



Places for the Future - Detailed SPD Guidance

Draft for Public Consultation

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1. Introduction

Detailed SPD Policy Guidance

The Detailed Supplementary Planning Document Policy Guidance should be read in conjunction with the Supplementary Planning Document. It provides the detailed policy guidance which developers will need to consider when submitting planning applications.

Developers should refer to the SPD, Section 1 to understand:

- Birmingham's vision
- The SPD policy context
- The SPD status
- The SPD content
- What is included
- SPD Objectives

Section 2 of the SPD outlines:

- How to use the SPD
- Sustainability in the Planning Process
- Sustainability Checklist
- Links with Design and Access Statements
- Carbon Budget Statement

We ask developers to submit the following Statements alongside their planning application:

- Sustainability Statement
- Design and Access Statement
- Carbon Budget Statement

The remainder of this Detailed SPD Policy Guidance provides further detail which will help developers in working through the above requirements. This includes:

- Sustainable Communities
- Green Infrastructure and Climate Change Adaptation
- Sustainable Transport
- Low and Zero Carbon Energy
- Water Efficiency
- Sustainable Construction and Waste



2. Sustainable Communities



The Issues

Birmingham is a City of just over a million people, it is anticipated that the population will grow by 122,000 with 50,600 new homes planned for the City by 2026. New homes will be supported by economic growth with the creation of in excess of 100,000 additional jobs. This substantial level of development in the City will place considerable pressure on the City's environment, transport systems, energy infrastructure, green infrastructure, community infrastructure and services. It is therefore important that the City's growth is sustainable.

Creating sustainable communities and neighbourhoods will be an essential part of ensuring that growth is sustainable. Sustainable places are those that: meet the needs of various sections of the community, that enable people to live in a high quality environment that are designed using good urban design principles, create sense of place, retain local character and heritage, provide a choice in the quality, type and affordability of housing, provide a range of opportunities for work, education or training, a diverse range of community facilities and infrastructure within easy reach by a range of sustainable modes of travel and have a low impact on the environment.

This section provides guidance on how developers can ensure that their developments are helping to achieve sustainable communities.

Birmingham's Approach

Birmingham 2026: our Vision for the Future is Birmingham's Sustainable Community Strategy which sets out five key outcomes for the City. People will be able to:

- Succeed economically;
- Stay safe in a clean, green city;
- Be healthy;
- Enjoy a high quality of life;
- Make a contribution.

In achieving these outcomes, the Sustainable Community Strategy identifies four key principles to guide the City's actions these include: prevention – to stop problems developing; targeting – protecting and nurturing vulnerable people and tackling disadvantaged communities; personalisation – ensuring services are tailored to people's needs; and sustainable development – improving the quality of life of our citizens and achieving a sustainable economy while living within environmental limits.

This section provides further guidance to developers on how they can comply with SP3 (Quality of life); SP4 (Sustainable Neighbourhoods); SP30 Design quality of new housing and residential development and SP36 (accessibility standards for new development).

Further guidance is provided in the New Residential Developments SPD (not yet written).



Table 2.1 - Sustainable communities requirements mandatory and where feasible

	Policy	Requirement	Applicant to consider and show evidence of
Mandatory	SP3	Ensure that a choice of housing is available to meet all needs.	Does the development include a mix of dwellings size, types and tenures? What proportion of dwellings will be designed to Decent Homes standards? Is the development accessible to those that have to use a wheelchair or have difficulty accessing buildings?
	SP3	Ensure that Birmingham's historic heritage is protected.	Does the development retain, adapt and reuse heritage assets?
	SP30	New housing should be constructed to the relevant CfSH level.	What level of CfSH do the residential units meet?
	SP30	New housing should be designed to Lifetime Homes criteria.	What proportion of dwellings will be designed to Lifetime Homes standards?
	SP30	New housing should incorporate crime reduction measures. Proposals should achieve 'Secure by Design' accreditation.	Is the development designed according to the principles of Secured by Design ¹ ? Is the development designed in accordance with good urban design principles (e.g. good natural surveillance of public spaces, secure backs)?
	SP30	New housing to provide open space in accordance with Policy SP45.	How much open space is within the vicinity of the site? Is the development providing enough open space on site?
	SP36	New residential development should demonstrate that they are accessible to a range of local services such as GPs, primary schools and secondary schools.	To what extent does the development provide a mix of uses on site? Has the development been designed with access to sufficient community infrastructure in the locality and or on site?
	SP36	For major developments that individually or in combination will generate 500 person trips per day will require - an appropriate level of public transport provision; public transport stops within 80m of main focal point for the location; good cycle access with cycle stands and shelters; good pedestrian access.	Does the development include safe and convenient pedestrian and cycle routes that connect the development to the wider pedestrian and cycle network and the main transport interchanges? Does the development include sufficient secure cycle parking and/or other cycle facilities? Does the development incorporate quality public realm that encourages walking and cycling?
	SP37	Developers required to include the necessary physical infrastructure to accommodate open access information and digital communications (ICT) networks as an integral part of new developments.	Does the development include access to 'superfast' broadband?
	SP45	2ha of open space and 1.2ha of public or private playing fields per 1,000. All residents to have an open space within 400m. All residents to have a play ground within 400m.	How much open space is within the vicinity of the site? Is the development providing enough open space on site?

¹ Secured by Design is the UK Police initiative to support designing out crime. www.securedbydesign.com

Table 2.1 - Sustainable communities requirements mandatory and where feasible (Continued)

	Policy	Requirement	Applicant to consider and show evidence of
Mandatory	SP48	Plans for development will be expected to: identify potential development assets and constraints; assess the character and context of the development site and surrounding area and buildings in order to interpret and emulate features and characteristics.	Does the development protect cultural assets? Does the development create a sense of place?
	SP48	Development proposals should follow principles of good urban design including: locating mixed use developments in centres or areas with good access; linking the development to existing networks of routes; creating places that are easily understood, safe and accessible; integrating landscaping into the development; retaining mature trees and planting new trees.	Does the development incorporate the principles of good urban design?
	SP50	Development proposals will be required to demonstrate a full understanding of the historic environment assets affected.	Does the development impact on any historic environment assets? Does the design of the development seek to integrate the historic environment? Does the development seek to protect and enhance historic assets?
	SP51	Tackle health issues through: provision of open space and sports facilities; create environments conducive to cycling and walking; improve air quality and reduce noise; provide good quality and design of housing and improving existing housing stock; promote health care; and promote safe residential environments.	Is the development designed to promote and encourage healthy lifestyles; such as a Walkable City?
Where feasible	SP50	Innovative design which integrates the historic environment into new development will be encouraged.	What design techniques has the development included to incorporate the historic development within the design?

Quality of Life

To create sustainable communities where people want to live, a quality living environment is crucial. Developers will need to set out in their design and access statement how they have followed the principles of good urban design.

The Council has set out the principles of good urban design that developers will be expected to including in their developments (SP48):

- Locating mixed use developments in centres or areas with good access - see 'access to services' below for further guidance.

- Linking the development to existing networks of routes – see layout and design and sense of place below for further guidance.
- Creating places that are easily understood, safe and accessible - see layout and design, sense of place, and 'safe and secure communities below for further guidance;

- Integrating landscaping into the development; retaining mature trees and planting new trees – see Section 3 for guidance on integration of green infrastructure.

Layout and Design

Developers will need to consider the development form (including layout, landscaping, density and mix of uses, scale and appearance) when designing their development, as this will be crucial to achieving the Council's objectives for good urban design in particular linking development to existing networks and routes, and creating places that are easily understood (legibility) safe and accessible.

To achieve the urban design objectives developers will need to consider the layout of development and consider various key questions:

- Urban structure - the framework of routes, spaces and the connections between spaces
 - » Does the development layout create physical connections with existing routes to and through the site?
 - » Does the development layout create or enhance visual links between places?
- Urban grain – pattern of streets, blocks, plots and buildings
 - » Does the development's urban grain respect the existing urban grain?

- » Does the development create landmarks or focal points that can be used to create places that are easily understood?

• Landscape

- » Does the development complement the sites existing character and land form?
- » Does the development integrate landscape in a way that assists with connecting the development to existing networks?

Developers will need to consider the design of development and consider various key questions:

- Scale
 - » Does the approach to height and massing of buildings relate to the street, in a way that will maintain or enhance legibility?
- Appearance
 - » How has the development used materials in a way that will assist in creating places that are easily understood, safe and accessible?

The measures that will be required to incorporate good urban design principles into the layout and design of developments will depend on the scale of the development. The potential measures that developments could include are identified below:




	<p>Small Development</p> <ul style="list-style-type: none"> - Small, single plot commercial developments - Residential blocks, business centres etc. 	<p>Potential Measures</p> <ul style="list-style-type: none"> - Carefully consider character and relationship to context - Maximise active frontage at ground floor - Ensure future flexibility of use for robustness - Ensure protection of existing habitats, vegetation and trees - Procure high quality architectural and urban design
	<p>Medium Development</p> <ul style="list-style-type: none"> - Multi unit residential/ mixed use schemes - Modest commercial regeneration - Brownfield site infill 	<p>Potential Measures (Small +)</p> <ul style="list-style-type: none"> - Locally appropriate scale and design approach - Sensitive to heritage context - Access and parking minimises local impact - Maximise pedestrian permeability and accessibility - Provide a high quality public realm - Procure high quality architectural and urban design
	<p>Large Development</p> <ul style="list-style-type: none"> - Major City centre commercial and mixed use - Sustainable Urban Neighbourhoods 	<p>Potential Measures (Small and Medium +)</p> <ul style="list-style-type: none"> - Connect development in to the city grain - Minimise the impact of parking using basements - Consider the mix of uses and resulting activity profile - Provide integrated green transport options - Reuse historic buildings where appropriate - Procure high quality architectural and urban design

Figure 2.1 - Principles for good urban design

Sense of place

Creating a sense of place is a key outcome of good urban design and will be important to achieving sustainable communities and creating a high quality environment where people want to live and work. Sense of place is related to a variety of elements within a location including building and landscape character, quality of the public realm, the mix of uses, cultural and heritage assets, and the community that live and work there (see Figure 3.2). Sense of place varies location to location and it can be affected by new development. Developers will need to consider how their development fits within the wider context and how it complements or creates a sense of place.

Developers will need to show through their design and access how potential development assets and constraints have been factored into the design of the development. Developers will also need to assess the character and context of the development site and surrounding area and buildings in order to interpret and emulate features and characteristics that are considered good (SP48).

To meet the Council's requirements developers should show that they have considered the following:

- Heritage Assets – landscapes, built heritage and archaeology.
 - » Are there any heritage assets on the site or in the surrounding areas?
 - » How has the development protected or enhanced heritage assets?
 - Character – identity of a place.
 - » Does the development include landmarks, gateways or focal points?
 - » Has the developments use of materials taken into consideration use of local materials, building styles and techniques?
 - Public realm – streets, parks and squares and spaces around buildings.
 - » Does the development enhance the public realm?
 - Community – the people who live, work and visit a place.
 - » Does the development reinforce and strengthen the sense of community with appropriate community facilities?
 - » Does the development meet the needs of Birmingham's ethnically diverse population?
- » Does the development include an appropriate range of housing, type, size and tenure?
 - » Does the development provide opportunities for people to work close to home?
- Mix of uses – Range and type of uses on site or within an area.
 - » Does the development include an appropriate mix of uses?
 - » Are uses compatible with surrounding uses?

