Technical Handbook - Domestic

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Sustainability

7.0 Introduction

7.0.1 Background

Sustainable development has been defined as meeting “the needs of the present without compromising the ability of future generations to meet their own needs” by the Brundtland Commission of the United Nations in 1983. It follows that the process of sustainable development and the quality of ‘sustainability’ to aspire to within the built environment should account for:

- social, economic and environmental factors
- the potential for long-term maintenance of human well-being in and around buildings
- the well-being of the natural world and the responsible use of natural resources, without destroying the ecological balance of the area where these resources originate or are processed, and
- the ability for the built environment to be maintained.

The Building (Scotland) Act 2003 allows Scottish Ministers to regulate for the purpose of furthering the achievement of sustainable development. In Scotland, sustainability is embedded into the building regulations for all new buildings, rather than reference being made to new buildings achieving levels within a voluntary system. Since 2005, progress has been made by strengthening the standards on, for example, energy efficiency and accessibility for all new buildings so they are comparable with the best in Europe.

Whilst the standards within Sections 1 - 6 of the 2013 Technical Handbooks deliver a level of sustainability in a number of areas such as energy efficiency, surface water drainage and sound insulation, there is always the possibility of going beyond the minimum standard. Scottish Ministers consider that it is not practicable at this time to require every building to incorporate higher performance standards or further sustainability measures. However developers may wish to gain recognition for building to higher standards. Additionally, organisations such as planning authorities or funding bodies may choose to make constructing to a higher level of sustainability a condition of approval or funding.

Defining higher standards to measure sustainability will enable higher quality buildings to be created and for such benefits to be formally recognised. The introduction of Section 7 is the next step in encouraging the sustainable design and construction of all new buildings within a broader context of sustainable development. Further reductions in carbon dioxide (CO_2) emissions from new buildings will also assist in meeting targets within the Climate Change (Scotland) Act 2009.

7.0.2 Aims

The intention of the standard in Section 7 is to:

- recognise the level of sustainability already achieved by the building regulations. By setting the 2010 Standards as the benchmark level, credit is given to meeting the standards within Sections 1 - 6 of the building regulations. This will emphasise that a degree of sustainable design and construction is not a niche market but must be achieved in all new buildings
- encourage more demanding sustainability standards through enhanced upper levels.

- encourage consistency between planning authorities that use supplementary guidance to promote higher measures of sustainable construction in their geographical areas. By making reference to this standard, local aspirations can be met by selection of clear national benchmarks. Levels of sustainability have been defined that must include a low or zero carbon generating technology, with reference to Section 72 of the Climate Change (Scotland) Act 2009.

7.0.3 Scope

The measures on sustainability are broadly related to the built form but some matters that are associated with sustainable development such as location and transport cannot be adequately delivered by the building standards system. The scope of the measures can be divided into two sets:

- **Climate change, energy and resource use** - Promote the more efficient use of energy, fuel and water in buildings. Reducing water use will reduce the energy consumed and the carbon emissions associated with distributing, processing and heating of water. It is also important that building occupants have the opportunity to understand how their behaviour can reduce use of these resources.

- **Quality of life; material use and waste** - Homes should be designed to accommodate flexible living, working and studying patterns for individuals, groups and families. More aspects of designing for well-being, such as daylighting rooms more effectively and protecting from noise from adjacent buildings, should be promoted for all new home occupants.

There are areas considered inappropriate for inclusion in the optional upper levels for domestic buildings due to the complexity of some subjects related to building design such as material sourcing and embodied energy. However the Sullivan Report ('A Low Carbon Building Standards Strategy for Scotland'; published by Scottish Ministers in 2007) recommends total-life zero carbon buildings by 2030. This standard can respond in due course to the growing relative importance of embodied energy as the performance of new buildings improves further. At present these areas are outside the scope of this standard. Reference to external examples of guidance that allow appraisal of local or ethical construction material sourcing, embodied energy and use of recycled materials are the BRE's Green Guide to Specification (www.bre.co.uk) and the materials section on www.greenspec.co.uk

7.0.4 Explanation of terms

Aspect is a term used for a subject area of sustainability. Due to the coverage of building standards and the position of the warrant process in the overall development process, aspects covering resource use and performance are more prominent in this standard. Examples of aspects named and defined in this standard for dwellings are:

- Energy for water heating

- Well-being and security, and

- Material use and waste

Within the aspect of flexibility and adaptability a ‘home office’ is a space for a desk in a dwelling to allow work or study. A mobility space is a space that could accommodate an electric wheelchair or an infant’s pram or a bicycle.

Level is the term used as a banding, where all the aspects of sustainability have reached a certain cut-off point. Upper levels in some aspects may become absorbed into guidance in Sections 1 to 6 to meet revised mandatory functional standards following future reviews

of these sections. However, they should not be seen as predictions because the process for review of these sections are independent of Section 7. It is possible that levels that are more demanding may be added into Section 7 in the future.

7.0.5 Latest changes

The following change has been introduced since October 2013:

- **Standard 7.1** - amendments have been made to guidance with regard to the carbon dioxide (CO_2) emissions target within the Silver and Gold level of Sustainability labelling in relation to the CO_2 emissions target introduced by the 2015 energy standards.

7.0.6 Relevant legislation

The Climate Change (Scotland) Act 2009 introduced clause 3F into the Town and Country Planning (Scotland) Act 1997. This places an obligation on local authorities within their development plans to avoid a specified and rising proportion of greenhouse gases by use of low and zero carbon generating technologies. Some of the levels in this standard could be referred to by local authorities when setting local policy in response to this legislation.

The EU Renewable Energy Directive 2009/28/EC states that by December 2014 Member States shall, in their building regulations and codes or by other means with equivalent effect, where appropriate, require the use of minimum levels of energy from renewable sources in new buildings and in existing buildings that are subject to major renovation.

7.0.7 Retrospective application

Scottish Ministers have powers under Section 25 of the Building (Scotland) Act 2003 to make a Direction to local authorities where they consider that buildings of any description to which building regulations apply ought to comply with a provision of the regulations.

