------------|--|
| | <ol style="list-style-type: none"> 2. Is accessed directly from an external door of the home 3. Has permanent fixings or fittings. <p>Communal drying space is acceptable only if such space is enclosed, is only accessible to the residents and has a secure entrance.</p> |

Evidence

| Criterion Reference | Title | Design Stage | Post Construction Stage |
|---------------------|---------------------|---|-------------------------|
| crit 1-crit 3 | 01 General Evidence | One or more of the appropriate evidence types listed in Appendix C - HQM evidence requirements on page 236 can be used to demonstrate compliance with these criteria. | |

Checklists, Tables & Illustrations

None.

Definitions

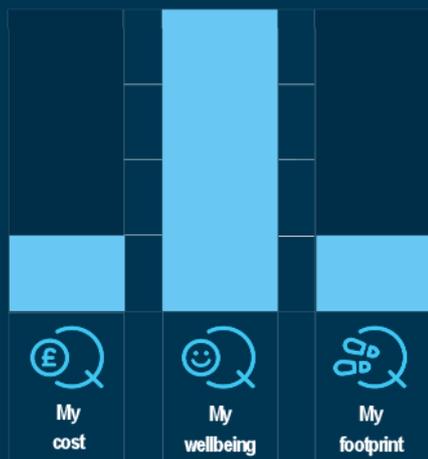
None.

23 ACCESS AND SPACE

Max credits

11

Indicators (Average)



Aim

To provide an acceptable and effective internal space that is accessible to all and supports the function of the home.

Benefit

- Ensures homes are accessible to, and usable by as many people as reasonably possible⁽¹²⁰⁾
- Helps considerations to future-proof the home against expensive retrofit measures to address changing needs.
- Improves occupants' wellbeing by providing enough space for their functional needs.

Context

This issues considers spaces need to be well designed and adequately sized to meet every day and future needs. To accommodate this, homes need to allow flexibility and accessibility for all types of users and their associated requirements. The UK government have streamlined the approach to setting space standards for new homes. The new nationally described space standard replaces the existing different space standards used by local authorities⁽¹²¹⁾ Furthermore new optional building regulations requirements for access have also been introduced⁽¹²²⁾



Credit Summary

| Criterion number | Title | Credits |
|---------------------------|---|---------------------|
| crit 1 | 01 Home information | Minimum requirement |
| crit 2-crit 3 | 02 Nationally described space standards | for 5 credits |
| crit 4 below-crit 5 below | 03 Accessible and Flexible design | for 6 credits |
| Total credits available | | 11 |

Criteria

| 01 Home information | | Minimum requirement |
|---|--|---------------------|
| crit 1 | Home information needs to be provided as part of or all of the criteria in this issue. Please see 33 Home Information. | |
| 02 Nationally described space standards | | for 5 credits |
| crit 2 | The home meets the Technical Housing Standards - Nationally Described Space Standard ⁽¹²³⁾ | |
| crit 3 | Where the built in storage provided shows an improvement over the requirement stated in Technical Housing Standards - Nationally Described Space Standards by 0.5m ² | |
| 03 Accessible and Flexible design | | for 6 credits |
| crit 4 | An accredited Access Consultant is appointed prior to Concept Design (RIBA Stage 2 or equivalent) to advise on the brief. The accredited Access Consultant | |
| | crit 4.a: At the concept design stage, conducts an assessment of the internal functional spaces based on nationally recognised design guidance and an assessment of the flexible design options (that meet every day needs and long term demands) present in the design. Where the assessment shows the requirements are not fulfilled, necessary changes are communicated to and agreed with the design team. | |
| | crit 4.b: Reviews and assesses of Design Development and Technical Design (RIBA Stages 3& 4) stage proposals to ensure requirements set at concept stage have been retained. | |
| | crit 4.c: Reviews the final design and checks that recommendations or solutions are implemented | |
| crit 5 | The Internal functional space and External spaces associated with the home meet the requirements of building regulations in Approved Document M - Access to and use of buildings Category 2 OR Approved Document M, Category 3 - Wheelchair user dwellings, where required by the local authority. | |

Methodology

None.

Compliance Notes

| Criterion Reference | Compliance Note | |
|---------------------|-----------------------------|--|
| crit 4 | CN1 Flexible design options | <p>Flexible design options are intended to meet every day and long term requirements and allow potential adaptations in the future. In order to achieve the credits, two or more examples of flexible design must be provided. Below are a few examples of what would be considered flexible design options:</p> <ol style="list-style-type: none"> 1. Load bearing walls are positioned in a way that takes future flexibility of the rooms into account. Non-loadbearing partitions that separate internal functional spaces are designed to be removable without significant disruption to |

| Criterion Reference | Compliance Note |
|---------------------|---|
| | <p>occupants. The Home Information (see crit 1) shall indicate which partitions shall not be removed due to compliance with building regulations (e.g. fire protection, structural integrity etc.).</p> <ol style="list-style-type: none"> The option to change room functionality easily within a home while maintaining compliance with the nationally described space standard (for example changing a study into a bedroom). Services such as radiators and electrics have been situated in areas which enable any applicable modifications to take place (such as those listed above). <p>Alternatively, if it is felt the project provides a different example (to those listed) which successfully meets the principles set out above, then please contact BRE Global.</p> |

Evidence

| Criterion Reference | Title | Design Stage | Post Construction Stage |
|---------------------|-------------------------|---|-------------------------|
| crit 2-crit 5 | 01 General Evidence | One or more of the appropriate evidence types listed in Appendix C - HQM evidence requirements on page 236 can be used to demonstrate compliance with these criteria. | |
| crit 2-crit 5 | 02 Written confirmation | Written confirmation from the designer, client and consultant. | |

Checklists, Tables & Illustrations

None.

Definitions

Accredited Access Consultant

Access consultant is identified as an individual who:

- Is a practising access consultant, with a minimum of three years' relevant experience (within the last five years). Such experience must clearly demonstrate a practical understanding of factors affecting access in relation to construction and the built environment, including acting in an advisory capacity to provide recommendations advice on the spatial, technical and legal implications associated with the design, management and use of inclusive, accessible built environments and associated spaces.
- 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 full members maintain a standard of knowledge or experience required to ensure compliance with a code of conduct and professional ethics.

Full members of the following organisation who meet the above criteria as deemed suitably qualified for the purposes of this issue: National register of access consultants (NRAC) RICS accredited access consultant

External spaces

For the purposes of this issue, external space includes not only the approach to the home (e.g. driveway) but also access to other functional spaces around or outside the home (e.g. access to the waste storage, parking and external drying space).

Internal functional space

This refers to internal spaces defined in the nationally described space standard, which includes occupied space such as:

1. Bedrooms
2. Kitchens
3. Living rooms

4. Dining rooms
5. Bathrooms

Credit Summary

| Criterion number | Title | Credits |
|-------------------------|---|---------------|
| crit 1 | 01 Home information | Prerequisite |
| crit 2 | 02 Consultation with the waste collection authority | for 2 credits |
| crit 3-crit 4 | 03 Internal storage waste | for 5 credits |
| crit 4-crit 5 | 04 Composting facilities and management | for 3 credits |
| Total credits available | | 10 |

Criteria

| | 01 Home information | Prerequisite |
|--------|---|---------------|
| crit 1 | Home information needs to be provided as part of or all of the criteria in this issue. Please see 33 Home Information. | |
| | 02 Consultation with the waste collection authority | for 2 credits |
| crit 2 | The waste collection authority is consulted to determine the waste collection patterns, identifying the: | |
| | crit 2.a: number of recyclable waste streams, i.e., for example, paper, plastic, glass, food waste, composting and general waste are all types of waste streams. | |
| | crit 2.b: type and size of waste collection containers (e.g. dedicated wheelie bins, boxes, communal bins etc.). | |
| | 03 Internal storage waste | for 5 credits |
| crit 3 | Dedicated internal space, with fixed units to store recyclable waste, is provided. The number of internal recyclable waste facilities should reflect the number of recyclable waste streams collected by the waste collection authority. Each individual bin (provided for different recycling waste streams) must be a minimum of 10L in volume. | |
| crit 4 | The combined capacity of internal recyclable waste facilities should be a minimum of: | |
| | crit 4.a: 30 litres for homes with 1-2 bedrooms | |
| | crit 4.b: 40 litres for homes with 3 or more bedrooms. | |
| | crit 4.c: All homes are provided with dedicated internal space, with fixed units to store food waste that is a minimum of 10 litres in volume. | |
| | 04 Composting facilities and management | for 3 credits |
| crit 5 | All homes are provided with composting facilities, for garden or food waste, in the form of one or more of the following: | |
| | crit 5.a: Individual home-composting facilities. | |
| | crit 5.b: Local communal facilities within 50 m from main entrance to the home via a safe pedestrian route. | |
| | crit 5.c: Composting collection services run by the waste collection authority. | |

Methodology

None.

Compliance Notes

| Criterion Reference | Compliance Note | |
|---------------------------|---|--|
| crit 4 | CN1 Frequency of collection | Where collection frequencies are greater than once a week then the size of recyclable waste storage can be amended accordingly. |
| crit 3-crit 4 | CN2 Apartments over five storeys | For apartments over five storeys where communal chutes are being used, these should be compliant with BS 1703:2005 Refuse chutes and hoppers - Specification ⁽¹²⁷⁾ - waste should be carried no more than 30m from the home entrance (excluding vertical distance). |
| crit 3, crit 4 and crit 5 | CN3 Recycling and composting facilities | All recycling and composting waste facilities must be: <ol style="list-style-type: none"> 1. Located in a dedicated position. 2. Easily accessible to all users. 3. Integrated within the design of the home achieving reduced visual impact. 4. Storage locations are durable, low maintenance and cleanable. 5. Managing odour and noise issues. 6. Addressing health and safety issues (including fire and vermin). |
| crit 5 | CN4 Phased or multiple home development | See Appendix D - Post-construction stage assessment issue exceptions on page 243. |
| crit 3-crit 4 | CN5 Post collection | Where there is post-collection sorting, individual bins for each waste stream would not be required, but must meet the required minimum volume and reflect the number of recyclable waste streams collected by the waste collection authority. |

Evidence

| Criterion Reference | Title | Design Stage | Post Construction Stage |
|---------------------|-------------------------|---|-------------------------|
| crit 2-crit 4 | 01 General Evidence | One or more of the appropriate evidence types listed in Appendix C - HQM evidence requirements on page 236 can be used to demonstrate compliance with these criteria. | |
| crit 2 | 02 Consultation Outputs | Documentary evidence of the consultation process, including the content and findings from this. | |

Checklists, Tables & Illustrations

None.

Definitions

Composting

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

Close Proximity

Within 50m from the main entrance to the homes via a safe pedestrian route.

Safe pedestrian routes

Pedestrian routes on the development site, within control of the developer are deemed to be safe and accessible for all pedestrian users (including people with disabilities, elderly and children), where they take into account physical limitation of those who may use them, for example providing steps appropriately supported by sloped access and dropped curbs positioned at crossing points. These routes and associated spaces are appropriately sized, with good visibility of the route ahead. Alongside these principles they should also meet the following requirements:

1. Where required, lighting design must be in accordance with BS 5489-1:2013 Code of practice for the design of road lighting. Lighting of roads and public amenity areas⁽¹²⁸⁾ (rural areas are exempt from this requirement).

2. At crossing points there must be appropriate pedestrian crossings (e.g. zebra or pelican crossings) in place or a clear line of sight for at least 50m in each direction on roads with a 30mph speed limit or 100m in each direction on roads with greater than 30mph speed limit).
3. On roads with a speed limit of 30mph (or higher) there is a clearly defined footpath.
4. All footpaths provided should be at least 900mm wide. In rural areas, on single track roads, a grass verge can be accepted in place of a footpath.
5. On clearly defined home zones, it is acceptable for the pedestrians' routes to use the road.

Pedestrian routes that are outside of the development site and therefore not within the control of the developer do not need to meet the above requirements, however it must be demonstrated that there is a pedestrian route, which is not shared with vehicular traffic, from the site boundary to the transport node (e.g. via pavements, footpaths, pedestrian crossings). The route shall be signposted.

WATER

This section discusses the following.

| | |
|----------------------------------|------------|
| 25 Water Efficiency | 150 |
|----------------------------------|------------|

25 WATER EFFICIENCY

Max credits

17

Indicators (Average)



Aim

To reduce the consumption of mains water in the home.

Benefit

- Reduces occupant costs for both water bills and energy bills (through hot water).
- Minimises environmental impact by ensuring that valuable resources are used efficiently.
- Reduced planning limitations and cost associated with improvement of local water infrastructure for developers where homes within a new development require a reduced amount of mains water.

Context

The availability of water to meet occupier demands is a basic expectation for any home. The UK is expected to be in deficit by up to 16% of the total water demand in the 2050s and of up to 29% in the 2080s leading to major impacts on cost and resource levels⁽¹³⁰⁾.

We need to efficiently use our water supplies to minimise the impact of homes on water stress, thus ensuring availability for all. This is mainly influenced by how people use water in the home, but can be aided by providing water efficient fittings and water recycling systems in order of priority within our homes.

Foe England

This issue builds upon Approved Document G of the building regulations by firstly encouraging water efficiency, and then greywater and rainwater recycling. The optional fittings standard (see Table 37 on page 152) is from Approved Document G.



Credit Summary

Although Approved Document G is only applicable in England, for the purposes of HQM it should be applied to Wales and Scotland where required by the criteria.

| Criterion number | Title | Credits |
|------------------------|-----------------------------|------------------|
| crit 1 | 01 Water efficient fittings | up to 11 credits |
| crit 2-crit 3 | 02 Water recycling | for 6 credits |
| Total credit available | | 17 |

Criteria

01 Water efficient fittings

up to 11 credits

crit 1 Eight credits are awarded where the home has achieved:

crit 1.a: The optional fittings standard (see Table 37 on the next page), and

crit 1.b: A modelled water consumption of less than or equal to 110 litres per person per day calculated in accordance with the methodology section without using rainwater or greywater recycling systems.

OR

Eleven credits are awarded where the home has achieved:

crit 1.c: The advanced fittings standard set out in Table 37 on the next page, and

crit 1.d: A modelled water consumption of less than or equal to 100 litres per person per day calculated in accordance with the methodology section without using rainwater or greywater recycling systems.

02 Water recycling

for 6 credits

crit 2 crit 1 has been achieved.

crit 3 Rainwater or greywater recycling systems have been specified and it is demonstrated that there is sufficient water supplied by these systems to offset the demand for WC flushing for the home in accordance with Methodology below.

Methodology

Appendix A of Approved Document G⁽¹³¹⁾, should be used to calculate and demonstrate:

1. The modelled water consumption in litres per person per day.
2. The total demand for WC flushing has been met by water supplied by rainwater or greywater recycling systems or both.

Compliance Notes

| Criterion Reference | Compliance Note | |
|---------------------|--|--|
| crit 1 | CN1 Water fittings efficiency performance data | <p>The water efficiency of fittings should be determined from the figure quoted on the European Water Label (see www.europeanwaterlabel.eu).</p> <p>Products that do not have a European Water Label can be recognised. However, in order for such products to be recognised, the following evidence for the purposes of HQM is required:</p> <ol style="list-style-type: none"> 1. Confirmation of the water consumption figure (e.g. from manufacturers literature etc.) 2. Confirmation that the water consumption figure has been calculated in line with the methodology used for the European water label |
| crit 3 | CN2 Rainwater recycling is specified | Where rainwater recycling systems are specified, the system has been designed and installed in accordance with BS 8515:2009+A1:2013 - |

| Criterion Reference | Compliance Note | |
|---------------------|---|---|
| | | Rainwater harvesting systems. Code of practice ⁽¹³²⁾ . To demonstrate compliance with crit 3 on the previous page, water collected by rainwater recycling systems must be reused in the home. Where this is not the case, the rainwater recycling system is not reducing the potable water consumption within the home and therefore cannot contribute to compliance within 02 Water recycling on the previous page. |
| crit 3 | CN3 Greywater recycling is specified | Where greywater recycling systems are specified, the system has been designed and installed in accordance with BS 8525-1:2010 - Greywater systems. Code of practice ⁽¹³³⁾ . To demonstrate compliance with crit 1.b water collected by greywater recycling systems must be reused in the home. Where this is not the case, the greywater recycling system is not reducing the potable water consumption within the home and therefore cannot contribute to compliance within 02 Water recycling on the previous page. |
| crit 3 | CN4 Phased or multiple home development | See Appendix D - Post-construction stage assessment issue exceptions on page 243. |

Evidence

| Criterion Reference | Title | Design Stage | Post Construction Stage |
|---------------------|---|---|-------------------------|
| crit 1-crit 3 | 01 Water Efficiency Calculator for New homes | A completed copy of the tool | |
| crit 1-crit 3 | 02 Data used to complete the Calculator tool. | Documentary evidence supporting the data used to complete the calculator tool. | |
| crit 1-crit 3 | 03 General Evidence | One or more of the appropriate evidence types listed in Appendix C - HQM evidence requirements on page 236 can be used to demonstrate compliance with these criteria. | |

Checklists, Tables & Illustrations

Table 37 Water fittings standards

| Water fitting | Optional fittings standard | Advanced fittings standard |
|-------------------|----------------------------|--|
| WCs | ≤ 4/2.6 litres dual flush | 4/2 litres dual flush (maximum 3 litres effective flushing volume) |
| Showers | ≤ 8L/min | ≤ 6L/min |
| Baths | ≤ 170 litres | ≤ 170 litres |
| Basin taps | ≤ 5L/min | ≤ 5L/min |
| Kitchen sink taps | ≤ 6L/min | ≤ 6L/min |
| Dishwashers | ≤ 1.25L/place setting | ≤ 1.25L/place setting |
| Washing machines | ≤ 8.17L/kilogram | ≤ 8.17L/kilogram |

Definitions

None.

DELIVERY

This section discusses the following.

| | |
|--|------------|
| Quality assurance | 154 |
| 26 Project Preparation | 155 |
| 27 Commissioning and Testing | 161 |
| 28 Inspections and completion | 167 |
| Construction impacts | 176 |
| 29 Responsible Construction Management | 177 |
| 30 Construction Energy Use | 183 |
| 31 Construction Water Use | 188 |
| 32 Site Waste Management | 193 |
| Customer Experience | 201 |
| 33 Aftercare | 202 |
| 34 Home Information | 206 |
| 35 Smart Homes | 213 |
| 36 Post Occupancy Evaluation | 218 |

QUALITY ASSURANCE

This section discusses the following.

| | |
|--|------------|
| 26 Project Preparation | 155 |
| 27 Commissioning and Testing | 161 |
| 28 Inspections and completion | 167 |

26 PROJECT PREPARATION

Max credits

6

Indicators (Average)



Aim

To encourage procedures that improve the overall quality of the home and reduce the difference between predicted and actual performance in the home

Benefit

- Achieving homes that perform closer to their predicted performance levels
- Give confidence to the consumer, developer, regulator and policy maker on the likely impacts and benefits of new homes
- Increase the build quality of the home and reduce the likelihood of both short and long term constructional difficulties that cause increased costs and disruption to occupants
- Ensure that homes are as affordable as they can be for consumers while meeting their needs.

Context

The gap between designed and actual performance is well recognised by industry and government as a key challenge to improving the quality of homes. This gap is especially recognised in connection with energy performance but it goes much further than this, impacting on the ability of the homes to meet occupants need across a wide range of performance requirements, including health and wellbeing and long-term build quality. Among others, Zero Carbon Hub’s research⁽¹³⁴⁾ and the principles of soft landings (developed by BSRIA⁽¹³⁵⁾ and Government⁽¹³⁶⁾), identify methods of reducing this gap. This includes promoting collaborative working, applying lessons learned from previous projects and ensuring a ‘golden thread’ of quality control is maintained throughout the project to ensure a quality development.



Credit Summary

| Criterion number | Title | Credits |
|-------------------------|------------------------------------|---------------------|
| crit 1 | 01 Feedback from previous projects | for 4 credits |
| crit 2- crit 5 | 02 Project delivery plan | Minimum requirement |
| crit 6 | 03 Procurement plan | Minimum requirement |
| crit 7 | 04 Dissemination | Minimum requirement |
| crit 8 -crit10 | 03 Procurement Policy | for 2 credits |
| Total credits available | | 6 |

Criteria

01 Feedback from previous projects **for 4 credits**

crit 1 Where it is demonstrated that lessons learned from previous projects have been incorporated into the assessed home following the process set out in the Methodology.

02 Project delivery plan **Minimum requirement**

crit 2 At Preparation and brief (RIBA stage 1) or equivalent an outline delivery plan has been developed which is kept up to date as the project progresses

crit 3 At the end of Developed design (RIBA Stage 3) or equivalent,

crit 3.a: the project delivery stakeholders have met to discuss project design and client requirements

crit 3.b: roles, responsibilities and contribution of each member of the project delivery team has been defined

crit 3.c: HQM performance targets to be achieved are formally agreed

crit 4 At the end of Developed design (RIBA Stage 3) or equivalent or before activities have started on site (whichever is earlier)

crit 4.a: the project delivery stakeholders have met to discuss Project delivery requirements

crit 4.b: set of actions to manage the construction process and construction quality are established, inspection routine and format of construction record has been set

crit 4.c: set of actions are established for managing risks of poor performance by adapting design introducing procedures to ensure appropriate site operatives are aware of how to manage these risks during construction and handover.

crit 5 At the end of Technical design stage (RIBA stage 4) or equivalent

crit 5.a: the project delivery stakeholders have met to discuss post construction and handover requirements

crit 5.b: set of actions have been established to manage fabric commissioning and testing, pre testing and commissioning of building services and controls

Refer to Checklist, Tables and Illustrations section to see topics to be covered under each of the above areas.

03 Procurement Policy **Minimum requirement**

crit 6 The client or the principal contractor has a product procurement policy that:

crit 6.a: sets out performance requirements for goods and specifications to be procured for the assessed project. The performance requirement should:

crit 6.a.i encourage goods and specifications to be procured according to best practice standards

crit 6.a.ii encourage specifications that lead to high build quality

crit 6.b: sets out instances where substitution will be allowed and what should be taken into account when considering substitution (CN1 on page 158)

crit 6.c: states clearly that any substitution of goods or specification will need to meet performance requirement set out for the project. It should also set out clear procedures for the contractor when seeking approval on any substituted goods and include a requirement for the contractor to provide details of substitution and evidence to demonstrate that substituted products meet performance requirements.

04 Dissemination

Minimum requirement

crit 7 Processes are in place to ensure communication of requirements of crit 3, crit 4, crit 5 above and key considerations (CN2 on the next page) to all trades and site operatives (e.g. via toolbox talks, briefings, meetings, BIM, graphic examples of good workmanship on site etc.) as appropriate for their specific involvement and in an understandable way, including appropriate language, which includes the following content as a minimum:

crit 7.a: Promote good practice of workmanship and highlight potential issues that can undermine build quality for the elements outlined in 28 Inspections and completion: Table 40 on page 172 at key stages throughout construction.

See the Zero Carbon Hub Builders Book for examples of good practice for many of the elements within the scope of this issue

crit 7.b: Explain processes of ensuring quality on site, including the role of the appropriately qualified person and how they can help

crit 7.c: Explain what the construction record is for and how site operatives need to contribute to it

crit 7.d: Clarify the process for making design and material substitutions

crit 7.e: Highlight areas where their work could impact (positively or negatively) on performance in other areas such as energy performance, health and wellbeing

05 Site Worker Feedback

for 2 credits

crit 8 The client or the principal contractor has a documented policy and procedure in place to enable staff to make protected disclosures.

crit 9 The policy should clearly :

crit 9.a: Communicate the significance that the company attach to identifying and resolving wrongdoing

crit 9.b: Encourage workers to raise concerns within their organisation as soon as possible and to give them the confidence to do so

crit 9.c: Remind workers of the standards of behaviour expected of them

crit 9.d: Ensure workers know whom to approach with a concern, and enable them to bypass the person, management level or part of the organisation to which the concern relates.

crit 9.e: Include a option to raise concerns anonymously and set out a process for it.

crit 9.f: Outline the procedures for investigating disclosures and what steps might be taken if wrongdoing is uncovered

crit 9.g: Set out safeguards for those making genuine disclosures

crit 9.h: Communicate what will happen to those who victimise genuine disclosures or abuse the system by crit

crit 9.i: Provide access to further sources of advice and guidance on making disclosures

crit 10 The principal contractor is responsible for prominently displaying the policy and contact details on the construction site and has ensured all site workers and the Client (where policy has been put in place by the Principal Contractor under crit 7) have been made aware of the policy.