Sense of place can operate on varying scales from the local to the City scale. Developers will need to consider how their development operates within the local area, within the quarter and within the City itself. Small scale developments are only likely to have an impact at the local scale and therefore the approach to development will necessarily be more locally focused. However, at the bigger scale, developments may be creating new neighbourhoods which will create their own sense of place, although they must still

respond to their surroundings to ensure that they connect to existing communities. Some large scale developments will be of City wide significance, in these cases developers will need to consider how the development contributes to Birmingham's sense of place as a City, these developments are crucial to the identity and perception of Birmingham and the quality of these developments therefore needs to be world class.



Adaptable buildings
Lifetime Homes Standards

Currently all housing built to level 6 of the Code for Sustainable Homes, must be built to Lifetime Homes Standards. Policy SP30 states that new housing should be designed in accordance with Lifetime Homes criteria.

The Lifetime Homes Standards set out inclusive design principles. The principles enable housing to meet the existing and changing

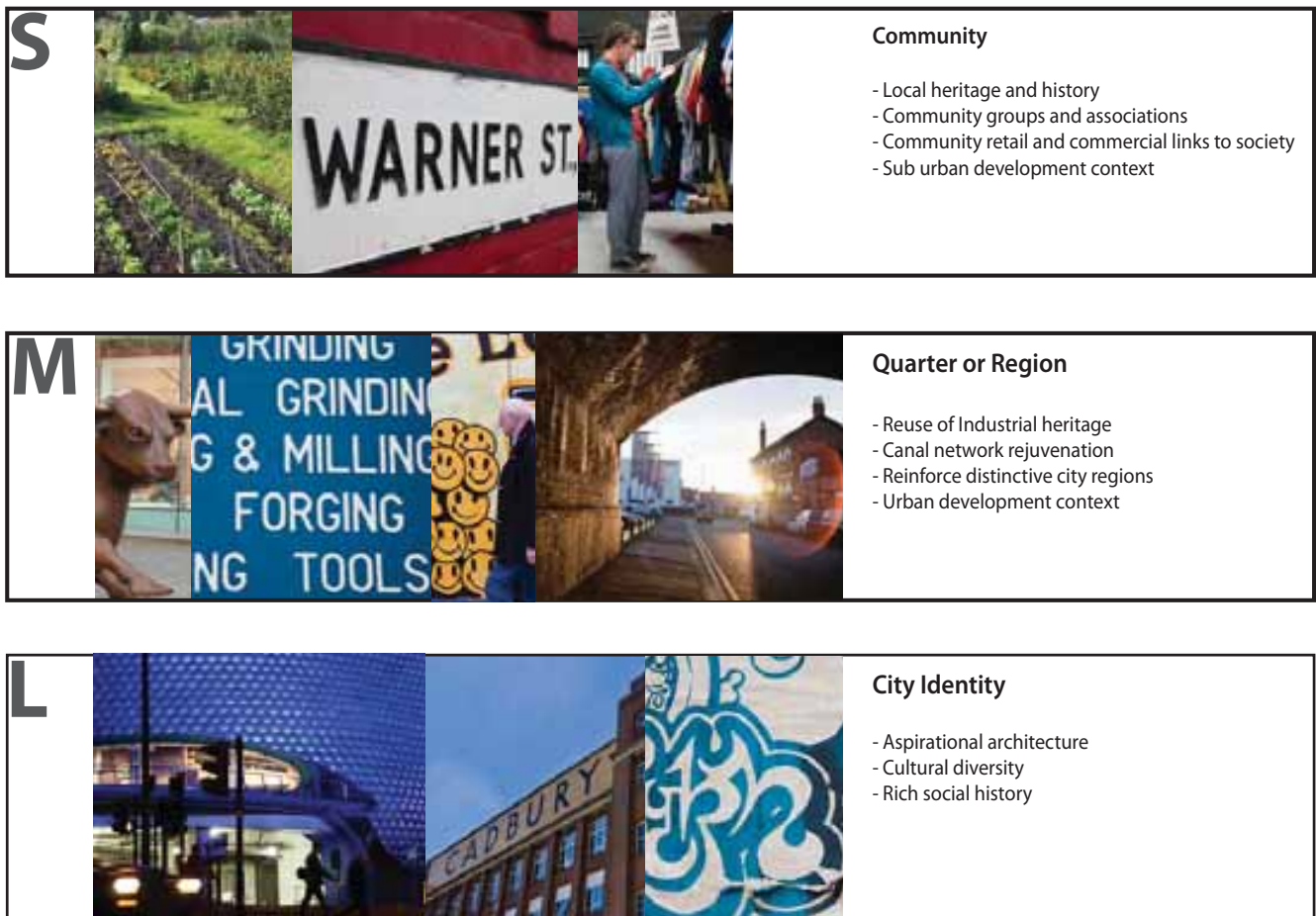


Figure 2.2 - Sense of place depending on scale of development

needs of diverse households. The design principles are either built in at the outset or can be achieved through simple adaptation. Lifetime Homes are convenient for most occupants, including some (but not all) wheelchair users and those with disabilities. Lifetime Homes are not a substitute for purpose designed wheelchair housing.

As Lifetime Homes are designed to meet changing needs, people are able to remain at home and live

independently for longer. Because older and disabled people can remain in their homes if they choose to, this adds to the social cohesion of a community.

Lifetime Homes Standards includes 16 design criteria that need to be met to achieve the standard. The criteria are highlighted on Figure 3.3 below.

Further information including the criteria for Lifetime Homes see www.lifetimehomes.org.uk

Wheelchair accessible housing

There is currently no planning policy requirement in Emerging Core Strategy to require developers of market housing to build homes that are specifically designed for people who use wheelchairs or that are capable of being easily adapted for wheelchair use. However, there is an increasing demand for



Figure 2.3 - Lifetime Homes Standards Criteria

wheelchair accessible homes, and providing these types of homes will be important for creating sustainable communities.

For those units that are easily adaptable for later occupation by a wheelchair user they will exceed minimum spatial requirements of Part M of the Building Regulations (See Building Regulations Part M 2004 Edition for minimum requirements).

Homes that are fully fitted out for a wheelchair users should follow the requirements set out in The Wheelchair Housing Design Guide (2nd Edition) by Stephen Thorpe and Habinteg Housing Association published by BRE press. Homes built to the standards set out in the guide enable immediate occupation by a

wheelchair user or easy adaptation, and are therefore different to Lifetime Homes, although they have some similar features.

Where wheelchair accessible homes are included in a development this should be clearly articulated in planning drawings along with any features that make a home wheelchair accessible, and this should be referred to in the design and access statement.

Healthy Communities

The Council will expect developers to show how they are helping to tackle health issues in accordance with Policy SP51. This means developers will need to show how their development is:

- Providing access to open space

and sports facilities to help tackling obesity. The following provides some guidance on access to open space.

- Creating environments that are conducive to walking and cycling - for advice on creating environments conducive to walking see section 4 on sustainable transport.
- Providing good quality housing – see guidance on application of decent homes
- Promoting safe residential environments - see guidance on Safe and Secure Communities.

Access to services, community facilities and open space

Access to a range of community facilities and open spaces within easy reach of home has a positive impact on people’s quality of life (see Figure

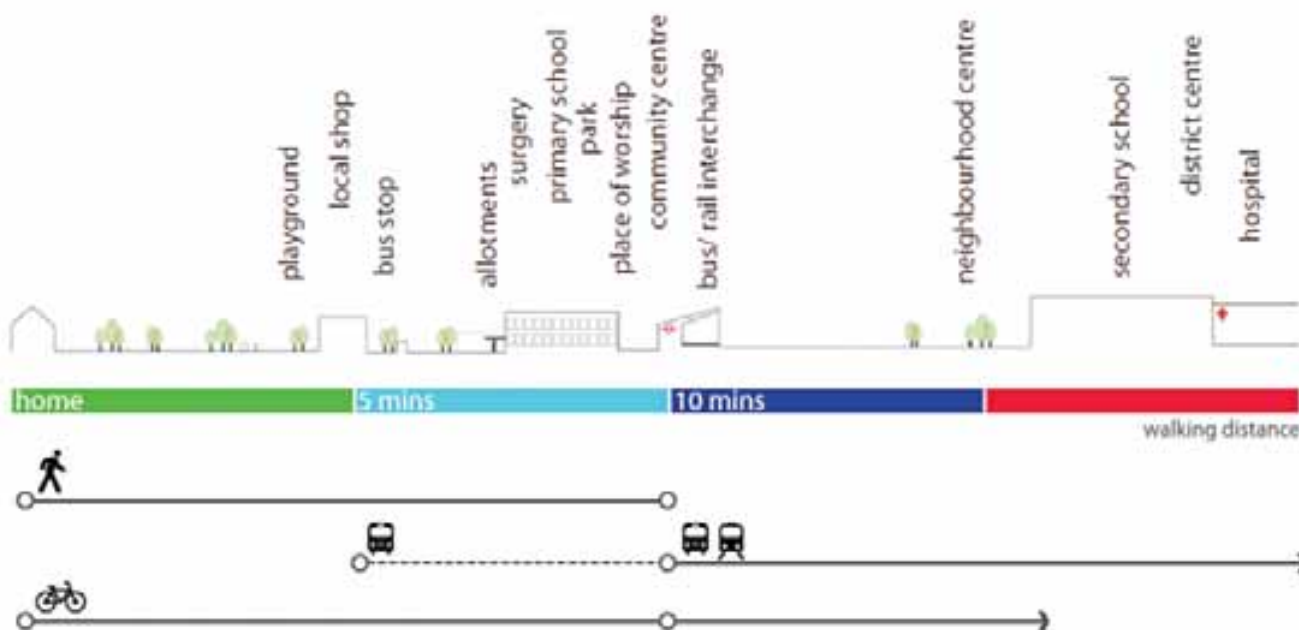


Figure 2.4 - Access to services

3.4). The Council requires developers of new residential development to demonstrate that their development is accessible to a range of local services (SP36). New residential developments are also expected to provide a sufficient open space, playing pitches, and play grounds in accordance with the quantity, quality and accessibility standards set out in policy SP46.

Applicants for residential development should identify on a map facilities within 400m, 800m and 1.2km catchment of their site, including:

- GP
- Primary School
- Secondary School
- Open Space – parks, allotments and children’s play areas
- Community facilities – places of worship, community centre

Application of Decent Homes.

The Decent Homes standard is a minimum standard that all council and housing association housing (except leasehold and shared ownership properties) must meet by 2010. Social landlords and local housing authorities may deliver housing above this standard. The Housing Health and Safety Rating System (HHSRS) assesses housing against 29 Category One Hazards that are split into four categories:

- Physiological requirements, that include excess heat and cold,

- damp and mould growth etc;
- Psychological requirements, that include crowding and space, lighting etc;
- Protection against infection, that includes water supply, sanitation etc; and
- Protection against accidents, that includes falling from stairs, and levels, fire etc.

Although Decent Homes Standards are a minimum standard that apply to council and housing association, developers of private housing should consider the requirements of the standards when proposing new housing or refurbishment of existing housing.

Further guidance on Decent Homes is set out in *A Decent Home: Definition and guidance for implementation, CLG (2006)*.