This power has been used to direct local authorities to apply Section 7 to buildings that have been assessed by verifiers. This would only be relevant for buildings that met Sections 1- 6, that have been in force since October 2010 and where, an applicant seeks the recognition that a specified level of sustainability on a label offers. Directions to local authorities, which enable the following measures, are published on the Building Standards Division website.

7.0.8 Certification

Scottish Ministers can, under Section 7 of the Building (Scotland) Act 2003, approve schemes for the certification of design or construction for compliance with the mandatory functional standards. Such schemes are approved on the basis that the procedures adopted by the scheme will take account of the need to co-ordinate the work of various designers and specialist contractors. Individuals approved to provide certification services under the scheme are assessed to make sure that they have the qualifications, skills and experience to certify compliance for the work covered by the scope of the scheme. Checking procedures adopted by Approved Certifiers will deliver design or installation reliability in accordance with legislation.

7.0.9 Other sustainability indicators

Other tools to assess a level of sustainability for new buildings exist and are used in Scotland. These indicators may be selected as appropriate for some developments because they cover issues such as location, orientation on site, or transport that are

broader than building regulations can include. Other established indicators place greater emphasis on the sourcing and embodied energy of construction materials, an area flagged up in this section for future review. Other tools could be complementary in an assessment of sustainability but they cannot be used as a method to meet an optional upper level of sustainability within building regulations.

7.1 Statement of sustainability

Mandatory Standard

Standard 7.1

Every building must be designed and constructed in such a way that:

a. **with regard to a dwelling or school building containing classrooms, a level of sustainability specified by the Scottish Ministers in respect of carbon dioxide emissions, resource use, building flexibility, adaptability and occupant well-being is achieved**

b. **with regard to a non-domestic building other than a school building containing classrooms, a level of sustainability specified by the Scottish Ministers in respect of carbon dioxide emissions is achieved, and**

c. **a statement of the level of sustainability achieved is affixed to the dwelling or non-domestic building.**

Limitation:

This standard does not apply to:

a. alterations and extensions to buildings

b. conversions of buildings

c. buildings that are ancillary to a dwelling that are stand-alone having an area less than 50 square metres

d. buildings which will not be heated or cooled other than by heating provided solely for the purpose of frost protection

e. buildings intended to have a life not exceeding the period specified in regulation 6, or

f. conservatories.

7.1.0 Statement of sustainability (sustainability label)

The statement of sustainability (sustainability label, or SL) that includes the level of sustainability achieved must be fixed to the building prior to completion. The sustainability label should be indelibly marked and located in a position that is readily accessible, protected from weather and not easily obscured. A suitable location could be in a internal cupboard containing a utility meter or the owner may choose to display the label in a more prominent location. An example of an approved label with the overall level achieved on the left hand side and the levels achieved in each of the individual aspects of sustainability on

the right hand side is given in Annex E. A program to generate such a label that is specific to a building can be accessed here: http://www.s7sust.co.uk/.

7.1.1 Levels of sustainability

The specified level of sustainability for a dwelling should be selected from the following:

- Bronze or Bronze Active
- Silver or Silver Active
- Gold

The aim is for balance in the setting of upper levels because sustainability is considered in the round rather than focusing on issues of energy or carbon emissions clauses 7.1 — 7.1.1. Reaching upper levels should be a valid target for any new development, regardless of size or location. Generally, levels have been set to avoid individual aspects that could upset applications which might otherwise meet all of the other aspects of sustainability.

The first optional upper level ‘Silver’ offers substantial benefits in a range of sustainability aspects which should be achievable by a sector of the mainstream market. The second optional upper level ‘gold’ is a more demanding target, initially aimed at those intent on pursuing best practice.

Buildings that exceed a gold sustainability level are also welcomed. A third upper level called 'platinum' has been reserved for further recognition within the building standards system. At present, only the aspect of carbon dioxide emissions has been defined for this level.

Buildings that exceed Bronze, Bronze Active, Silver, Silver Active or Gold levels by achieving a higher level criteria in one or more of the aspects are welcome. This additional achievement will be reflected on the sustainability label. However the achievement of the next upper level will only be recognised once all aspects of that particular level have been included. The award of an overall upper level depends upon meeting all aspects, rather than allowing trade-offs to achieve a score, reinforcing the fact that sustainable outcomes rely on holistic integrated design.

The specified levels of sustainability in clauses 7.1.2 to 7.1.7, are sets of measures that are transparent to all including verifiers, planners, funding bodies, owners and tenants. To meet this standard, it should not be necessary to secure expert evaluation beyond that already used in the design to demonstrate compliance with the standards in Sections 1 to 6.

7.1.2 Bronze level

This is the baseline level for sustainability achieved where the dwelling meets the functional standards set out in Sections 1 – 6 of this Handbook.

7.1.3 Bronze Active level

This is the baseline level where the dwelling meets the functional standards set out in Sections 1 – 6 of this Handbook, but in addition the dwelling includes the use of a low and zero carbon generating technology (LZCGT) in respect of meeting Standard 6.1 within Section 6, Energy. This level is primarily to assist local authorities to meet their obligations under Section 72 of the Climate Change (Scotland) Act 2009 by identifying the use of LZCGT. In this respect, LZCGTs include: wind turbines, water turbines, heat pumps (all varieties), solar thermal panels, photovoltaic panels, combined heat and power units (fired by low emission sources), fuel cells, biomass boilers/stoves and biogas.

7.1.4 Silver level

A dwelling at this first optional upper level should meet all the standards in Sections 1 – 6 that apply to the building for the Bronze level and, in addition, the dwelling should comply with the Silver level in each of the eight aspects below.

Aspect Silver level 1: Carbon dioxide emissions

All new dwellings that meet or exceed the Target Emissions Rate (TER) detailed in Section 6, Energy of this Handbook, will automatically meet the Silver level criteria in respect of CO_2 emissions. This is due to the 21% improvement on the 2010 standards that occurred in October 2015.

