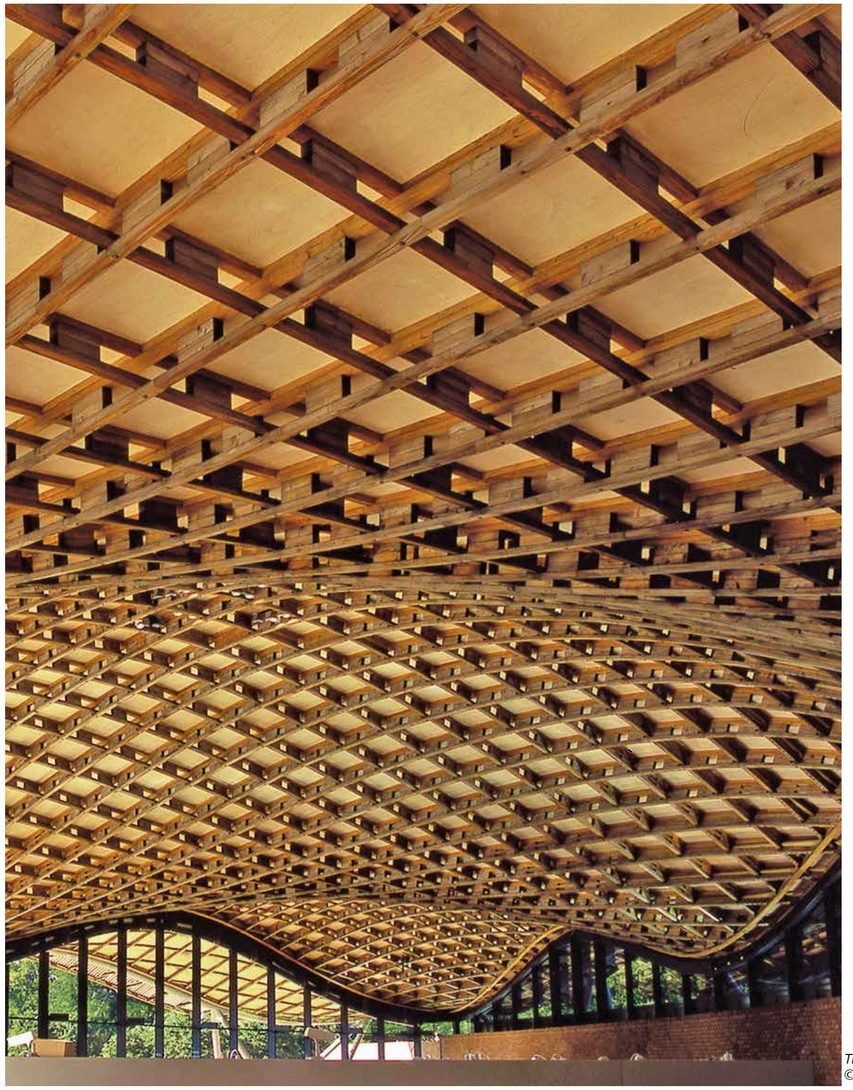
Birmingham Design Guide

Efficient and Future Ready City Manual

September 2022

Birmingham City Council



The Savill Building, Glenn Howells Architects.
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Contents

1 Creating future-aware development

1.1 The City Council recognises that technologies and infrastructure that seek to reduce the environmental impact of development and their use is evolving and changing at a (positively) rapid rate. As a result, elements of the infrastructure and measures detailed within this guidance may become superseded by new innovations or there may be alternative solutions more appropriate for a specific site or development.

1.2 The aim is to provide developers with guidance about how their development could be designed and/or integrate infrastructure that would reduce the environmental burden of their development. If a developer has an alternative approach to achieving this, the City Council would welcome working with them to achieve this.

CITY NOTE EF-1

Energy efficiency

1.3 Reducing the energy use and loss of a building is one of the primary elements of achieving sustainable design, and should be a core goal for any development. While Building Regulations sets the minimum requirements development must achieve, the City Council encourages all developments to exceed the minimum requirements set in the Building Regulations (as detailed in BDP Policy TP3 and associated guidance note); reducing carbon emissions, future-proofing the building and minimising the life-time energy costs for occupants.

1.4 The initial focus of designs should be to reduce the energy demands of a building, maximising air tightness, increasing insulation and optimising natural ventilation; with the energy requirements needed, provided by appropriate decentralised and/or renewable energy technologies where possible.

1.5 Building technologies, infrastructure and products utilised by a design will play a primary role in creating these efficient buildings; but architects should also use the orientation, landscape and characteristics of the site to seek naturally sourced heating, light and shading.