Requirement	How Measured
Meets the current statutory minimum standard for housing	<ul style="list-style-type: none"> • Dwellings that have one or more of the hazards under the HHSRS will fail to meet this criterion.
Reasonable state of repair	<ul style="list-style-type: none"> • Key building components are in good condition and do not need replacing or major repair. • Key components are those, which, if in poor condition, could have an immediate impact on the integrity of the building. • All other building components should be in a decent state of repair.
Has reasonably modern facilities and services	<ul style="list-style-type: none"> • Dwellings which lack three or more of the following will fail on this criterion. • Reasonably modern kitchen (20 years old or less). • Kitchen with adequate space and layout. • Reasonably modern bathroom and WC. • Adequate insulation against external noise. • Adequate size and layout of common areas for blocks of flats.
Provides a reasonable degree of thermal comfort	<ul style="list-style-type: none"> • Must have effective insulation and efficient heating.



Safe and Secure Communities

The design of buildings and the public realm can have a significant impact on reducing the opportunity for crime and the fear of crime, and can create a safer and more secure environment. Creating a safer environment is an important aspect of a creating a sustainable community.

'Secured by Design' (SBD) is the UK Police initiative to support the principles of designing out crime in new and refurbished residential and commercial premises. The Council expects new housing to achieve Secure by Design accreditation (SP30).

Developers should refer to the Design Guides on the Secured by Design Website:
www.securedbydesign.com/professionals/guides.aspx

To achieve SBD it is essential that developers consult with the local Crime Prevention Design Advisor (CPDA) at the earliest possible stage in the design process. Developers will need to apply to the CPDA for an SBD award filling out the appropriate form (these can be found here www.securedbydesign.com/professionals/sbd_developers_award.aspx) and providing copies of the plans and schedules of security specifications.

Further guidance can also be found in:

- Safer Places - The Planning System & Crime Prevention (2004) ODPM
- Good practice Companion Guide Places Streets and Movement ODPM

The principles of 'designing out crime' include:

Issue		Principles
Environmental Quality	Poor quality environments	Can make people feel uncomfortable about using spaces. People are unlikely to feel a sense of ownership over such areas.
	Well designed environments	Attractive environments are those that are attractive, clearly defined and well maintained. They will make people feel comfortable create a sense of ownership and responsibility. They meet the needs of legitimate users and therefore are less attractive to those intent on crime or anti-social behaviour. Clearly defined spaces are those where there is no ambiguity between private and public spaces, and how they relate to each other.
	Anonymity	Avoid designs that create opportunity for offenders to be anonymous, as anonymity provides more opportunity for offenders. In particular it is important to ensure that the relationship between public and private space is addressed so that property owners can exercise a degree of control over these 'transitional areas'.
	Site management	Design should facilitate ease of maintenance and management. Poorly maintained buildings and public realm will discourage use and can lead to vandalism and other anti-social or criminal behaviour.
	Landscape design	Avoid the creation of opportunities for crime (e.g. providing hiding places). Open space should be designed with a function in mind rather than being left over space.
Natural Surveillance	Overlooking	Where the likelihood of being seen is low, the risks perceived by potential offenders are also low. Design spaces around buildings, footpaths, open spaces and parking areas to ensure they are open to view from adjoining properties or premises and well used routes. This will discourage criminal activity by increasing the risk of detection.
	Activity	Design spaces that will attract more people to increase natural surveillance.
Access and Footpaths	Access design and escape routes	Adequate access is important to meet functional and recreational needs. However, multiple footpaths and points of access can make crime easier as it provides a choice of escape routes. Therefore careful attention needs to be paid to the design of access. Uncontrolled rear access ways to buildings and footpaths that are secluded are strongly discouraged.
	Perceptions and safety	Where an access route is deemed desirable it should be designed so that it will be perceived to be safe and minimises the opportunities for it to be used to commit crimes.
	Footpaths and cycle paths	Poorly located or designed footpaths can provide opportunities for unobserved access to the rear of buildings, offer means of escape and opportunities for crimes against people. Poorly designed or sited paths may give rise to fear of crime. The knock on effect is reduced levels of use.
	Road design	For private or semi private areas changes in surface colours or materials or the use of physical or psychological barriers such as gates or thresholds can help to create a sense of ownership and deter offenders.
	Canals and rivers	There are particular issues where rivers provide public access. In urban environments 'double fronted buildings' ensure that both the waterside and street are overlooked.
Open Space	Amenity space	Provision of open space should be an integral part of design and functions must be clearly defined. Open spaces can be associated with issues such as gaining access to properties and anti-social behaviour. Design quality, degree of natural surveillance, standards of maintenance and level of use, will all be factors in minimising these issues.
	Long term management	Management systems will need to ensure grounds, buildings and structures are in good condition and free from litter, graffiti and vandalism. Poor maintenance can encourage anti-social behaviour such as vandalism. Developers will need to show that adequate measures are in place for the future maintenance of open space (either through the transfer of ownership to the local authority or through establishment of a residents' management company).
Lighting	Lighting	Increasing the level and consistency of lighting can help reduce the fear of crime. In designing lighting, the objective is to increase intensity and avoid deep shadow. Care needs to be taken to ensure that light spillage or pollution is kept to a minimum and to avoid harmful effects on ecology or heritage assets

3. Green Infrastructure and Climate Change Adaptation



The Issues

Climate change is already happening, and the impacts will become increasingly significant for Birmingham's built environment and the people who live, work and visit the City. Climate projections for Birmingham have identified various effects, table 4.1 identifies the effects and impacts of climate change and possible benefits of adapting development to climate change.

This section provides guidance to developers on adapting to climate change through site layout and building design, whilst maintaining zero and low carbon approaches. One method of achieving this is through using green infrastructure (GI). This section also details the role of green infrastructure in adapting to climate change and its wider role in sustainable development.

This section also provides guidance on how development can be designed to be more resilient to impacts of climate change, by providing guidance on the urban heat island and flood management.

Table 3.1 - Effects and impacts of climate change

	Effect	Impacts	Benefits of Adaptation
Temperature	Increased annual temperature	Human health (heat stress)	Ensuring building longevity
	Likely 5.2°C summer max by 2080	Business disruption – inability to use premises through overheating	Ensuring business continuity
	Exacerbated urban heat island		Reducing long term running and insurance costs
Precipitation	Annual precipitation not expected to change	Increased risk of flooding (damage to humans, wildlife and property)	Attractive to investors and buyers
	Wetter winters and drier summers	Increased risk of drought (damage to humans, wildlife and property)	Enables better risk management
		Strain on water resources and quality	Improves working and living conditions
Extreme Weather	Heatwaves, heavy rainfall, gales and storms and excessive cold and snow	Human health (psychological, possible injury or death)	Improves air quality
	Frequency and severity will increase	Business disruption	Will create a more walkable city Lead to a greener city environment Maintain and enhance the presence of wildlife in the city

Birmingham's approach

The Council's Climate Change Action Plan 2010+ identifies key early actions that include ensuring that major developments and eco-neighbourhood areas include mitigation and adaptation to climate change as key components. The Council's Climate Change Adaptation Action Plan 2012+ which is in draft form, provides details on climate change impacts and opportunities.

This section of the SPD provides guidance on how developments can achieve this. It sets out what a developer / applicant will need to

do to show that they have taken on board the policy on climate change adaptation (SP6), and what evidence they need to provide.

Birmingham's approach has been to use Geographic Information System (GIS) mapping (BUCCANEER Project) to understand the varying degree of climate change impact across the city on two key areas:

- Temperature and the urban heat island
- Flood risk

Developers need to take into account this mapping to assess how extreme weather and climate impacts will vary depending on their site location.

Developers will need to consider Birmingham's Draft Green Infrastructure Strategy (2012) which identifies the City's existing green infrastructure networks (GI) and seeks to strengthen them through protection, restoration, enhancement and creation of green infrastructure.

Table 3.2 - Green Infrastructure and Green Climate Change adaptation requirements mandatory and where feasible

	Policy	Requirement	Applicant to consider and show evidence of
Mandatory	SP6	Demonstrate how the design of development minimises overheating and reduces reliance on air conditioning systems	Layout and design to: <ul style="list-style-type: none"> • Maximise the use of natural ventilation and cooling • Minimise the use of mechanical cooling • Mitigate the effects of the heat island
	SP6	Demonstrate how the development integrates GI as part of the design (SP6)	Does the development maintain and/or enhance existing open spaces on the site? Does the development integrate with the City's wider network of GI? Can the scheme contribute to filling existing gaps in the GI network? Can this support adaptation approaches?
	SP10	FRAs required for all sites over 1ha located in flood zones 2, 3a and 3b. Also required for sites considered to be at risk from flooding this includes sites that are susceptible to surface water or groundwater flooding.	Is the development located in accordance with the flood risk zones set out in PPS25? What measures have been taken to reduce the risk of flooding and manage the risk of flooding elsewhere? Are the buildings together with the site layout and GI designed to repel or minimise the impact of extreme weather conditions?
	SP11	Development that would affect the integrity of a linear corridor will be refused.	How does the development integrate or effect the City's wider network of GI?
	SP11	New development should allow for tree planting in both private and public domains.	Does the development protect existing trees and or increase the amount of tree cover on site? How does the scheme provide for the long term survival of all trees introduced?
	SP49	Development that may directly or indirectly harm sites of national importance for biodiversity or geology will not be permitted.	Does the development protect existing sensitive species and enhance, protect or create habitat?
Where feasible	SP6	Provide accessible green/brown roof to aid cooling and enhance biodiversity and promote sustainable drainage.	How can the scheme include living walls and/or green/brown roofs?
	SP6	Maintain and enhance the canal network to reflect the canals role in urban cooling & connectivity.	Is the development near to the canal network and if so, have you considered making use of the canal network for cooling?
	SP10	The expectation is that natural drainage of surface water will be achieved.	How has the development been designed to manage surface water and run off?
	SP10	Opening up of culverted streams and rivers is encouraged.	Does the site affect rivers? If yes – how can these be enhanced or returned to a more natural state?
	SP10	Measures that increase wildlife and amenity value of natural water features are encouraged.	Does the site include natural water features? If so can these be enhanced to encourage biodiversity?
	SP11	New development is encouraged to create new GI such as green/brown roofs.	Does the scheme include living walls and or green/brown roofs?
	SP49	Development proposals should contribute towards objectives and targets in the LBAP, biodiversity enhancement measures should be appropriate to the nature and scale of the development proposed.	Does the development protect existing sensitive species? How can it enhance, protect or create appropriate habitat?
	SP51	Tackle health issues through design & layout solutions that improve air quality and reduce noise; improve or provide open space; improve accessibility - cycling and walking; and promote safe and adapted residential environments.	Is the development designed to promote and encourage:- <ul style="list-style-type: none"> • Healthy lifestyles? • The Walkable City? • Adapted and sustainable communities? • Contribute to a Natural Health Improvement Zone?

Site layout and building design principles

Sustainable site layout and the building design principles can help adapt to climate change impacts, including:

- reducing heat risk and the urban heat island (UHI);
- managing flood risk;
- reducing the strain on water resources and quality;
- reducing effects on building fabric and infrastructure;
- reducing the affect on human comfort and how people use the urban environment.

Site layout and building design principles will also be important in retention and incorporation of historic buildings and other heritage assets.