Aspect Silver level 2: Energy for space heating

Maximum annual demand for useful energy for space heating should be:

- 40kWh/m^2 for houses, or
- 30kWh/m^2 for flats or maisonettes

To assess, the output from box no.99 of the SAP 2009 DER worksheet should be no more than the figures above.

Aspect Silver level 3: Energy for water heating

At least 5% of the dwelling or domestic building's annual energy demand for water heating should be from:

- heat recovery and/or renewable sources with little or no associated fuel costs (e.g. solar thermal water heating and associated storage or heat recovery from greywater) that are allocated for water heating.

To assess, the annual energy demand for water heating in kWh multiplied by 0.05, should be no more than the contribution from specified equipment that uses renewable energy and/or heat recovery. A SAP spreadsheet is available for this calculation here: http://www.bre.co.uk/sap2009/page.jsp?id=2294.

Where a building contains more than one dwelling (such as a block of flats or terrace of houses) the average annual energy demand for water heating may be met by installations of renewable sources and/or heat recovery for the block. This is similar to the buildings with multiple dwellings guidance in Section 6.

Aspect Silver level 4: Water use efficiency

Enhanced or additional products should be provided as follows:

- WCs of average flush volume not more than 4.5 litres
- Wash hand basin taps with a flow rate not more than 6 l/m litres per minute
- shower heads with a flow rate not more than 8 l/m, and
- 1 water butt (with a min. capacity of 200 litres) for outdoor use per dwelling. Dwellings without a private garden or landscaped area, or if there is no access to rainwater collection (for example if there is no external rainwater pipe within the curtilage) are excluded.

The flow rates referred to align with performance bands in the Bathroom Manufacturers Association's water efficient product labelling scheme (BMA scheme). Reference can to be

made to the performance bands within the BMA scheme or equivalent standards. Kitchen or utility room sinks are not included in low flow fitting targets at this level.

Consideration should be given to the flow rates that combi boilers (if fitted) need to activate their water heating function when specifying taps and shower heads with lower flow rates.

When installing low volume flush WCs, the pipe diameter and gradient inter-relationship is critical in order that the new and any existing sections of the drain are self-cleansing.

Aspect Silver level 5: Optimising Performance

a. **Quick start guide**: Provide guidance to the occupants on the ways in which the specific dwelling is intended to function and how to optimise its performance on the scope, format and contents of the guide for occupants. Supplementary guidance with a performance specification as well as links to an example completed quick start guide is in Annex B.

   This is additional to the written information to be provided to occupants under Section 6.

b. **Resource use display**: Install a real-time resource use monitor that displays electricity use, located in an easily accessible and readable position.

Aspect Silver level 6: Flexibility and Adaptability

Provide a home office space dedicated for home working/study to include:

- A clear space, against a wall or partition, where a desk of 1800mm long x 600mm deep could be placed. Alternatively, the desk space could be ‘L’ shaped in plan as long as each leg of the ’L’ is a minimum length of 1200mm. Diagrams below show the two desk options with associated activity spaces.

- 2 switched electrical sockets in addition to those that should be provided under Section 4.

- A connection to allow direct access to internet services (unless such a provision is made elsewhere in the dwelling).

- For natural daylight there should be line of sight to a window, glazed external door or rooflight.

- Generally ventilation, accessibility, safety and escape should meet all the other standards however, see paragraphs below.

For diagram, see Annex C.

In any dwelling, the home office space can be in a circulation space but should not be located in a protected enclosure. The desk space and/or its activity space can locally reduce a corridor width to 800 mm and should not interfere with door swings.

In any dwelling, the home office space can occupy a room by itself even if this room is too small to be an apartment. In this case, this small room should be ventilated as if it were an apartment.

In any dwelling, the home office space can occupy a part of the enhanced apartment but the desk space and its activity space should be additional to the defined spaces and access of the enhanced apartment, as described in guidance in Section 3.

In any dwelling the home office space can be in a room that includes the kitchen but the desk space and or its activity space should not interfere with kitchen worktops, appliances or manoeuvring spaces.

To allow some more flexibility in smaller dwellings (those of not more than 2 apartments) the home office space can be in any apartment. But in this case, the desk space and its activity space should not overlap with the minimum furniture provision or associated activity spaces.

The height of the home office should be not less than 1.8m over the activity space and 1.5m over the desk space. For dwellings over 150m^2 floor area, two home office spaces should be provided.

Aspect Silver level 7: Well-being and security

a. **Noise separation**: Design performance levels for separating walls and separating floors associated with attached dwellings should be:

   - Minimum airborne sound insulation: 58 dB $D_{nT,w}$
   - Maximum impact sound transmission: 54 dB $L'_{nT,w}$

   Performance levels for noise isolation for separating walls and separating floors should be verified by carrying out a sound test as indicated in the guidance to Section 5.

b. **Noise reduction between rooms**: Design performance level for a minimum airborne sound insulation should be 44 dB R_w.

   This refers to all internal partitions in all dwellings and intermediate floors within houses and maisonettes excluding storage cupboards and should be substantiated by manufacturer's laboratory test certificates.

c. **Enhanced natural lighting**: The enhanced apartment should be provided with a glazed area of not less than 1/8th of the floor area of the apartment.

d. **Security**: Install a 13 amp fused spur, suitable for an intruder alarm system, located within 2m of the main entrance door.

Aspect Silver level 8: Material use and waste

Recycling of solid waste: Provide a dedicated internal space with a volume of at least 0.12m^3(120 litres) and no dimension less than 450mm, for storing recyclable material.

The storage space should:

- be able to store small amounts of recyclable material (e.g. metal, glass, plastic, cardboard and/or paper)
- be easily cleanable
- be additional to the general 1m^3 kitchen storage in Section 3, and
- facilitate temporary storage before transfer to a main storage point or a collection point, whether for the dwelling or for a group of dwellings.