Methodology

Feedback from previous projects

The following steps outline the steps to assess this criterion:

1. An individual has been appointed who will be responsible for facilitating the lessons learned activities and its implementation in the assessed project
2. Projects completed in the past two years that are similar (size, budget, location, project brief etc.) to the assessed project have been identified.
3. In early stages of the project the following information is gathered about the selected past projects
 - a. Best practice in design specification, construction, procurement,
 - b. Areas of improvements
 - c. Risks to avoid

One or more sources below can be used to collect information on the previous projects: Customer satisfaction surveys, performance reviews, aftercare support records, complaints received, post occupancy evaluations, seasonal commissioning activities, snagging issues identified, record of repair works carried out, warranty claims, feedback from previous project team.

4. The cause of issues in the past project have been investigated and solutions identified to address them in the assessed project to avoid defects/ mistakes or repeat successes.

Identified solutions can include improvement to one or more of the following areas as relevant: Design, project delivery process, construction techniques, construction process or sequencing, procurement, testing procedures and monitoring, methods, training and upskilling of labour, handover procedures and services.

Improvements can also relate to organisation wide improvements to address recurring issues

5. A report detailing all lessons learned activities is developed and made accessible to all in the organisation for future reference. The report should include as a minimum:
 - a. details of the selected previous projects,
 - b. feedback and records used from previous projects,
 - c. issues investigated and solutions identified to address them along with justification of why the particular solution was thought to be the best way to resolve the issue,
 - d. improvements in the assessed project,
 - e. expected results and
 - f. framework for monitoring improvements and measure success of the solution.

Compliance Notes

| Criterion Reference | Compliance Note | |
|----------------------|---------------------------|---|
| crit 4.b on page 156 | CN1 Product substitutions | When substituting products consider any applicable requirements for product performance and compliance, the substituted product's interaction with other building products and systems and its overall impact on HQM requirements and targets, in order to avoid any negative impact on performance of this or any other design features. |
| crit 7 | CN2 Key considerations | The Zero Carbon Hub (2014) outlines the following general guidance regarding key considerations relating to reducing the performance gap, which must form part of what is disseminated to |

| Criterion Reference | Compliance Note |
|---------------------|---|
| | <p>site operatives in crit 4 on page 156:</p> <ul style="list-style-type: none"> - The importance of closely following the details within the drawings and specification - Feeding information back to the site management team where drawings are inadequate - Sequencing the installation of specific materials into difficult areas such as complex roof construction and loft eaves - Helping individuals to understand their role in maintaining items such as the airtight barrier. |

Evidence

| Criterion Reference | Title | Design Stage | Post Construction Stage |
|---------------------|---------------------|---|-------------------------|
| All | 01 General Evidence | One or more of the appropriate evidence types listed in Appendix C - HQM evidence requirements on page 236 can be used to demonstrate compliance with these criteria. | |
| crit 1 | 02 Reports | Copy of the reports detailing all lesson learned activities | |
| crit 2 - crit 7 | | Evidence of dissemination of all required information to relevant parties. | |
| crit 6 | 056 Staff Feedback | Evidence of documented policy for making protected disclosures. | |
| | | Evidence that the policy was disseminated to all relevant parties | |

Checklists, Tables & Illustrations

The following topics should be covered as a minimum under each of the areas listed under crit 2

- Project design and client requirements
 - design aims and design strategy
 - budget
 - end user requirements
 - project phases
 - maintainability and adaptability of the proposals
 - lessons learnt from previous projects (where relevant)
 - specific system requirements (where relevant)
 - HQM performance targets
- Project delivery requirements
 - construction process and approach
 - quality management
 - inspections
 - construction record
 - general and specific risks to the project, relating to typical sources of poor performance including the elements outlined in 28 Inspections and completion on page 167.
- Post-construction and handover requirements
 - requirements for specific commissioning
 - testing
 - aftercare support
 - post occupancy evaluation (where pursued)

Definitions

Formally agreed

The term 'formally agreed' relates to the performance strategy targets. In addition to the strategy itself, formal agreements may include a contract or letters of appointment with the architect and with other relevant project team members.

HQM performance targets

HQM performance targets refer specifically to the HQM star rating and key performance indicators targeted. Although individually targeted HQM issues or credits may be traded over the course of the project as it evolves, it is recommended that these are targeted or prioritised to ensure that the agreed performance target is achievable, and achieved without potentially costly alterations to the design at a later stage.

Post occupancy evaluation

Post-Occupancy Evaluation (POE) is the umbrella term for the process of obtaining feedback on the performance of a recently completed new building or refurbishment. Over time the value of POE has been recognised not only as a one off evaluation of a recently completed project but as an ongoing assessment process for any building in use that should be conducted at regular intervals over the building's lifecycle. For further guidance regarding POEs, please refer to the references outlined in 36 Post Occupancy Evaluation on page 218.

Project delivery stakeholders

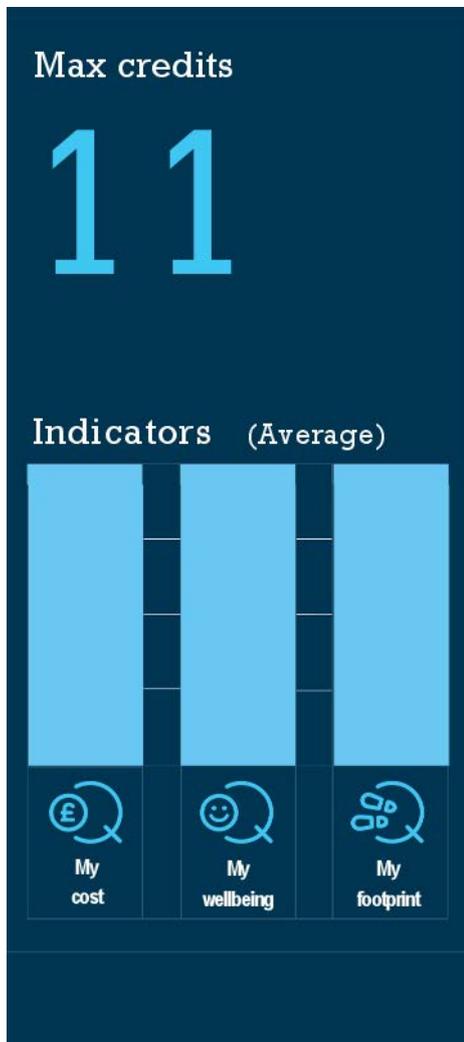
The purpose of the collaborative working criteria is to reflect the need to consider the input of all the major project stakeholders from the earliest practical stage, to ensure smooth and successful delivery of the project's sustainability objectives.

Project delivery stakeholders therefore include the client, the building occupier or their representative (where known), the design team and the principal contractor. Concerning contractors' involvement, it ensures their input in terms of formulating sustainable design solutions, commenting or inputting on the practicality and buildability of (one or more) design solutions and their impact on programming, cost etc.

It is recognised that traditionally for some projects, the contractor for the works might not be appointed at the early stages of the project and therefore compliance with would not be possible. In these instances, to ensure the aim of the criterion is upheld will be met, provided that a suitably experienced person with substantial construction or contracting experience in projects similar to the proposed works is involved prior to appointment of the contractor.

A suitably experienced person could be a contractor appointed as a consultant for this stage or a construction project manager.

27 COMMISSIONING AND TESTING



Aim

To ensure that homes and their systems are performing as designed at handover.

Benefit

- Ensure running costs and energy efficiency are as close to design as possible.
- Increase the build quality of the home and reduces the likelihood of performance related issues during occupation.
- Help to maintain customer satisfaction and developer reputation.

Context

Rigorous testing and commissioning at key stages of development is important for ensuring quality standards sought at design are met in practice.⁽¹³⁷⁾

Although all controlled services that fall under the scope of building regulations need to be commissioned (i.e. parts F, L and J), good practice commissioning is often not carried out. Commissioning strategies over-optimistic, where not effectively managed, can delay project completion, cause handover problems and result in poor performance⁽¹³⁸⁾.

Testing building fabric helps to reveal any problems with home performance. If left too late, solutions are usually limited to temporary fixes, which can quickly fail over time, reducing the home's long term performance. Pre- testing helps to ensure targeted fabric performance levels are met in practice when the primary air barrier is still accessible, to make long- term repairs relatively easily, if needed. At post - construction, further fabric testing helps to ensure targeted fabric performance is being met in practice, after significant works have been carried out and before handover.



Credit Summary

| Criterion number | Title | Credits |
|-------------------------|--|---------------------|
| crit 1-crit 3 | 01 Commissioning and testing strategy | Minimum requirement |
| crit 4-crit 5 | 02 Commissioning building services and control systems | Minimum requirement |
| crit 6-crit 7 | 03 Fabric pre-testing | 4 credits |
| crit 8-crit 10 | 04 Post-construction testing | up to 7 credits |
| Total credits available | | 11 |

Criteria

01 Commissioning and testing strategy

Minimum requirement

- crit 1 There is a schedule of commissioning and testing that identifies and includes a suitable timescale for commissioning of all building services and control systems and testing building fabric, in line with appropriate commissioning best practice guidance.
- crit 2 The principal contractor accounts for the commissioning and testing programme, responsibilities and criteria within their budget and main programme of works, allowing for the required time to complete all commissioning and testing activities prior to handover.
- crit 3 A target for the home's permeability (m³/hm²) is agreed and a strategy for how it will be met is established, including: roles and responsibilities, how performance will be monitored and details of any testing that will be carried out.

02 Commissioning building services and control systems

Minimum requirement

- crit 4 Appropriate project team members have been appointed to conduct and manage commissioning activities
- crit 5 All building systems listed below that are present are commissioned in line with the manufacturer's guidance and appropriate commissioning best practice guidance by individuals who were not involved in the installation process:
 - crit 5.a: Hot water
 - crit 5.b: Heating
 - crit 5.c: Ventilation (e.g. MVHR)
 - crit 5.d: Comfort cooling
 - crit 5.e: Low and zero carbon technologies.

03 Fabric pre-testing

for 4 credits

- crit 6 A member of an appropriate body (referred to in the 'airtightness testing' part of Table 38) has been appointed to:
 - crit 6.a: Determine the appropriate inspection and pre-testing methods for the home, using their professional discretion in line with the Methodology section and their professional body best practice guidance.
 - crit 6.b: Provide quality assurance of the assessed home's fabric performance, including continuity of insulation, through inspection and air permeability testing, after the primary air barrier (see definition) is complete and while it is still accessible (see Methodology).

crit 6.c: Outline recommendations to help meet the designed fabric performance standards, at post construction.

crit 7 The recommendations made as part of crit 6.c are carried out.

04 Post-construction testing

up to 7 credits

crit 8 Where post construction testing and inspection of the integrity of the assessed home’s building fabric is carried out, in accordance with an appropriate standard (see Table 38).

crit 9 Credits are awarded, inline with table below:

| Testing method | Credits |
|---|---------|
| Air leakage paths (air tightness testing) | 3 |
| Continuity of insulation and thermal bridging (e.g. thermographic survey) | 4 |
| Air leakage paths, continuity of insulation and thermal bridging | 7 |

crit 10 Any remedial work is carried out before handover, to ensure the required performance characteristics of the home are met, where this is highlighted as needed from post construction testing and inspection.

Table 38 Appropriate testing standards

| Testing method | Requirement |
|----------------------|---|
| Airtightness testing | <p>Carried out by professionals with membership of ATTMA (Air Tightness Testing and Measurement Association) or IATS (Independent Air Tightness Testing Scheme) attained at organisational level maintaining UKAS accreditation (as airtightness testing laboratories to ISO 17025).</p> <p>Airtightness testing is required by building regulations but this may only happen on a sampling basis and would need to be performed on the specific home being assessed, for the purposes of meeting crit 8. This may happen at post-construction, or earlier (e.g. prior to first fix), when there is often more opportunity to carry out remedial works and resolve any problems revealed by the test or survey reports.</p> |
| Thermographic survey | <p>Carried out by a professional holding a valid Level 2 certificate in thermography (as defined by the UKTA website www.ukta.org). Where a Level 2 thermographer is not available at the site, the survey may be undertaken by a Level 1 thermographer and then the images interpreted by a Level 2 thermographer.</p> <p>The thermographic survey must cover 100% of the treated spaces, unless it is a large complex building. The survey must ensure that all elements of the building fabric that enclose an internal heated or conditioned (treated) zone of the building, will be tested. This includes internal walls separating treated and untreated zones.</p> |
| Other methods | <p>Where a method for investigating fabric performance is being used that is not listed above (e.g. co-heating or heat flux testing), details of the method must be sent to BRE in order to consider if the method is acceptable for the purposes of this issue.</p> |

Methodology

Pre-testing

Inspections and pre-testing needs to be carried out after any works are finished that can risk undermining the primary air barrier (see definition). For example, after the principal penetrations have been made for: services, electrics, plumbing, drainage and extractions. It also needs to happen before the air barrier is covered up and is still accessible for thorough inspection and any potential remedial works that are recommended by the appropriately qualified person. Leaving it later than this can lead to costly remedial works, a risk of poor performance, and non-compliance with regulatory requirements and

fabric performance targets. The appropriately qualified person needs to be satisfied that this is done in an adequate way to identify and resolve any problems that may affect the fabric performance standards, agreed in the commissioning and testing strategy, from being met in practice and maintained throughout occupation.

Compliance Notes

| Criterion Reference | Compliance Note | |
|---------------------|---|--|
| crit 4 | CN1 Specialist commissioning manager | <p>For buildings with complex building services and systems (e.g. communal systems with a centralised plant), a specialist commissioning manager must be appointed to conduct and manage commissioning activities. They must be appointed during the design stage (by either the client or the principal contractor) to carry out the following responsibilities:</p> <ul style="list-style-type: none"> - Undertaking design reviews and giving advice on suitability for ease of commissioning - Providing commissioning management input to construction programming and during installation stages - Management of commissioning, performance testing, handover, post-handover stages. <p>Any seasonal commissioning that is undertaken for these complex services and systems, should be carried out over the course of one year from the date of home completion, in accordance with commissioning best practice (see seasonal commissioning) and must include the following:</p> <ul style="list-style-type: none"> - Testing of all building services under full load conditions, i.e. heating equipment in mid-winter, cooling or ventilation equipment in mid-summer, and under part load conditions (spring, autumn) - Re-commissioning of systems (following any work needed to serve revised loads), and incorporating any revisions in operating procedures into the operations and maintenance (O&M) manuals. <p>Where seasonal commissioning is conducted during occupancy, it is possible that this may contribute to meeting some of the criteria outlined in 33 Aftercare on page 202.</p> |
| crit 6 to crit 9 | CN2 Temporary sealing | <p>Short term remedial measures carried out, such as using mastic on the secondary air barrier, are only acceptable when used within the guidelines outlined in TIL001—Temporary Sealing Guidance (ATTMA, 2015).</p> <p>The appropriately qualified person must be satisfied that any remedial measures will reasonably last the lifetime of the home and are in line with best practice.</p> <p>Where temporary sealing is applied, documentary evidence needs to be provided showing where this is used. This should be included as part of the construction record, in the ‘Inspections and completion’ issue.</p> |
| crit 4 | CN3 Phased or multiple home development | <p>See Appendix D - Post-construction stage assessment issue exceptions on page 243.</p> |

Evidence

| Criterion Reference | Title | Design Stage | Post Construction Stage |
|---------------------|---------------------------------------|---|--|
| All | 01 General Evidence | One or more of the appropriate evidence types listed in Appendix C - HQM evidence requirements on page 236 can be used to demonstrate compliance with these criteria. | |
| crit 1 | 02 Commissioning and testing strategy | Copy of the commissioning and testing strategy. | |
| crit 8 | 03 Thermographic survey | Refer to General evidence requirement above. | Thermographic survey and level 2 thermography certificate (where a thermographic survey has been carried out). |
| crit 8 | 04 Test results | Refer to General evidence requirement above. | Test or survey results from the post construction testing performed. |

Checklists, Tables & Illustrations

None.

Definitions

Commissioning best practice

For guidance on commissioning, refer to the sources below (where appropriate for systems installed):
BSRIA Commissioning Guides: Application Guide 1/91:

- Commissioning HVAC Systems: Guidance on the division of responsibilities (TM1/88.1)
- Commissioning of Air Systems (BG49/2013)
- Pre-Commission Cleaning of Pipework Systems (BG29/2012)
- Commissioning Water Systems (BG 2/2010)
- Commissioning Job Book - A framework for managing the commissioning process (BG 11/2010)
- Seasonal Commissioning (BG 44/2013)
- Domestic ventilation systems - a guide to measuring air flow rates (BG 46/2015).

CIBSE Commissioning Codes: Set of Seven Codes (2003):

- CIBSE Commissioning Code A: Air Distribution Systems (1996 confirmed 2006). ISBN: 9780900953736
- CIBSE Commissioning Code B: Boilers. ISBN: 9781903287293
- CIBSE Commissioning Code C: Automatic Controls. ISBN: 9781903287132
- CIBSE Commissioning Code L: Lighting (SLL Commissioning Code L). ISBN: 9781903287323
- CIBSE Commissioning Code M: Commissioning Management. ISBN: 9781903287330
- CIBSE Commissioning Code R: Refrigerating Systems. ISBN: 9781903287286
- CIBSE Commissioning Code W: Water Distribution Systems. ISBN: 9781906846152.

CSA

- www.csa.org.uk.

The institute of engineering and technology:

- Photovoltaics (PV), i.e.T code of practice.

Commissioning parts from Microgeneration certification scheme guidance:

- Solar Thermal (ST): MIS3001 and associated references
- Small Wind: MIS3003 or BWEA standards (now Renewable UK)
- Biomass: MIS3004
- Heat pumps: MIS3005
- Micro-CHP: MIS3007.

BRE Trust:

- Wiltshire R, Williams. J, & Woods. P, (2014) A technical guide to district heating, BRE Trust.

Where other LZCTs are present that are not mentioned above, please contact BRE for further guidance on how to proceed for the purposes of this issue

Primary air barrier

The construction product layer or layers that provide the majority of the envelope's resistance to the movement of air from wind, passive or mechanical sources. The barrier may be a combination of materials and components.

Remedial works

Where systems or services fail commissioning or are not performing as expected, remedial works are the measures taken to ensure systems and services pass commissioning. These measures may involve performing repairs and adjusting settings appropriate to the particular home being commissioned. These measures may also involve providing guidance or advice to occupants, where poor performance is partly due to how they are interacting with their systems or services (e.g. where seasonal commissioning carried out). The remedial works implemented must be in accordance with the recommendations made by the Commissioning strategy.

28 INSPECTIONS AND COMPLETION

Max credits

16

Indicators (Average)



Aim

To increase confidence that the home is capable of meeting its specified performance targets and a high level of build quality.

Benefit

- Independent inspections help to give unbiased assurance of quality during design, throughout construction and at completion.
- Improve customer satisfaction by ensuring homes are finished to a high standard before occupants move in.
- Reduce risk of poor performance in-use, benefiting investors, warranty providers and other stakeholders.
- Reduce performance gap to enhance value of other aspects of the home that are adopted.

Context

Building warranty and building control processes provide inspections at certain stages of the development, for a selection of homes on-site, to highlight and resolve any non-compliances with warranty standards or Building Regulations. Support from building warranties, developers and schemes like the Consumer Code for Home Builders help to resolve defects within the early stages (usually about 10 years) of the home if they occur.

To deliver high quality homes, effort needs to go beyond processes of sampled spot checks and retrospective support. This can be aided by establishing well planned strategies during design⁽¹³⁹⁾ that are followed up with rigorous, independent inspections of all homes, at key stages during construction⁽¹⁴⁰⁾ and at completion⁽¹⁴¹⁾ to ensure homes are finished to a high standard.

Delivery of high quality homes doesn't stop at handover; proactive visits are an effective way for addressing any issues that can emerge during the early stages of occupation. Occupant satisfaction can be enhanced and the performance gap reduced, by helping occupants to manage their home effectively and by resolving any defects that are only noticed during occupancy and when allowing for seasonality⁽¹⁴²⁾. This, combined with a transparent record of the quality measures taken, can encourage a culture of accountability, reassure occupants and help to resolve defects or disputes⁽¹⁴³⁾.



Credit Summary

| Criterion number | Title | Credits |
|-------------------------|------------------------------|---------------------|
| crit 1- crit 2 | 01 Visual defects inspection | Minimum requirement |
| crit 3- crit 4 | 02 Construction record | Minimum requirement |
| crit 5- crit 8 | 03 Right to inspect | 2 credits |
| crit 9 | 04 Construction inspections | 5 credits |
| crit 10 | 05 Third party verification | 3 credits |
| crit 11 | 06 Early inspection visit | 3 credits |
| crit 12 | 07 Seasonal inspection visit | 3 credits |
| Total credits available | | 16 |

Criteria

01 Visual defects inspection

Minimum requirement

- crit 1 An appropriately qualified person (AQP see Definition), who is independent from site activities (i.e. not checking their own work) has done the following, before the occupant moves in:
- crit 1.a: Carry out a visual defects inspection of all the aspects in the visual defects inspection (see Methodology), to check final finishes are of required standard
- crit 1.b: Identify, monitor and report on any remedial work that is needed, to the developer or client.
- crit 1.c: Ensure the home is finished and habitable, including the following:
- crit 1.c.i: Access to the home is safe and clear (e.g. unobstructed by construction works), including drives and pathways to the home.
- crit 1.c.ii: No health and safety hazards inside the home.
- crit 1.c.iii: Electrics and plumbing are all functioning.
- crit 1.c.iv: All active systems, inside the home, are installed, working and ready for occupant use.
- crit 1.c.v: All fixtures and fittings installed and finished.
- crit 1.c.vi: Finishes and decoration completed internally and externally
- crit 2 Results of visual defects inspection and any outstanding remedial work are reported and given to occupants before they move in as part of their home information (see 34 Home Information).

02 Construction record

Minimum requirement

- crit 3 Where an appropriately qualified person (see Definition) has been appointed to ensure a construction record is kept throughout the construction stage that demonstrates the quality assurance measures taken to meet the home's required performance characteristics.
- crit 4 The record is available to:
- crit 4.a: Site operatives throughout the construction stage for them to directly contribute to as appropriate.
- crit 4.b: Occupants on request, as part of any visual defects inspections and when moving in. It needs to be available for the duration of the building warranty in place (see 33 Aftercare: crit 1 on page 203).

03 Right to inspect**2 credits**

- crit 5 Potential owners of the home (CN1), are given the right for them or their own independent representative (not provided or recommended by the developer) to carry out their own non-invasive, visual inspection or snagging check up to one month before committing to buy the home. The notification of this right is prominently given within the property sales materials
- crit 6 The home's specification and construction record is available to the potential owner or their representative carrying out the inspection.
- crit 7 Any snags, defects or inconsistencies with the home's specification that are identified by the visual defects inspection in crit 5 are resolved within 28 days from completion of the property purchase
- crit 8 Any activities referred to in the occupant's right to inspect does not impact on the statutory rights owed by the developer to the purchaser, in any way

04 Construction inspections**5 credits**

- crit 9 Where an appropriately qualified person, is based on site (see CN4) has carried out the following, as a main part of their role:
- crit 9.a: Outline and agree the strategy, roles and responsibilities for meeting the 04 Construction inspections criteria, as part of the activities in the 'project delivery plan' criteria in 26 Project Preparation on page 155.
- crit 9.b: Carry out systematic and scheduled inspections of build quality for all assessed homes, throughout construction, at key stages and ensures they comply with the home's required performance characteristics, including the following, as a minimum:
- crit 9.b.i: Design specifications,
 - crit 9.b.ii: Warranty standards
 - crit 9.b.iii: Building regulations, planning permissions and other local authority and statutory requirements
- crit 9.c: Ensure any design variations or materials substitutions are appropriately managed and approved by an appropriate member of the design team or the client.
- crit 9.d: Feedback any lessons and examples of good practice regarding quality assurance from activities on the assessed, back to the developer, client, consultants and designers, to inform future projects via recorded meetings or an easily accessible platform.