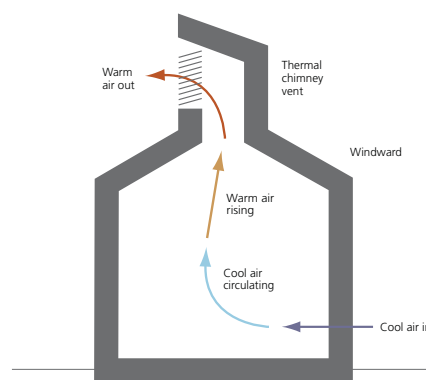
Urban heat island

To minimise the impact of the UHI developers can use the site layout and building design. The aim of these measures is to reduce the capacity of buildings to absorb and store heat, therefore lowering exterior and interior temperatures, making temperatures more comfortable for people and reducing the need for costly and energy hungry air conditioning. These measures either need to be applied at the site or neighbourhood level, or at the building level as follows:

- Site / Neighbourhood level
 - » Increase ventilation – natural ventilation should be increased through orientation

of buildings and streets to provide cooling, and reduce the need for mechanical cooling.

- » Use of cool building materials- light colours allow evaporative cooling and do not store heat efficiently.
- » Use of porous pavements (including porous materials) – porous pavements assist with tree growth (by enabling water to penetrate to roots) which assists with reducing the UHI effect (see below on green infrastructure).
- » Use of trees and greenspace (see green infrastructure and trees).
- » SUDs – such as filter strips and swales can help reduce UHI.
- » Water features – ponds, fountains, or canals and streams can be incorporated into design to provide cooling in summer months.
- » Density of development – high density although important for minimising travel and making efficient use of land, can have an impact on UHI and can reduce urban drainage capacity so where a high density approach is put forward, it will be important to ensure other measures are included to mitigate these impacts.



- Building level
 - » Use of cool building materials - cool or reflective building materials on roofs or facades. Cool roofs/facades made of light coloured materials to prevent solar heat gain and reduce need for mechanical cooling these can be cheaper than green/brown roofs and can be more effective on buildings with a high roof to volume ratio 1 or 2 storeys.
 - » Building envelope insulation, thermal storage or thermal mass (absorbs heat during hot periods so that it can dissipate in cooler periods (usually using ventilation) ground coupled systems make use of thermal storage in the ground.
 - » Screens and sun shelters, or overhangs to provide shade.
 - » Thermal chimney vents and louvres to allow natural cooling.



Integration of green infrastructure

GI is the network of green spaces and blue corridors and features that are found within the city, that includes parks and gardens, natural and semi-natural greenspaces, green and blue corridors, outdoor sports facilities, amenity greenspace, community assets (e.g. churchyards, allotments, community gardens), and GI design features (green/brown roofs, SUDs, swales, and street trees). Green infrastructure also provides links to the countryside beyond the City boundaries (e.g. Forest of Mercia, Black Country Canals etc.).

Birmingham’s Draft Green Infrastructure Strategy (2012) identifies the City’s existing GI networks. Developers will need to take account of any existing GI on their development site and the networks of GI in the surrounding neighbourhood. It will be important for new development not only to reinforce and enhance existing but also to provide new GI. The GI Strategy identifies seven city-wide GI principles.

Table 3.3 - Birmingham city - wide GI principles

Principle	Output
The City’s Productive Land	<ul style="list-style-type: none"> • Endorse the Birmingham Forest • Promote allotments • Facilitate community food growing, orchards, and woodlands • Embed biomass production
The City’s Greenways	<ul style="list-style-type: none"> • Adopt A Walkable City • Greenway networks • “ Quiet Roads” • Permissive access rights
The City’s Ecosystem	<ul style="list-style-type: none"> • Ecosystem Evaluation of Birmingham’s GI and Trees • Explore new funding mechanisms & joint partnerships • Biodiversity mapping
The City’s Blue Infrastructure	<ul style="list-style-type: none"> • Adopt a Blue Corridor Policy • Enhance the wider Blue network. • SUDS & flood & water management • Enhance water quality & riparian habitat
The City’s Green Infrastructure	<ul style="list-style-type: none"> • Adopt a Birmingham Index for GI • Sustainable tree planting policy • Introduce a Birmingham GI Index • Habitat permeability
An Adapted City	<ul style="list-style-type: none"> • Adopt GI Solutions to the Urban Heat Island • Green and brown roofs & living walls • Protection of natural & built heritage • Integrate public health concerns
A Healthy City	<ul style="list-style-type: none"> • Adopt Natural Health Improvement Zones (NHIZ) • Introduce sustainable land management principles. • ‘Be Active’ neighbourhoods • Childhood development

The integration of GI within new development will play an important role in climate change adaptation for Birmingham, for several reasons: green infrastructure can have a cooling effect on urban temperatures; GI assists with flood management; GI helps with protection of habitat by providing a connected network of habitats (in gardens, allotments, amenity greenspace, green/brown roofs etc) which enable species to migrate through the landscape in response to climate change impacts; and integration of GI can help with protection of heritage assets, including archaeology, built heritage and historic landscapes.

As well as climate change adaptation, the protection, restoration, enhancement and creation of GI has a range of economic, social and environmental benefits including: providing recreational, cultural, social and educational opportunities; providing routes for wildlife, walking and cycling; creating a sense of place; raising property values; boosting economic potential; enhancing quality of life, enabling food production; and promoting health and well being.

Development should be designed to protect any GI within the development site and in particular ensure that the role they play in climate change adaptation (such as flood management, or cooling) is not affected by the development. Most new developments will generate a need for some new GI as a result of new resident or worker needs and applicants will need to show that they are providing open space in accordance with policy SP45. As GI delivers such a wide range of benefits developers will need to consider it early on in the design process.

Developers will need to ask some key questions about GI as they develop their design that include:

- How does the site fit within the existing network of GI?
- What are the functions of the existing GI assets in and around the site?
- How well does the existing GI function, does it need to be maintained or enhanced?
- What scale and type of GI needs will the development generate?
- How will the site restore or maintain GI?
- What benefits can GI provide for climate change adaptation in terms of flood storage, climate cooling and habitats creation?

- How can the development address each of the City's seven GI principles?

Where development includes the creation of new GI the multi-functionality of the GI will be important, for example spaces such as outdoor sports facilities, although providing a specific role for sports could also accommodate habitat areas and or flood storage features on part of the site, contributing to climate change adaptation.

New development, where possible, should aim to fill gaps in the currently fragmented GI network. The following sections provide guidance on how applicants can incorporate Birmingham's seven GI principles into their development.

The City's Productive Landscapes

Food production

Local food production is once again increasing in popularity, as a result of rising global food prices, a greater desire to know the provenance of food and a desire to reduce the food miles and carbon foot print of food.

In appropriate parts of the City developers should consider the inclusion of small gardens to enable residents to carry out domestic food production. In locations where individual gardens are not possible, developers should consider the inclusion of community gardens to allow residents to grow their own produce.

Developers should also consider whether there is scope to include community orchards or edible landscapes into their GI framework for the site. Edible landscapes are

those where many or all of the plants chosen have an edible product - usually fruit, berries or nuts, but can also be flowers, leaves, bark or sap. Edible landscapes can provide colour and interest throughout the year, provide a freely available source of food for both people and wildlife, and also provide an excellent way of getting people to engage with and connect with nature.

Birmingham Forest

The City has adopted a wholesale concept approach to the urban forest in the city, under this working title. The City is viewing the entire tree canopy as one system, regardless of ownership. As part of this new adopted approach the City is currently undertaking an "i-tree-eco" evaluation of the city's entire tree stock. Part of this evaluation will consider how the

City could better manage its urban forest in future to provide a sustainable source of wood fuel. This is just one potential benefit from urban forests or trees in cities.

Birmingham is fortunate in its historic legacy of inherited trees, many of which have their origins in the city's early industrial past, as part of the planning and development of a relatively young city; Birmingham celebrated its centenary in 1989. The citizens of Birmingham have universally benefitted and enjoyed many of the benefits of this historical planning approach. With the advent of climate change - ironically accelerated through the very process of industrialisation - there is a real need to re-prioritise the importance of trees for the future liveability of the city.

To reflect this universal approach the City is including this future commitment to urban forestry within its planning documents, principally the Emerging Core Strategy; within its long-term Energy Strategy through to 2050; and within its Public Health strategies, embracing the multiple social benefits of trees.

Trees

Applicants for all sites should carry out a survey of existing trees. This should include trees external to the site that may be impacted by development, identify how trees can be accommodated within the design and which trees should be retained. Retaining existing trees



on development sites and planting trees in new developments will offer a variety of environmental benefits that will assist with climate change adaptation, including: moderating climate; improving air quality; storm water management and creation of habitat for wildlife.

The City's Greenways

Recreation

GI provides people with an opportunity to enjoy open space for a variety of recreational pursuits from walking and cycling to sports and children's play. New developments will create a need for new GI to meet the needs of those who will live or work there. Applicants will need to show that they are providing open space in accordance with policy SP45.

Further guidance on providing open space in new residential developments is included in the SPD Public open space in New Residential Developments (2007).



GI can promote health and well being through promoting active lifestyles and improving air quality. GI can also encourage the use of sustainable modes of transport (such as foot or cycle) and therefore encourage reduced car use.

Developers will need to consider what GI is already at the site or nearby, the Birmingham Draft Green Infrastructure Strategy (2012) provides a map of the existing GI assets in the City, so developers will need to review their development site within this context. In particular they will need to consider what roles existing GI performs these could include: recreational (sports or informal); educational; cultural; heritage; ecological; structural; and amenity. There will also be a need to consider what facilities the GI provides and how these are meeting the needs of the existing population and those of the future population that the development will bring.

Provision of new GI should not simply be about providing a sufficient quantity of new space, it is also important to ensure that the GI framework for a new development is designed to ensure that GI is accessible to all, particularly those that have mobility difficulties. It is also important that people have access to a range of types of GI, to allow the differing needs of the community to be met.

In designing GI networks developers should ensure that connections to the wider network (beyond the site boundary) are included, and should consider how connections are made. Developers should also take account of the plans and priorities for improving the rights-of-way network set out in the Council's Right-of-way Improvement Plan.

Landscape

Landscapes can include a range of features including rivers, canals, historic parkland, natural or semi-natural greenspace, woodland to name some. High quality landscape features can create a sense of place, and help to reinforce local character. Creating a sense of place in new developments is an important aspect of creating places for the future that are sustainable places that people want to live.

Developers will need to show that their proposals respond to the existing landscape, both within and adjacent to the site. Responding to the landscape will mean ensuring that development proposals:

- create visual connections to the existing GI network
- conserve and enhance existing landscapes and heritage
- create new landscapes that complement and connect with existing GI
- ensure boundary treatments are appropriate.

Visual connections to the existing GI network are important as they help to link the development visually to the surrounding area. Developers should therefore create a design that maximises views and vistas to existing landscapes.

In designing GI networks developers should ensure that connections to the wider network (beyond the site boundary) are included, and should consider how connections are made.

Although providing for recreation is an important element of providing GI, there is a need to balance access by people with the need for biodiversity. GI frameworks should be designed so that they provide

recreational areas and access to wildlife areas, but not at the expense of habitat protection.

Where new GI is to be provided as part of development, developers will need to show that they have considered how recreational spaces will be managed in the long term, to ensure that they are sustained.

The City's Ecosystem

The proposed GI network has a role to play in conserving and enhancing existing landscape features in and around the site, and any historic features (buildings or structures, or landscapes) on or adjacent to the site.

Maintaining, enhancing and restoring sites of importance for biodiversity along with the habitats and corridors between designated sites is a crucial aspect of sustainable development.