It is recognised that local authority provision, resources and preferences for collecting separately or together will vary across Scotland. Therefore subdivision into containers for different materials is optional.

7.1.5 Silver Active level

This is the same as the silver level but, in addition, the dwelling includes the use of a low and zero carbon generating technology (LZCGT) in respect of meeting at least one of the aspects: Silver 1, Silver 2 or Silver 3. This level is primarily to assist local authorities to meet their obligations under Section 72 of the Climate Change (Scotland) Act 2009

by identifying the use of LZCGT. In this respect, LZCGTs include: wind turbines, water turbines, heat pumps (all varieties), solar thermal panels, photovoltaic panels, combined heat and power units (fired by low emission sources), fuel cells, biomass boilers/stoves and biogas.

7.1.6 Gold level

A dwelling at this second optional upper level should meet all the standards in Sections 1 – 6 that apply to the building for the bronze level and in addition the dwelling should comply with the gold level in each of the eight aspects below.

Aspect Gold level 1: Carbon dioxide emissions

Under the guidance to Standard 6.1, the carbon dioxide emissions (Dwelling Emission Rate) is to be 27% lower than the Target Emission Rate set by the 2015 Standards.

To establish this, the TER from SAP 2012 calculation should be multiplied by 0.73, to give a revised figure which the DER should not exceed (this is equivalent to a 42.8% improvement on the 2010 Standards and a 60% improvement on the 2007 Standards).

Where a building contains more than one dwelling (such as a block of flats or terrace of houses) the average carbon dioxide emissions for the proposed block or terrace (DER) may be compared to the average target CO_2 emissions (TER) for the ‘notional block or terrace', similar to guidance in Section 6.

Aspect Gold level 2: Energy for space heating

Maximum annual demand for useful energy for space heating should be:

- 30 kWh/m^2 for houses, or
- 20 kWh/m^2 for flats or maisonettes

To assess, the output from box no.99 of the SAP 2009 DER worksheet should be no more than the figures above.

Aspect Gold 3: Energy for water heating

a. **Renewables and heat recovery:** At least 50% of the dwelling or domestic building’s annual energy demand for water heating should be from:

- heat recovery and/or renewable sources with little or no associated fuel costs (e.g. solar thermal water heating and associated storage or heat recovery from greywater) that are allocated for water heating.

To assess, the annual energy demand for water heating in kWh multiplied by 0.5, should be no more than the contribution from specified equipment that uses renewable energy and/or heat recovery. A SAP spreadsheet is available for this calculation here: http://www.bre.co.uk/sap2009/page.jsp?id=2294

Where a building contains more than one dwelling (such as a block of flats or terrace of houses) the average annual energy demand for water heating may be met by installations of renewable sources and/or heat recovery for the block. This is similar to the buildings with multiple dwellings guidance in Section 6.

b. **Water heating display:** A display showing the performance of the primary renewable source, such as a solar collector, should be mounted in easily accessible space, for instance alongside controls for heating equipment or near the bathroom/shower room door.

Aspect Gold 4: Water use efficiency

Enhanced or additional products should be provided to encourage water efficiency as follows:

- 1 water butt (with a min. capacity of 200 litres) for outdoor use per dwelling. Dwellings without a garden or landscaped area, or if there is no access to rainwater collection (for example if there is no external rainwater pipe within the curtilage) are excluded, and
- 3 of the following 5 items:
  - water meter
  - WCs of average flush volume to be not more than 3.5 litres
  - wash hand basin taps of flow rates not more than 4 l/m and to kitchen or utility room sinks to be not more than 6 l/m
  - shower heads with maximum flow rate not more than 6 l/m
  - rainwater harvesting or greywater recycling system designed to provide water for toilet flushing.

The flow rates referred to align with performance bands in the Bathroom Manufacturers Association's water efficient product labelling scheme (BMA scheme). Reference can be made to the performance bands within the BMA scheme or equivalent standards.

Consideration should be given to the flow rates that combi-boilers (if fitted) need to activate their water heating function when specifying taps and shower heads with lower flow rates.

When installing low volume flush WCs, the pipe diameter and gradient inter-relationship is critical in order that the new and any existing sections of the drain are self-cleansing.

Aspect Gold 5: Optimising Performance

a. **Quick start guide:** Provide as for Aspect Silver 5, plus: Direct 'easy release' adhesive labels on all key heating and ventilation equipment including (where fitted): trickle ventilators, extract fans, mechanical ventilation with heat recovery (MVHR), heating controls (programmers, Thermostatic Radiator Valves (TRVs)). Supplementary guidance on the content of the direct equipment labels is in Annex B.

b. **Resource use display:** Provide as for Aspect Silver 5, plus the real-time resource display indicates gas use (if gas is used for heating), displaying gas use at least at a daily period.

Aspect Gold 6: Flexibility and adaptability

a. **Home office:** Provide as for Aspect Silver 6.

b. **Mobility space:** Provide convenient secure mobility space to accommodate an electric wheelchair(s) and that could also be suitable for pram storage and the storage of a bicycle(s). The size is defined as follows:

- An electric wheelchair (or pram) storage space of: 0.8m x 1.1m on plan, minimum height of 1.8m. For dwellings of 4 apartments or more; or over 150m^2; space for two electric wheelchairs and
- A bicycle storage space of: 2m x 0.75m on plan, minimum height of 1.2m. For dwellings of 3 apartments or more; or over 150m^2; space for two bicycles: 1m x 1.5m.

A single infant's pram or pushchair should generally be able to use the mobility space as defined by either the cycle or wheelchair footprint. The space does not need to be able

to store a wheelchair at the same time as a pram or bicycle; this diagram shows how the spaces can overlap.

For diagram, see Annex D.

The mobility space should have a socket outlet for recharging. Ideally, it should be adjacent to the accessible entrance. It should not be located in a protected enclosure and it should be outwith the minimum corridor width noted in Section 4, clear of any door way, door swing, stair landing or space identified for a future stairlift installation.