05 Third party verification**3 credits**

crit 10 The appropriately qualified person (see Definition) appointed to carry out the role in the 04 Construction inspections criteria, is an independent third party (see Definition)

06 Early inspection visit**3 credits**

crit 11 Where a contracted commitment is in place for a visit to be made, between four and six weeks after occupants have moved in, that includes the following

crit 11.a: An inspection of the active systems referred to in 33 Aftercare: 02 Handover visit on page 203 to check they are functioning in line with their design intent and manufacturer's guidance. If needed, actions are taken including: repairs, remedial works, recommissioning, replacement or guidance given to occupants.

crit 11.b: Rectify any problems regarding the home (e.g. fixtures and fittings). For example, as a result of any snagging issues or defects not previously identified or resolved.

crit 11.c: Adapt any systems to reflect occupant usage patterns and individual preferences as appropriate.

07 Seasonal inspection visit**3 credits**

crit 12 Where a contracted commitment is in place for a visit to be made, between eight and twelve months after the occupant has moved in, to do the following:

crit 12.a: Carry out the same checks referred to in the 06 Early inspection visit criteria.

crit 12.b: Make any adjustments or provide occupants with guidance to ensure the home and its systems are performing as expected throughout the year, allowing for seasonal variation.

crit 12.c: Offer to check heating bills and take action to investigate and ensure homes are performing in line with their design intent. For example, this may include a combination of:

crit 12.c.i: Occupant guidance where occupant behaviour is a significant factor

crit 12.c.ii: Remedial measures to address any sources of unexpected heat loss, where this is identified by testing such as thermal imaging at junctions and meeting points etc.

crit 12.c.iii: Systems adjustments or replacement where they are not running efficiently or are faulty.

crit 12.d: Offer to align any inspection visits with visits required for meeting criteria for the post occupancy evaluations (see issue), as appropriate.

Methodology

Visual defects inspection

Visual defects inspection should cover all aspects of the home that are possible to check visually including superstructure, finishes, building services and external works



Visual defects inspection at completion (crit1) provides a useful opportunity to address any problems, before occupants move in, to avoid the chance of early problems or complaints and therefore improve the handover process. However, checks made as part of the 'construction inspections' criteria are needed to ensure quality standards are being achieved and any defects that are only visible at certain stages, are revealed and resolved early on. Doing this will help homes pass visual defects inspections at completion, without delays and potentially costly remedial works and improve the home's long-term performance .

Construction inspections scope

The appropriately qualified person, needs to determine the scope of the construction record and scheduled inspections (where pursuing the construction inspections criteria), to ensure it is appropriate for the assessed project. This is likely to vary depending on the construction methods used, the project type and the quality assurance processes being considered. Table 40 outlines items that would be typically required for compliance with the construction inspections criteria and gives examples of the key stages inspections should be carried out, based on a traditional brick/ block construction scenario.

However please note that this list is not exhaustive, and has been provided to illustrate the scope of elements and stages that are expected to be quality assured as part of the criteria

Table 40 Inspections scope

| Building elements | Key stages of inspection |
|--|---|
| Substructure (e.g. foundations, excavations, service entries) | Excavations and foundations in and before concrete filled in Throughout foundations |
| Damp proof course (e.g. below thresholds, upper or lower levels) | DPC level installed After blown cavity insulation |
| External and party walls (e.g. wall ties, cavity trays, cladding, tolerances) | During wall construction (e.g. while cavity still accessible) At completion |
| Insulation (e.g. continuity, roofs, floors, services, at junctions, blown insulation drill points) | Installation of: walls, roofs, lofts and lowest floors. Before first fix After services installed At completion |
| External windows and doors (e.g. size tolerances), garage doors | Window and door installation During construction of blockwork (if applicable) After blown cavity insulation |
| Floors | Floor installation |
| Roofs (e.g. mortar mix, waterproofing) | When mortar mixed During and after roof installation |
| Services (e.g. wiring, plumbing, ventilation, ducting, drilling, seals or insulation) | First fix Commissioning (partly covered by Commissioning and testing issue) |
| Drainage (e.g. drainage pipes, chambers, manhole covers) | Completion or pre-handover |
| Hard and soft landscaping (e.g. fencing, top soil, planting) | Completion or pre-handover |
| Protection of building materials during construction (e.g. against rainwater, frosts or hot weather) | During all inspections for this issue, as applicable (e.g. insulation, roofs, drainage etc.) |

Compliance Notes

| Criterion Reference | Compliance Note | |
|---------------------|---------------------------|---|
| crit 5-crit 8 | CN1 Potential owner | <p>Who this refers to will vary depending on the type of project and nature of the home's ownership.</p> <p>Essentially it refers to anyone who will own the home, once it is completed and handed over including:</p> <ul style="list-style-type: none"> - Purchasers, including those who will own a proportion of the home as part of a shared ownership scheme (e.g. part buy or part rent). - A client who will own the home once it has been completed by the developer for occupation by others (e.g. a social housing provider). - The developer if they are also the client, i.e. they will continue to own and manage the home during occupation, e.g. private rented sector provider. In this case, the criteria will essentially be met by default as part of the visual inspections criteria. <p>The purpose of this is to ensure that the home owner is given the opportunity to ensure they are satisfied with the home that will be their responsibility after construction.</p> |
| All | CN2 Off-site construction | <p>The principle for homes constructed off-site is the same in terms of the construction inspections criteria to ensure quality assurance is carried out throughout construction. As long as evidence is provided to demonstrate the criteria are being met, this should be acceptable.</p> |
| crit 1-crit 2 | CN3 Gardens finished | <p>The 'finished and habitable' requirement is focussed on ensuring occupants can move into a new home that is accessible, functional, comfortable and safe. As a minimum, hard landscaping is needed for access but soft landscaping may not be complete for the purposes of this criterion as long as the garden areas are capable of planting being done after occupants move in. For example, gardens are clear of building debris and adequate topsoil is present for planting</p> |
| crit 9 | CN4 Frequency on site | <p>HQM has not attempted to define benchmarks for the frequency the AQP should be on site because this will vary, depending on the type of project and quality assurance processes in place.</p> <p>The AQP needs to be on site enough to adequately carry out the level of quality assurance required for all elements, at key stages, within the construction inspections scope, for all assessed homes targeting these credits.</p> <p>For example, on a site of hundreds of homes, the AQP will probably need to be based on the assessed site most of the time, in order to carry out the level of quality assurance required. On a smaller site, an AQP may only be needed to be on site once a week or more frequently during stages that require more continuous presence on site within a short period of time (e.g. foundations).</p> <p>A level of remote quality assurance may also be appropriate in some scenarios. For example, using remote inspections via video may help to reduce the frequency an AQP is located on site, if evidence is provided that demonstrates the same outcome is being achieved.</p> |

Evidence

| Criterion Reference | Title | Design Stage | Post Construction Stage |
|---------------------|---------------------|---|-------------------------|
| All | 01 General Evidence | One or more of the appropriate evidence types listed in Appendix C - HQM evidence requirements on page 236 can be used to demonstrate compliance with these criteria. | |

Checklists, Tables & Illustrations

None

Definitions

Appropriately qualified person

A person is considered appropriate where they meet the following:

- Adequate experience required for carrying out inspections and quality assurance for all elements in the Construction inspections scope, in line with the home's required performance requirements. This may come from a mixture of qualifications or relevant site experience.
- Have at least 3 years on-site experience working in the building industry (within the last 5 years)
- Is incentivised by quality rather than quick delivery, i.e. it is in their interest to identify defects and ensure they are resolved. For example, where this is confirmed in their contract and formally confirmed as part of their role.
- Keep up to date with changes in construction methods, statutory legislation and carry out continued professional development (CPD).
- Be a member of relevant professional body and subject to their code of conduct such as below (not an exhaustive list):
 - RICS Chartered surveyor (MRICS) <https://www.rics.org/uk>
 - CABE Chartered engineer (Member) <https://www.cbuilde.com/home>
 - CIOB Chartered Construction Member or Chartered Builder (MCIOB) <http://ciob.org>
 - Chartered RIBA Member <https://www.architecture.com>
 - Architects Registration Board (Registered architect) <http://www.arb.org.uk>
 - Federation of master builders at the Buildassure & FMB member or equivalent if also have met the FMB member criterion of a minimum of three years trading history and provided one year's accounts: <https://www.fmb.org.uk>
 - Approved Inspector on the CICAIR register (<http://cic.org.uk>)
 - The institute of Clerks of Works and Construction Inspectorate of GB <http://www.icwgb.org>
- Alternatively, it is possible for an equivalent membership qualification to be accepted where the individual can demonstrate the following:
 - Subject to an ethical code of conduct and may be removed from the membership scheme if they are found to not comply
 - Be an established professional, with experience leading other on a building site
 - Have good spoken and written communication skills

It is possible for multiple people to carry out the construction inspections role where responsibilities can be demonstrated as being handed over.

Construction record

A clear and systematic record of the quality assurance measures taken, at key stages, to ensure the home's performance characteristics are being achieved. The format is flexible and should align with the existing processes where possible.

The appropriately qualified person is responsible for ensuring the record robustly reflects activities on site but it may be contributed to by multiple people on site. Examples of sources of evidence that may contribute to the record may include:

- Details of the installations and inspections carried out including methods (e.g. visual, thermographic), times, dates, individuals involved etc.
- Photographic or recorded evidence of installation
- Delivery notes
- Details of any substitutions or variations made
- Details of any remedial work carried out.

The record can be contributed to from multiple people on site, as long as the AQP oversees the record to ensure it accurately represents the work carried out.

Examples of how a construction record may be kept could be:

- A written construction journal that multiple site operatives contribute to, potentially organised by a site secretary so the inspector can focus on build quality on site, instead of filling out forms.
- Using quality management software. Some software allows multiple site operatives to collect evidence and manage processes using a central platform, accessible via tablets or smart phones. They can often record and support: photographs taken on site backed up by geo-location, site plans, task management, inspection reports and allocating tasks to different users.

Independent third party

An individual or group of individuals, who are not involved in any other aspects of the project (e.g. design, construction or management of the assessed home), to ensure they are providing independent verification of the quality assurance processes. For example, this could be an organisation employed by the developer or main contractor, or they could be a client representative (e.g. a clerk of works) where the client is not also the developer.

Active Systems

Any home systems that require active operation or maintenance. This includes common home systems such as:

- Heating and hot water systems
- Ventilation systems
- Low and zero carbon technologies
- Comfort cooling systems
- Appliances
- Showers or baths, WCs
- Lighting
- Safety systems (e.g. smoke detectors, fire alarms and sprinklers)
- Security systems
- Smart devices (e.g. smart meters)

As well as any other systems, which may be less typical, such as:

- Electric car charging points
- Living roof systems (e.g. green roofs)
- Flood resilience measures
- Drainage systems or strategies e.g.. SuDS
- Temperature control measures (e.g. active external shading)

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CONSTRUCTION IMPACTS

This section discusses the following.

| | |
|---|------------|
| 29 Responsible Construction Management | 177 |
| 30 Construction Energy Use | 183 |
| 31 Construction Water Use | 188 |
| 32 Site Waste Management | 193 |

Credit Summary

There are two routes to assessing this issue; foundation and comprehensive routes. These routes represent varying degrees of rigour. The route selected will depend on the number of credits sought. More credits are available through the more rigorous comprehensive route.

| Criterion number | Title | Credits |
|-------------------------|---|-----------------|
| crit 1, crit 2-crit 7 | 01 Routes of rigour (follow 01A or 01B) Responsible construction management | up to 5 credits |
| crit 1 crit 2 | 01A Foundation route: Using a compliant considerate construction scheme | for 2 credits |
| crit 2-crit 7 | 01B Comprehensive route | up to 5 credits |
| Total credits available | | 5 |

Criteria

01 Routes of rigour (follow 01A or 01B) Responsible construction management **up to 5 credits**

01A Foundation route: Using a compliant considerate construction scheme **2 credit**

crit 1 Where the principal contractor has used a 'compliant' organisational, local or national considerate construction scheme and their performance against the scheme has been confirmed by independent assessment and verification. Refer to Definitions on page 181 for a list of compliant schemes and therefore how performance, as determined by a compliant scheme, translates into HQM credits.

01B Comprehensive route **up to 5 credits**

Risk evaluation and implementation **2 credits**

crit 2 Appoint a dedicated person to be responsible for monitoring and reporting on the identified, evaluated and mitigated risks related to crit 3, crit 5 and crit 7 on the facing page, depending on which credits are sought.

crit 3 The principal contractor evaluates risks (on site and off site) and implements actions to minimise the identified risks, covering the following where appropriate:

crit 3.a: Vehicle movement on and near site:

crit 3.a.i: Manage the construction site entrance to minimise the impacts (e.g. safety, disruption) arising from vehicles approaching and leaving the site.

crit 3.a.ii: Ensure the site remains accessible for delivery vehicles fitted with safety features (e.g. side under run protection).

crit 3.a.iii: Identify access routes to the site, including for heavy vehicles, that minimise traffic disruption and safety risks to others.

crit 3.b: Pollution management

crit 3.b.i: Minimise risks of vibration, air, land, water, light, noise pollution etc. within the assessment zone

crit 3.b.ii: Minimise risks of vibration, air, land, water, light, noise pollution etc. in the affected areas

crit 3.c: Tidiness

crit 3.c.i: Practices ensure the assessment zone is safe, clean and organised at all times. This includes, but is not limited to facilities, materials and waste storage.

crit 3.c.ii Remove all plant, surplus materials and temporary structures from the construction zone, on completion of the construction works.

crit 3.d: Health and wellbeing

crit 3.d.i: Provide processes and equipment required to respond to medical emergencies.

crit 3.d.ii Establish initiatives by the principal contractor or employer promoting and maintaining the health and wellbeing (e.g. occupational, physical and mental health) of the workforce.

crit 3.d.iii Establish management practices and facilities encouraging equality, diversity, fair treatment and respect of all site operatives, including accessible design, religious practices etc.

crit 3.d.iv Provide secure, clean and organised facilities (e.g. changing and storage facilities) within a reasonable location in the construction zone.

crit 3.e: Security

crit 3.e.i: Processes for minimising security risks and ensuring site security.

crit 3.e.ii Processes for minimising risks and ensuring security of the neighbouring community.

Training, awareness and feedback

2 credit

crit 4 crit 2 and crit 3 on the previous page are achieved.

crit 5 The principal contractor is responsible for ensuring that the following is undertaken:

crit 5.a: The community affected by the site works is identified, notified and kept informed on aspects of the construction process that might influence them, ensuring that nuisance and intrusion are minimised.

crit 5.b: Attitudes and conduct of the personnel associated with the site ensure safety and continuous improvements to safety and nuisance.

crit 5.c: All risks and management practices are communicated to the relevant stakeholders, as per below:

crit 5.c.i: health and wellbeing risks are communicated to operatives and visitors, along with any actions they must take to reduce the risks within the assessment zone.

crit 5.c.ii environmental risks are communicated to the operatives, the site visitors and the neighbouring community

crit 5.d: The principal contractor or employer address professional development needs of operatives through training.

crit 5.e: The fleet operator (where present) undertakes driver training and awareness to promote safety within the construction zone and off site.

Monitoring and reporting

1 credit

crit 6 crit 2 and crit 3 on the previous page are achieved.

crit 7 The principal contractor ensures that the following are undertaken:

crit 7.a: The fleet operator (where present) captures, analyses and investigates any road traffic accidents, incidents and near misses and reports them back to the principal contractor. This refers to all items listed under crit 2 on the previous page.

crit 7.b: All visitor, work force and community accidents, incidents and near misses are recorded and action is taken to reduce the likelihood of them reoccurring. This refers to all items listed in crit 2.

crit 7.c: Processes are in place to facilitate collecting and recording feedback from the community and to address any concerns related to the construction zone and works.

Methodology

Scope

This issue includes demolition and construction activities on site, from the beginning of demolition to the completion of the construction. Where the site is taken over by the developer after demolition, the demolition phase can be excluded from the scope of this part of the issue.

Training

For the purposes of this HQM issue, training can be teaching, or developing in oneself or others, any skills and knowledge (, e.g. manual handling, safe working practices, regulations, project management, vocational skills, site supervision) that relate to specific useful competencies.

Training includes, but is not limited to the following:

- Formal external training
- On-site learning from trained or experienced people
- Provision of training material or instructions for carrying out tasks

Frequency of monitoring on site

Site monitoring and visits shall occur at stages where significant health and safety risks or errors are likely to occur; where timing is critical to demonstrating compliance with the criteria; where key evidence is required to be produced at specific times including, but not limited to photographic, delivery notes and other documentary evidence.

Dedicated persons on site

This can be a member of the project team or not. The person should ideally be based on site or frequently be on site. Their role will be to monitor and report on activities described in criterion 2 and especially those that are otherwise more difficult to evidence, such as the attitudes and conduct of the personnel on site.

This does not have to be the same person throughout the process. However, they need to keep any records required for HQM evidence purposes and make sure these are handed over if a new person takes over.

There can be one or more dedicated persons on site at the same time responsible for different items that are part of crit 2-crit 7 on the previous page.

Compliance Notes

| Criterion Reference | Compliance Note | |
|---------------------|---|---|
| crit 1 | CN1 Phased or multiple home development | See Appendix D - Post-construction stage assessment issue exceptions on page 243. |

Evidence

| Criterion Reference | Title | Design Stage | Post Construction Stage |
|---------------------|--|---|--|
| All | 01 Responsible Construction Management | One or more of the appropriate evidence types listed in Appendix C - HQM evidence requirements on page 236 can be used to demonstrate compliance with these criteria. | Scheme certificate and compliance report. OR One or more of the appropriate evidence types listed in Appendix C - HQM evidence requirements on page 236 can be used to demonstrate compliance with these criteria. |

Examples of evidence that satisfy criteria 2 to 7 include, but are not limited to the

following:

- Company's policy and procedure documents (including environmental management, pollution prevention, security)
- Construction logistics plan
- Responsibility matrix
- Statement of confirmation by the 'dedicated person'
- Training records
- Photographic evidence
- Records of communication with the neighbouring community
- Contracts or formal agreements
- Reporting documents and logs
- Reporting procedures
- Evidence produced by third party schemes (e.g. CCS monitor's report, FORS, CLOCS, Yellow Jacket documentation).

Checklists, Tables & Illustrations

None.

Definitions

Compliant organisational, local or national considerate construction schemes

The following are defined as compliant schemes for the purpose of this HQM issue:

- Considerate Constructors Scheme.

To achieve HQM credits using the CCS and its Code of Considerate Practice, the principal contractor must achieve scheme certification and a CCS score as follows:

Two credits: a CCS score of 40* or greater

* A score of at least 8 in each of the five sections must be achieved.

A site can be visited by a CCS Monitor more than once and the CCS Certificate will be awarded based on the results of the CCS Monitor's final visit. At the final stage of the HQM assessment, the number of HQM credits awarded should therefore be based on the final visit and the subsequent Monitor's report and certified CCS score.

Where a considerate construction or constructors' scheme exists and is not listed as a HQM compliant scheme, the scheme administrator or operator should apply to BRE Global Ltd. for details on how to achieve recognition as a compliant scheme.

Considerate Constructors Scheme (CCS)

The CCS is a national initiative set up by the UK construction industry to improve its image. The scheme is a self-financing, independent organisation owned by the Construction Umbrella Bodies (Holdings) Ltd (made up of the Construction Products Association and the Construction Industry Council). Sites and companies that register with the scheme sign up and are monitored against a Code of Considerate Practice, designed to encourage best practice beyond statutory requirements.

Assessment Zone

For the purpose of this HQM issue the assessment zone is defined as any land on the site which is being developed (and therefore disturbed) for buildings, hardstanding, soft landscaping, site access, plus a 3m wide zone measured outward from the boundary around these areas irrespective of site boundary. It also includes any areas used for temporary site storage and buildings.

If it is not known exactly where buildings, hardstanding, site access and temporary storage will be located it must be assumed that the construction zone is the entire site.

Affected areas

The areas over which ecological features, animals and humans may be affected by vibration, air, land, water, light, noise pollution etc. caused by activities within the assessment zone.

Fleet operator

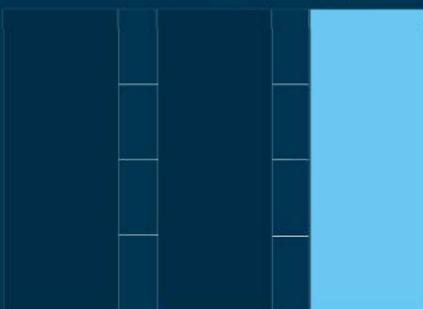
The fleet operator is responsible for the fleet vehicles. Fleet vehicles are groups of motor vehicles owned or leased by a business, government agency or other organisation rather than by an individual or family.

30 CONSTRUCTION ENERGY USE

Max credits

5

Indicators (Average)



My cost



My wellbeing



My footprint

Aim

To avoid wastage of energy on site and minimising consumption during the construction process and associated emissions.

Benefit

- Manage environmental impact by ensuring responsible use of energy during construction
- Helps control construction costs.

Context

Carbon emissions from on-site activities are responsible for a third of the construction sector's emissions. By monitoring energy consumption, through methods such as metering, sites are able to identify inefficiencies in their processes⁽¹⁴⁶⁾. This issue recognises where developers take measures to reduce their energy consumption for on-site activities.

There are factors, such as the ability to secure grid connection, weather considerations and the type of works required on-site, that may be outside the project's control. This can lead to a wide variation in energy consumption across the housing construction sector. Due to this wide variation it is not possible to set benchmarks at present.



Credit Summary

| Criterion number | Title | Credits |
|-------------------------|---|---------------|
| crit 1 | 01 Contractor's energy efficiency checklist | for 2 credits |
| crit 2 | 02 Energy monitoring and reporting | for 2 credits |
| crit 3 | 03 Weekly detailed monitoring and reporting of metered energy use | for 1 credit |
| Total credits available | | 5 |

Criteria

01 Contractor's energy efficiency checklist

for 2 credits

crit 1 The contractor's energy efficiency checklist⁽¹⁴⁷⁾ (see Table 41 on page 186) has been completed with a full record of decisions actions or justifications for all points. In cases where the contractor has not been appointed at the time of design stage assessment, see CN1 on the facing page.

02 Energy monitoring and reporting

for 2 credits

crit 2 Target, monitor and report data on the principal contractor's and subcontractors' metered energy consumption as a result of the use of construction plant, equipment (mobile and fixed) and site accommodation.

03 Weekly detailed monitoring and reporting of metered energy use

for 1 credit

crit 3 Conduct the monitoring and reporting of data in crit 2 on a weekly basis.

Methodology

Contractor's energy efficiency checklist

The contractor's energy efficiency checklist (see Table 41 on page 186) should be completed at both pre-construction and construction stage.

- Step 1 The HQM Assessor is to distribute the contractor's energy efficiency checklist to the individual responsible, and also raise awareness of the potential for pursuing the requirements outlined in crit 2-crit 3 above to monitor and report energy consumption on site. The consideration process on the checklist must be commenced during the mobilisation stage or earlier where possible.
- Step 2 In order to be eligible for the credits available in crit 1 above, the contractor is to consider and justify their chosen actions regarding the points listed on the checklist. When assessing the checklist, the HQM Assessor should assume that all points are possible until they are discounted by a justification from the contractor before awarding this credit. The answer 'Not Applicable' by itself would not be sufficient without an accompanying reason.

Energy monitoring and reporting

- Step 1 Where energy monitoring is being carried out and reported, a method is established for how this will be reported back.
- Establish whether the contractor has procedures in place which allows them to capture the required information.
 - Establish the designated individual who will be responsible for overseeing monitoring and reporting and how this will be communicated during the build.
 - Establish if any intermediate measurements will be taken, e.g., whether metered energy data will be measured weekly in order to achieve crit 3 above..
 - Establish the targets for each fuel type.

- Establish if any intermediate measurements will be taken. Where detailed monitoring and reporting is possible (see CN4 below) then the project may be eligible for the credits available in crit 3 on the previous page.
- Establish the method of scoping that the readings will relate to. This could be as simple as a total reading for a whole project for each fuel type or, where practical, it could be a reading per sub-meter, per project phase, per block, per storey, per plot, per trade or any other grouping that the contractor can effectively manage. This detail does not influence the credits, it only declares the scope to the assessor so evidence can also be organised accordingly.
- Collate the information that demonstrates the energy monitoring and reporting has been carried out.