Biodiversity can offer three key benefits that include:

- Providing products such as food, timber and fuel, crops for biomass heating, fresh water.
- Regulating various natural processes such as climate and floods, purifying water, absorbing pollutants, and reducing erosion.
- Other benefits such as creating sense of place, cultural heritage, peace and tranquillity, and a healthy environment.



Applicants will need to show that their proposals are in accordance with Emerging Core Strategy Policy SP49: Biodiversity and Geology.

Biodiversity and Geology

The Biodiversity Action Plan for Birmingham and the Black Country (LBAP) sets out priority habitats and species. Development will need to show how it is contributing to the objectives and targets set out in the LBAP.

Applicants will need to appraise the ecology of their site, and its surroundings before submitting a planning application. The design of any new development should integrate existing habitats for example rivers, or trees into the GI framework for the site. As well as integrating existing habitat into the GI framework new development should create connections to existing habitats surrounding the site. Applicants should use the Council's Biodiversity Opportunity Mapping series to identify opportunities for new habitat. Existing habitat could include, road side verges, railway lines, river and canals, cycle and walking paths. New development provides an opportunity to fill gaps in the existing GI network and reconnect previously isolated habitats through the creation of corridors between new GI and existing habitats. These corridors provide a safe route for wildlife to move along enabling plants and animals to disperse.

Where new biodiversity areas are included as part of development, developers will need to ensure that they have planned appropriately for the future management of these areas to ensure that they can be sustained long term.

The City's Blue Infrastructure

The Council's Sustainable Management of Urban Rivers and Floodplains (SMURF) SPD provides guidance for development that is located in river corridors in Birmingham. Developers who are proposing to develop in river corridors should take account of the guidance in the SMURF SPD.

The Environment Agency's Building a Better Environment is a guide

for developers providing advice on flood risk management, managing surface water, and other aspects of sustainable development.

Birmingham's emerging Surface Water Management Plan will be helpful in assessing the risk of surface water flooding, identifying options to manage risk to acceptable levels, and planning and delivery of actions that manage flood risks. Developers will need to take account of emerging surface water management plans.

The Flood and Water Management Act (2010) provides a more comprehensive management of flood risk. The Act introduced into law the concept of flood risk management rather than flood defence and



provides a framework for delivery. The Act encourages the use of SUDs for the management of surface water and establishes at the County and unitary level a SUDs approving body (SAB). The SAB will have responsibility for the approval of proposed drainage systems in new developments (in accordance with national standards for sustainable drainage) and for their adoption and maintenance once developed. The Act amends the existing right of connection to surface water sewers unless prior approval is granted by the SAB.

The Government is currently working with the Environment Agency on a set of National Standards for SUDs. The standards will set out the requirement for the design, construction, operation and maintenance of SUDS in England and Wales.

Location of Development

The Birmingham City Council Level 1 Strategic Flood Risk Assessment (SFRA) assesses and maps areas of known flood risk taking into account future climate change. It provides advice to the Council in allocating development sites, and it identifies opportunities for managing flood risk and promoting the use of SUDs. Developers should consider the risk of flooding at the earliest possible stage in the development process, this includes considering the map of flood zones produced by the Environment Agency (see below) and the Council's SFRA.

The Council will apply a sequential approach to development proposals that in order to manage the risks of flooding, vulnerable uses that are not compatible with the level of flood risk will not be allowed unless the 'exceptions' set out in PPG25 are met.

Rivers and Floodplains

Where development sites include natural drainage channels these should be maintained and incorporated into the landscape design of the development.

The Council will expect developments to maintain the natural character of rivers, and where rivers have been culverted or channelised these should be restored to a more natural state where appropriate (where flood risk will be reduced or not increased).

The floodplain provides natural storage for water. As potential for flooding increases with climate change, it will be increasingly important to retain the floodplain and restore it where possible.

Layout and Design

In managing flood risk, there are various measures that developers can include in the design and layout of their development. These measures can operate at either the wider neighbourhood scale or at the site level and include:

- flood attenuation and water storage in greenspace (as identified in the section above)

- managing flood pathways (to remove pinch points)
- providing sacrificial areas (open space or car parks) where water can collect during floods
- increasing drainage capacity
- SUDs.



Sustainable Urban Drainage (SUDs)

Traditional drainage methods of drainage seek to move rainwater from the point where it has fallen to a discharge point, either a river or soakaway. This approach can be harmful as impervious surfaces (pavements or buildings) in urban areas prevent rainwater from infiltrating into the ground. Rates of run-off can increase as further development takes place meaning that flood risks downstream of development can be increased. Other harmful effects of traditional drainage include the effect on water quality as surface water run-off can include harmful pollutants and effects on ground water as water is diverted into pipes and therefore not infiltrating the ground.

As the climate changes winter rainfall is expected to increase, and this is likely to increase the risk of flooding. Alternative approaches to traditional drainage are therefore required in new development, as well as retrofitting of existing developments.

SUDs are an alternative to traditional approaches to run off from buildings and hardstanding, they mimic natural drainage patterns, to reduce run off, encourage recharge of groundwater and provide amenity and biodiversity. Developers will need to show that they have fully considered the potential to accommodate SUDs on their site.

Prevention of run-off is a key part of the drainage solution, so developers should consider how the design of their development can incorporate measures to prevent run off, this could be reconsidering or reducing the paved areas within a development, or including measures to dispose of rainwater onto landscaped or grassed areas.

In selecting drainage methods to be used, developers will need to consider the impact on the natural, historic and built environment.

The drainage solution that is used will depend on the site in question, in most cases a combination of the following techniques will be required.

- Control at source – green/brown roofs (described in section below) and rainwater re-use (see chapter 7), porous pavements / surfaces
- Infiltration trenches and filter drains
- Swales, filter strips and basins
- Ponds and wetlands

Porous pavements and surfaces can be made from concrete, asphalt, open celled stones, and gravel or grass, the key thing being that water can soak away. Porous surfaces not only reduce run off, but have the added advantages of: replenishing groundwater; reduce the need for land to be set aside for retention basins; reduce pollutants run off; reduce irrigation requirements and help to cool water run off temperatures.

An infiltration trench is a shallow, rock / gravel filled excavated trench with no outlets. The run-off is stored in the void space between the stones and infiltrates into the soil below. Infiltration trenches can help to remove fine sediment and pollutants in rain water.

Filter drains include a perforated pipe which runs through a filter material (rock or gravel). This allows run-off to be stored and filtered and also infiltration into the surrounding soil. These can be used for draining roads.



Swales

Swales are vegetated depressions that drain water off impermeable areas. Swales are long shallow relatively wide channels, they allow the storage and conveyance of water. Filter strips are gently sloping vegetated areas of ground that allow the conveyance and infiltration of water. Swales can also be designed for a combination of conveyance, infiltration, detention and treatment of runoff. Swales are usually designed as conveyance systems, but can also be designed with check dams to increase attenuation and, where applicable, infiltration. Swales and filter strips are effective at removing polluting solids through filtration and sedimentation. The vegetation traps organic and mineral particles that are then incorporated into the soil, while the vegetation takes up any nutrients. Basins are designed to hold back storm water run-off. They are dry outside storm periods.

Ponds and wetlands can include either dry or wet ponds and wetlands. They can accommodate variations in water levels during storms. Algae and plants in wetlands can provide a good level of filtering. They can be fed by swales and filter beds, to create a linked drainage system.

Flood resilience

Managing flood risk can reduce the threat of flooding to buildings and infrastructure. Where buildings take in areas of low flood risk or residual flood risk, they will be susceptible to some flooding. It is crucial that developers ensure that their buildings are designed to be either flood resistant or flood resilient. This can be achieved through design details and use of various materials.

In deciding what approach to take developers will need to consider whether they want to adopt a strategy where water is allowed to enter buildings or whether they want to adopt a strategy where water is excluded. A combination of these approaches could be used. The approach will depend on the expected frequency, duration, depth and speed of flooding, and what the buildings are used for.

Where flood water depths are predicted to be high, the general principle will be to use durable materials that are not affected by water and use construction techniques that allow easy draining and drying. It can be more damaging to the structure to hold back the water than let the water in and clean up afterwards, so it is important to consider whether the impact of allowing water to enter a building will be less than the impact (on the integrity of the building) would be if the water were excluded.

Resilience measures should be designed so that the building can be occupied safely throughout the buildings proposed lifetime, taking into account the effects of climate change.

There are various measures that developers should consider for the design and layout of their development including:

- Raising ground levels ensure that this does not adversely cause flooding elsewhere.
- Boundary walls and fencing can be designed to create flood resistant barriers.
- Raised floor levels can be used, although design must remain compliant with regulations about access to buildings.
- Internal spaces can be designed to reduce the impact of flooding, this includes siting living accommodation above flood level, or siting less vulnerable uses (such as parking) at ground level.

There are also a variety of measures related to building materials and form that should be considered including:

- Flood resistant materials that can withstand direct contact with floodwaters for some time without significant damage. The performance of materials in terms of water penetration, drying ability and integrity need to be considered.



- One way valves, fitted to drains to prevent back flows.
- Rain proofing and overhangs to prevent rain penetration around doors and windows, temporary free-standing barriers.
- Electrical units and points to be positioned at a higher level in case of flooding.
- Removable measures, flood boards and air brick covers fitted temporarily at times of flooding.

Further guidance can be found in *Improving Flood Performance of New Buildings: Flood Resilient Construction CLG*.

The City's Green Infrastructure

In providing new GI the developer should consider the scale and type of GI needs that their development will generate and consider these needs against the existing network of GI in the locality. However, developers should also pay particular attention to the benefits that GI can provide for climate change adaptation in terms of flood storage, climate cooling and habitats creation.

ensure that they make the right choices for siting of the tree and type of tree. Developers will need to take account of predicted climate change to ensure that the trees have the best chance of thriving and contributing to the aims of climate change adaptation.

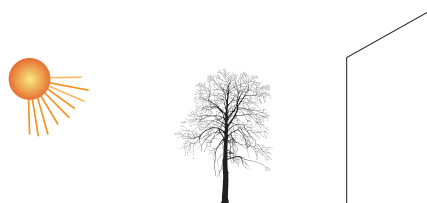
Site conditions are important in deciding the approach to tree planting in particular soil, exposure, drainage, space, hardiness, human activity. Developers will need to consider these aspects carefully to

Monyhull Hospital Site

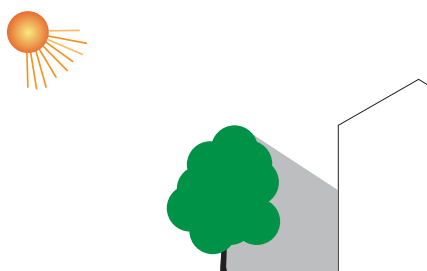
Monyhull Hospital is situated in south west Birmingham. In 2007 and 2008 a new washland was created on the site, which feeds the Chinn Brook and provides a habitat for water voles. It was developed as part of the Birmingham Wetlands and Sustainable Urban Drainage Scheme after 600 new homes were built.



The table below identifies the benefits of tree planting and some issues to consider when incorporating trees into new development.



Deciduous vegetation should be used to block the high summer sun and reduce the chance of overheating. In the winter, the low sun will be able to penetrate through the branches and increase solar gain.



Taller buildings should be located to the north of a site to maximise solar access.