The mobility space in the dwelling would be defined only by the wheelchair size(s) if either of the areas below are present, allowing the bicycle storage provision to be located outwith the dwelling:

- A motor vehicle garage could be adequate as long as bicycle storage is outwith a 4.8m x 2.4m space for parking a single motor vehicle or

- Communal bicycle storage that is secure (locked with resident only key access) and weather protected. This should be sized on the number of apartments in total or overall size of all dwellings served. The communal store should be at ground level or accessible by a ramp.

If separate bicycle storage is allocated (garage or communal store), this does not need an electrical socket outlet. The storage provision for more than one bicycle could be split between a dwelling and a communal store.

c. **General storage provision within a dwelling**: Accessible storage of $1m^3$ in volume per apartment. The storage space should be capable of being closed off with a door but does not need to be off each apartment.

General storage is in addition to a wardrobe space or built-in wardrobe, or storage that is designated for the future provision of a shower. Both of these are identified in Section 3.

Aspect Gold 7: Well-being and security

a. **Noise separation:** Design performance levels for separating walls and separating floors associated with attached dwellings should be:

- Minimum airborne sound insulation: 60 dB $D_{nT,w}$

- Maximum impact sound transmission: 52 dB $L'_{nT,w}$

Performance levels for noise isolation for separating walls and separating floors should be verified by carrying out a sound test as indicated in the guidance to Section 5.

b. **Noise between rooms:** Design performance level for a minimum airborne sound insulation should be 45 dB R_w.

This refers to all internal partitions in all dwellings and intermediate floors within houses and maisonettes excluding storage cupboards and should be substantiated by manufacturer's laboratory test certificates.

c. **Enhanced natural lighting:** Provide as Aspect Silver 7 plus the average daylight factor (average DF) for kitchens and living room/dining/study should be 1.5% and 2% respectively, using the simplified calculation below.

The DF is a factor, expressed as a percentage, that will rise or fall depending on the relationship of glazed area and room dimensions. Here it is simplified as an average for a particular room. Matters pertaining to overshadowing, neighbouring buildings or orientation are removed from this calculation.

Average DF% = (52 x M x W) / A

Where:

A = The sum of the area of all room surfaces (ceiling, floor, walls, doors, windows and rooflights), in m^2.

M = Correction factor for dirt or ease of cleaning, consisting of:

- 1.0 for vertical glazing or
- 0.8 for sloping glazing or
- 0.7 for horizontal glazing.

W = Glazed area of windows or rooflights, taking account of framing, in m^2. Measure glazed panes or measure window area including frames then multiply by:

- 0.9 for metal frames (patent glazing) or
- 0.8 for metal frames (large pane) or
- 0.7 for timber frames (large pane) or
- 0.6 for timber frames ('Georgian' pane).

Assume the factors for PVC framed windows are equal to timber.

d. **Security:** Provide as Aspect Silver 7 plus:

- provide doorsets and windows which are tested and certified by a notified body as meeting a recognised standard for security or
- install a full intruder alarm system that complies with BS EN 50131 and PD6662 (wired system) or a Class VI alarm to BS 6799 (wire free system) that conforms to Association of Chief Police Officers (ACPO) guidelines.

e. **Outdoor space:** Provide private or communal outdoor space with room for occupants to sit outside. The outdoor space should be accessible only to occupants of designated houses or flats and not be occupied by car or cycle parking space, waste storage area, electricity substations or other ancillary features. It must comprise of at least one of the following:

- a private garden, patio, roof terrace or balcony (with the front open to air, or see Note 1 below) of an area no less than $1.5m^2$/apartment (minimum $3m^2$/home) with a minimum short dimension of 1.2m or
- a communal shared garden or courtyard that is:
  - of an area no less than $1.5m^2$/apartment (minimum $3m^2$/home) with a minimum short dimension of 2m
  - secure by, for example, resident only key access
  - secluded and fully enclosed with buildings themselves, walls, fencing or planting are all permitted possibilities to define the space.

Generally issues of daylight, ventilation, safety and escape should meet the guidance of all the other mandatory standards. Access to these spaces should follow the guidance of Section 4.

Note 1: In a studio or single bedroom flat (i.e. a flat with 2 apartments or less) then the balcony could be a ‘Juliet’ type where the size could then be provided by a space immediately inside of an inward opening glazed door or door(s) and has a protective barrier externally. This space should not:

- interfere with the defined space or access of an enhanced apartment
- overlap with minimum furniture provision or associated activity spaces and
- interfere with kitchen worktops, appliances or manoeuvring spaces.

Aspect Gold 8: Material use and waste

a. **Recycling of solid waste:** Provide as for Aspect Silver 8.

b. **Design for de-construction:** By consideration of waste minimisation arising from the built-form, one of the following should be adopted:

- Demonstrate that key principles of demountable construction detailing have been followed. This could be demonstrated by submitted drawings containing reference to guidance such as the Scottish Ecological Design Association’s (SEDA) document on: 'Design and Detailing for Deconstruction'. A minimum of three of the high or medium priority items from the example constructions in the detailed section of this document should be demonstrated clearly or
- Provide a detailed plan for deconstruction of the building that follows a template such as that on page 21 of the SEDA document. This option provides opportunities to meet this level in this aspect for prefabricated, modularised or flexible internally partitioned constructions that use techniques that involve off-site manufacturing where the described assembly could be reversed for disassembly or
- An option only where a site is occupied and the warrant application is for demolition and construction. Provide a pre-demolition audit of existing buildings/structures on site. In this option for brownfield developments only, the audit should follow an established methodology such as the ICE Demolition Protocol, referred to by the Waste and Resources Action Programme (WRAP) that:
  - produces a Bill of Quantities of the different materials in the building to be demolished
  - identifies the tonnages of material that can be recovered and
  - determines the percentage of materials recoverable.

7.1.7 Carbon dioxide emissions only at Platinum level

All the standards in Sections 1 - 6 that apply to the building for Bronze level, and in addition the building should comply with the following.