Orientation and Passive Solar Gain

1.6 The siting, design, layout and orientation of buildings can have a significant impact on energy consumption and the internal environment of the building. As a natural resource, developers should seek to positively use the site's orientation to help reduce the energy burden of the building and enhance the internal environments created.

1.7 Harnessing the sun through passive solar design is a simple method of achieving these gains, creating naturally lit and heated space; in turn reducing the need for artificial light and heating. Keeping the main glazed areas of the building to within 30 degrees of south, will maximise the potential for the sun to heat the internal environment and for natural daylight to penetrate the building.

1.8 Solar electricity infrastructure (photovoltaic tiles, cells, and panels) and solar thermal (water heating) installations also require this orientation. South-easterly orientation maximises early morning gains and reduces the likelihood of internal overheating in the afternoons.

1.9 A consequence of seeking heat and light from the sun may be the potential to overheat the building or space; requiring designs to incorporate features and/or measures to manage the levels of solar gain harnessed. Simple measures such as blinds or screens, and wider eaves will allow sunlight into rooms in winter when the sun is lower whilst providing shade in summer when the sun is higher.

Consideration should also be given to providing ventilation to aid heat management and moisture prevention. The use of green and brown roofs can help to regulate temperatures.

1.10 To help maximise the benefits of solar gain, internal layouts should be influenced by the buildings orientation and the associated solar gain (balanced with with site specific characteristics, constraints and other design principles). The most frequently used rooms should be located on the south side of buildings to make best use of solar gain, whilst the north side should be used for less frequently used spaces such as bathrooms, circulation, building cores and storage that require less heating. Rooms sized to allow sunlight to hit the back wall will benefit from both the sun's natural heat and light.

Insulation and thermal mass

1.11 In order to efficiently use the passive heat gained by a considered orientation and layout, designs should consider the use of insulation and specify materials with a high thermal mass.

1.12 Enhanced insulation and draught-proofing will help prevent the loss of heat during winter months; and aid cooling during the summer. This in turn, will reduce the energy needed to heat and cool the building through the year. To further aid heat retention, designs should specify internal materials (in appropriate elements of the building) with a high thermal mass, allowing the building to absorb, store and release the passive heat gained; whilst aiding the moderation of internal temperatures. Conversely, during warmer months, this moderation helps with building cooling.

CITY NOTE EF-2

Conserving water resources and maximising water efficiency

1.13 Buildings should seek to reduce the amount of water used by occupants; and where appropriate install infrastructure that enables grey water and rain water to be captured and used productively within the development. As with the building's energy consumption, managed water use will help reduce resource wastage (and the associated energy) and lower on-going water bills for occupants.

1.14 Grey water and/or rain water capture, has the potential to reduce the level of fresh water consumption. In residential and non-residential developments, the flushing of toilets account for a significant volume of water usage, which could be mitigated by utilising grey or rain water to flush the toilets. These secondary water resources could also be utilised to help irrigate surrounding landscape, clean vehicles and building elements, or used within an industrial process.

1.15 The capture of rain water, may also offer a reduction in the amount of water entering streams and surface drainage systems, contributing to SuDS and surface water flood management.

1.16 Coupled with grey and rain water capture, developers are also encouraged to specify water efficient appliances and infrastructure that will further reduce the overall water consumption of the development.

1.17 During construction, developers are encouraged to remedy any water leaks or aging systems on their site to reduce water loss and surface water drainage issues.

CITY NOTE EF-3

Decentralised energy generation

1.18 As detailed within BDP Policy TP4, where viable, development must seek to install or connect to low or zero carbon energy infrastructure that can achieve long-term cost savings for the occupants; and carbon reduction gains for the city.

1.19 As suggested within BDP Policy TP4, the characteristics of the site and its surroundings will inform which methods of generation are viable for the development. Whilst on-site generation may not be feasible, proposals must also consider utilising the energy, heat and cooling potential of the city's canal network, other water courses and the Birmingham's District Energy Scheme networks.

1.20 Where on-site infrastructure is proposed, on a building or within the public realm, the infrastructure must be effectively integrated into the wider design. Considered effectively, the infrastructure can be subsumed into the design; or used as an architectural feature that adds to the character of the building. Both approaches have merit in their outcomes, allied with a consideration of character and historic context; but proposals must not apply infrastructure as an afterthought or bolt-on that detracts from the architectural quality of the outcome.

1.21 Where a development is not proposing to connect to or install infrastructure, appropriate consideration needs to be given to how infrastructure could be connected or installed in the future. This should include:

- Installation or routing for appropriate ducting.
- Consideration of building orientation (as detailed above).
- Ensuring architectural elements such as roofs are of a design and form that could accommodate solar panels or other appropriate renewable energy source.