Compliance Notes

| Criterion Reference | Compliance Note | |
|---------------------|---|---|
| crit 1 | CN1 Contractor not yet appointed | At the design stage, where a contractor has not been appointed and there is no suitable individual to undertake the completion of the checklist, the client should appoint an individual to assume responsibility for ensuring inclusion of the requirements of this criterion before the credit can be awarded. Once a constructor is appointed, the responsibility is handed over. This compliance note does not apply at the post construction stage. In order to award this credit at the post construction stage, the requirement must be followed up as soon as it becomes available and included in Appendix D - Post-construction stage assessment issue exceptions on page 243, and must be completed before site construction activity commences. |
| crit 2-crit 3 | CN2 Energy reporting | Principal contractor's and subcontractors' energy consumption should be reported in kWh (and where relevant, litres of fuel used). |
| crit 2-crit 3 | CN3 Phased or multiple home development | See Appendix D - Post-construction stage assessment issue exceptions on page 243. |
| crit 3 | CN4 Detailed monitoring and reporting | In instances where there are no sources of energy being metered on the site, then the credits cannot be awarded. |

Evidence

| Criterion Reference | Title | Design Stage | Post Construction Stage |
|---------------------|--------------------------------|---|---|
| All | 01 General Evidence | One or more of the appropriate evidence types listed in Appendix C - HQM evidence requirements on page 236 can be used to demonstrate compliance with these criteria. | |
| crit 1 | 02 Energy efficiency checklist | <p>Energy efficiency checklist (pre-construction stage).</p> <p>Submit the completed checklist before activities start on site.</p> <p>OR</p> <p>Where a contractor hasn't been appointed, a letter from the client or their representative containing:</p> <ul style="list-style-type: none"> - Confirmation that the Energy efficient measures listed on the checklist will be undertaken. <p>AND</p> <ul style="list-style-type: none"> - Submit the completed checklist before activities start on site to continue eligibility to post construction. | <p>Energy efficiency checklist</p> <p>(construction stage items)</p> <ul style="list-style-type: none"> - Submit the completed pre-construction stage checklist before activities start on-site - Submit additional construction stage items. |
| crit 2 | 03 Site Monitoring | <p>A copy of the specification or procedure confirming:</p> <ul style="list-style-type: none"> - Procedures are in place to monitor and report energy consumption - Name and job title of the designated individuals. <p>OR</p> | <p>Monitoring records or report confirming:</p> <ul style="list-style-type: none"> - Type of energy sources utilised on-site (i.e. electricity, fuel |

| Criterion Reference | Title | Design Stage | Post Construction Stage |
|---------------------|--------------------------------------|---|---|
| | | A letter from the client or their representative containing: <ul style="list-style-type: none"> - Confirmation that the specification will contain a clause on monitoring energy consumption - An outline of the detailed requirements that will be included in that specification clause. | etc.) <ul style="list-style-type: none"> - Recorded energy consumption for each energy source. |
| crit 3 | 04 Detailed monitoring and reporting | To demonstrate compliance the following must be provided: <ul style="list-style-type: none"> - Each meter reading that has been taken, clearly displaying the units of measurement - The date on which the reading was taken - Photographic evidence of meter readings or data report from the Automatic Meter Reading (AMR) system (where applicable) for the duration of the project - The scope of each reading. | |

Checklists, Tables & Illustrations

Table 41 Contractor’s energy efficiency checklist.

| Stage | Energy efficiency action (see Definitions for further detail on where to find more information about what each title entails) | Record of decisions and actions taken |
|------------------------|---|--|
| Pre-construction phase | Plan the energy requirements of the project | To be completed by contractor or the appointed individual. For example, at design stage - established monitoring at a weekly frequency For example, at post construction - monitoring was carried out on the first working day of the week throughout the project. Not applicable is not valid for this point. |
| | Procure low CO ₂ site accommodation | To be completed by contractor or the appointed individual. For example, obtain EPC rating of C or higher for site accommodation. |
| | Specify energy efficient plant | To be completed by contractor or the appointed individual. |
| | Secure early, high capacity, electricity grid connection | To be completed by contractor or the appointed individual. |
| | Co-ordinate monitoring with phasing programme of work and set the intervals at which the reporting will be taken at. | To be completed by contractor or the appointed individual. The action against this point will determine eligibility for crit 3 on page 184. |
| | *Other energy efficiency actions can be added to this checklist | |
| Construction phase | Deploy the right size generators (if generators are needed) | To be completed by contractor |
| | Manage energy in a site office efficiently | To be completed by contractor |
| | Consider energy saving measures | To be completed by contractor |
| | Consider installing intelligent and efficient temporary electrics | To be completed by contractor |

| Stage | Energy efficiency action (see Definitions for further detail on where to find more information about what each title entails) | Record of decisions and actions taken |
|-------|---|--|
| | Consider techniques which avoid forced drying of wet trades | To be completed by contractor |
| | Monitor and manage energy use | To be completed by contractor. The action against this point will determine eligibility for crit 2-crit 3 on page 184. |
| | *Other energy efficiency actions can be added to this checklist | |

Definitions

Automatic Meter Reading (AMR)

Automatic meter reading (AMR) ensures bills are based on actual, rather than estimated, consumption, and avoids the need for manual readings, which can be impractical and unreliable.⁽¹⁴⁸⁾

Constructing Excellence and reporting of construction site impacts

Constructing Excellence publishes the construction industry key performance indicators (KPIs)⁽¹⁴⁹⁾ based on data collected by the Department for Business, Innovation and Skills via a voluntary quarterly survey returned by contractors throughout the UK. The Office of National Statistics also reports the annual results in the Construction Statistics Annual. One of the key performance indicators is the 'amount of CO₂ emissions caused by the energy used during the construction process per £100,000 of project value (kgCO₂/£100k)'. Information collated by contractors as part of their voluntary submissions to Constructing Excellence may also serve to help demonstrate compliance with this HQM issue.

Energy consumption

This is the energy that is used by the construction plant, equipment (mobile and fixed) and site accommodation for the development as a whole from start on site up until practical completion.

Energy efficiency action

A list of actions that a contractor is to consider, and justify their chosen actions against in order to complete the checklist. For further information on the items included in the checklist see the Green Construction Board - How to reduce CO₂ on construction sites crib sheet. For further general information, see www.greenconstructionboard.org

Mobilisation

The project stage which occurs after the appointment of the main contractor and preparatory work is undertaken prior to activities starting on site.

Practical completion

For the purposes of this issue, this is to broadly align with the term that is generally understood within the industry found within many standard forms of contract. For clarification it should satisfy the following point:

- The building has received a completion certificate from the contract administrator.
- All works will have finished on the home and it is practical for occupation. This also includes the external works within the deeds boundary of the home.

Tools for monitoring and targeting construction site impacts

BRE's online environmental reporting tool, SMARTWaste, enables users to capture, monitor and target a project's on-site energy consumption and produce a CO₂ footprint, water consumption and responsible sourcing of timber. Transport and CCS data can also be collected. The system can be used as a tool to help meet the criteria of this issue and as a source of evidence for demonstrating compliance. It is available through the SMARTWaste Membership scheme by developing tailor-made versions of SMARTWaste. More details on the tool and membership are available at www.smartwaste.co.uk

Credit Summary

| Criterion number | Title | Credits |
|-------------------------|--|---------------|
| crit 1 | 01 Contractor's water efficiency checklist | for 2 credits |
| crit 2 | 02 Water monitoring and reporting | for 2 credits |
| crit 3 | 03 Weekly detailed monitoring and reporting of metered water use | for 1 credit |
| Total credits available | | 5 |

Criteria

01 Contractor's water efficiency checklist for 2 credits

crit 1 The contractor's water efficiency checklist⁽¹⁵²⁾ (see Table 42 on page 191) has been completed with a full record of decisions actions or justifications for all points. In cases where the contractor has not been appointed at the time of design stage assessment, see CN1 on the next page.

02 Water monitoring and reporting for 2 credits

crit 2 Target, monitor and report data on the principal contractor's and subcontractors' potable water consumption (m³) arising from the use of construction plant, equipment (mobile and fixed) and site accommodation.

03 Weekly detailed monitoring and reporting of metered water use for 1 credit

crit 3 Conduct the monitoring and reporting of data in crit 2, on a weekly basis.

Methodology

Contractor's water efficiency checklist

The contractor's water efficiency checklist should be completed at both the pre-construction and construction stages (see Table 42 on page 191).

Step 1 The HQM Assessor is to distribute the contractor's water efficiency checklist to the individual responsible, and also raise awareness of the requirements outlined in crit 2-crit 3 above to monitor and report water consumption on site. The consideration process on the checklist must be commenced during the mobilisation stage or earlier, where possible.

Step 2 In order to be eligible for the credits available in crit 1 above, the contractor is to consider and justify their chosen actions regarding the points listed on the checklist. When assessing the checklist, the HQM Assessor should assume that all points are possible until they are discounted by a justification from the contractor before awarding this credit. The answer 'Not Applicable' by itself would not be sufficient without an accompanying reason.

Water monitoring and reporting

Step 1 Where water monitoring is being carried out and reported, a method is established for how this will be reported back.

- Establish whether the contractor has procedures in place which allows them to capture the required information.
- Establish the designated individual who will be responsible for overseeing monitoring and reporting, and how this will be communicated during the build.
- Establish if any intermediate measurements will be taken, e.g., whether metered energy data will be measured weekly in order to achieve crit 3 above.
- Establish the targets for water consumption.
- Establish if any intermediate measurements will be taken. Where detailed monitoring and reporting is possible (see CN3 on the next page), then the project may be eligible for the credits available in crit 3 above.
- Establish the method of scoping that the readings will relate to. This could be as simple as a total reading for a whole project for each fuel type or, where practical, it could be a reading per sub-meter, per project phase, per block, per

storey, per plot, per trade or any other grouping that the contractor can effectively manage. This detail does not influence the credits, it only declares the scope to the assessor so evidence can also be organised accordingly.

- Collate the information that demonstrates that water monitoring and reporting has been carried out.

Compliance Notes

| Criterion Reference | Compliance Note | |
|---------------------|---|---|
| crit 1 | CN1 Contractor not yet appointed | At the design stage, where a contractor has not been appointed and there is no suitable individual to undertake the completion of the checklist, the client should appoint an individual to assume responsibility for ensuring inclusion of the requirements of this criterion before the credit can be awarded. Once a constructor is appointed, the responsibility is handed over. This compliance note does not apply at the post construction stage. In order to award this credit at the post construction stage, the requirement must be followed up as soon as it becomes available and included in the Post Construction Evidence, and must be completed before site construction activity commences. |
| crit 2-crit 3 | CN2 Phased or multiple home development | See Appendix D - Post-construction stage assessment issue exceptions on page 243. |
| crit 3 | CN3 Detailed monitoring and reporting | In instances where water is not being metered on the site, then the credit cannot be awarded. |

Evidence

| Criterion Reference | Title | Design Stage | Post Construction Stage |
|---------------------|-------------------------------|---|--|
| crit 1-crit 3 | 01 General Evidence | One or more of the appropriate evidence types listed in Appendix C - HQM evidence requirements on page 236 can be used to demonstrate compliance with these criteria. | |
| crit 1 | 02 Water efficiency checklist | <p>Water efficiency checklist. Submit the completed checklist before activities start on site.</p> <p>OR</p> <p>Where a contractor hasn't been appointed, a letter from the client or their representative containing:</p> <ul style="list-style-type: none"> - Confirmation that the water efficient measures listed on the checklist will be undertaken. <p>AND</p> <ul style="list-style-type: none"> - Submit the completed checklist before activities start on-site to continue eligibility to post construction. | <p>Water efficiency checklist (construction stage items)</p> <ul style="list-style-type: none"> - Submit the completed checklist before activities start on site. |
| crit 2 | 03 Site Monitoring | A copy of the specification or procedure confirming: | Monitoring records or report confirming: |

| Criterion Reference | Title | Design Stage | Post Construction Stage |
|---------------------|--------------------------------------|--|---|
| | | <ul style="list-style-type: none"> - Procedures are in place to monitor and report water consumption - Name and job title of the designated individuals. <p>OR</p> <p>A letter from the client or their representative containing:</p> <ul style="list-style-type: none"> - Confirmation that the specification will contain a clause on monitoring water consumption - An outline of the detailed requirements that will be included in that specification clause. | <ul style="list-style-type: none"> - Recorded water consumption. |
| crit 3 | 04 Detailed monitoring and reporting | <p>To demonstrate compliance the following must be provided:</p> <ul style="list-style-type: none"> - Each meter reading that has been taken, clearly displaying the units of measurement - The date on which the reading was taken - Photographic evidence of meter readings or data report from the Automatic Meter Reading (AMR) system (where applicable) for the duration of the project - The scope of each reading. | |

Checklists, Tables & Illustrations

Table 42 Contractor's water efficiency checklist

| Water efficiency action | Record of decisions or actions taken |
|---|--|
| Consider installing trigger guns to hoses. | To be completed by contractor or the appointed individual. |
| Consider the use of efficient dust suppression techniques (general and road) such as fan misting systems. | To be completed by contractor or the appointed individual. |
| Consider waste efficient wheel washing, e.g. drive on systems. | To be completed by contractor or the appointed individual. |
| For washing out and cleaning - consider efficient systems such as high pressure (low flow) washers. | To be completed by contractor or the appointed individual. |
| For site accommodation, consider the use of water efficient fittings for urinals, toilets and taps. | To be completed by contractor or the appointed individual. |
| Consider installing a rainwater harvesting system. | To be completed by contractor or the appointed individual. |

| Water efficiency action | Record of decisions or actions taken |
|---|--|
| *Other water efficiency actions can be added to this checklist. | To be completed by contractor or the appointed individual. |

Definitions

Automatic Meter Reading (AMR)

Automatic meter reading (AMR) ensures bills are based on actual, rather than estimated, consumption, and avoids the need for manual readings, which can be impractical and unreliable.⁽¹⁵³⁾

Mobilisation

The project stage which occurs after the appointment of the main contractor and preparatory work is undertaken prior to activities starting on site.

Tools for monitoring and targeting construction site impacts

BRE's online environmental reporting tool, SMARTWaste, enables users to capture, monitor and target a project's on-site energy consumption and produce a CO₂ footprint, water consumption and responsible sourcing of timber. Transport and CCS data can also be collected. The system can be used as a tool to help meet the criteria of this issue and as a source of evidence for demonstrating compliance. It is available through the SMARTWaste Membership scheme by developing tailor-made versions of SMARTWaste. More details on the tool and membership are available at www.smartwaste.co.uk.

Credit Summary

| Criterion number | Title | Credits |
|-------------------------|--|-----------------|
| crit 1-crit 3 | 01 Product procurement policy | for 1 credit |
| crit 4-crit 6 | 02 Construction resource efficiency | up to 8 credits |
| crit 7-crit 8 | 03 Diversion of construction waste from landfill | up to 4 credits |
| crit 9-crit 10 | 04 Diversion of excavation waste from landfill | for 3 credits |
| Total credits available | | 16 |

Criteria

01 Product procurement policy for 1 credit

- crit 1 The client or developer has a documented policy and procedure in place by the end of RIBA stage 2 (or equivalent). The documented policy and procedure sets out procurement requirements relating to opportunities for minimising construction waste on-site for all suppliers and trades. (see CN1 on the facing page).
- crit 2 The documented policy and procedure must be disseminated to all relevant internal and external personnel. It should also be included within the construction contract to ensure that they are enforceable on the assessed project.
- crit 3 The documented policy and procedure must encourage the specification of products which can help to minimise waste arisings (for example, considers materials that can be reused once the home has been deconstructed, considers recycling or take-back arrangements and packaging recycling or minimisation (154)).

02 Construction resource efficiency up to 8 credits

- crit 4 A resource management plan (RMP) has been developed covering the non-hazardous waste related to on-site construction and where applicable, dedicated off-site manufacture or fabrication (including demolition and excavation waste) generated by the building's design and construction.
- crit 5 Associated credits can be awarded where, construction waste related to on-site construction, and dedicated off-site manufacture or fabrication (excluding demolition and excavation waste) meets or is lower than the benchmarks identified in Table 43 below.

Table 43 Site Waste Reduction Performance credit allocation

| Waste generated per 100m ² (project wide gross internal floor area (GIFA)) for new build residential projects | | |
|--|------------------------------|---------|
| m ³ per 100m ² | Tonnes per 100m ² | Credits |
| ≤ 13.9 | ≤ 8.5 | 2 |
| ≤ 8.1 | ≤ 4.9 | 4 |
| ≤ 4.8 | ≤ 2.9 | 6 |
| ≤ 3.5 | ≤ 1.9 | 8 |

Volume (m³) is actual volume of waste (not bulk volume).

- crit 6 Where existing buildings on the site will be demolished a pre-demolition audit of any existing buildings, structures or hard surfaces is completed.

03 Diversion of construction waste from landfill up to 4 credits

- crit 7 Waste materials will be sorted into separate key waste groups (according to the waste streams generated by the scope of the works) as per Table 45 on page 197. This can be either on-site, or through a licensed contractor for recovery.
- crit 8 Credits are awarded for the project's performance concerning the diversion of non-hazardous construction and demolition (where applicable) waste from landfill. The associated benchmarks are outlined in Table 44 below.

Table 44 Diversion from landfill credit allocation

| Type of waste | Percentage diverted from landfill (by Volume) | Percentage diverted from landfill (by Tonnage) | Credits |
|---------------|---|--|---------|
| Construction | 70% | 80% | 2 |
| Demolition | 80% | 90% | |
| Construction | 85% | 90% | 4 |
| Demolition | 85% | 95% | |

04 Diversion of excavation waste from landfill**for 3 credits**

- crit 9 Maximum credits have been achieved from crit 8 above.
- crit 10 At least 95% (either by volume or tonnage) of excavation waste is diverted from landfill.

Methodology

None.

Compliance Notes

| Criterion Reference | Compliance Note | |
|---------------------|--|--|
| crit 1-crit 3 | CN1 Documented product procurement policy | This may be prepared and adopted at an organisational level or be site or project specific. It is recommended (but not a requirement) that the documented policy follows the principles of BS 8900-1:2013 ⁽¹⁵⁵⁾ Managing sustainable development of organisations - Guide; BS 8903:2010 ⁽¹⁵⁶⁾ Principles and framework for procuring sustainably - Guide or BS 8895 Designing for Material Efficiency in Buildings Part 1 and 2. This policy may form a part of a broader Sustainable Procurement Plan or be in the form of a standalone document. |
| crit 4 | CN2 Resource Management Plan records | The project waste arisings should be recorded and include construction, demolition and excavation waste. Note that the performance benchmarks for the award of credits do not include demolition and excavation waste. |
| crit 5 | CN3 Phased or multiple home development | See Appendix D - Post-construction stage assessment issue exceptions on page 243. |
| crit 7-crit 10 | CN4 Limited site space for segregation and storage | Where space on site is too limited to allow 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, evidence must be produced which demonstrates that segregation of materials is carried out to the agreed levels and that materials are reused or recycled as appropriate. Such evidence could be Environment Agency or Scottish Environment Protection Agency or Environment Agency Wales or Northern Ireland Environment Agency Waste Return Forms. |
| crit 7-crit 10 | CN5 Waste collation from multiple satellite sites | In cases where the constructor has adopted a strategy that includes multiple sites which collates the waste in a centralised location, the assessment is based on the combined sites as if they are one development site. Sites that are not undertaking a HQM assessment which are collated in this manner are to be included in the assessment. |

| Criterion Reference | Compliance Note | |
|---------------------|---|--|
| crit 7-crit 10 | CN6 Waste from temporary support structures | Any waste generated on-site for the purposes of the development (excluding demolition and excavation waste) must be taken account of in the assessment of this issue. If temporary support structures, or any other materials or systems brought to facilitate the construction of the building, enter the waste stream (albeit for recycling), then they will need to be classified as construction waste, and therefore contribute to the construction waste, and be assessed against the benchmark for this issue. If the support structure or system or material is reused by the contractor (or any other contractor) on other sites and therefore has not entered the waste stream, then such items can be excluded from calculations. The same principle would apply to timber formwork where used. |

Evidence

| Criterion Reference | Title | Design Stage | Post Construction Stage |
|---------------------|--|---|--|
| All | 01 General Evidence | One or more of the appropriate evidence types listed in Appendix C - HQM evidence requirements on page 236 can be used to demonstrate compliance with these criteria. | |
| crit 1-crit 3 | 02 Documented product procurement policy | <ul style="list-style-type: none"> - A copy of the documented product procurement policy. - Evidence that the policy is disseminated, or a written commitment to do so. - Evidence that the policy is included in the construction contract, or a written commitment to do so. - Evidence that there is a policy on waste minimisation. | <ul style="list-style-type: none"> - Evidence that the policy was disseminated. - Evidence that the policy was included in the construction contract. |
| crit 4 and crit 6 | 03 Resource Management plan and pre-demolition audit | A copy of the Resource Management plan and where relevant, pre-demolition audit. Waste data obtained from licensed external waste contractors is reliable and verifiable, by using data from EA/SEPA/EA Wales/NIEA Waste Return Forms or from a PAS 402:2013 on page 198 certified company can be used as method of compliance | |
| crit 5 | 04 Construction resource efficiency | <p>A projected waste benchmark</p> <p>AND</p> <p>A copy of the specification or procedure confirming:</p> <ul style="list-style-type: none"> - Procedures are in place to monitor and minimise construction waste - Name and job title of the designated individuals. | <p>Monitoring records or report confirming:</p> <ul style="list-style-type: none"> - Monitoring actions carried out by the designated individual - The total waste arising for the development - Comparison of the total waste arising against the benchmark. |

| Criterion Reference | Title | Design Stage | Post Construction Stage |
|---------------------|---|--|---|
| | | OR | |
| | | <p>A letter from the client or their representative containing:</p> <ul style="list-style-type: none"> - Confirmation that the specification will contain a clause on reporting and minimising construction waste - An outline of the detailed requirements that will be included in that specification clause. | |
| crit 7-crit 10 | 05 Diversion of construction waste and excavation waste from landfill | <p>Projected waste diversion figures. A copy of the specification or procedure confirming:</p> <ul style="list-style-type: none"> - Procedures are in place to divert wastes from landfill - Targets that will be set and reviewed regularly - Name and job title of the designated individual. <p style="text-align: center;">OR</p> <p>A letter from the client or their representative containing:</p> <ul style="list-style-type: none"> - Confirmation that the specification will contain a clause on diverting wastes from landfill - An outline of the detailed requirements that will be included in that specification clause. | <p>A copy of the main contract programme showing:</p> <ul style="list-style-type: none"> - Actions taken to divert waste from landfill. <p>Monitoring records or report confirming:</p> <ul style="list-style-type: none"> - Monitoring actions carried out by the designated individual - The total waste arising for the development (broken down by demolition, excavation and construction) and the amount that has been diverted from landfill - Evidence of waste transfer stations recycling rates - A comparison of the estimated figures in the pre-demolition audit with the actual figures. |

Checklists, Tables & Illustrations

Table 45 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, board products such as plywood, chipboard, medium density fibreboard (MDF) |
| 1602 | Electrical and electronic equipment | Electrical and electronic TVs, fridges, air-conditioning units, lamps equipment |

| European Waste Catalogue | Key group | Examples |
|--------------------------|------------------------|---|
| 200301 | Canteen or 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, sanitary ware |
| 1701 | Inert | Mixed rubble or excavation material, glass |
| 1704 | Metals | Radiators, cables, wires, bars, sheet |
| 170802 | Gypsum | Plasterboard, plaster, fibre cement sheets |
| 170101 | Binders | Render, cement, mortar |
| 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 or other | Efforts should be made to categorise waste into the above categories wherever possible. |

Definitions

Best practice construction waste management plan

Best practice is a combination of commitments to:

1. Design out waste (materials optimisation).
2. Reduce waste generated on site.
3. Develop and implement procedures to sort and reuse or recycle construction and demolition waste on site and off site (as applicable).
4. Follow guidance from:
 - a. Defra (Department of Environment, Food and Rural Affairs)
 - b. BRE (Building Research Establishment Ltd)
 - c. Welsh Government
 - d. SEPA (Scottish Environment Protection Agency)

Diversion from landfill

Actions to avoid waste being disposed of in landfill include:

1. Reusing the material on-site (in situ or for new applications)
2. Reusing the material on other sites
3. Community reuse and recycling
4. Salvaging or reclaiming the material for reuse
5. Returning material to the supplier via a 'take-back' scheme
6. Recovery of the material from site by an approved waste management contractor and recycled or sent for energy recovery.