Aspect Platinum 1: Carbon dioxide emissions

Under the guidance to Standard 6.1, carbon dioxide emissions CO_2 Dwelling Emission Rate (DER) is to be 100% lower than the Target Emission Rate (TER) set by the 2010 Standards. To establish this, the DER should not exceed zero. (This net zero carbon equivalent is a 100% improvement on the 2007 Standards).

Where a building contains more than one dwelling (such as a block of flats or terrace of houses) the average carbon dioxide emissions for the proposed block or terrace (DER) may be compared to the average target CO_2 emissions (TER) for the ‘notional block or terrace', similar to guidance in Section 6.

Aspect Platinum 2: Energy for space heating

[not currently defined]

Aspect Platinum 3: Energy for water heating

[not currently defined]

Aspect Platinum 4: Water use efficiency

[not currently defined]

Aspect Platinum 5: Optimising Performance

[not currently defined]

Aspect Platinum 6: Flexibility and Adaptability

[not currently defined]

Aspect Platinum 7: Well-being and Security

[not currently defined]

Aspect Platinum 8: Material use and waste

[not currently defined]

Annex 7.A Sample sustainability label

7.A.0 Introduction

Below is a sample sustainability label. In this example the dwelling has achieved the bronze active level of sustainability and in addition has achieved the silver level in the aspects of energy for water heating, optimising performance and material use and waste.

7.A.1 Sample sustainability label

For an example of the sustainability label, see Annex E.

Annex 7.B Supplementary guidance in the aspect of optimising performance

7.B.0 Introduction

The quick start guide (QSG) should be produced in 2-stages:

- at building warrant application submit as much information as possible including the plan, an outline of the construction and building fabric, specified systems or equipment and any other environmental features and
- re-submit at completion after review and updating of specified items as necessary.

A good practice example of the QSG is on the Scottish Government website at www.scotland.gov.uk/bsd

7.B.1 Scope

The QSG should be specific to each individual dwelling. Where there are a number of houses or flats of the same type, it is likely that the information could be repeated for each type, taking care to ensure correct orientation of plans and correct positions of installed items on the plan.

The purpose is not to explain details of how or why a home is designed to work environmentally, but rather what occupiers need to know to make a home work efficiently. It should describe the overall performance of the dwelling as a system itself. The focus should be on maintaining internal comfort in an efficient manner. Do not include unnecessary detail on the operation of the individual elements or systems of technology.

7.B.2 Format

The QSG should be as compact and graphic as possible to aid rapid comprehension, making it more likely to be kept available, used for future reference and be capable of being passed on to future owners or residents.

A variety of formats could be used to convey the information but it should be a free-standing document, separate from other documentation (but including directions to further information). It may be designed to meet a similar graphic standard of other material which is provided at completion. The recommended formats are:

- an A4 guide of maximum 6 pages, preferably 4 or less or
- a booklet with page sizes smaller than A4, possibly with double page spreads such as the booklet in the first good practice example.

Better design and construction of control mechanisms should make systems more intuitive and reduce the need for guidance, therefore please be very concise if appropriate.

7.B.3 Graphics, images and text

The QSG should include plans, locating key items of equipment and information only on the systems installed. The format should revolve around simple illustrations following the principle – ‘show don’t tell’. An illustration can be a hand-drawn sketch, a computer image or a photograph. These can be mixed because consistency in style is less important than content. Illustrations do not need to be to scale, but should show relationships and explain things quickly and easily. These guidelines should be followed:

- Use illustration where possible to focus the occupant on the equipment that users normally come into contact with. For example, the programmer in the heating section should show where it is placed in relation to the boiler
- Link key components (such as heating controls) to a location plan to help the resident to make connections between controls and systems quickly
- Images should be labelled
- Avoid non-essential images (e.g. lifestyle image) which can reduce the authority of the document
- Use graphic formats that preserve the sharpness of lines, such as PDF
- Illustrations should be associated with a legible caption of standard size and colour
- Many people have difficulty understanding plans, so use other images, for example a simple 3D diagram alongside plans to aid comprehension

- Use colour where possible as an easy way to differentiate categories visually. However readers may be colour blind, so use icons, illustrations and high contrast type
- Text size should aim to be at least 11pt but can be of smaller sizes in annotations, labels or text boxes if a typeface designed for text reading at small sizes is used. Make headings as large as possible
- Use clear, colour, photographs (well lit, avoid use of flash if possible) or line illustrations of actual installed equipment
- Use engineer’s or manufacturer’s drawings as reference in order to comprehend the system but edit these to remove unnecessary items. Do not attempt to replace the manufacturer's manuals, but do refer to them for further information. The main elements or products should be identified with their full names/reference model numbers and links to more information such as manuals or manufacturers websites
- Use plain English avoiding detailed technical descriptions
- Use bullet points where possible
- Avoid jargon and acronyms. If an acronym is necessary define it on first use. In the good practice example MVHR (Mechanical Ventilation Heat Recovery system) is used because the acronym is more likely to lead to success in internet searches for more information.

7.B.4 DOs and DON'Ts

Provide a brief list of up to 5 essential DOs and DON'Ts for occupant interaction with each system (heating, ventilation etc). This should be specific to the heating system installed and ideally, in a colour coded text box, in a consistent position on the page. General guidance is available on the Energy Saving Trust website: http://www.energysavingtrust.org.uk/

7.B.5 Sections

Aim to fit a section relating to each of the following categories on the equivalent of a single A4 sheet, or less where possible.

a) Overview

Give a brief description of the basic features of the house, including insulation, building fabric, heating, ventilation, hot water use and any major equipment that make a difference to how the house operates. Avoid large paragraphs. Keep to between 100 to 150 words.

The overview page should include the following sentence: This guide is produced to meet the aspect of 'Optimising Performance' within Section 7: Sustainability of the Building Standards Technical Handbooks.