1.22 The Council's Guidance Note on Sustainable Construction and Energy Statements provides further guidance on the requirements of BDP Policy TP4 Low and Zero Carbon Energy Generation.

CITY NOTE EF-4

Flexible and adaptable building designs

1.23 It is important development across the city seeks to create buildings that have longevity; with the ability to adapt and change to altering needs, without major redevelopment.

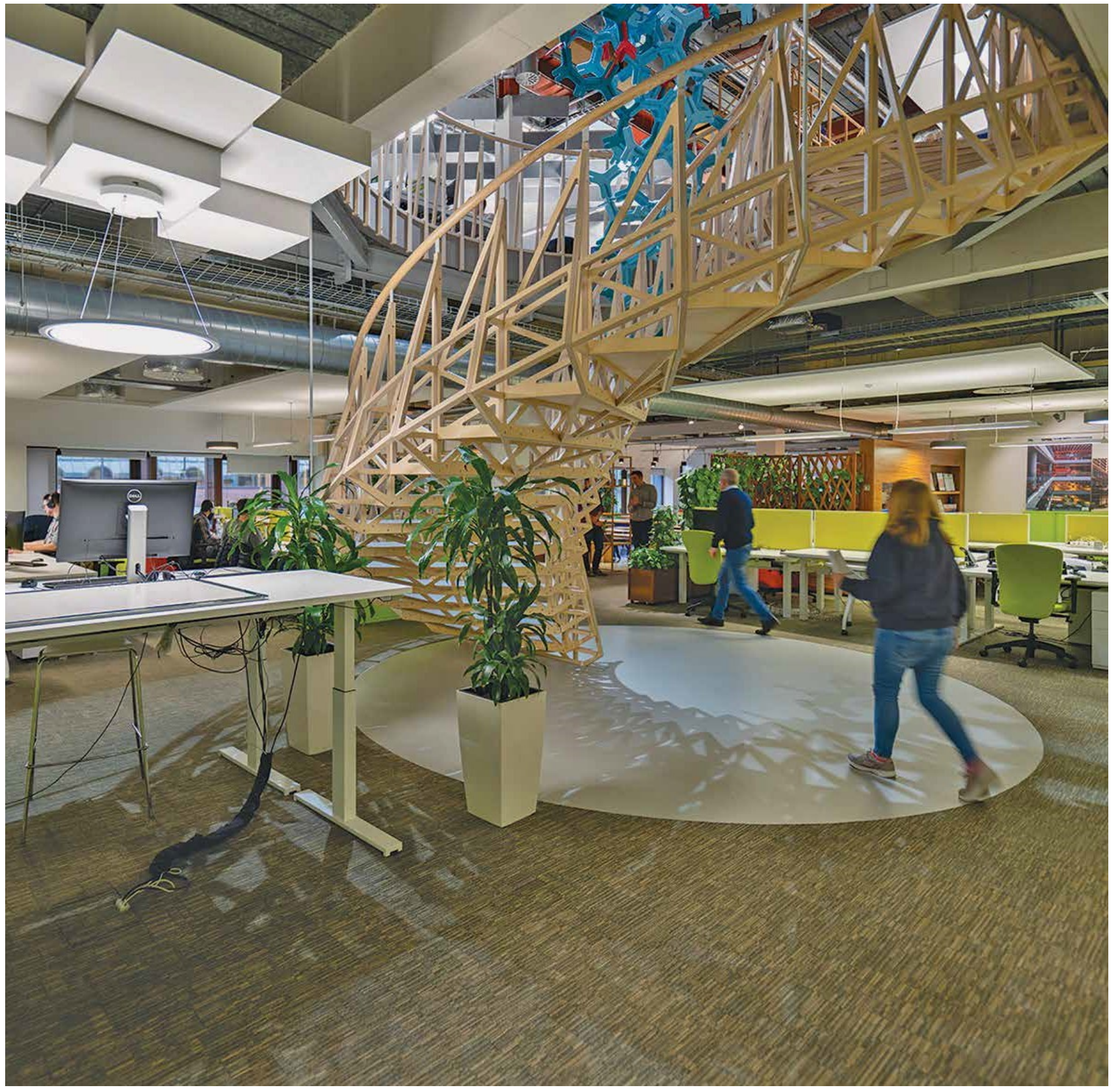
1.24 A number of commercial developments (such as office, retail and industrial) are often designed to be flexible, providing spaces and units that have the ability to accommodate a wide range of uses; and be easily refurbished or internally modified as these uses change. This flexibility may also enable these buildings to accommodate a change of use, with relative ease.