PAS 402:2013

PAS 402:2013 is a specification for performance reporting that can be adopted by waste management organisations. It is applicable to waste management organisations that process waste, e.g. a waste treatment facility and not those operating solely as carriers or brokers. The specification provides the framework for the demonstration of performance against key areas of delivery, including how waste management activities are conducted, landfill diversion and materials recovery, assuring potential and

existing customers of the service they are procuring. It can provide clients such as government and local authorities with a framework for good practice which they can specify.

Pre-demolition audit

The pre-demolition audit is undertaken to determine if, in the case of demolition, refurbishment or reuse is feasible and, if not, to maximise the recovery of material from demolition for subsequent high-grade or high-value applications. The audit must be referenced in the RMP and cover:

1. Identification of the key refurbishment or demolition materials.
2. Potential applications and any related issues for the reuse and recycling of the key refurbishment and demolition materials in accordance with the waste hierarchy.

Resource Management Plan (RMP)

The aim of the RMP is 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. A compliant RMP should be written in line with best practice (see Definitions on the previous page) and defines:

1. A target benchmark for resource efficiency, i.e. m³ of waste per 100m² or tonnes of waste per 100m².
2. Procedures and commitments for minimising non-hazardous waste in line with the target benchmark.
3. Procedures for minimising hazardous waste.
4. A waste minimisation target and details of waste minimisation actions to be undertaken (consider those actions listed within the waste minimisation definition).
5. Procedures for estimating, monitoring, measuring and reporting hazardous and non-hazardous site waste. If waste data are obtained from licensed external waste contractors, the data needs to be reliable and verifiable, e.g. by using data from EA/SEPA/EA Wales/NIEA Waste Return Forms or from PAS 402:2013 certified company
6. 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.
7. Procedures for reviewing and updating the plan.
8. The name or job title of the individual responsible for implementing the above.

A Site Waste Management Plan is a form of Resource Management Plan and for HQM should be written in line with best practice (see Best practice construction waste management plan on the previous page)

Waste hierarchy

The order of priority for the management of waste where waste generation could or does occur. This is listed in descending order of environmental preference in The Waste (England and Wales) Regulation 2011⁽¹⁵⁷⁾ as:

- Prevention
- Reuse
- Recycle
- Recover

Waste minimisation

This term encompasses two elements of the waste hierarchy:

Waste reduction or prevention = using less material in design, manufacture and installation, keeping products for longer, using no hazardous materials

Reuse = using products again for the same purpose for which they were conceived, which may require checking, cleaning or repairing (preparing for reuse).

Types of waste minimisation actions include:

1. Consider implementing BS 8895:2013 Designing for material efficiency in building projects, Parts 1 and 2.
2. Set and report against waste reduction targets
3. Design for standardisation of components
4. Avoid waste from excavation or groundworks and consider opportunities for zero cut and fill
5. Return packaging for reuse
6. Consider community reuse of surplus or offcuts
7. Include waste minimisation initiatives and targets in tenders or contracts and engage with the supply chain

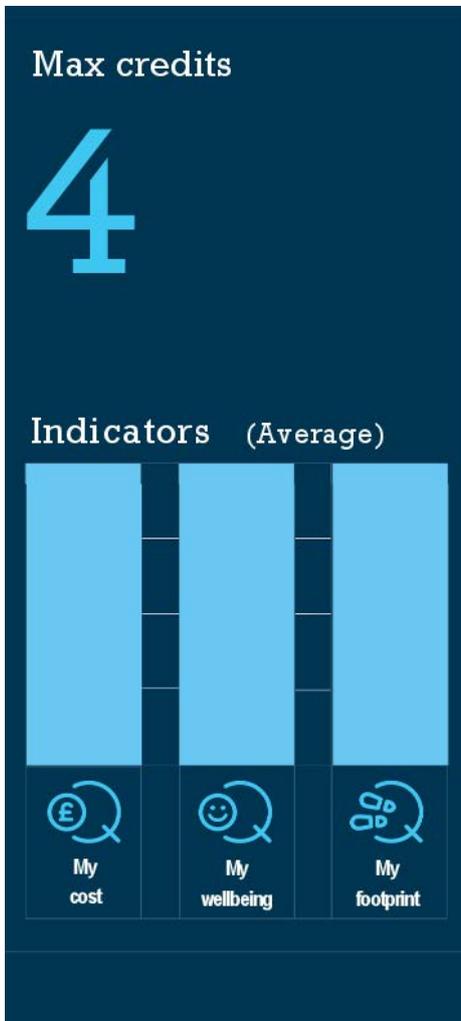
8. Consider use of BIM (building information modelling)
 9. Design for off-site or modular build
 10. Design for flexibility, adaptability and future deconstruction
 11. Design to use fewer materials
 12. Use of reusable temporary elements such as shuttering and protection.
- This list is not exhaustive and other waste minimisation actions can be taken.

CUSTOMER EXPERIENCE

This section discusses the following.

| | |
|---|------------|
| 33 Aftercare | 202 |
| 34 Home Information | 206 |
| 35 Smart Homes | 213 |
| 36 Post Occupancy Evaluation | 218 |

33 AFTERCARE



Aim

To provide occupant support during early stages of occupancy, to help occupants manage their home efficiently, live comfortably and resolve any early problems in a timely manner

Benefit

- Help occupants feel happy, comfortable and confident in their new home.
- Reduce costs and disruptions by helping to ensure that home systems are working efficiently and identify and resolve problems early if and when they occur.
- Allow the developer to have a closer relationship with their customers, improving relationships and reputation.

Context

Moving home is considered to be one of the most stressful events many people go through and in many cases it will be by far the biggest financial investment of their lives. A smooth and well supported handover can have a huge impact on an occupant's satisfaction and experience of settling into their new home and therefore the reputation of the developer more widely.

This issue supports industry and government efforts to produce better buildings building on the principles of BSRIA's soft landings framework (158) and recognises the growing emphasis on giving more protection to consumers regarding homes, encapsulated by publications such as the Each Home Counts report(159) and the All Party Parliamentary Group's 'More homes, fewer complaints'(160). This is an integral part of HQM's approach as a consumer centred standard for sustainable quality.



Credit Summary

This issue contains a criterion that is a minimum requirement and needs to be met in order for a home to become certified under the Home Quality Mark.

| Criterion number | Title | Credits |
|-------------------------|------------------------|---------------------|
| crit 1 | 01 Building warranty - | Minimum requirement |
| crit 2 | 02 Handover visit | Minimum requirement |
| crit 3 | 03 On-call support | up to 4 |
| Total credits available | | 4 |

Criteria

01 Building warranty -

Minimum requirement

crit 1 The home is covered by a building warranty, from a warranty provider who is a member of and fully complies with “The Consumer Code for Home Builders” (consumercodeforhomebuilders.com) or is recognised by the Trading Standards Institute.

02 Handover visit

Minimum requirement

crit 2 Where a contracted commitment is in place for the following to be met, when the first occupants move in:

crit 2.a: Introduction to the home information available including its purpose and communication of the content for the below topics as a minimum (see 34 Home Information on page 206):

crit 2.a.i: Introduction including the quick start guide, HQM certificate and HQM charter promise

crit 2.a.ii Health and safety

crit 2.a.iii Operation and maintenance

crit 2.a.iv Support

crit 2.b: Demonstrations of how to operate and maintain any installed active systems (see definition) and passive design features, with reference to the home information available, including the following as a minimum:

crit 2.b.i: Ventilation systems including how to use installed systems to maintain a comfortable and energy efficient home

crit 2.b.ii Heating and hot water systems including how to conserve energy and carry out or identify when maintenance or repair is needed

crit 2.b.iii Low and zero carbon technologies (LZCT) including: how to check their performance, the support available if needed and how to maximise energy saving benefits (e.g. using appliances at peak supply and electric vehicle charging).

crit 2.b.iv Smart devices and any monitors and controls, including any installed a part of the Smart homes issue (see 35 Smart Homes on page 213).

crit 2.c: Provisionally agree dates for the 4-6 week and 8-12 month aftercare visits, where these criteria are met.

crit 2.d: Where post occupancy evaluations (POEs) have been committed to (see 36 Post Occupancy Evaluation on page 218), details regarding what a POE is, how they can get involved and the benefits of being involved. Provisional dates are arranged for POE visits as appropriate.

03 On-call support

up to 4 credits

crit 3 Where a contracted commitment has been made to provide on-call support, to the occupants of the home being assessed, which meets the below:

crit 3.a: Cover all parts of the home (i.e. all building fabric, systems and services etc.)

crit 3.b: Is available for the whole duration of time specified in the criteria

crit 3.c: Is free for occupants to use. Credits are not available where aftercare support is offered as an optional feature of the home at an additional cost to occupants.

Credits are awarded depending on how long the support is available for:

- 3 credits for two years
- 4 credits for three years

Methodology

None.

Compliance Notes

| Criterion Reference | Compliance Note | |
|---------------------|---|--|
| All | CN1 Aligning with other relevant requirements | If existing solutions conflict with HQM requirements but it is believed that the criteria intent is being met, please contact BRE Global for consideration. |
| All | CN2 Change of occupancy | The aftercare support must be arranged in a way that it is available to whoever occupies the home, during the time the support is specified as being available for. This means that in the event that a home changes occupancy before the arranged aftercare support is due to finish, the support must still be available to any new occupants for the time originally agreed to. |

Evidence

| Criterion Reference | Title | Design Stage | Post Construction Stage |
|---------------------|---------------------|---|-------------------------|
| All | 01 General evidence | One or more of the appropriate evidence types listed in Appendix C - HQM evidence requirements on page 236 can be used to demonstrate compliance with these criteria. | |

BRE will contact developers to ensure any aftercare or POE commitments made to achieve these credits have been undertaken. In the event that aftercare or POE commitments are not undertaken or completed, BRE may suspend or withdraw the assessment's HQM certificate and its Green Book Live listing. Alternatively, BRE may re-issue the HQM certificate with an updated rating and score based on the withdrawal of the affected credits (at the client's own expense).

Checklists, Tables & Illustrations

None.

Definitions

Active systems

Any home systems that require active operation or maintenance. This includes common home systems such as:

- Heating and hot water systems
- Ventilation systems
- Low and zero carbon technologies
- Comfort cooling systems
- Appliances

- Showers or baths
- Lighting
- Security systems
- Smart devices (e.g. smart meters)

As well as any other systems, which may be less typical, such as:

- Electric car charging points
- Living roof systems (e.g. green roofs)
- Flood resilience measures
- Drainage systems or strategies e.g. SuDS
- Temperature control measures (e.g. active external shading)

On-call support

This is support that is available to occupants on demand. For example:

- Call-out service
- Call-out service
- Call-out service
- Call-out service

Near-site LZCT

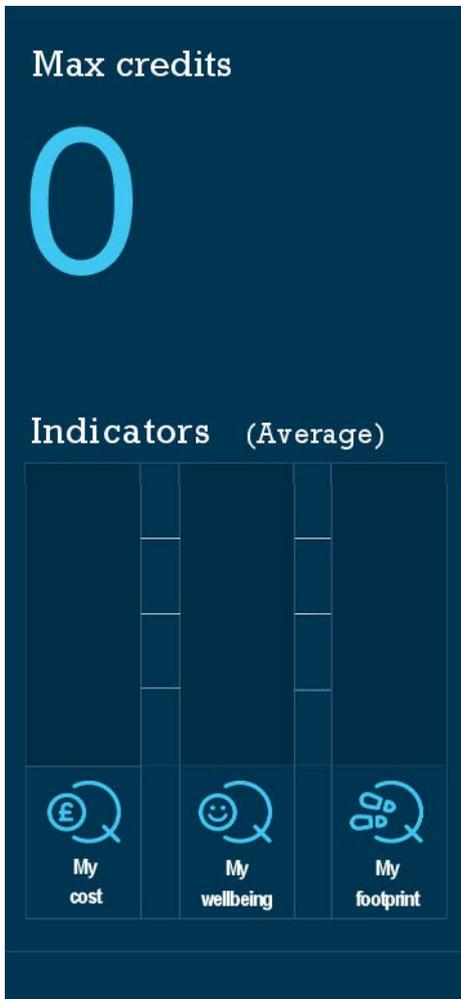
A low or zero carbon source of energy generation located near to the site of the assessed building. The source is or will be providing energy for all or part of a local community of buildings, including the assessed home, e.g. decentralised energy generation linked to a community heat network or renewable electricity sources connected via private wire.

On-site LZCT

A low or zero-carbon source of energy generation which is located on the same site as the assessed home. This is support that is available to occupants on demand. For example:

- Call-out service
- Ongoing maintenance and management arrangements
- Periodic walkabouts
- Resident on-site attendance.

34 HOME INFORMATION



Aim

To provide occupants with useful, accessible information that helps them to get the most out of their home, engage with their local community and reduce their costs and environmental footprint.

Benefit

- Help occupants manage their homes in a cost effective way and to operate them in an efficient way that takes account of the design intent.
- Inform occupants how to operate their home in a way that supports their health and wellbeing.
- Allow occupants to understand and make the most of their community and its amenities.

Context

Providing occupants with relevant, clear, accessible and user-friendly information about the operation, and maintenance of their homes, is an important part of helping people to live well and be satisfied with their new home⁽¹⁶²⁾. Quality and accessible information is of growing importance given the increasingly airtight, serviced and complex buildings being required by regulations and market expectations. Providing transparent information also helps to empower consumers to ensure they get the most from their home by informing them of what support is available to them and giving them access to information they should have a right to have access to. This is one of the recommendations from the All Party Parliamentary Group's report 'More homes, fewer complaints'⁽¹⁶³⁾. This issue recognises where this type of information is provided via written guides, videos, websites, or other media, in order to help translate the design benefits of homes directly to the people living in them.



Credit Summary

This issue contains criteria that are minimum requirements and need to be met in order for a home to become certified under the Home Quality Mark.

| Criterion number | Title | Credits |
|-------------------------|---------------------|---------------------|
| crit 1 | 01 Home information | Minimum requirement |
| Total credits available | | 0 |

Criteria

01 Home information

Minimum requirement

crit 1 Where it is demonstrated that all applicable home information, will be provided to occupants of all homes from the first day of moving in that meets the following:

crit 1.a: Available in an accessible format (CN1 on page 211)

crit 1.b: Available in both a hard and soft copy

For England and Scotland

crit 1.c: Written in Plain English (e.g. meets the guidelines of the Plain English Campaign), which is jargon free and uses simple illustrations as appropriate. For example, this may include diagrams, flow charts or interactive graphics to show where items referred to are located for.

For Wales

crit 1.d: Provided in Plain English (e.g. meets the guidelines of the Plain English Campaign) and in Welsh, which is jargon free and uses simple illustrations as appropriate. For example, this may include diagrams, flow charts or interactive graphics to show where items referred to are located.

crit 1.e: Clearly communicates the following:

crit 1.e.i: All the content outlined in Table 46 below where it is mandatory or where the corresponding criteria have been met (see 'required if criteria met' column), to all parties, for transparency.

crit 1.e.ii: The person or organisation responsible for anything referred to in the home information, and their contact details (e.g. who is responsible for maintenance of active systems)

crit 1.e.iii: Who the information is relevant to (e.g. leaseholder, freeholder or trades person etc.)

crit 1.e.iv: and for the person or company responsible for any queries regarding the home (e.g. this may include landlords, warranty providers, management companies, housing associations etc.).

The home information relating to criteria that have not been met, does not need to be provided for the purposes of meeting the home information mandatory requirement

Table 46 Information required where various issues are pursued.

| Topic | Required if criteria met | Information required |
|--------------|--------------------------|---|
| Introduction | Minimum requirement | <p>A quick start guide where all home information is briefly summarised and can be used to direct readers to the section of home information they need where further information is needed (e.g. a simple index or 'crib' sheet)</p> <p>The assessed home's HQM post-construction certificate issued by BRE Global Ltd.</p> <p>The HQM charter and details regarding the support and assurances provided as part of this, including what to do if</p> |

| Topic | Required if criteria met | Information required |
|--|---|---|
| | | the charter is breached. |
| Operation and maintenance | Minimum requirement | Operational and maintenance information for all home systems (see 33 Aftercare: 33 Aftercare) within the home or building (where present) |
| Health and safety | Minimum requirement | <p>Key health and safety information and emergency procedures specific to the home. For example, location and use of: fuse box, stop cock, smoke alarms, emergency exits etc.</p> <p>Contact details for:</p> <ul style="list-style-type: none"> - Local emergency services (e.g. local police station, hospitals, fire brigades etc.). |
| Support | Minimum requirement | <p>A summary of all types of aftercare support available to the occupants, including the duration and how to use it. This includes details for the following, as a minimum:</p> <ul style="list-style-type: none"> - Guarantees, insurance policies or warranties - Support from organisations like Consumer Code for Home Builders and the Trading Standards Institute, depending on the warranty in place - How to deal with defects or snagging issues - Visits available, including any available as part of the Aftercare issue - Details of the commissioning or testing has taken place including who by and what was done. |
| Public transport | Minimum requirement | <p>Information for local transport networks or nodes, including the following where available:</p> <ul style="list-style-type: none"> - Public transport options available (e.g. buses, trains) - Locations including distance - Routes available - Timetable (e.g. from the transport provider). <p>These could be provided in different formats such as a phone application, for accuracy and real time updates.</p> |
| Local amenities | Minimum requirement | Details of the key and beneficial local amenities that are within walking distance to the home and their locations |
| 02 Alternative Sustainable Transport Options | 02 Alternative Sustainable Transport Options on page 14 | <p>The location of any sustainable transport access including: electric charging points, car clubs, electric bicycles, bike hire etc.</p> <p>Contact details for those responsible for any sustainable transport schemes (including car clubs)</p> |
| | 04 Electric vehicle charging points on page 15 | An overview of the reasons for using sustainable transport options (e.g. environmental and economic savings) |
| | Car clubs | |
| 05 Recreational | 05 | Maintenance requirements relating to any growing space |

| Topic | Required if criteria met | Information required |
|------------------------------------|---|--|
| Space | Recreational Space on page 24 07 Initial planting on page 27 | provided. Access restrictions to outdoor space (e.g. allotments closed after daylight hours). Types of produce that have been planted and advice of what would grow well in the soil conditions. |
| 03B Medium or high risk | 03B Medium or high risk on page 33 | Information regarding the flood resilience measures in place within the site boundary. |
| 07 Managing the Impact of Rainfall | 07 Managing the Impact of Rainfall on page 38 | An overview of the reasons for their use (e.g. environmental and economic savings) and restrictions on making alterations. Emergency contacts for those responsible for managing any drainage systems or strategies installed |
| 08 Security | 08 Security on page 45 crit 1, crit 2 and crit 3 | A summary of the Security Needs Assessment (SNA) and the recommendations implemented. |
| 09 Indoor Pollutants on page 51 | 02 Minimising the effects of cooking - Homes with MVHR | Where recirculating hoods are specified, regular maintenance guidance, according to manufacturer's instructions (e.g. charcoal filter replacement, grease filter cleaning or replacement). |
| 13 Temperature | Minimum requirement | The results from the thermal analysis carried out for the Temperature issue's minimum requirement are communicated along with accessible guidance for occupants on how they can avoid excessive indoor temperatures caused by hot weather. This guidance should cover the appropriate use of any specific features that are present within the home to help with this, including: external shutters, openable windows, window coverings, trickle vents and purge ventilation (including mechanical and natural). |
| 14 Ventilation | 14 Ventilation on page 83 Any criteria | Information regarding the designed ventilation system and its design intent. Operational information on all ventilation systems includes: the location of any associated monitors and controls and how these should be used, including any automatic or manual control functions and guidance relating to how systems should be operated during summer and winter. |
| 15 Energy and cost | 15 Energy and cost on page 90 Any criteria | Details of all parts of the energy strategy for the home Details of any energy performance targets or levels incorporated into the homes design Guidance for the occupant on how to operate their home efficiently General information for the EU energy labelling scheme. |
| 16 Decentralised Energy | 16 Decentralised Energy on | Simple guidance of how to check LZCT systems are performing correctly and what to do when they are not. The design intent of each LZCT installed. |

| Topic | Required if criteria met | Information required |
|--|--|---|
| | page 100 Any criteria | How systems can be expanded, adapted or installed in the future (where options are available). Advice of ways that occupants can adjust their patterns of energy use to optimise the use of energy from LZCTs. |
| 20 Life Cycle Costing of Construction Products | 20 Life Cycle Costing of Construction Products on page 129 Any criteria | A simple outline of the cost appraisal showing the specific maintenance and living costs associated with the building fabric. Any specific manufacturer advice that can help the homeowner understand how to care for and get the most out of the products. An outline of what may be required if maintenance will be needed on a product that has been specified. A year-on-year projected expenditure in a graphic form or the raw data that could feed into a graphic form. The format of this data should at least include the year, the element or component and the expected cost. A copy of the final version of the homeowner’s report (in accordance with 20 Life Cycle Costing of Construction Products: crit 3 on page 130). |
| 23 Access and Space | 23 Access and Space 23 Access and Space | Information regarding any functional flexibility that has been designed into the spaces within the home and any opportunity to expand spaces. Information that indicates the partitions which should not be removed due to compliance with building regulations (e.g. fire protection, structural integrity etc.). |
| 24 Recyclable Waste | 24 Recyclable Waste on page 145 | Details of the waste collection patterns, recyclable waste facilities, composting waste facilities provided in the home including what bins are used for what. Information provided by the service provider or local authority is sufficient, where available. |
| 35 Smart Homes | 35 Smart Homes on page 213 Any criteria | Information regarding the options for retro-fit available (e.g. smart meters, heat meters etc.). How to interpret information from devices installed Contact details to help where devices malfunction where available (examples include: warranty provider, manufacturers, maintenance management plan providers etc.). Guidance on cyber-security relating to smart devices and internet access including: <ul style="list-style-type: none"> - Changing default router passwords - Keeping software of devices up to date - Complete the setup of smart devices - Appropriate positioning of voice activated devices - Smart lock features |

It is good practice for specific information required for other purposes, to be provided as part of the home information supplied for complying with HQM. For example, home reports or quick start guides are sometimes required for regulatory purposes. Where possible, information should be provided in a consistent format and information should not be duplicated.

Methodology

None.

Compliance Notes

| Criterion Reference | Compliance Note | |
|---------------------|-----------------------|--|
| crit 1 | CN1 Accessible format | <p>Written information provided to occupants must be communicated using clear and appropriate language (e.g. avoidance of jargon). This information must also be provided in an appropriate format for users where particular needs are known (e.g. foreign languages, Braille, audio etc.) or must be available on request where this is not known.</p> <p>Home information must also be user friendly and have a layout that is easy to navigate so that the occupants can find the information they need (e.g. by using a simple index or 'crib' sheet).</p> <p>The form that the digital version of the home information should take is flexible, in order to recognise the different ways this information can be provided (e.g. online portal, interactive website, mobile apps etc.).</p> |
| All | CN2 Flexible format | <p>The format the home information shall be provided in is flexible, as long as the requirements in the criteria are met. For example, the guidance relating to ventilation, temperature, energy efficiency, indoor air quality could be communicated together as part of section giving guidance on maintaining a comfortable and efficient home, rather than having to rigidly structure home information into sections listed in Table 46 on page 207.</p> |

Evidence

| Criterion Reference | Title | Design Stage | Post Construction Stage |
|---------------------|--------------------------|---|--|
| crit 1 | 01 General evidence | One or more of the appropriate evidence types listed in Appendix C - HQM evidence requirements on page 236 can be used to demonstrate compliance with these criteria. | |
| crit 1 | 02 Home information | Refer to the general evidence requirements | Copy of the home information content that will be provided to all homes. |
| | 03 Confirmation supplied | Refer to the general evidence requirements | Confirmation that the home information has been provided to all homes. |

Checklists, Tables & Illustrations

None.