Locate key parts of the equipment, annotated on a legible plan or other illustration. Plans should be simple and clear, generally ‘planning application’ standard with walls blacked in, dimensions and unnecessary annotation removed in the CAD program. Showing fittings such as bathrooms and kitchens on layouts can assist. Limitations on alterations due to the construction (e.g. avoid holes in external walls that penetrate the vapour barrier) can be mentioned here. Use 3D plan perspectives, axonometric diagrams, or cutaway models to aid understanding. Items to be shown include:

- Key elements of the construction and materials - roof, walls, windows and doors

- Elements of heating, hot water and ventilation equipment
- Heat element devices
- Control locations
- Meters
- Water stop-cock

If the dwelling has achieved a silver, gold or platinum level, it is permissible to use the associated 'badge' on the overview page of the front cover.

b) Heating

Describe how the home can be heated including aspects of the building fabric and ventilation that are relevant to how the system works. Cover the main principles of use in both warm and cold weather. Simple diagrams illustrating how the building is heated in both winter and summer are useful. Avoid engineering heating system schematics as many people find these hard to understand.

Describe in around 50-100 words the main heating source in the home, including the principles of operation and fuel source if relevant. Supplementary heating sources should be mentioned, where included. Provide a brief description of how heat reaches rooms e.g. radiators, underfloor heating, air grilles, with illustrations provided as required.

Briefly describe how heating is controlled. Illustrations and locations are required for all the main controls. Identify the reaction to heating controls (for example there may be a time lag before a heating system operates at optimum capacity) and outline the normal range if this is not obvious.

c) Ventilation

Describe in around 50-100 words how the home is ventilated and the main principles for its use, in both warm and cold weather. Simple diagrams illustrating how the building is ventilated in winter and summer are useful.

Briefly describe how the ventilation is controlled with illustrations and locations required for all the main controls. This should include both natural and mechanical systems. Identify the elements that users have the most interaction with, so in natural ventilation, it may be trickle vents and opening of windows together with a reference to cross ventilation. For mechanical ventilation it may be the boost switch and location of filters.

d) Hot Water

Provide up to 50-100 words on how water is heated in the homes, including primary and secondary systems (for example a boiler working with solar hot water panels). Consider a simple diagram illustrating how the system works if it has a number of components or options.

Briefly describe how hot water generation is controlled. Illustrate the controls, identify the reaction to hot water controls (for example there may be a time lag before a hot water system operates at optimum capacity) and outline the normal range if this is not obvious.

e) Other Energy Saving Features (if installed)

Cover any other energy saving feature installed as part of the fabric of the home or included in the SAP calculation. Include instructions for items not covered elsewhere. Each item should have a brief (around 50 words).

description of other energy saving features. Identify for each item:

- Name or description
- Location
- How to control it and where the controls are located
- Manufacturer and model number
- Location of further information such as a manual or specific website address

f) How to maintain systems

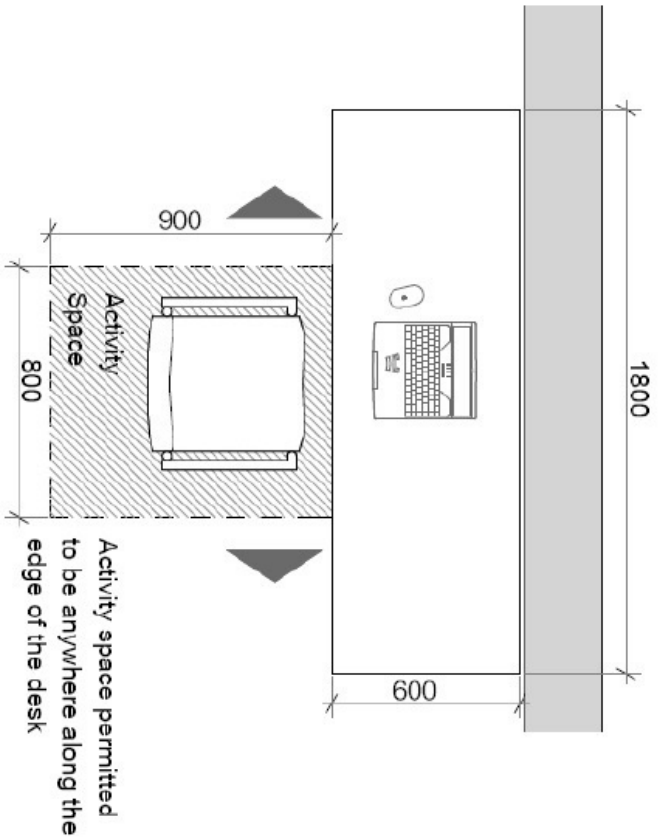
A ‘how to keep your home running efficiently’ section should provide an easy to understand list of maintenance required for systems outlined in the guide. It must only include items that residents should be undertaking without tools or specialist knowledge. In particular consider including the following information:

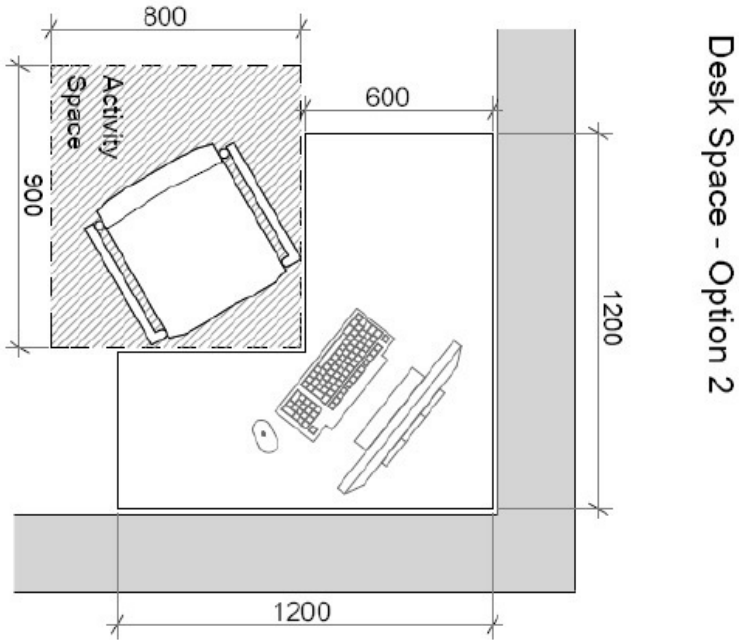
- List of equipment names/serial numbers
- Links to further detailed information
- Manufacturers websites
- Recommended servicing organisations