Figure 3.1 - Planting for shade and shelter

Table 3.4 - Benefits of Trees

Benefits	Considerations
Moderating climate <ul style="list-style-type: none"> Reduced summer temperature – reduced need for mechanical cooling Wind break – reduced energy need for heating 	<ul style="list-style-type: none"> Position to either south or west of site. Deciduous trees will offer shading in summer and light to enter buildings in winter. Impact of wind break dependent on size and foliage. Consider exposure, soil conditions to ensure trees survive.
Stormwater management <ul style="list-style-type: none"> Absorb rain reducing runoff 	<ul style="list-style-type: none"> Consider species type against drainage of the site.
Improved air quality <ul style="list-style-type: none"> Filter dust Absorb pollutants 	<ul style="list-style-type: none"> Consider hardiness of tree species Consider position of roads and rail lines and other polluting land uses.
Habitat <ul style="list-style-type: none"> Habitats for wildlife 	<ul style="list-style-type: none"> Consider native species. Ensure that there will be a balance between human activity (to allow enjoyment) and limiting the disturbance to wildlife.
Aesthetics <ul style="list-style-type: none"> Define character 	<ul style="list-style-type: none"> Retain existing mature trees. Consider type and size of new trees and space on site.
Economic benefits <ul style="list-style-type: none"> Direct increase in value of development Reduced energy requirements for occupiers Food production 	<ul style="list-style-type: none"> Future management maintenance of trees Consider fruit bearing trees / shrubs. Consider exposure, soil conditions to ensure longevity of investment.
Social benefits <ul style="list-style-type: none"> Health and well being 	<ul style="list-style-type: none"> Consider locating trees where humans can benefit most.

An Adapted City

Green/brown roofs & Green Walls

Green/brown roofs are intentionally vegetated roofs. They can be categorised into three groups:

- intensive - used as a park or garden
- semi-intensive - used as a garden or ecological landscape
- extensive - used as an ecological landscape.

In general green/brown roofs can be low maintenance depending on the type of green roof, with intensive roofs needing regular maintenance while extensive roofs are low maintenance.

Green/brown roofs can impact on the structural loading of a building, so the inclusion of green/brown roofs should be considered early on in the design phase. However, it should be noted that green/brown roofs have and can be successfully retrofitted to existing buildings, and therefore concerns about structural loading should not mean that green/brown roofs are not possible in developments that are making use of existing buildings.

Green/brown roofs provide various benefits:

- stormwater management – vegetation reduces surface runoff volumes and rates of heavy rainfall
- reduced UHI – recognised as having a positive effect on reduction of UHI
- biodiversity – important refuge for wildlife

- amenity space – provide valuable natural greenspace in urban environments
- thermal performance - reduced energy consumption and fuel costs (cool in summer, warm in winter)
- air quality - reduced air pollution by filtering of particles and pollutants
- protection of waterproofing – protects roof's waterproofing membrane doubling its life expectancy

More information on planning, specifying and installing a green roof can be found at www.livingroofs.org.

Green walls are either free standing or part of a building that provide a growing medium for vegetation. There are two main types of green walls:

- green facades - made up of climbing plants that grow up the side of a building but are rooted in the ground
- living walls – made up of modular panels that are self irrigating and include growing medium and vegetation.

The main benefit from installing green walls is that the plants can reduce building temperatures. Living walls can also be used for water recycling. Greywater can be used to water the plants within the green wall. As well as these sustainability benefits green walls have the benefit of creating a green and aesthetically pleasing environment.



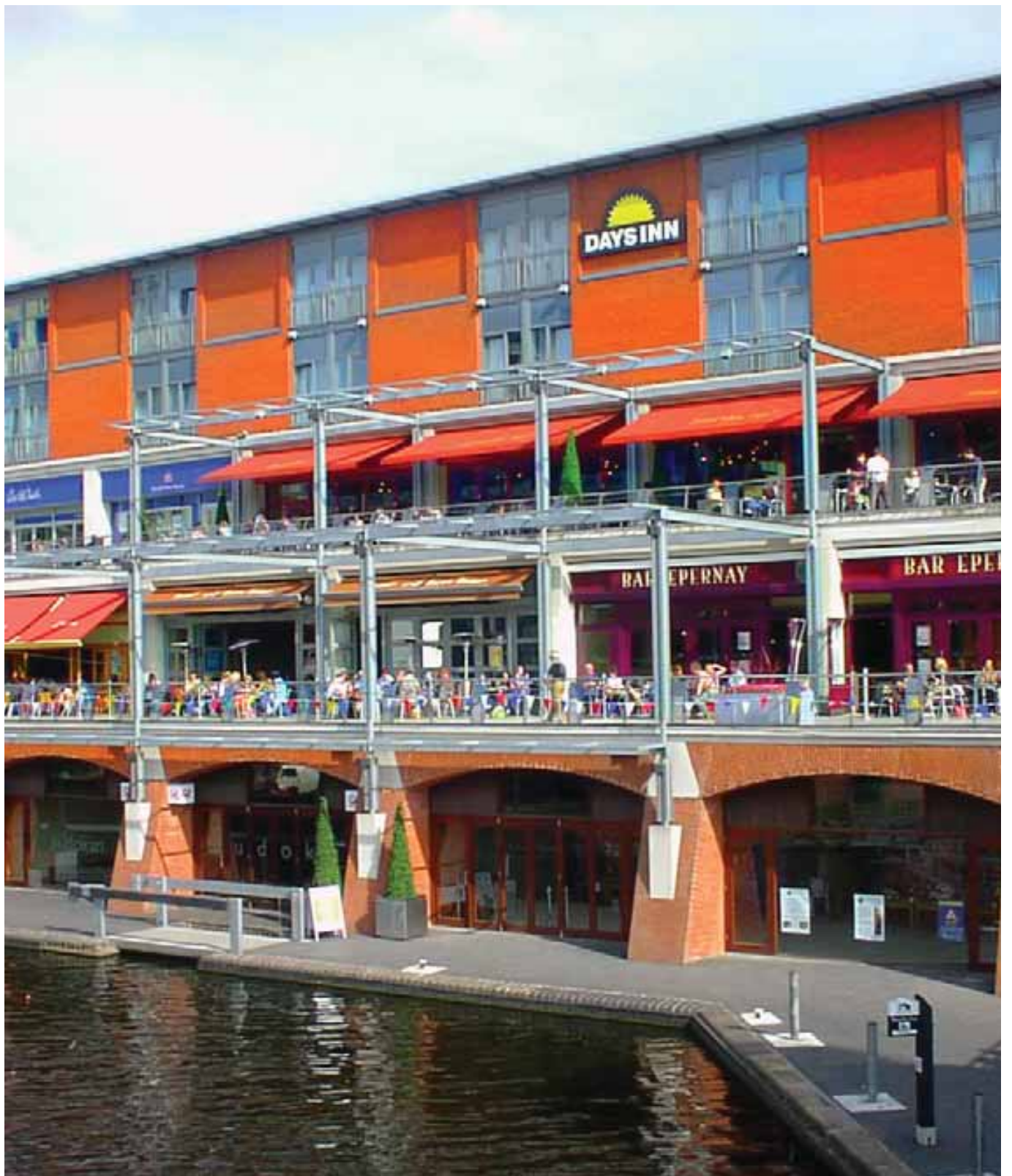
Birmingham Library

Birmingham's new library plans to incorporate green terraces into the space in order to create more green space. The garden terraces and amphitheatre have been designed to be family friendly, interactive outdoor spaces. Promoting a culture of social interaction and informal learning they will be vibrant, multi-purpose and environmentally friendly, an inclusive relaxing sanctuary within the city centre.

The Library of Birmingham has introduced – a 'living wall' on the site hoardings in Centenary Square. The lower 2.8m is covered by Mobilane Green Screens – ivy-clad metal fencing sections which are particularly robust and designed to prevent vandals and fly posters from abusing and damaging the hoardings. A LivePanel living wall covers the top 2.2m of the hoardings and features a variety of mixed species and colourful plants.

The green wall is intended to be an early indication of the Green credentials of the new Library of Birmingham itself. Environmental sustainability has been at the forefront of plans for the new building, which aims to achieve a BREEAM 'excellent' rating, the highest national standard for sustainable construction. The Library is set to feature an aquifer ground source cooling system, an innovative energy saving heating system utilising a renewable energy source. Other environmental features include a brown roof and two green outdoor terraces to support biodiversity, combined heat and power technology to reduce waste, and energy efficient lighting systems and controls.





4. Sustainable Transport



The Issues

Transport activities generate high levels of air and noise pollution in urban areas, reducing local environmental quality and contributing to climate change. Road transport is responsible for approximately 24% of Birmingham's CO₂ emissions. Road transport emissions also remain the main source of many harmful pollutants, including carbon monoxide (CO), nitrogen dioxide (NO) and particulate matter (PM10), which are responsible for upto 70% of air pollution in urban areas². These vehicle pollutants have been linked to human ill health in contributing to respiratory and cardio-pulmonary diseases.

The Government's 2011 Transport White Paper '**Creating Growth, Cutting Carbon**' highlights "Where places (e.g. shops, work and other services) are located in relation to where people live is a significant factor in determining how much people need or want to travel".

The DfT guidance *Delivering Sustainable Low Carbon Travel* (2009) identifies that in developing a sustainable transport approach the following three pillars should be taken into account:

- Creating positive choices for travellers;
- A holistic package of measures, which 'lock-in' the benefits; and
- Local application tailored to local circumstances.

Sustainable, low carbon travel initiatives need to be carefully tailored to the specific location and objectives³. The Department for Transport (DfT) identified the types of measures that could be included in sustainable travel programmes are outlined as follows:

- Influencing demand through planning and land use
- Locking in benefits
- Active travel choices: cycling and walking
- Supporting travel planning
- Promoting public transport
- Marketing and communication
- Car sharing & car clubs
- Low carbon/electric vehicle choice & infrastructure.

Birmingham's Approach

Sustainable transport policies are set out in the West Midlands Local Transport Plan 3. Planning policies relating to transport in Birmingham are set out in the Emerging Core Strategy⁴ as policies SP33, SP34, SP35, SP36, SP38, SP39, SP40 and SP41.

The Birmingham Low Carbon Transport Strategy published by Birmingham City Council in June 2011 outlines how transport measures will contribute to achieve the City's overarching aim of meeting a 60% reduction in tonnes of CO₂ emissions per capita from transport from 1990 to 2026⁵, whilst also

providing a local framework for improvements to cut emissions, improve connectivity and reduce congestion, while additionally stimulating economic growth.

The Draft Low Carbon Transport Strategy sets out a four key principles for helping to achieve this target:

- Smarter Choices (SC) – providing and promoting a package of techniques for influencing people's behaviour towards sustainable modes.
- Smarter Infrastructure (SI) – encouraging the efficient use of existing transport network, effective maintenance and implementation of any new schemes.
- Smarter Technology (ST) – promoting electromobility through supporting electric and other low emission vehicles.
- Effective Carbon Management Planning (EC) – exploring how the Council's transport and planning services can be delivered in a more sustainable way, from the inception stage through to implementation.

² House of Commons Environmental Audit Committee, *Air Quality, Fifth Report of Session 2009-10, Volume 1* (March 2010)
³ *Delivering sustainable, low carbon, travel: An essential guide for Local Authorities*, DfT, (November 2009)
⁴ *Core Strategy, Draft 2010*, Birmingham City Council
⁵ *Birmingham Climate Change Action Plan 2010*, Birmingham City Council

Delivering Sustainable Transport in New Development

Birmingham has a significant ambition to be the UK's first "Walkable City"; all development should make this their first transport consideration. New development offers the opportunity to provide on-site and off-site sustainable transport measures, that promote walking and cycling and reduce the reliance on the car.