Definitions

Active systems

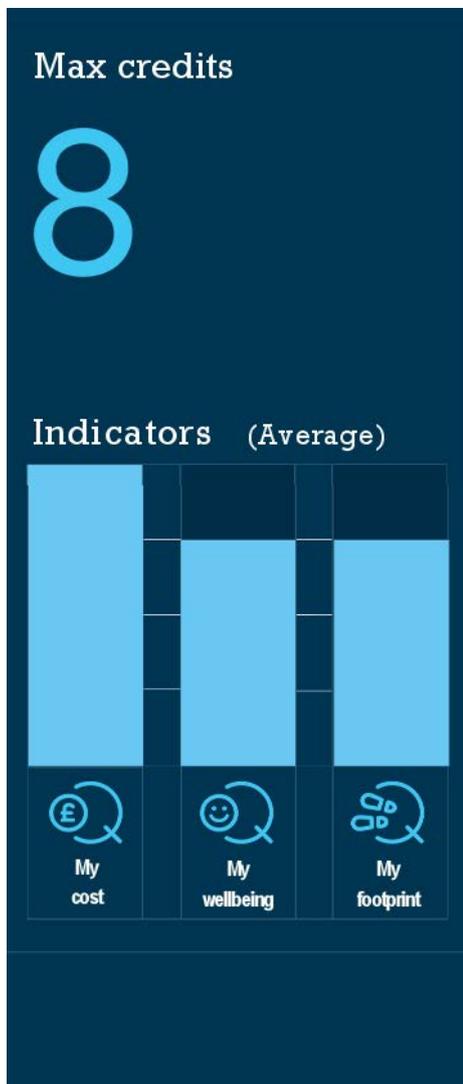
Any home systems that require active operation or maintenance. This includes common home systems such as:

- Heating and hot water systems
- Ventilation systems
- Low and zero carbon technologies
- Comfort cooling systems
- Appliances
- Showers or baths
- Lighting
- Security systems
- Smart devices (e.g. smart meters)

As well as any other systems, which may be less typical, such as:

- Electric car charging points
- Living roof systems (e.g. green roofs)
- Flood resilience measures
- Drainage systems or strategies e.g. SuDS
- Temperature control measures (e.g. active external shading)

35 SMART HOMES



Aim

To ensure that the home is able to adapt to increasingly digital lifestyles, take account of developing technologies, and respond to the growing demand for digital connectivity and smart systems throughout the home.

Benefit

- Help access to high speed digital entertainment and the flexibility to work from home.
- Improve health and well being and reduce running cost by using smart meters.
- Promote increased controllability in the home to allow it to adapt to occupier needs.

Context

The dependency on connectivity across all age groups and cultures is growing in the UK, with approximately 70% of adults using a smartphone in the UK, in 2016⁽¹⁶⁴⁾. Using devices and appliances such as tablets, TVs, heating controls, security systems and white goods, the 'internet of things' is allowing smart technologies to intuitively help people live in their homes more comfortably and efficiently. Digital connectivity is fundamental to getting the most from smart home technologies⁽¹⁶⁵⁾ and it is increasingly important to consumers looking for new homes, particularly for entertainment⁽¹⁶⁶⁾. As of December 2016, Ofcom reported that almost 89% of UK properties can get Superfast broadband with this continuing to rise⁽¹⁶⁷⁾.

Broadband connection to the home is partly covered by Approved Document R. However connection throughout the home is also essential for realising the value of smart devices, in practice⁽¹⁶⁸⁾, by preventing issues like 'Wi-Fi dead zones' and interrupted connections through building materials



Credit Summary

| Criterion number | Title | Credits |
|-------------------------|---------------------------------|---------------------|
| crit 1 | 01 Home information | Minimum requirement |
| crit 2-crit 3 | 02 Connectivity to the home | up to 2 credits |
| crit 4-crit 8 | 03 Connectivity within the home | for 1 credit |
| crit 9-crit 10 | 04 Basic smart heating | for 1 credit |
| crit 11-crit 13 | 05 Advanced smart heating | for 1 credit |
| crit 14-crit 15 | 06 Basic smart lighting | for 1 credit |
| -crit 17 | 07 Smart energy management | for 1 credit |
| crit 18- crit 19 | 08 Additional smart solutions | for 1 credit |
| Total credits available | | 8 |

Criteria

| 01 Home information | Minimum requirement |
|---------------------------------|--|
| crit 1 | Home information needs to be provided as part of or all of the criteria in this issue. Please see 34 Home Information on page 206). |
| 02 Connectivity to the home | up to 2 credits |
| crit 2 | A network infrastructure provider is contacted during the planning stage (see further information) and the following is achieved: <ul style="list-style-type: none"> crit 2.a: Connections from the street for broadband, telecommunications and cable TV are installed in duct work provided by the service provider, overhead from the street or via direct burial cable, to support future changes, as defined in PAS 35491 2017 Section 5.2.2 crit 2.b: Any other appropriate infrastructure is implemented on site during construction, in line with the network infrastructure provider's guidance (e.g. in terms of layout, installation of inspection chambers, joint boxes, distribution units etc.) crit 2.c: Connection to the broader network via network terminating equipment (e.g. master socket for copper or optical network termination unit for fibre) by post-construction stage crit 2.d: Cabled connection is available to occupants when they move in (e.g. cabling installed during construction or pulled through before occupancy) |
| crit 3 | Credits are awarded depending on the download speed of the broadband available to the home: <ul style="list-style-type: none"> - 1 credit for superfast broadband (24Mbit/s) - 2 credits for ultra-fast broadband (100Mbit/s) |
| 03 Connectivity within the home | for 1 credit |
| crit 4 | There is a primary home distribution space (PHDS) containing a patching panel which together provide a central location for all wiring to be run including connections from incoming services and distribution of cabling around the home, in accordance with PAS 35491 2017. |
| crit 5 | Ethernet (Cat 5e) is routed to all principal rooms (see definition) in the home, within routing ducts, and with the provision for pulling through new cables in future. |
| crit 6 | Cable ducting is provided in secondary rooms (see definition) in the home for future upgrades or to resolve poor wireless broadband in any secondary rooms. |
| crit 7 | Cable ducting must either have curved inside and outer corners if they have 90 degree angles, or must be greater than 90 degrees |
| crit 8 | Installation and commissioning are done in accordance with PAS 35491 2017 (sections 5 and 6). |

04 Basic smart heating**for 1 credit**

- crit 9 crit 2 on the previous page to crit 3 on the previous page and crit 4 on the previous page to crit 8 on the previous page have been achieved.
- crit 10 Accessible (see definition) smart home devices or systems have been installed at no additional cost to the occupant (e.g. subscription fees) that:
- crit 10.a:Provide a smart heating functionality by monitoring internal temperature levels in the main living room as a minimum (CN3) and keep it within a fixed range for energy savings and comfort and:
- crit 10.b:Has a 12-month warranty on the smart heating devices. This includes smart thermostat, temperature sensors, boiler transceiver unit and any communications hub provided specifically with the smart heating system.
- crit 10.c:Use a smartphone application interface for the smart devices that:
- crit 10.c.Display internal temperature levels over a weekly, monthly and yearly basis
 - crit 10.c. Provide remote control of heating with the ability to change schedules
 - crit 10.c. Provide instant on/off override.

05 Advanced smart heating**for 1 credit**

- crit 11 crit 9 to crit 10 have been achieved.
- crit 12 Provide additional smart heating functionality that:
- crit 12.a:Uses multi-zone heating; the ability to independently measure and control the internal temperature of multiple zones for all principal rooms within the home.
- crit 12.b:Uses external temperature sensing
- crit 12.c:Allows 'away from home' or geo-location control
- crit 12.d:Allows active frost protection
- crit 12.e:Uses stored environmental and behavioural data to tailor experience
- crit 13 Occupancy sensing that can be used to trigger heating schedules (such as "away from home" modes).

06 Basic smart lighting**for 1 credit**

- crit 14 crit 2, crit 3 and crit 4 to crit 8 have been achieved.
- crit 15 Accessible (see definition) smart home devices or systems have been installed at no additional cost to the occupant (e.g. subscription fees) that:
- crit 15.a:Monitor and control the internal lighting in principal rooms, using pre-set lighting controls for energy savings and comfort and having the ability to be controlled remotely via a smart phone app.
- crit 15.b:Allow for remote dimming control of individual lights in principal rooms.
- crit 15.c:Occupancy sensing that is used to trigger lighting schedules (e.g. "away from home" modes)

07 Smart energy management**for 1 credit**

- crit 16 crit 14 and crit 15 met.
- crit 17 Accessible (see definition) smart home devices or systems have been installed at no additional cost to the occupant (e.g. subscription fees) that:
- crit 17.a:Monitor, control and report energy use of individual devices via a smartphone app in at least the principle rooms, using smart plugs or sufficient energy disaggregation methods.
- crit 17.b:Provide additional lighting functionality that automatically senses ambient light levels and adjusts light levels to meet pre-set requirements (e.g. by altering brightness or temperature of the light).

crit 17.c: Monitor and display the operational status and availability of LZCTs where these are installed (e.g. where solar PVs are installed).

08 Additional smart solutions

for 1 credit

crit 18 crit 9 to crit 10 and crit 14 to crit 15

crit 19 Accessible (see definition) smart home devices or systems have been installed at no additional cost to the occupant (e.g. subscription fees) that:

crit 19.a: Monitor air quality in all principle rooms and either reports information to a smart phone app or in-home display.

crit 19.b: Enables voice control of the smart heating and smart lighting devices, independent from a smartphone.

crit 19.c: Include at least two of the following functionalities:

crit 19.c.i: Monitors and reports humidity in the kitchen, bathroom and a main bedroom.

crit 19.c.ii: Smart ventilation or filtering, linked with an air quality sensor that measures at least three of the following: Carbon monoxide, Carbon dioxide, humidity, particulates, volatile organic compounds (VOCs)

crit 19.c.iii: Gesture control for smart devices

crit 19.c.iv: Geofencing; ability to control devices based on the location of the user (e.g. where they are within a set radius of the home)

crit 19.c.v: Other controls (see compliance notes)

Methodology

None.

Compliance Notes

| Criterion Reference | Compliance Note | |
|---------------------|--|--|
| All | CN1 Minimum number of electrical sockets | Installed devices relating to this issue (e.g. visual display units, sensors, transmitters, signal repeaters, hubs etc.) must not reduce the minimum number of electrical sockets available to occupants that are required legally or by the design. Additionally, installed devices must not impede the access or functioning of any other switches or control devices. |
| crit 2 | Connection during handover not possible | Where it is not possible for occupants to have access to broadband, telecommunications, TV or data services, when moving in, due to unavoidable delays, temporary measures need to be taken to ensure occupants are given temporary access until full connection is available (e.g. via dongles). This needs to be agreed between the developer, network infrastructure provider and internet service provider where applicable. |
| crit 10 | CN2 Temperature sensor location | For the purposes of the 04 Basic smart heating on the previous page criteria, homes over 150m ² must have temperature sensors in a main bedroom, in addition to the main living room. |
| crit 12 | Heating zones | For Multiple Dwelling Units (MDUs) or homes consisting of two main rooms or less, heating zones for the whole unit, rather than individual rooms, are acceptable, provided occupants have control of their own heating zones. |
| crit 19.c.v | CN3 Other controls | Where other forms of home controls are present that are not listed |

| Criterion Reference | Compliance Note |
|---------------------|---|
| | <p>in crit 19.c.v, please contact BRE for consideration.</p> <p>Due to the innovative nature of smart home systems, the examples provided are by no means a full list of all of the types of controls that are, and will be, available.</p> |

Evidence

| Criterion Reference | Title | Design Stage | Post Construction Stage |
|---------------------|-------------------------|---|-------------------------|
| All | 01 General evidence | One or more of the appropriate evidence types listed in Appendix C - HQM evidence requirements on page 236 can be used to demonstrate compliance with these criteria. | |
| crit 3 | 02 Broadband speed test | Data bit speed measurement using apps or web services to verify speeds. | |

Checklists, Tables & Illustrations

None.

Definitions

Accessible device

For the purposes of the Smart Homes issue, devices are accessible if they link with a web or mobile interface that meet the WCAG2.0 (ISO/IEC 40500) accessibility standards (www.w3.org; www.iso.org).

Where the above is not met, (e.g. only a visual display unit is installed), a device must have been installed that meets an equivalent level of accessibility to ensure it is usable by people with disabilities.

Principal rooms

Main lounge or living room, study or home office, main bedroom and TV room. (PAS 35491, 2017)

Secondary rooms

Second and third bedrooms, kitchens, dining rooms and playrooms. (PAS 35491, 2017)

Network infrastructure guidance

The below references provide guidance on how to provide new homes with a connection. The earlier this is considered, the easier it is to implement on site and provide occupants with connection on moving in, which helps to assure customer satisfaction and reduce the need for often expensive or time-consuming remedial works.

- Openreach (2016) 'How to build a copper network - developer guide: www.openreach.co.uk
- Openreach (2017) 'How to build a fibre network - developer guide: www.openreach.co.uk
- Virgin New Build Developers Guide: <http://www.virginmedia.com/lightning/network-expansion/property-developers>
- Department for Business Innovation & Skills (2016) 'PAS 2016:2010. Next generation access for new build homes guide': www.gov.uk
- HM Government (2014) Better connected: A practical guide to utilities for home builders. Available at: www.gov.uk

For more details, including their time frames before starting on site, please contact a network infrastructure provider during the early design stage (e.g. RIBA stage 3).

Credit Summary

| Criterion number | Title | Credits |
|-------------------------|--|--------------------------------|
| crit 1-crit 2 | Occupant satisfaction feedback and bill data | for 2 credits below |
| crit 3-crit 4 | Energy and temperature monitoring | for 3 credits below |
| crit 5- crit 6 | Advanced POE | for 2 credits |
| crit 7-crit 8 | Independent third party | for 3 credits on the next page |
| Total credits available | | 10 |

Criteria

Occupant satisfaction feedback and bill data

for 2 credits

Where a commitment has been made for an appropriately qualified professional to carry out the following:

crit 1 Within 6 weeks of occupation:

crit 1.a: Occupants are formally offered to be involved with the POE, in an accessible format or in person (e.g. as part of any appropriate Aftercare visits)

crit 1.b: The formal offer must include the following, as appropriate:

crit 1.b.i: Details of the actions to be carried out with the occupant's permission

crit 1.b.ii: Benefits of the POE to the occupants, including any services available to them as part of the POE (e.g. incentives or if the Aftercare issue has been pursued), to encourage occupant involvement

crit 1.b.iii: Broader reasons for POEs to be carried out and importance for house building

crit 1.b.iv: Approximate timescales for any home visits or opportunities for occupant feedback (e.g. questionnaires, interviews, focus groups etc.)

crit 1.b.v: Contact details for the company and persons responsible for carrying out POEs.

crit 1.c: Request occupant contact details including up to date phone number and e-mail address, to help encourage their involvement.

crit 1.d: Contact occupants after the 6 week period, prior to when the POE is scheduled to be carried out, where the first offer has not been accepted or declined.

crit 2 Between 12 and 18 months after occupation:

crit 2.a: Collect occupant feedback (POE 1- see Methodology on the next page), between;

crit 2.b: Request the annual energy and water bills for the first year of occupation

crit 2.c: Analyse occupant feedback, and energy and water bills to evaluate the performance of the home in practice, compared to its design intent, to improve future projects

crit 2.d: Disseminate the POE results and lessons learnt to key stakeholders, in order to share good practice.

crit 2.e: Send POE data to BRE, in the format outlined in the Methodology on the next page section for each POE method

Energy and temperature monitoring

for 3 credits

crit 3 crit 1 to crit 2 above have been achieved.

crit 4 Where an appropriately qualified professional has also been appointed to do the following:

crit 4.a: Collect and monitor the following data for at least one year, recorded hourly:

crit 4.a.i: Energy consumption data in kWh/person or kWh/m²

crit 4.a.ii Internal temperature in C°, recorded in the main bedroom and living room as a minimum

crit 4.b: Compare actual and predicted energy costs using the home's EPC

crit 4.c: Analyse results and outline future lessons, as part of crit 2 on the previous page, to improve the performance of future projects,

Advanced POE

2 credits

crit 5 Where crit 1 on the previous page to crit 4 on the previous page have been met.

crit 6 Where the appropriately qualified professional will also undertake at least one other POE method (see Methodology below) as part of the data being collected and analysed for crit 1 on the previous page to crit 4 on the previous page

Independent third party

for 3 credits

crit 7 Where crit 1 on the previous page and crit 2 on the previous page have been achieved.

crit 8 Where an independent third party (see definitions) has been appointed as the appropriately qualified professional and is contractually obliged to fulfil any POE commitments referred to in crit 1 on the previous page to crit 6 above.

Methodology

Table 47 Methods that may be used to conduct a post occupancy evaluation

| Method | Requirements |
|--------------------------|---|
| POE 1. Occupant feedback | <p>The exact format of occupant satisfaction feedback is flexible (e.g. questionnaires, focus groups, interviews etc.) as long as occupant satisfaction feedback is gathered for the following aspects of their home, as a minimum:</p> <ol style="list-style-type: none"> 1. Public transport 2. Alternative sustainable transport options (if present) 3. Local amenities 4. Local community overall 5. Outdoor space 6. Security 7. Indoor air quality 8. Indoor daylight levels 9. Noise 10. Thermal comfort 11. Comfort overall 12. Energy and water bills 13. Running costs overall 14. Indoor space (e.g. size, accessibility etc.) 15. Active systems (see Aftercare definition) 16. Quality of build, fixtures and fittings 17. Maintenance and operation of the home 18. Aftercare support 19. Home information 20. Digital connectivity (e.g. broadband) and smart features. |

| Method | Requirements |
|------------------------------------|---|
| POE 2. Energy audit | Energy data need to be sent to BRE using the HQM template, available on BREEAM Projects. |
| POE 3. Water audit | Monitoring of water consumption data, in litres per person, for at least one year, with readings recorded at least every hour. Predicted consumption would be based on the modelled water consumption calculated for the purposes of the HQM water efficiency issue. |
| POE 4. Forensic walk-through | A thorough inspection undertaken to check the home's operation, identify problems with the home itself as well as any operational practices (e.g. occupant behaviour). This is conducted between 12 and 18 months of occupation. A summary of the observations made by the walk-through and any actions carried out to rectify identified problems. |
| POE 5. LZCT performance monitoring | Technical review of installed LZCTs to determine if performance (e.g. energy generated) is in line with design intent, as specified by the installer and relevant guidance from the manufacturer. The following data need to be collected and disseminated appropriately as a minimum: <ul style="list-style-type: none"> - Predicted and actual energy generation or savings (e.g. kWp for PV) |
| POE 6. Humidity monitoring | Relative humidity must be measured in a living room and at least one bedroom, over the course of at least one year and readings must be recorded at least every hour. |

While monitoring humidity and temperature is less common as part of a POE compared to monitoring energy and water usage for instance, monitoring these aspects of the home can be useful where occupants have expressed problems with poor ventilation or overheating, for example. As these types of problems can have significant health implications, they have been included as types of data that may be useful to collect as part of a POE. Monitoring humidity and temperature may therefore be most appropriate as part of a whole house research project or case study or where occupant feedback identifies particular problems associated with these aspects in their home.

Appropriately disseminated

The HQM assessment reference and dwelling ID used in the HQM assessment tool needs to be clearly recorded as part of any POE results that are disseminated.

Dissemination will vary depending on the type of data or information collected as part of the POE but may be in the form of a written summary, follow up meetings, case study or report of POE results and analysis, which is disseminated to key stakeholders including (where appropriate):

- Occupants
- BRE
- Developer
- Designers (e.g. architects and structural engineers)
- Principal contractor
- Management companies.
- Landlords.

Examples of the types of acceptable content for dissemination include:

- Occupants: A user-friendly written summary or follow up interview, meeting or focus group may be appropriate ways to disseminate useful findings to occupants and advice to help occupants get the most from their home. For example, simple ways they can reduce energy consumption and, how to prevent overheating
- BRE: POE results (excluding confidential information) as part of the evidence to confirm compliance and help to shape HQM in the future so that technical requirements more closely reflect performance in use.

- Developers, designers and principal contractor: A report or analysis of the POE findings, in order to help inform future energy strategies and better quality design and construction. This report may also help stakeholders support their claims of quality in use.
- Management companies: Occupant feedback on building services and control systems, to help inform future maintenance.

Compliance Notes

| Criterion Reference | Compliance Note | |
|---------------------|-----------------------|---|
| All | CN1 Accessible format | Where formal offers are made in writing, they must be communicated using clear and appropriate language (e.g. avoidance of jargon). This information must also be provided in an appropriate format for users where particular needs are known (e.g. foreign languages, Braille, audio etc.) or must be available on request where this is not known. |
| All | CN2 Data format | All data must be anonymous, to protect occupant privacy, while still being able to cross-reference the HQM registration number and individual dwelling ID, to allow for comparison with inputs made for the assessment. This is required to help contribute to HQM's ongoing technical development and will be subject to use across the BRE Group. |

Evidence

| Criterion Reference | Title | Design Stage | Post Construction Stage |
|---------------------|---|--|--|
| All | 01 General evidence | One or more of the appropriate evidence types listed in Appendix C - HQM evidence requirements on page 236 can be used to demonstrate compliance with these criteria. | |
| All | 02 Confirmation of POE offer to all occupants | Refer to general evidence requirement above. | A copy of the correspondence and the POE offer that will be provided to occupants (see CN1 above). |
| crit 8 | 03 Contract | The contractual agreement between the developer and the independent party, confirming: <ul style="list-style-type: none"> - What will be carried out as part of the POE - How the occupant will be contacted to ask for their permission - Timescales for carrying out the POE - The independent party responsible for carrying out the POE. | |

BRE will contact developers to ensure any aftercare or POE commitments made to achieve these credits have been undertaken. In the event that aftercare or POE commitments are not undertaken or completed, BRE may suspend or withdraw the assessment's HQM certificate and its Green Book Live listing. Alternatively, BRE may re-issue the HQM certificate with an updated rating and score based on the withdrawal of the affected credits (at the client's own expense).

Checklists, Tables & Illustrations

None.

Definitions

Active systems

Any home systems that require active operation or maintenance. This includes common home systems such as:

- Heating and hot water systems
- Ventilation systems
- Low and zero carbon technologies
- Comfort cooling systems
- Appliances
- Showers or baths
- Lighting
- Security systems
- Smart devices (e.g. smart meters)

As well as any other systems, which may be less typical, such as:

- Electric car charging points
- Living roof systems (e.g. green roofs)
- Flood resilience measures
- Drainage systems or strategies e.g. SuDS
- Temperature control measures (e.g. active external shading)

Appropriately qualified professional

For the purposes of the POE issue, an AQP is an individual or multiple individuals with the relevant skills and experience to carry out the specific POE methods being used.

Their organisation may be involved with the project but the AQP specifically carrying out the POE, has to be independent from the project's design and construction.

Independent third party

An individual or group of individuals, independent from the parties involved with the assessed home.

For the purposes of the POE issue, this could be a consultancy specifically employed to carry out a POE, where they have had no involvement in the assessed home other than POE.

Post-occupancy evaluation

Post-occupancy evaluation (POE) is the umbrella term for the process of obtaining feedback on the performance of a recently completed new building or refurbishment. Over time, the value of POE has been recognised not only as a one-off evaluation of a recently completed project but as an ongoing assessment process for any building in use that should be conducted at regular intervals over the building's lifecycle.

APPENDICES

This section discusses the following.

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APPENDIX A

HQM scoring and rating methodology

There are two elements to the scoring approach taken within HQM. There is a single overarching Star Rating and a set of three occupant focused Indicators which represent the degree to which the home meets the requirements set out in each of the 35 distinct issues within HQM.

How the Rating is calculated

The Rating provides a simple comparative measure of the overall quality and performance of a new build home. This is based on a total HQM score which is calculated out of a maximum available 500 credits all of which are of equal value. The relative importance of different issues and criteria (and therefore the number of credits available within them) is based on the scoring methodology that underpins all BREEAM schemes, albeit tailored to the needs of the new build housing sector.

To achieve an HQM Star rating, a minimum total number of credits must be achieved as highlighted in Table 48 below. In HQM, all credits are equal (i.e. one credit is equal to one credit throughout the scheme).

Table 48 Minimum credits required for each Star Rating

| | 3 Star | 3.5 Star | 4 Star | 4.5 Star | 5 Star |
|-----------------------|--------|----------|--------|----------|--------|
| Minimum total credits | 150 | 225 | 275 | 350 | 400 |
| Percentage | 30 | 45 | 55 | 70 | 80 |

There are a number of minimum requirements within key issues which apply for all star ratings (see Table 54 on page 227 for more details). If these minimum requirements are not achieved, an HQM certificate cannot be issued.

How the Indicators are calculated

The second element of scoring in HQM are the Indicators which reflect key areas of concern to the Householder. The respective scores for each of these Indicators are generated in parallel with the overall HQM score. The relative contribution of each assessment issue to the Indicator scores is confirmed in the information box at the top of each issue, alongside the total number of credits available.