7.B.6 Labels (applicable to Gold level only)

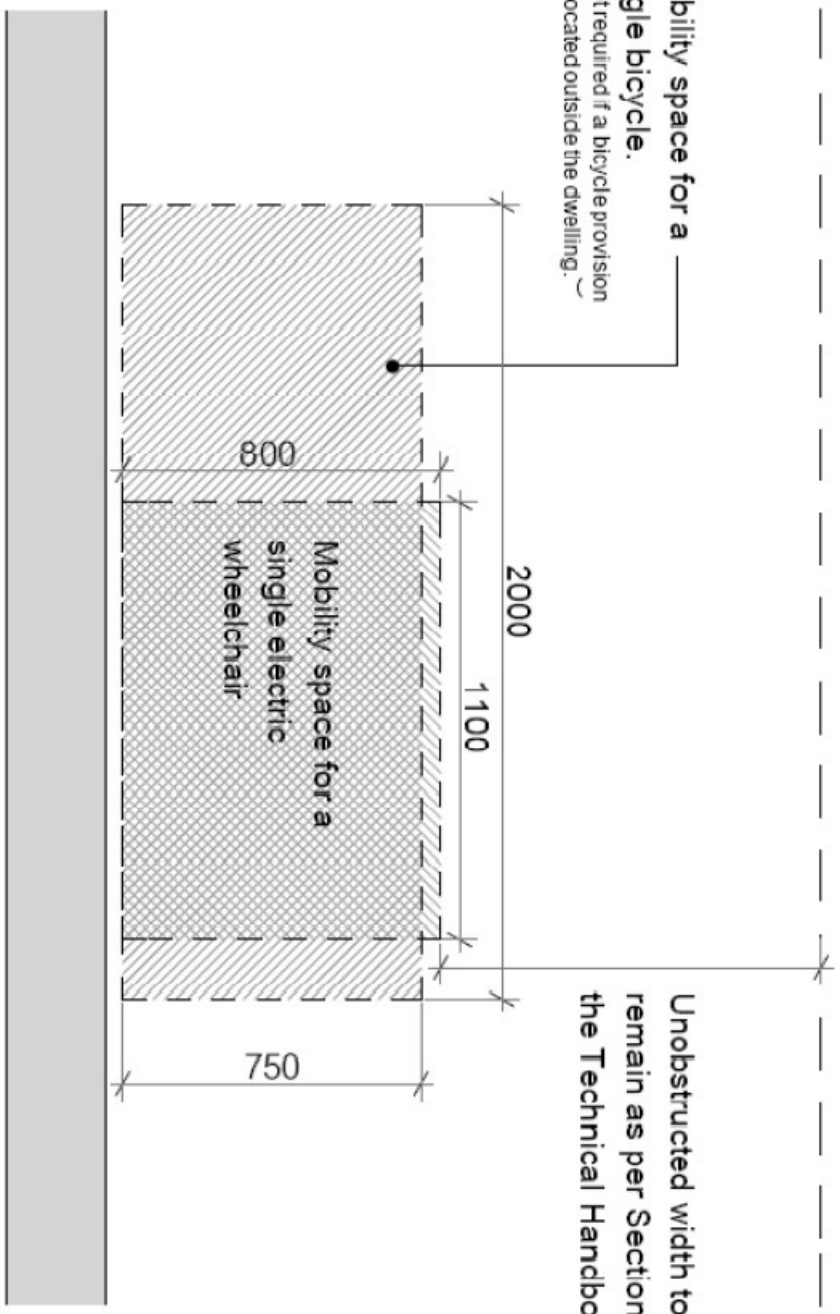
Provide labels fixed to all components of heating, ventilation and hot water, including controls. Use a consistent naming convention and colour coding. These labels should be colour coded to match the booklet colour scheme and text size about 11pt. Avoid small font sizes. The labels should indicate ‘standard’ setting for items or equipment.

Annex 7.C Desk Space





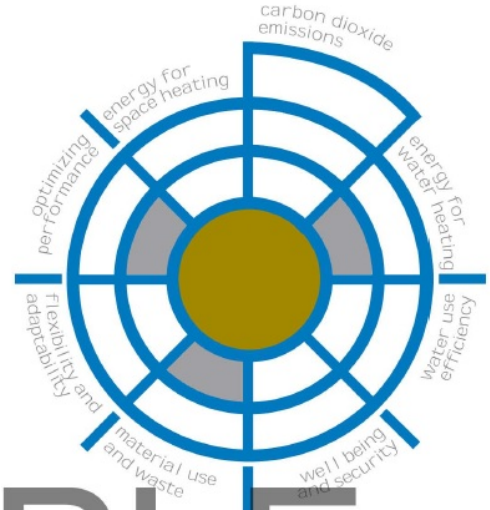
Annex 7.D Mobility Space



Annex 7.E Sustainability Label

Building Standards **Sustainability**

At completion, the building achieved the specified level of sustainability in the aspects below:



Platinum
Gold: Not Achieved
Silver: Partly Achieved
Bronze Active: Achieved by use of the following technology: Heat Pump
Bronze: Sections 1-6, 2010 Standards

Building / Development:
64 Greenstreet,
Bigtown
XX9 9XX

Building Warrant Reference:
621621844KKY

Date:
10.10.2011

Building Standards Division's Technical Handbooks
Contain detailed guidance on the measures to achieve the levels within each aspect of sustainability. See Building Standards pages on www.scotland.gov.uk

This statement of sustainability for a new building must be fixed within the building in accordance with standard 7.1.

The Scottish Government