Public transport and other modes of sustainable travel have a key role to play in encouraging a modal shift to a low carbon economy by encouraging zero carbon options (e.g. cycling and walking), encouraging more sustainable patterns of travel behaviour

(e.g. car sharing, car clubs) and reducing the need to travel (e.g. through telecommunications). These measures will also generate health benefits for its communities, contribute to providing a cleaner and greener society and promote sustainable economic growth.

- Accessibility of new development: All significant new development should be accessible by public transport, cycling and walking (as per SP36).
- Location of development: New development Sites should ideally be close to centres or on public transport corridors, to reduce the

levels of car usage and parking associated with development.

- Type of development: Sites with the best public transport accessibility should, wherever possible, be reserved for uses (or densities) that generate a high level of trips. Higher density, together with mixed uses, should be encouraged to reduce the length of journeys and the need to drive.
- Impact on transport network: New development should not have an adverse impact on existing or future transport operations.
- Developer contributions: Developers should fund any necessary improvements to the transport network.

Table 3.1 - Sustainable transport requirements

	Policy	Requirement	Applicant to consider and show evidence of
Mandatory	SP36	For major developments that individually or in combination will generate 500 person trips per day will require - an appropriate level of public transport provision; public transport stops within 80m of main focal point for the location; good cycle access with cycle stands and shelters; good pedestrian access.	<p>Does the development include safe and convenient pedestrian and cycle routes that connect the development to the wider pedestrian and cycle network and the main transport interchanges?</p> <p>Does the development include sufficient secure cycle parking and other cycle facilities?</p> <p>Does the development incorporate quality public realm that encourages walking and cycling?</p> <p>Is the development connected to or within close proximity of public transport networks?</p>
Where feasible	SP35	Measures that ensure sustainable modes choices are convenient such as greenways through new residential developments, information and communication technologies to facilitate modal interchange and the use of public transport.	<p>Low carbon transport: Has the development been designed to facilitate the use of low carbon vehicles, for example spaces available for electric vehicle charging?</p> <p>Parking: Has the development been designed with a level of parking appropriate to the location of the development, and in particular a level that encourages a shift to more sustainable modes of transport?</p> <p>Has the development included the provision of a car club?</p>

- Promotion of sustainable travel: Significant development should promote sustainable travel and be accompanied by a travel plan.
- Design and layout: The design and layout of a development should maximise the potential for sustainable travel in particular public transport use and give non-car modes priority. It is crucial that any significant new developments are within reasonable walking distance of public transport.

By implementing a package of sustainable transport measures Developers can improve the marketability, accessibility and attractiveness of their development site. There is also opportunity to benefit and gain support from the wider local community by relieving congestion problems or improving public transport connections across the area.

Transport Assessments

The Transport Assessment sets out likely trip generation, public transport accessibility and impact of a development on the transport network. Developers are encouraged to produce these at an early stage, ideally before the formal submission of a planning application to inform pre application discussions. This helps speed up the planning application process.

For further information please see DfT Guidance on Transport Assessments. <http://www2.dft.gov.uk/pgr/regional/transportassessments/guidanceonta.html>

Travel Plans

Travel Plans are important long-term management strategies that aim to promote the better use of all sustainable transport options for both people and goods e.g. walking, cycling and public transport. Travel Plans set out site-specific strategies for a development and are reviewed on a regular basis.

Travel plans are beneficial to developers in the following ways:

- Reduce development costs
 - if the demand for car travel is reduced then fewer car parking spaces may be required and this land can therefore be developed for more valuable land uses.
- Increase marketability of the site – through improved site accessibility
- Enable a smoother planning process – achieved by engaging with the Local Authority early-on in the application process
- Improve community's perception of the development – through sustainable transport improvements and carbon footprint reductions.

Planning Policy Guidance 13: Transport (PPG13⁷) emphasises the need for travel plans to be required

as a condition of planning permission and states that travel plans are a tool for the planning system to deliver sustainable transport objectives. The DfT identifies that Travel Plans are important for major new developments in order to:

- support increased choice of travel modes;
- promote and achieve access by sustainable modes;
- respond to the growing concern about the environment, congestion, pollution and poverty of access;
- promote a partnership between the authority and the developer in creating and shaping 'place'⁶.

Birmingham City Council requires that developers produce Travel Plans that encourage sustainable modes of transport to access workplaces.


Travel Plans contribute towards minimising the amount of car trips generated by a new development thereby minimising congestion and single occupancy car travel and encouraging more travel by sustainable modes.

Developers should engage with Birmingham City Council early on in developing their Travel Plan from pre-application discussions through application determination to implementation, monitoring and review.

⁶ Good Practice Guide: Delivering Travel Plans through the Planning Processes, Dft and DCLG, April 2009 www.dft.gov.uk
⁷ PPG13 is the Government's current guidance on Transport Planning. This will be replaced by the NPPF when it is adopted.

Developers should aim to cover the following key elements within their travel plans:

- Background – overview of the site and occupier
- Staff Survey – travel patterns to site, where feasible
- Site Audit – site accessibility to various forms of transport
- Measures – incentives and initiatives that can achieve the targets (e.g.):
 - » Provision of cycle stands, lockers and showers
 - » provision of public transport timetables
 - » incremental reduction in car parking space
 - » charging for car parking, promotion of car sharing and car share database
 - » mileage payments for car sharers and cyclists
 - » use of pool cars and pool bikes and flexi working
 - » working from home and '9 day fortnight'.
- Monitoring – records how effective individual measures have been
- Action Plan – records how the travel plan will be implemented and monitored



Further guidance available from the Department for Transport for preparing Travel Plans:

- Good Practice Guide: Delivering Travel Plans through the Planning Process, Dft and DCLG, April 2009, www.dft.gov.uk
- The Essential Guide to Travel Planning, Dft, 2008 www.dft.gov.uk
- Travel plan benefits for employers: Making the human resource link (2008) www.nbtn.org.uk
- National Business Travel Network – a business to business network for sharing best practice and promoting the rationale for travel plans, www.nbtn.org.uk

Car Parking

The City Council adopted supplementary planning guidance 'Birmingham Parking Guidelines' in February 2012. The guidelines set standards for vehicle parking in new developments and aims to ensure that parking levels in new developments reflect the overall accessibility of the site. It sets more restrictive standards for the city centre and other local centres which are well served by public transport. Restricted parking levels can cause concern that parking will cause unsafe displaced parking on street. Unacceptable displacement is parking that restricts essential highway movement, affects highway safety or undermines the Council's sustainable transport aims.

Financial Contributions

New developments can have significant impacts on the existing and future transport networks for an area including on cycling and walking links. To mitigate adverse impacts from development and encourage sustainable travel patterns, early consideration of this issue is needed.

Transport measures to which developers could be asked to contribute, as appropriate, include:

- On-site infrastructure (e.g. shelters and cycle parking, electric vehicle charging points).
- Off-site infrastructure, such as Real Time Information (RTI), which help achieve modal shift from car to public transport.
- Provision of incentives such as ticketing deals for employees/ residents. This will help developers anticipate the full financial implications of development projects early in the process to ensure a more accessible development.
- Provision of interest free loan to purchase bicycles.
- Off-site infrastructure e.g. new cycle lanes, improved walking routes to bus stops, stations and public transport interchanges, highway and junction improvements, on-street parking controls (Controlled Parking Zones and Residents' Parking Schemes), car club bays, electric vehicle charging infrastructure.

- Improved public transport facilities, either through enhancing the existing public transport network or new services e.g. a mini bus service to the local rail station or town centre.

Car club and sharing use

A car club enables people to use a car whenever they need it on a pay-as-you-go basis without the financial commitment of owning their own vehicle. The scheme aims to reduce congestion, improve the environment and make transportation within the city more accessible and affordable for everyone.

Developers can benefit from such schemes as this can reduce the number of parking spaces on-site, which enables the land to be freed up for more valuable land uses or higher densities. In addition, the wider existing community can also benefit from a Car Club Scheme, which may potentially reduce the need for financial contributions.

A number of commercial car clubs now operate around Birmingham in addition to smaller, community-based social enterprise clubs. Birmingham City Council has also recently partnered with the City Car Club Company to provide members with exclusive use of designated on-street parking bays across the city, including the Jewellery Quarter. The partnership with Birmingham City



Council has enabled the City Car Club to expand its relatively small operation to provide more locations in key city areas.⁸

This scheme can help to facilitate lower levels of car ownership whilst preserving accessibility by car. This initiative is also particularly useful for businesses as they can hire vehicles for a short period of time, which provides employees flexibility and could save businesses money on vehicle hire, parking and claims.

Developers can support these car club schemes by setting aside parking bays as part of their developments. Birmingham City Council promotes the development and implementation of travel plans that facilitate initiatives such as car sharing and car clubs.

Further guidance available: Good Practice Guide: Making Car Sharing and Car Clubs Work, Dft, March 2005 www.dft.gov.uk

Cleaner vehicles and requirements for electric vehicle charging points

The transition to low and ultra-low emission vehicles is important for moving towards a low carbon economy and is supported by the Government's 'Plugged-in Places' programme, which supports the installation of electric vehicle recharging infrastructure in eight lead places, which includes the Midlands.

An effective recharging infrastructure, alongside improvements in vehicle range, is a key part of this strategy. However, it

⁸ Birmingham car share scheme launched in the Jewellery Quarter, 30th May 2011, Birmingham Mail.net <http://www.birminghammail.net/news/top-stories/2011/05/30/birmingham-car-share-scheme-launched-in-jewellery-quarter-97319-28786424/>

Car Club Initiative

Car clubs one of the innovative schemes which is currently being developed in Birmingham, which seek to reduce congestion, help the environment and make transport links within the city more accessible and affordable for all.

Birmingham City Council has recently partnered with the City Car Club Company to provide member with exclusive use of designated on-street parking bays across the city, including the Jewellery Quarter. The partnership with Birmingham City Council has enabled the City Car Club to expand its relatively small operation to provide more locations in key city areas.

is important that this infrastructure operates in the most cost-effective way possible to maximise the environmental, economic and energy system benefits of plug-in vehicles.

Developers can benefit from introducing electric vehicle charging points (EVCP) on the development site as it can be used by the wider existing community, which may potentially reduce the need for financial contributions. Developers can encourage the use of low carbon and electric vehicles and minimise

the impact of motorised vehicles on the network by providing an electric vehicle charging point on their development sites, which can form part of a wider network electric charging point strategy (part of 'Plugged in Places' project).

Further guidance available from the Department for Transport for facilitating Plug-In Vehicle Infrastructure:

- Making the Connection: The Plug-In Vehicle Infrastructure Strategy, Office for Low Emissions, Department for Transport, June 2011

Guidance on integration of walking and cycling routes


Walking, cycling and public transport can deliver better health and quality of life for people, while creating more attractive places with less traffic congestion and improved air quality.

Birmingham has an existing network of official on and off road routes for cycling and walking, which also feed into the extensive canal towpath network across the City. A cycling and walking map of Birmingham was first launched in March 2006 to provide visual information on cycling and walking routes and bicycle parking locations, which is regularly monitored and updated.