Each issue was rated in terms of the likelihood that it will impact householders living costs (My cost), health & wellbeing (My wellbeing) and environmental footprint (My footprint). The ratings are classed as "No, Low, Medium, High or Very High Impact" this was determined through a series of workshops and questionnaires.

The Indicators are scored out of 5 and are awarded on the basis of the total minimum number of points as highlighted in Table 49 below.

Table 49 Minimum number of points required for each Indicator band

| | Indicator bands | Indicators | | | | |
|---|-----------------|------------|-----------|-----------|-----------|-----------|
| | | 1 | 2 | 3 | 4 | 5 |
|  | My costs | 79 | 118 | 144 | 184 | 210 |
|  | My wellbeing | 84 | 126 | 155 | 197 | 225 |
|  | My footprint | 120 | 180 | 220 | 281 | 321 |
| Percentage | | 30 | 45 | 55 | 70 | 80 |

Each issue is classed as No, Low, Medium, High or Very High Impact which is calculated using a decimal as shown in Table 50 below

Table 50 Issue Impact Decimals

| No | Low | Medium | High | Very High |
|----|------|--------|------|-----------|
| 0 | 0.25 | 0.5 | 0.75 | 1 |

There are a number of performance backstops set to achieve certain levels within each indicator. These represent the minimum performance criteria that must be met by the home in key areas relevant to that particular Indicator.

To achieve an Indicator score, the minimum number of points (as highlighted in Table 49 on the previous page) must be achieved, and the performance backstop relevant to that Indicator for the level required (as highlighted in Table 52 below, and Table 53 below), must be complied with.

Table 51 'My Cost' Indicator Performance Level Backstops

| Issue | Level 1 | Level 2 | Level 3 | Level 4 | Level 5 |
|------------------|---------|---------|------------|--|--|
| Flood Risk | | | 17 credits | 17 credits | 17 credits |
| Security | | | | 4 credits | 9 credits |
| Temperature | | | | Foundation route - 7 credits OR Comprehensive route - 11 credits | Foundation route - 7 credits OR Comprehensive route - 11 credits |
| Ventilation | | | | 4 credits (Maintenance & Controls) | 4 credits (Maintenance & Controls) |
| Energy and Cost | | | | 7 credits (Cost) | 11 credits (Cost) |
| Water Efficiency | | | 8 credits | 8 credits | 11 credits |

Table 52 'My Wellbeing' Indicator Performance Level Backstops

| Issue | Level 1 | Level 2 | Level 3 | Level 4 | Level 5 |
|-----------------------------|---------|---------|---|---|---|
| Recreational Space | | | 3 credits | 5 credits | 7 credits |
| Security | | | | | 9 credits |
| Indoor Pollutants | | | 1 credit | 2 credit | 4 credits |
| Daylight | | | 3 credits | 5 credits | 8 credits |
| Internal and External Noise | | | | | 2 credits |
| Sound insulation | | | 1 credit (Between homes) | 3 credits (Between homes) | 5 credits (Between homes) |
| Temperature | | | Foundation route - 7 credits OR Comprehensive route - 11 credits | Foundation route - 7 credits OR Comprehensive route - 11 credits | Foundation route - 7 credits OR Comprehensive route - 11 credits |
| Ventilation | | | 5 credits (Ventilation rates) | 5 credits (Ventilation rates) + 4 credits (Ventilation air intakes) | 5 credits (Ventilation rates)+ 4 credits (Ventilation air intakes) |
| Access and Space | | | 5 credits (Nationally described standards) | 5 credits (Nationally described standards) | 11credits |

Table 53 'My Footprint' Indicator Performance Level Backstops

| Issue | Level 1 | Level 2 | Level 3 | Level 4 | Level 5 |
|---------|---------|---------|--|---|--|
| Ecology | | | Credits achieved in 'Managing Negative Impacts on Habitats and Biodiversity' issue | Credits achieved in 'Enhancement of Ecological Value' issue | Credits achieved in 'Enhancement of Ecological Value' issue AND |

| Issue | Level 1 | Level 2 | Level 3 | Level 4 | Level 5 |
|---|---------|---------|---|---|--|
| | | | | | Credits in 'Long Term Biodiversity Management and Maintenance' issue |
| Energy and Cost | | | 9 credits (Energy Performance) | 28 credits (Energy Performance) | 40 credits (Energy Performance) |
| Responsible Sourcing of Construction Products | | | 2 credits (Product Procurement Policy) + 5 credits (Responsible sourcing of construction products assessment) | 2 credits (Product Procurement Policy) + 7 credits (Responsible sourcing of construction products assessment) | 2 credits (Product Procurement Policy) + 9 credits (Responsible sourcing of construction products assessment)2 |
| Environmental Impact from Construction Products | | | 2 credits (Product Procurement Policy) + 2 credits (Environmental Product Declaration) | 2 credits (Product Procurement Policy) + 2 credits (Environmental Product Declaration) + 3 credits (Building Life Cycle Assessment) | 2 credits (Product Procurement Policy) + 2 credits (Environmental Product Declaration) + 10 credits (Building Life Cycle Assessment) |
| Water Efficiency | | | 8credits | 8 credits | 11 credits |
| Site Waste | | | 5 credits | 7 credits | 11 credits |

Detail

Table 54 Detail of the scoring

| Categories | Issues | Criteria | Criteria Credits | Either or | Total issue Credits | Indicators | | |
|---------------------------------------|---|---------------------------|------------------|-----------|---------------------|------------|--------------|--------------|
| | | | | | | My cost | My wellbeing | My footprint |
| Our surroundings (153 Credits) | | | | | | | | |
| Transport and Movement | Accessible Public Transport | Public Trnsprt Index | 12 | | 15 | 0.5 | 0.5 | 0.5 |
| | | Local service | 3 | | | 0.5 | 0.5 | 0.5 |
| | Alternative Sustainable Transport Options | Cycle Storage | 6 | | 17 | 0.5 | 0.75 | 0.5 |
| | | Cycle Networks | 4 | | | 0.5 | 0.75 | 0.5 |
| | | Electric Charging points | 4 | | | 0.5 | 0.25 | 0.5 |
| | Local Amenities | Car Clubs | 3 | | 16 | 0.5 | 0.25 | 0.5 |
| | | Key Local Amenities | 11 | | | 0.75 | 0.5 | 0.5 |
| | Beneficial Amenities | 5 | | 0.75 | 0.5 | 0.5 | | |
| Outdoors | Ecology | Previously developed land | 6 | | 36 | 0 | 0 | 1 |
| | | Appointing an expert | 2 | | | 0 | 0.5 | 1 |
| | | Early appointment | 2 | | | 0 | 0.5 | 1 |

| Categories | Issues | Criteria | Criteria Credits | Either or | Total issue Credits | Indicators | | |
|-----------------------|---------------------------------|-------------------------------|--|-----------|---------------------|------------|--------------|--------------|
| | | | | | | My cost | My wellbeing | My footprint |
| | | Survey (Fdtn) | 3 | 10 | 26 | 0 | 0.5 | 1 |
| | | Ecological value (Fdtn) | 4 | | | 0 | 0.5 | 1 |
| | | Biodiversity records (Fdtn) | 3 | | | 0 | 0.5 | 1 |
| | | Ecologist's survey (Comp) | 5 | | | 0 | 0.5 | 1 |
| | | Ecological value (Comp) | 9 | 0 | | 0.5 | 1 | |
| | | Invasive or diseased (Comp) | 4 | 0 | | 0.5 | 1 | |
| | | Communal areas (Comp) | 5 | 0 | | 0.5 | 1 | |
| | | Biodiversity records (Comp) | 3 | 0 | | 0.5 | 1 | |
| | Recreational Space | Public recreational space | 4 | 22 | 0.5 | 0.75 | 0.5 | |
| | | Private space | 6 | | 0.5 | 0.75 | 0.5 | |
| | | Communal space | 4 | | 0.5 | 0.75 | 0.5 | |
| | | Management strategy | 3 | | 0.5 | 0.75 | 0.5 | |
| | | Growing space | 2 | | 0.5 | 0.75 | 0.5 | |
| | | Expert input | 1 | | 0.5 | 0.75 | 0.5 | |
| | Initial planting | 2 | | 0.5 | 0.75 | 0.5 | | |
| Safety and Resilience | Flood Risk | Flood Risk Assessment | Minimum requirement - England and Scotland | | | N/A | N/A | N/A |
| | | Flood Consequence Assessment | Minimum requirement - Wales | | | N/A | N/A | N/A |
| | | Flood Risk - Low Risk | 19 | 19 | 1 | 0.75 | 1 | |
| | Flood Risk - Medium or High | 17 | | | | | | |
| | Managing the Impact of Rainfall | Managing Rate & Volume (Fdtn) | 3 | 3 | 19 | 0.25 | 0.25 | 1 |
| | | Peak Rate Run Off (Comp) | 5 | | | 0.25 | 0.25 | 1 |
| | | Volume Run Off (Comp) | 9 | 19 | | 0.25 | 0.25 | 1 |
| | | Water Quality (Comp) | 3 | | | 0.25 | 0.25 | 1 |

| Categories | Issues | Criteria | Criteria Credits | Either or | Total issue Credits | Indicators | | | |
|------------------------------|-----------------------------|--|-----------------------------|-----------|---------------------|------------|--------------|--------------|------|
| | | | | | | My cost | My wellbeing | My footprint | |
| | Security | Maint. & Operation (Comp) | 2 | | | 0.25 | 0.25 | 1 | |
| | | Approved Document Q | Minimum requirement - Wales | | | N/A | N/A | N/A | |
| | | Suitably Qualified Security Specialist | Prerequisites | | 9 | N/A | N/A | N/A | |
| | | Security Features | 9 | | | 1 | 1 | 0.25 | |
| My Home (261 Credits) | | | | | | | | | |
| Comfort | Indoor pollutants | Min emissions from space and water heating | Prerequisites | 0 | | N/A | N/A | N/A | |
| | | Min the effects of cooking-fuel | 2 | | | 0.25 | 1 | 0 | |
| | | Min emissions from building product types | 4 | | | 12 | 0.25 | 1 | 0 |
| | | Min airborne formaldehyde all sources | 3 | | | | | | |
| | | Minimising TVOC all sources | 3 | | | 0.25 | 1 | 0 | |
| | Daylight | ADF kitchens | 5 | | | 13 | 0.75 | 1 | 0.75 |
| | | ADF living spaces | 5 | | | | 0.75 | 1 | 0.75 |
| | | View of sky | 3 | | | | 0 | 1 | 0 |
| | Internal and External Noise | Internal noise levels | 2 | | | 4 | 0 | 1 | 0 |
| | | External noise Levels | 2 | | | | 0 | 1 | 0 |
| | Sound insulation | Between homes | 5 | | | 9 | 0 | 1 | 0 |
| | | Between rooms | 4 | | | | 0 | 1 | 0 |
| | Temperature | Temperature Analysis | Minimum Requirement | | | | N/A | N/A | N/A |
| | | HQM temperature tool (Fdtn) | 12 | 12 | 12 | | N/A | N/A | N/A |
| | | Current Conditions (Comp) | 11 | 11 | | 17 | 1 | 1 | 1 |
| | | Predicted CC (Comp) | 6 | 6 | | | 1 | 1 | 1 |
| | Ventilation | Ventilation air intakes | 4 | | | | 0.25 | 1 | 0 |
| | | Minimum Ventilation rates | Minimum Requirement | | | 13 | N/A | N/A | N/A |
| | | Ventilation rates | 5 | | | | 0.5 | 1 | 0.5 |
| | | Maintenance & controls | 4 | | | 0.75 | 1 | 0.75 | |
| Energy and Cost | Energy Forecast and Cost | Energy Performance | 40 | | 60 | 1 | 0.75 | 1 | |

| Categories | Issues | Criteria | Criteria Credits | Either or | Total issue Credits | Indicators | | | |
|--------------------------------------|---|-------------------------------------|----------------------------|-----------|---------------------|------------|--------------|--------------|-----|
| | | | | | | My cost | My wellbeing | My footprint | |
| | | Towards carbon negative | 6 | | | 1 | 0.75 | 1 | |
| | | Cost | 14 | | | 1 | 0.75 | 1 | |
| | Decentralised energy | Feasibility Study | Pre- requisite | | | 8 | N/A | N/A | N/A |
| | | Infrastructure (Ftdn) | | 4 | 4 | | 1 | 0.25 | 1 |
| | Impact on Local air quality | Installation(Comp) | | 8 | 8 | | 1 | 0.25 | 1 |
| | | | Non-combustible appliances | 15 | 15 | | 15 | 0 | 1 |
| | | NO _x emissions, VOC, PMs | 10 | 10 | | 0 | 1 | 1 | |
| Materials | Responsible Sourcing of Construction Products | Legal Timber | Pre- requisite | | | N/A | N/A | N/A | |
| | | Product procurement plan | 2 | | 25 | 0 | 0 | 1 | |
| | | RSM | 23 | | | 0 | 0 | 1 | |
| | Environmental Impact from Construction Products | Product Procurement Policy | 2 | | | 25 | 0 | 0 | 1 |
| | | Product Environmental Information | 4 | | | | 0 | 0 | 1 |
| | | Life cycle assessment (Ftdn) | 7 | 7 | | | 0 | 0 | 1 |
| | | Life cycle assessment (Comp) | 19 | 19 | | | 0 | 0 | 1 |
| | Life Cycle Costing of Construction Products | Homeowner's LCC report | 6 | | | 12 | 1 | 0.25 | 1 |
| | | Component | 6 | | | | 1 | 0.25 | 1 |
| | Durability of Construction Products | Integral Elements | 5 | | | 7 | 1 | 0.25 | 1 |
| Finishing Elements | | 2 | | | | 1 | 0.25 | 1 | |
| Space | Drying Space | External drying space | 1 | | 3 | 0.75 | 0.5 | 0.75 | |
| | | Internal drying space | 2 | | | 0.75 | 0.5 | 0.75 | |
| | Access and Space | National space standards | 5 | | | 11 | 0 | 1 | 0 |
| | | Flexible design | 6 | | | | 0.5 | 1 | 0.5 |
| | Recyclable Waste | Consultation with authority | 2 | | | 10 | 0 | 0 | 1 |
| | | Internal waste storage | 5 | | | | 0 | 0 | 1 |
| Composting facilities and management | | 3 | | | | 0 | 0 | 1 | |
| Water | Water Efficiency | Water Efficient Fittings | 11 | | 17 | 1 | 0.25 | 1 | |

| Categories | Issues | Criteria | Criteria Credits | Either or | Total issue Credits | Indicators | | | |
|------------------------------|-----------------------------|---|---------------------|-----------|---------------------|------------|--------------|--------------|-----|
| | | | | | | My cost | My wellbeing | My footprint | |
| | | Water Recycling | 6 | | | 1 | 0 | 1 | |
| Delivery (86 Credits) | | | | | | | | | |
| Quality Assurance | Project Preparation | Feedback from previous projects | 4 | | | 1 | 1 | 1 | |
| | | Project delivery plan | Minimum requirement | | 6 | N/A | N/A | N/A | |
| | | Procurement policy | Minimum requirement | | | N/A | N/A | N/A | |
| | | Site Worker feedback | 2 | | | 1 | 1 | 1 | |
| | Commissioning and Testing | Commissioning and testing strategy | Minimum requirement | | | | N/A | N/A | N/A |
| | | Commissioning building services and control systems | Minimum requirement | | | 11 | N/A | N/A | N/A |
| | | Fabric Pre-testing | 4 | | | | 1 | 1 | 1 |
| | | Post Construction testing | 7 | | | | 1 | 1 | 1 |
| | Inspections and completions | Visual Defects inspection | Minimum requirement | | | | N/A | N/A | N/A |
| | | Construction record | Minimum requirement | | | | N/A | N/A | N/A |
| | | Right to inspect | 2 | | | | 1 | 1 | 1 |
| | | Construction Inspection | 5 | | | 16 | 1 | 1 | 1 |
| | | Third party inspection | 3 | | | | 1 | 1 | 1 |
| | | Early inspection visit | 3 | | | | 1 | 1 | 1 |
| | Seasonal inspection visit | 3 | | | | 1 | 1 | 1 | |

| Categories | Issues | Criteria | Criteria Credits | Either or | Total issue Credits | Indicators | | | |
|----------------------|-------------------------------------|---|---------------------|---------------------|---------------------|------------|--------------|--------------|-----|
| | | | | | | My cost | My wellbeing | My footprint | |
| Construction Impacts | Responsible Construction Management | Compliant CCS | 2 | | 5 | 0 | 0.25 | 0.75 | |
| | | Risk evaluation and implementation (Comp) | 2 | | | | | | |
| | | Training, awareness and feedback(Comp) | 2 | 5 | | | | | |
| | | Monitoring and reporting (Comp) | 1 | | | | | | |
| | Construction Energy Use | Checklist | 2 | | 5 | 0 | 0 | 1 | |
| | | Monitoring & Reporting | 2 | | | | | | |
| | | Detailed Mon. & Report. | 1 | | | | | | |
| | Construction Water Use | Checklist | 2 | | 5 | 0 | 0 | 1 | |
| | | Monitoring & Reporting | 2 | | | | | | |
| | | Detailed Mon. and Report. | 1 | | | | | | |
| | Site Waste | Procurement - Waste Min. | 1 | | 16 | 0 | 0 | 1 | |
| | | Resource Efficiency | 8 | | | | | | |
| | | Div. Construction Landfill | 4 | | | | | | |
| | | Div. Excavation | 3 | | | | | | |
| | Customer experience | Aftercare | Building warranty | Minimum requirement | | 4 | N/A | N/A | N/A |
| | | | Handover visit | Minimum requirement | | | | | |
| On-call support | | | 4 | | | | | | |
| Home information | | Home information | Minimum requirement | | | N/A | N/A | N/A | |
| Smart Homes | | Connectivity to home | 2 | | 8 | 1 | 0.75 | 0.75 | |
| | | Connectivity within home | 1 | | | | | | |
| | | Basic smart home heating | 1 | | | | | | |
| | | Advanced smart home heating | 1 | | | | | | |
| | | Basic smart home lighting | 1 | | | | | | |
| | | Smart energy management | 1 | | | | | | |
| | | Additional Smart home solutions | 1 | | | | | | |
| Post Occupancy | | Occupant Satisfaction | 2 | | | 0.25 | 0.25 | 0.25 | |

| Categories | Issues | Criteria | Criteria Credits | Either or | Total issue Credits | Indicators | | |
|--------------------------|----------------------------------|-----------------------------------|------------------|-----------|---------------------|------------|--------------|--------------|
| | | | | | | My cost | My wellbeing | My footprint |
| | Post Occupancy Evaluation contd. | Energy and temperature monitoring | 3 | | 10 | 0.25 | 0.25 | 0.25 |
| | | Advanced POE | 2 | | | 0.25 | 0.25 | 0.25 |
| | | Independent third party | 3 | | | 0.25 | 0.25 | 0.25 |
| Total Credits available | | | | | 500 | | | |
| Maximum Points available | | | | | | 263 | 281 | 401 |

APPENDIX B - HQM APPLICATION: SUPPORTING GUIDANCE

How many homes can be included in a single HQM assessment?

In the first instance clients are advised to consult a licensed HQM assessor on how best to categorise and classify their project for assessment, registration and certification purposes (BRE Global can assist HQM assessors where required).

At least one HQM assessment must be undertaken for each project or site seeking to apply the scheme, regardless of the proposed number of homes on the site.

The number and type of homes and phases of the project are important factors in deciding how to apply the scheme on a single site. For example, separate assessments can be undertaken for each phase of a project, with HQM certification sought to coincide with completion and sale or handover of each phase. Alternatively

Homes can also be grouped within input sets, on the online assessment tool, to share inputs and evidence for issues selected by the assessor, to prevent the same inputs having to be entered repeatedly.

Input sets may be useful for issue inputs that are identical for a set of homes, which might include: site-wide (e.g. in Our Surroundings), issues that can be assessed according to house type where the dwellings are identical (e.g. for Environmental Impact from Construction Products), or issues that refer to organisational processes (e.g. Aftercare).

Pre-approval of HQM assessment issues and criteria

HQM has been designed to encourage pre-approval of solutions and processes that are 'deemed to satisfy' parts (criteria) of the scheme. This type of approval provides clients and designers with greater flexibility while maintaining the robustness of the process and its outcome.

Pre-approvals is designed to complement the assessment process, enabling the HQM assessor to award a number of credits in a specific project or site HQM assessment without additional verification. This is because the 'standard' applied solution has previously been verified through the pre-approvals process.

The performance of any pre-approved solution or procurement process is combined with the assessment of issues that are influenced by project specific factors to produce the overall HQM rating and scorecard for the project. The approach therefore reduces repetition in the application of the scheme for the house-builder across multiple projects, or multiple homes or house types on a single larger project.

There are a number of ways in which pre-approvals can be applied;

- Pre-Approval within My Home on page 49 for common elements of house design and where elements of the home are manufactured off-site.
- Pre-Approval of company processes, quality control and customer support systems for issues within the Delivery on page 153 section.
- Site outline scoring within the Our surroundings on page 7, linking with BREEAM Communities for larger scale developments.
- Recognition of established certification schemes to provide evidence of compliance across issues where these have been pre-approved as being comparable to the HQM requirements.

For further information on HQM pre-approvals contact the HQM team at BRE.

Post-Construction Review Assessments

Where an assessment of a project has been certified at the 'interim' design stage, a post-construction review assessment of the same project can be completed to verify its design performance 'as-built' (for final certification).

Where certification of a design stage assessment has not been sought, a full 'post-construction' assessment can be undertaken, with verification based on the project's 'as-built' performance (for final certification).

A post-construction review or assessment is based predominantly on evidence collated during one or more visits to a site during or after completion (and typically before handover). HQM assessors can refer to the scheme Operations Manual (SD5070) for guidance on site visits.

APPENDIX C - HQM EVIDENCE REQUIREMENTS

This section provides guidance to assessors and project teams on the types of evidence required to demonstrate compliance with HQM issues.

Why does HQM require evidence?

HQM is a third party assessment and certification scheme operated in accordance with international standards. Operating to international standards ensures that certification schemes such as HQM are run in a consistent and reliable manner. The HQM assessor's assessment report and the BRE Global quality assurance process are the fundamental tenets of HQM, ensuring consistency of and confidence in, the HQM rating awarded by the assessor.

To maintain this consistency and credibility all certification decisions must be based on verified and credible project information that is traceable, i.e. evidence based. This is not only important for ensuring compliance with the international standards to which HQM operates, but also in terms of managing risk to clients and HQM assessors in the event that a certification outcome is challenged.

The assessment report and the HQM assessor role

It is the HQM assessor who determines the HQM rating and the assessment report is the formal record of an assessor's audit against the criteria defined in the technical manual for the HQM scheme. The HQM certificate issued by BRE Global provides assurance that the service provided by the assessor (that is, the process of producing the assessment report) has been conducted in accordance with the requirements of the scheme. The purpose of the certificate is therefore to give confidence to the client in the assessor's performance and processes in determining a HQM rating.

It is the role of the assessor to gather project information and use it to assess performance against the HQM scheme in a competent and impartial manner. To award a HQM credit, the assessor must be satisfied beyond reasonable doubt, that the evidence gathered demonstrates unambiguous compliance with all relevant criteria defined in the HQM scheme. All evidence must be appropriately referenced in the formal report produced by the assessor and made available on request from BRE Global Ltd for quality assurance checks.

Clear, ordered and well-referenced evidence for each HQM issue and criterion facilitates efficient quality assurance and certification.

Evidence Types

Evidence should not necessarily need to be prepared specifically for the purpose of the HQM assessment. In many instances, the assessor should be able to source readily available and prepared project information for the purpose of demonstrating compliance. For this reason, HQM aims to avoid being prescriptive on the type of evidence required, although some issues do require specific documents to be provided.

The assessor and project team will find that many assessment issues will require more than one piece or type of information to demonstrate compliance with one criterion, or alternatively, one piece of information may be sufficient to demonstrate compliance with multiple criteria or assessment issues.

To assist project teams and the HQM assessor in their collation of evidence at each stage of assessment, the different types of documentation that can be used as evidence of compliance are listed below.

These evidence types fall broadly in to three categories:

1. General evidence type
2. Specific evidence type
3. Other evidence type

For some assessment issues, the assessor is likely to require a mixture of general and specific evidence types.