1.25 In contrast, residential uses are rarely designed with the same level of adaptability, as their use is likely to remain residential for its lifetime. However, whilst the use may remain consistent, these buildings need to be able to adapt with their occupants. As lifestyles, personal circumstances and ways of living change, building need to be able respond to this; enabling internal layouts to be adjusted, supportive infrastructure to be installed and extensions to be added.

1.26 Beyond the accessible and adaptable homes requirement outlined in Policy DM10 of the Development Management in Birmingham DPD, the City Council encourages designers to consider wider enhancement to flexibility, that may enable adaption by a future resident. Building Regulations Part M4 (2 & 3) contains a number of useful design considerations that would enable a resident who has reduced mobility to move around and use the dwelling effectively. Whilst not a requirement, the City Council encourages proposals to integrate all or elements of these standards.

1.27 Beyond this standard, consideration could also be given to the internal layout; the future installation or removal of internal walls; or whether a downstairs room could be converted into a bedroom without impacting on wider circulation.

1.28 All these considerations could give the building a longer lifespan, and may enable residents to remain in their home and community throughout their life; in turn potentially reducing future demand on health and care services.



CITY NOTE EF-5

Building re-use and sustainable materials

1.29 The construction of developments utilises a range of resources and energy, which developers should seek to reduce. This could be aided through the use of sustainable building techniques, low carbon materials and re-using existing built fabric.

Modular/Prefabrication

1.30 The offsite construction of buildings or elements of a building, can lead to a number of advantages in terms of building efficiencies and sustainability. Construction within a factory environment can enable elements to be constructed quicker; higher levels of quality control to be monitored/achieved; and health and safety risk reduced. With an efficient system, it can also result in less waste and lower tolerances in terms of insulation and air tightness.

Use of low carbon materials

1.31 Proposals should seek to utilise low carbon materials across their project, from the building's construction material to the hard and soft elements of the landscaping. In seeking to achieve this, proposals must consider the source of the products being used, their associated transport burden and the sustainability of the product. Where possible, the City Council promotes the re-use of materials and those sourced and produced in the UK.

1.32 Sustainable materials are those which have a low environmental impact. Generally they are:

- Produced from a renewable resource or are re-used or recycled from a previous use.
- Sourced locally to cut down on transport costs and to support the local economy.
- Produced with minimum ecological damage and no exploitation of the workforce.
- Non-polluting and non-toxic in manufacture, use or disposal.

And/or:

- Have low embodied energy, i.e. they are unprocessed or use the minimum amount of energy possible in their production.

1.33 Where an applicant is proposing to utilise low carbon materials, their intent should be detailed in the Design and Access Statement, with confirmation of the materials origin or source provided as part of the material condition attached to a permission.

Building re-use

1.34 Where a site contains an existing building, the feasibility (considering viability and site constraint) of retaining it (in whole or part) should be appropriately considered by any development proposal. Scenarios must consider how the building could be refurbished and/or modified to successfully accommodate the new uses sought.

1.35 Appropriately re-used, an existing building can be a more sustainable approach to development, reducing the amount of virgin resources needed to deliver the outcome desired.

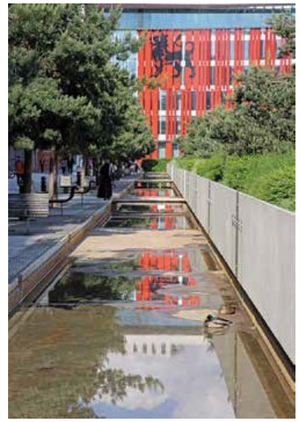
1.36 Historic England provide a range of technical guidance related to enhancing the energy efficiency of historic buildings, which could be applied to a range of existing buildings.

CITY NOTE EF-6

Climate resilience

1.37 Proposals must be designed to take account of the local climate and the potential changes to it resulting from climate change. This should take into account the potential for hotter, drier summers, and warmer wetter autumn and winter periods. More frequent and more extreme storms including high winds and flash flooding are also predicted. This will impact on all forms of infrastructure including storm drains and sewers as well as the built environment in general. Given the longevity of the buildings being created today, it is crucial they accommodate (or have the ability to accommodate) relevant infrastructure; and are constructed with robust materials that can manage and withstand the more erratic and warmer climate predicted.

1.38 While the requirement for SuDS will help manage the potential for surface water flooding, design must also consider how the building will shed and manage water. This may include architectural detailing and infrastructure such as: gutters and other rainwater goods of a size that can accommodate increased and heavier rainfall; robust roof designs that incorporate detailing such as over-hanging eaves to cope with increased rainfall; and external walls protected from increased rain by large eaves and splash zones at their base.



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