1. General Evidence

General evidence includes a broad list of defined information commonly produced for a building project. One or a mix of these types of information can be used to demonstrate compliance for one or more of the HQM issues and criteria,

as deemed appropriate by the HQM assessor for the stage of assessment.

General HQM evidence types are listed in Table 56 on page 240 and are not specifically listed in the 'Evidence' section found within each HQM issue. Note, not all general evidence types will be appropriate for all issues and it is the responsibility of the assessor to ensure that the evidence provided specifically demonstrates compliance and is fully referenced in the assessment reporting tool.

2. Specific Evidence

Specific evidence is defined as information that must be provided to verify compliance with the relevant criteria for the HQM credit sought. In all cases it will be the only type of evidence that will be accepted by BRE Global Ltd for that particular issue or criterion. Where specific evidence is not provided and appropriately referenced in the assessment report, the quality assurance checks will identify a non-conformity and certification will be delayed. An example of specific evidence would be a copy of the relevant SAP output documents from the approved SAP software for the HQM issue 'Energy forecast and cost', which is listed in the 'Evidence' section for this issue.

Where required, specific evidence is defined and listed for each HQM issue in the 'Evidence' section for both design and post construction stages of assessment. Although the 'Evidence' section lists the specific evidence required to demonstrate compliance with particular criteria, simply submitting this evidence may not be sufficient to demonstrate full compliance. Additional 'general evidence types' may also be required. For example; to demonstrate compliance with criteria 1-3 of the Water Efficiency issue at design stage, a copy of the Water Efficiency Calculator for New Dwellings and documentary evidence supporting the data used to complete the calculator tool is required. However, in addition to this, further evidence is required, i.e. general evidence types such as letters of commitments, specifications, drawings etc. must be provided confirming the water fittings and systems entered into the tool are to be installed. Note, not all HQM issues will have specific evidence requirements.

3. Other evidence Types

Other types of evidence can still be used to demonstrate compliance where an information type provided by a client or design team is not listed in Table 56 on page 240 or the 'Evidence' table for each issue. To avoid non-conformities and delays in certification, undefined alternative types of evidence must demonstrate credible, robust and traceable assurance to the same level as, or better than, specified or general evidence types. If in doubt, please contact the HQM technical team prior to accepting such evidence.

Written commitments at Design Stage

At the design stage of assessment, it is permissible to use letters or emails to demonstrate intent to comply with particular HQM criteria (provided they meet the requirements for communication records below). Such evidence must also make clear the actions and evidence (or an understanding thereof) that will be undertaken and provided to ensure the project's on going compliance, particularly at the final stage of assessment, i.e. post-construction. This is to ensure that the party who makes the commitment is clearly aware of the actions and evidence that needs to be supplied to demonstrate compliance with HQM at the post-construction stage of assessment. For example, in many circumstances it would not be acceptable for the design team to copy and paste the HQM criteria into a formal commitment. The commitment should specifically detail how criteria are to be achieved in the context of the assessment, and often copying and pasting the HQM criteria will not provide this level of detail.

While letters of commitment can play a role in demonstrating compliance, they are not a replacement for more formal and established types of project information. The assessor must not award credits where they have a reason to doubt the validity or intent of written commitments, or where it is reasonable to expect formal design or specification information to be available to confirm compliance.

Post Construction stage evidence

There are two types of assessment that can be carried out at the post construction stage;

1. A post construction review of a design stage assessment, or
2. A post construction assessment (where no design stage assessment has been carried out)

The 'post construction stage' evidence section in each issue assumes that a design stage assessment has been completed. Where a design stage assessment has not been completed, the assessor will need to review both the 'design stage' and 'post construction stage' evidence listed in the evidence section and ensure sufficient evidence is submitted with the assessment to demonstrate compliance with the criteria.

Evidence supplied at the post construction stage must be reflective of the completed building and must therefore demonstrate what has actually been implemented or constructed. For example if flood resilience measures have been specified at design stage, evidence at the post construction stage would need to demonstrate that these have actually been installed. Appropriate evidence may be a site inspection report with supporting photographs or as-built drawings showing the location of the flood resilience measures.

For a large or phased development, there are some issues that will not be complete when a post construction stage assessment for the first homes is completed. For example, these could include some ecology credits or community-based facilities. It is possible to certify the first homes without certain issues being complete based on written commitments. The details of these exceptions are highlighted in Appendix D - Post-construction stage assessment issue exceptions: Table 57 on page 243. This is not intended to be a comprehensive list; its purpose is to provide guidance to assessors on the type of exceptions that are acceptable.

Written commitments at Post-Construction

Written commitments cannot be used to demonstrate compliance at the post construction stage of assessment. The only exception to this is where the criteria require an action to take place post construction, i.e. after handover and possibly during the building operation. An example could be a written commitment from the building owner or occupier making a commitment to conduct a post occupancy evaluation. As with letters of commitment at the design stage, the HQM assessor must not award HQM credits where they have a reason to doubt the validity or intent of written commitments or where it is reasonable to expect a formal documentation, e.g. a schedule of services or professional services contract.

Written confirmation at Post-Construction

Where a post construction review of a design stage assessment is carried out, written confirmation validating that nothing has changed since the design stage assessment can be provided as evidence within the post construction review. Where anything has changed since the design stage assessment or where the design stage assessment evidence was in the form of a written commitment or where full detailed documentary evidence was not provided, written confirmation is not acceptable.

Where a post construction stage assessment is carried out without an associated design stage assessment, written confirmation is not an option to demonstrate compliance.

Evidence Principles

HQM assessors and the BRE Global Ltd Quality Assurance team work to the evidence principles in Table 55 below.

As described above, where specific evidence is stated in the ‘evidence’ section within each assessment issue, this must be sourced and verified by the HQM assessor.

Where no specific evidence has been listed for an issue or specific criterion, this means that there are potentially a number of different types of ‘general’ project information, as per Table 56 on page 240 that can be sourced by the HQM assessor and used to demonstrate compliance. It is the HQM assessor’s responsibility to source and verify the Table 56 on page 240 for each relevant criterion, where compliance and credits are being claimed by the project team.

In determining the appropriateness of any evidence type for each issue, the principles outlined in Table 55 below must be considered by HQM assessors. Where the evidence meets the principles outlined in Table 55 below and, where appropriate, the guidance provided in Robustness of Evidence on the facing page, such evidence is admissible for the purpose of the assessment and the BRE Global Quality Assurance checks.

These principles are not listed in a hierarchical order and are all equally important when considering which evidence type to submit to demonstrate compliance for each issue or criterion.

Table 55 HQM Evidence principles

| | Principle | Objective | | A question to ask to check |
|---|---|---|--------------|--|
| 1 | Evidence provided for all criteria for all credits sought | Evidence must demonstrate that ALL relevant* criteria and sub-criteria for each credit sought are achieved and where relevant, is | Completeness | Are all criteria and sub-criteria covered? Have all relevant compliance |

| | Principle | Objective | | A question to ask to check |
|---|------------------------|---|--|--|
| | | provided to support compliance notes, definitions etc. | | notes and definitions been addressed? |
| 2 | Unambiguous assessment | The assessment must demonstrate unambiguous compliance and the evidence must support this assessment. Evidence (and supporting notes) must clearly demonstrate to a third party reviewer that the criteria have been met. | Independent review compatibility | If a third party (e.g. BRE Global) reviewed my report with the submitted evidence, would they be able to confirm compliance and award the same credits I have? |
| 3 | Robust | a. When selecting the Evidence type, always ensure it is robust and is relevant to the stage of assessment. b. The selected Evidence contains all the relevant basic information, with the necessary constituent parts to be deemed robust. (see Robustness of Evidence below section for further details on both of the above) | Proof that evidence is robust and from a reliable source | Is this the most robust form of evidence available to demonstrate compliance with this criterion? Does the evidence contain all the relevant basic information? Is it fully auditable? Is it the latest revision? |
| 4 | Use existing evidence | Use existing project information to demonstrate compliance. In most cases evidence shouldn't need to be 'created' for HQM compliance purposes. | Minimises evidence and reduces time and cost of compliance | Does robust evidence meeting the above principles already exist that I can use? If I need to ask for more evidence, is the project seeking credits where compliance is not adequately demonstrated? |

*Where the assessor or design team deem specific criteria 'not relevant' to the assessment, a full justification should be collated and then submitted as a technical query for review by BRE Global Ltd.

Robustness of Evidence

Robust evidence provides confirmation that the assessment has been carried out correctly and the building complies with the criteria for the HQM credits sought. The assessor should consider the following when gathering project information and evaluating whether the evidence provided is as 'robust' as possible:

- Is there more than one piece of evidence that could be used to demonstrate compliance?
- Where there is more than one piece of evidence, is the chosen evidence the most robust and appropriate piece of evidence to demonstrate that a particular criterion has been achieved?

Minimum Level of Information

Any evidence submitted for a HQM assessment must be robust in terms of its source and its traceability. Below is a list of the minimum Level of Information (LOI) the assessor must expect to see when certain types of evidence are submitted:

Communication records:

Any communication records used as evidence must provide clear confirmation of the site name, author's identity and role, the date and recipient's identity.

Formal letters of correspondence:

Must be on company or organisation headed notepaper with a signature (electronic signatures are acceptable) and must provide clear confirmation of the site name. Ideally letters should be a secured document.

Meeting minutes:

Must provide clear confirmation of the site name and include date, location and attendee information (names, organisations and roles), along with a record of the meeting and agreed actions.

Drawings:

All drawings must have the building or site name, phase (if applicable), title of drawing, date, revision number and a scale.

Specification:

It must be clear that the specification relates to the project under assessment, and it must have a date and revision number. Where sections of a specification are provided the assessor should reference the extract and as a minimum submit the front page of the specification detailing the project name, revision number and date.

Site Inspection report:

A site inspection report must include the building or site name, date, author, and summary text to detail what was witnessed and confirm compliance. The report must include sufficient information to create an audit trail that justifies the conclusions reached, particularly where the site report is the only evidence supplied at post construction stage. A simple statement confirming compliance will not be sufficient. Photographs may be useful as supporting evidence in a report, though it is unlikely that a photograph on its own will demonstrate compliance.

Please note that for some issues a visual inspection cannot be undertaken to verify whether compliance has been achieved with the criteria, e.g. Water Efficiency, Responsible Sourcing etc.

For other types of evidence not listed, the assessor should use the above as a guide for the sort of evidence that is suitable. As a minimum in most cases the evidence used to assess compliance should always contain key information such as the project name, the author, date, revision numbers etc.

Table 56 General Evidence Types

| Ref. | Document or Evidence Type | Description or notes |
|------|---------------------------------------|--|
| E1 | As constructed information | Information produced at the end of a project to represent what has been constructed. This will comprise a mixture of ‘as-built’ information or drawings and surveys from specialist subcontractors and the ‘final construction issue’ from design team members. |
| E2 | Building Information Model (BIM) | The BIM (or BIM files) used for the project containing relevant information or evidence of compliance. This could include outputs in a neutral format such as IFC or COBie and native format (e.g. BIM authoring software). Note: The assessor should be able to intelligibly view any native software formats and upon request by BRE Global provide neutral formats. |
| E4 | HQM assessor’s site inspection report | A formal report based on the HQM assessor’s own survey of the site or building to confirm compliance with HQM criteria. During the site inspection an attempt should be made to check as many issues as possible. However it is unlikely that all issues could be checked during one site visit. Different specifications of the home will be completed at different times therefore the site inspection will need to be planned in discussion with the client to identify when would be most appropriate. At least one site visit must be carried out for every assessment. An assessor’s site inspection report will be distinct from their formal HQM assessment report, serving as a form of evidence of compliance in its own right, and it may include photographs taken by the assessor as part of the survey. Assessors may ask others to complete the site inspection on their behalf. If so, it is the responsibility of the assessor to ensure that their representative is: |

| Ref. | Document or Evidence Type | Description or notes |
|------|---|---|
| | | <ul style="list-style-type: none"> - competent - able to carry out the task - impartial. |
| E5 | Building Contracts | The building contract or excerpts and clauses from it. In some instances, the Building Contract may contain design duties for specialist subcontractors or design team members. |
| E6 | Certificates of compliance (third party) | Examples include ISO14001, BES6001, FSC (Forest Stewardship Council), other BREEAM recognised RSCS (Responsible Sourcing Certification Scheme) certificates, EPC (Environmental Profile Certificate), EPD (Environmental Product Declaration), Considerate Constructors certificate, Passivhaus, DOP (Declarations of Performance Certificates) etc. |
| E7 | Communication records | Formal communication records between or from relevant project stakeholders or other third parties confirming an appointment, action or outcome. This may be in the form of a letter, meeting minutes, email correspondence, publication or other form of media (see also additional guidance on following pages). |
| E8 | Communication Strategy | The strategy that sets out when the project team will meet, how they will communicate effectively and the protocols for issuing information between the various parties, both informally and at information exchanges. This may be covered by the employer information requirements. |
| E9 | Computer aided modelling results or outputs | Examples include thermal modelling, flooding, life cycle assessment, life cycle costing, ventilation modelling, daylighting etc. |
| E10 | Construction Specification | The specification for the project or building ⁽¹⁷⁵⁾ . |
| E11 | Construction stage data and information | For example, purchase orders, metering data, log books, commissioning records or reports etc. |
| E12 | Contractual tree | A diagram that clarifies the contractual relationship between the client and the parties undertaking the roles required on a project. |
| E13 | Cost information | Project costs, including the cost estimate and life cycle costs. |
| E14 | Design drawings ⁽¹⁷⁶⁾ | Developed and Technical Design, including the coordinated architectural, structural and building services design. Site plans, drainage designs. |
| E15 | Design programme | A programme setting out the strategic dates in relation to the design process. It is aligned with the Project Programme but is strategic in its nature, due to the iterative nature of the design process, particularly in the early stages. |
| E16 | Design responsibility matrix | A matrix that sets out who is responsible for designing each aspect of the project and when. This document sets out the extent of any performance specified design. |
| E17 | Feasibility Study | Studies undertaken to test the feasibility of the Initial Project Brief of the site or in a specific context and to consider how site-wide issues will be addressed. |
| E18 | Final project brief | The Initial Project Brief amended so that it is aligned with the Concept Design and any briefing decisions made during this stage. |
| E19 | Other third party information | For example, maps, public transport timetables, product data or details, manufacturers' literature, PDS (Product Data Sheets), Government /EU standards or codes, EU labelling, CE Marking Labels, Curriculum Vitae (CV). |
| E20 | Professional services contract | An agreement to provide professional or consulting services such as, designing, feasibility studies, or legal or technical advice. |
| E21 | Professional specialist reports | Professional reports resulting from specialist surveys, studies or test results, e.g. contaminated land, ecology, flood risk assessment, surface water run-off report, site investigation, acoustics, indoor air quality plan, low and zero carbon technologies study, transport analysis, commissioning reports, passive design analysis report, life cycle assessment, landscape and habitat management plan etc. |
| E22 | Project execution or quality plan | The Project Execution Plan is produced in collaboration between the project lead and lead designer, with contributions from other designers and members of the project |

| Ref. | Document or Evidence Type | Description or notes |
|------|------------------------------------|---|
| | | team. The Project Execution Plan sets out the processes and protocols to be used to develop the design. |
| E23 | Project programme | The overall period for the briefing, design, construction and post completion activities of a project. |
| E24 | Project roles table | A table that sets out the roles required on a project as well as defining the stages during which those roles are required and the parties responsible for carrying out the roles. |
| E25 | Project Strategy | The strategies developed in parallel with the Concept Design to support the design and, in certain instances, to respond to the Final Project Brief as it is concluded. Examples include strategies for sustainability, acoustics, handover, maintenance and operational, fire engineering, building control, technology, health and safety, construction, travel plan, sustainable procurement plan. |
| E26 | Risk Assessment | The Risk Assessment considers the various designs and other risks on a project and how each risk will be managed and the party responsible for managing each risk. |
| E27 | Schedule of services | A list of specific services and tasks to be undertaken by a party involved in the project, which is incorporated into their professional services contract. |
| E28 | Strategic or initial project brief | The brief prepared following discussions with the client to ascertain the project objectives, the client’s business case and, in certain instances, in response to site feasibility studies. |

APPENDIX D - POST-CONSTRUCTION STAGE ASSESSMENT ISSUE EXCEPTIONS

For developments that are either phased, or contain multiple homes, there are some issues that will not be complete when a post-construction stage assessment for the first homes is completed. For example, these could include some ecology credits or community-based facilities. It is possible to certify the first homes without certain issues being complete based on written commitments. The details of these exceptions are highlighted in Table 57 below. This is not intended to be a comprehensive list; its purpose is to provide guidance to assessors on the type of exceptions that are acceptable.

Table 57 Post-construction stage exceptions

| Categories | Issues | Exception |
|------------------------|--|--|
| Transport and Movement | 01 Accessible Public Transport | Where new transport facilities will be provided, but at a later stage than the home being assessed, the assessment can consider such facilities, provided that a commitment has been made to provide these transport facilities. This can be demonstrated either within the general contract specification or in the form of a Section 106 agreement. This must outline that the transport facilities will be available for use by the time 60% of the development (either within a phase or over all phases) has been completed and is ready for occupation. |
| | 02 Alternative Sustainable Transport Options | Where communal facilities will be provided, but at a later stage than the home being assessed, communal facilities must be provided prior to 60% of the development being completed. However, in instances where it is deemed that the occupants of the development require these facilities at an earlier time, then they must be provided as such. When the facilities are being provided at a later stage than the home being assessed, then written confirmation from the developer demonstrating that these facilities will be completed is required to demonstrate compliance with the relevant criteria. |
| | 03 Local Amenities | Where local amenities will be provided, but at a later stage than the home being assessed, these must be provided prior to 60% of the development being completed. However, in instances where it is deemed that the occupants of the development require these facilities at an earlier time, then they must be provided as such. When the facilities are being provided at a later stage than the home being assessed, then written confirmation from the developer demonstrating that these facilities will be completed is required to illustrate compliance with the relevant criteria. |
| Outdoors | 04 Ecology | All protection measures from the ecological survey must be implemented prior to any work being undertaken on site. However, any selected solutions, actions and measures related to enhancing the ecology, must be undertaken prior to 60% of the development being completed. When this enhancement is being undertaken at a later stage than the home being assessed, written confirmation from the developer demonstrating that these recommendations will be undertaken, is required to demonstrate compliance with the relevant criteria. |
| | 05 Recreational Space | Communal space must be provided prior to 60% of the development being completed. When the facilities are being provided at a later stage than the home being assessed, then written confirmation from the developer demonstrating that these facilities will be completed is required to demonstrate compliance with the relevant criteria. |

| Categories | Issues | Exception |
|-----------------------|--|--|
| Safety and Resilience | 06 Flood Risk | All site-wide flood resilience measures should be planned and a programme for their construction finalised which indicates that they will be operational before more than 60% of the homes on a development site are completed or certified. |
| | 07 Managing the Impact of Rainfall | Site-wide SuDS may not be fully installed when initial phases are released, but evidence of the devices to be used and any relevant calculations need to be available. They need to be operational before more than 60% of the homes are completed or certified. |
| | 08 Security | Security recommendations or solutions to external areas within the boundary of the site may not be implemented when initial phases are released, but evidence of the features to be used needs to be available. They need to be operational before more than 60% of the homes are completed or certified. |
| Energy and Cost | 15 Energy and cost | Centralised energy supply infrastructure on multi-phase developments must be operational before more than 60% of the homes are completed or certified. This requirement is variable where there is an alternative statutory requirement in place for the system to be operational at a different stage. For centralised energy supply infrastructure; the infrastructure to allow a future connection must be provided to each home for credits to be awarded, regardless of the percentage of total homes completed. |
| | 15 Energy and cost Bolt-on calculation: Appliances | White goods may not be fitted owing to security risk until just prior to handover to new residents. Orders must be in place. |
| | 16 Decentralised Energy | Centralised energy supply infrastructure on multi-phase developments must be operational before more than 60% of the homes are completed or certified. This requirement is variable where there is an alternative statutory requirement in place for the system to be operational at a different stage. For centralised energy supply infrastructure; the infrastructure to allow a future connection must be provided to each home for credits to be awarded, regardless of the percentage of total homes completed. |
| | 17 Impact on Local Air Quality | Centralised energy supply infrastructure on multi-phase developments must be operational before more than 60% of the homes are completed or certified. This requirement is variable where there is an alternative statutory requirement in place for the system to be operational at a different stage. For centralised energy supply infrastructure; the infrastructure to allow a future connection must be provided to each home for credits to be awarded, regardless of the percentage of total homes completed. |
| Space | 24 Recyclable Waste | Where communal composting facilities will be provided, but at a later stage than the home being assessed, these must be provided prior to 60% of the development being completed. When the facilities are being provided at a later stage than the home being assessed, then written confirmation from the developer demonstrating that these facilities will be completed is required to demonstrate compliance with the relevant criteria. |
| Water | 25 Water Efficiency | Communal grey water or rainwater systems may not be installed but should be operational before more than 60% of the homes the systems are serving have been completed or certified. |

| Categories | Issues | Exception |
|-------------------|--|---|
| Quality assurance | 27 Commissioning and Testing | <p>Centralised energy supply infrastructure or other centralised systems that fall under the scope of the commissioning part of this issue, which are on multi-phase developments, may not be commissioned in the first phase but should be operational before more than 60% of the homes are completed or certified. This requirement is variable where there is an alternative statutory requirement in place requiring the system to be operational at a different stage.</p> <p>For community heating systems; the infrastructure to allow a future connection must be provided to each home for credits to be awarded, regardless of the percentage of total homes completed.</p> |
| | 29 Responsible Construction Management | <p>The Considerate Constructors Scheme (CCS) makes provision for phased developments within their registration process, allowing each phase to be registered separately. They make this provision to allow for very large developments that may go on over several years.</p> <p>The situation with HQM phasing is different, in that it is possible that HQM homes will be released for sale (and therefore require HQM certificates) gradually, perhaps only a few at a time. We recognise that it would be unreasonable to expect final CCS certificates to be issued for all of these releases (which would require each of these groups of a few homes to be registered separately with CCS).</p> <p>Credits for phased developments can be based on the latest site monitor's report from CCS and a firm commitment from the developer. Where homes are to be released before the first site monitor's visit, credits can be awarded based on a firm commitment from the contractor or developer.</p> <p>When the final homes, being assessed using HQM, are submitted for Post Construction Stage Assessment, the CCS site monitor's report AND the final CCS certificate must be included in the evidence. Please note this means that where HQM assessed homes form part of a larger phased development and construction will not be completed on the site before the final HQM home is assessed, the development will need to be registered with CCS as more than one phase, with HQM homes forming a separate phase.</p> <p>If on submission of the final CCS certificate with the final HQM assessed homes, the CCS certificate does not meet the level stated in the commitment, BRE reserves the right to withdraw HQM certificates or reduce the level achieved.</p> |
| | 30 Construction Energy Use | <p>For phased developments, evidence should be provided to demonstrate that the proposed monitoring strategy has been implemented up to the completion date for the phase being certified. Where there is no sub-metering of individual phases, then as a minimum, a reading for the site as a whole on the date that the respective phase is completed should be submitted.</p> |
| | 31 Construction Water Use | <p>For phased developments, evidence should be provided to demonstrate that the proposed monitoring strategy has been implemented up to the completion date for the phase being certified. Where there is no sub-metering of individual phases, then as a minimum, a reading for the site as a whole on the date that the respective phase is completed should be submitted.</p> |
| | 32 Site Waste Management | <p>It is recommended that where work is phased, contractors should look to monitor and record waste arisings for each respective phase individually.</p> <p>However, where this is not possible and earlier phases are finalising their Post-Construction Stage report, the waste that has been generated up</p> |

| Categories | Issues | Exception |
|------------|--------|--|
| | | <p>until that point can be divided by the site-wide GIFA of the buildings that have been handed over.</p> <p>Additional appropriate supporting evidence must support the timing of the measurement and handover. Subsequent phases should include all phases that precede it in the calculation methodology, especially when phases have overlapped.</p> |

REFERENCES

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- 3 BREEAM is the World's first and most widely used measure of sustainability in the built environment: www.breeam.com
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- 175** For the purpose of HQM the specific clause of the specification must be referenced within the report.
- 176** Evidence in the form of design drawings must be presented in a clear, professional working format with clearly identified legends indicating revision number, date, title, owner etc. (where appropriate).