Developers could benefit from improving the accessibility of their site and the immediate surrounding area by making it a more desirable place to work and live and therefore improve the marketability of the site. Developers could design sites to provide walking and cycling facilities, such as provision of cycle racks. Targeted investments (secured through financial contributions) could also enhance the walking and cycling infrastructure in the immediate area, which could positively impact on the accessibility and marketability of a site resulting from improvements made to:

- lighting
- surfaces
- signage
- crossings
- footways (well maintained and free from street clutter)
- dedicated cycle routes
- cycle parking

 Further guidance available from the Department for Transport appraising walking and cycling schemes:

- Guidance on the Appraisal of Walking and Cycling Schemes, TAG Unit 3.14.1, DfT January 2010.

Guidance on Home Zone principles

Home Zones are residential streets, in which the road space is shared between drivers of motor vehicles and are designed primarily to meet the needs of pedestrians and cyclists. The aim is to improve the

Plugged in Places Initiative
 Cenex is operating the Government's Plugged in Places scheme which will see the cost of £6,000 to install each charging point split between landowners and the DfT.

Birmingham City Council is a partner in the Coventry and Birmingham Low Emissions Demonstration (CABLED) project. This involves around 110 electric vehicles being driven on city streets. The two-year CABLED project aims to increase the number of public electric vehicle recharging points around Birmingham City Centre. Currently there are only six charging points within the City Centre. The vehicles are considered to be a reliable sustainable transport mode that can be fully charged in seven hours for less than £2 and has a range of more than 90 miles.


quality of life in residential roads by making them places for people, rather than just thoroughfares for cars, and to encourage people to use streets in different ways. As such, street design, landscaping and highway engineering all have a role in controlling vehicles and achieving very low speeds.

The potential for a Home Zone needs to be considered at an early stage to ensure compatibility with the overall design of the site. Developers could incorporate principles of Home Zone design into their new development sites during the early concept stages. The features that belong most distinctively to the Home Zone concept include:

- Car Parking that adequately provides for residents and visitors
- Shared surfaces for the footway and carriageway
- 10-mph design speeds to discourage through traffic

- Local distinctiveness and integration of scheme with local connections

Developers can benefit from introducing Home Zone design principles, as these measures can create a better place for people to live by improving safety, encouraging more social activities and community interaction on the street and public realm, which lead to an increase in the marketability of a site.

 Further guidance available from the Department for Transport on Home Zones:

- Department for Transport's guide, Home Zones: Challenging the future of our streets, (DfT, 2005) and at the IHIE website: www.homezones.org.uk.
- Guidance on integration of public transport

Birmingham has a comprehensive public transport network which includes buses, trains and trams. There is opportunity to improve the integration, reliability, safety, quality, accessibility, frequency, attractiveness and environmental performance of the existing public transport system.

Financial contributions linked to a new development provide an established mechanism for securing improvements to public transport. These are widely used to bring development in line with sustainability requirements, for encouraging accessible public transport provision and for securing more sustainable patterns of transport development.

Although an improved public transport system is at an additional cost to the developer these financial contributions can be offset against the following benefits:

- Release of land for more valuable land uses and higher density development, as there are fewer car parking spaces required.
- Provides opportunity to market and promote a development offering sustainable transport choices.

Figure 5.1 - Sustainable Transport Choices

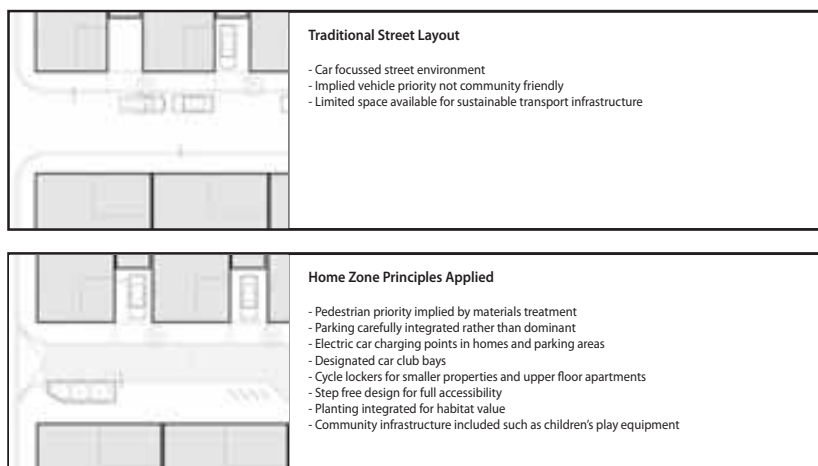
Longbridge Development Masterplan

The masterplan development strategy for Longbridge is for a major mixed use development including a new town centre, a regional transportation interchange and the creation of at least 10,000 jobs over a site area of 195ha. The Longbridge Area Action Plan (LAAP) for the locality reflects integrated land use and transport aspirations.

The scale of the site as well as its proximity to existing public transport infrastructure allow for flexibility and creativity in sustainable design.

The 'Brownfield' location provides the possibility for integration with existing transport links and to the likelihood of shorter trips to/from the site. The location of key facilities are accessible by sustainable modes this is a key component of integrating planning with transport. The Longbridge plan includes leisure, health and education facilities intended to serve the wider area. These are to be located near Longbridge station and will also be linked by foot, cycle and bus to the nearby neighbourhoods of Frankley, Cofton and Great Park. Thus, these facilities will provide an accessible focal point for the development and the surrounding neighbourhoods.

Greater land use mixing can reduce the number of trips people make by allowing for linked trips and to make streetscapes more pleasant for walking and cycling. Longbridge has designated areas for lower and higher degrees of land use mixing depending on the nature of employment (i.e. manufacturing vs. small enterprise) and the location relative to public transport. The area with the greatest land use mix including housing, retail and employment centres, at relatively high density, is oriented around Longbridge station. The LAAP encourages a mix of uses within buildings as well as within streets.



5. Low and Zero Carbon Energy



The Issues

The Council has positioned the City of Birmingham as a leader among major cities in seeking to stimulate a low carbon economy and has begun the journey towards securing major carbon emission reductions to address the challenge of climate change mitigation⁹. The Council is committed to a city-wide reduction of 60% in CO₂ emissions by 2026¹⁰.

This section of the SPD provides guidance on how key policies within the Emerging Core Strategy will be implemented.

These policies are reinforced by policies at national level set out within the Governments Low Carbon Strategy and forthcoming Climate Change Strategy. Recent changes including market incentives such as the introduction of the Feed In Tariff, Low Carbon Cashback as well as regulatory changes, changes to building regulations and the Code for Sustainable homes have provided positive conditions for enabling implementation of the Council's policies.

Birmingham's Approach

The Council's approach to reducing overall CO₂ emissions, as set out in the Sustainable Energy Action Plan 2005-2020 report, which promotes CO₂ reduction through:

- Ensuring new development is constructed to high standards to minimise energy use;
- Replacement of demolished commercial and industrial space with more energy efficient buildings;
- Replacement of demolished domestic buildings with carbon neutral homes;
- Installing solar thermal panels and biomass boilers in domestic properties;
- Installing large and medium scale wind turbines on appropriate sites;
- Installing solar photovoltaics (PV) on appropriate domestic and non-domestic buildings.
- Realising additional opportunities to generate energy from decentralised Combined Heat and Power (CHP) networks around the city.

The council's Emerging Core Strategy policies will be implemented by the following means which are interrelated:

- Compliance with Code for Sustainable Homes and BREAAAM¹¹;
- Maximising opportunities for embedding low and zero carbon technologies with new development and /or financial contribution towards equivalent

- off site allowable solutions;
- Maximising opportunities for securing efficient energy generation and distribution through realising opportunities for Combined Heat and Power (CHP).

The Council adopts a practical approach to implementing these policies. There are three key issues to address:

9 Birmingham's Climate Change Action Plan 2010+: Birmingham City Council Sustainable Energy Action Plan 2010 - 2020
 10 Refer to Policy SP5 in Appendix A.
 11 Policy SP7 requires all new residential development to at least meet the regulatory construction requirements of Code for Sustainable Homes level 3 (or any future national equivalent), at least Code level 4 from 2013 and Code level 6 from 2016.
 For non-residential developments over 1,000 sq. m. of gross floor area, or being developed on a site of 0.5 Ha or more, a BREEAM standard of Very Good must be met (or any future national equivalent), or a BREEAM standard of Excellent must be met from 2013.

Ambitious but viable – maximise the opportunities which are available for minimising energy use and securing carbon emissions reductions.

A balanced approach will be taken by the Council in considering what may be achieved at particular sites and locations within the city and will acknowledge market conditions and not compromise the delivery of economic development or homes within the city.

A carbon budget approach set out in Section 2 of the Supplementary Planning Document will provide the basis for determining the level of carbon emissions reductions and the viability of other sustainability requirements appropriate to individual sites. This approach embeds the consideration of the overall costs of meeting the targets within an open book approach to development appraisals to ensure that requirements do not compromise the viability of schemes significantly to a point at which development would not proceed.

The carbon budget will provide the platform for an informed discussion between the applicant and the Council of the opportunities and limitations associated with particular sites and the package of measures needed to secure sustainable development.

The range of available business models and financial products is expanding which enables establishment costs for low and zero carbon technologies to be recouped over the operational life of the development.

Feasible – Ensuring that suitable low and zero carbon technologies are deployed taking account of renewable energy resources. Where physical space or other policies constrain opportunities then allowable solutions can be used.

Guidance is provided below on the suitability and feasibility of the most common low and zero carbon solutions.

Applicants will need to demonstrate how their proposals respond to the local context through their Design and Access Statement and will need to undertake a post-construction review certificate. The council encourages measures to adapt, enhance and regenerate (where appropriate) existing communities to achieve the same standards of sustainability as in new developments. Meeting these standards will ensure that new and existing buildings contribute to reducing future demand for fossil fuel energy sources and reduce carbon emissions from buildings.

Deliverable – For low and zero carbon technologies to be successful it is important that adequate arrangements are in place for their long term management and maintenance.

The Council also supports proposals for appropriate renewable energy projects at suitable locations within the city to harness the renewable energy resources of the City.

Justification

This approach offers flexibility to avoid the upfront capital investment costs of installing low and zero carbon technologies impacting on overall scheme viability or the supply of new homes including affordable housing and other requirements for infrastructure necessary to make development acceptable.

At the same time developers are encouraged to 'try harder' to maximise carbon emissions reduction which can be secured in conjunction with development to lock in lower per capita CO₂ emissions from the domestic and non domestic sector in the future providing a mechanism for carbon reduction targets to be met.

Table 5.1 - Low and Zero Carbon requirements mandatory and where feasible

	Policy	Requirement	Applicant to consider and show evidence of
Mandatory	SP4 & SP5	Developments required to reduce CO ₂ emissions.	<p>What level of the code for sustainable homes or BREEAM standard does the development meet?</p> <p>Energy Efficiency:</p> <p>To what extent are buildings designed to maximise energy efficient lighting of buildings, including natural lighting?</p> <p>To what extent are buildings designed to maximise thermal efficiency?</p> <p>To what extent are buildings designed to enable energy efficient heating of spaces?</p> <p>To what extent are buildings designed to enable energy efficient heating of water?</p> <p>Retrofitting:</p> <p>What carbon reduction savings are predicted to be achieved through retrofitting previously developed buildings on the site with energy efficiency measures (including heating, cooling and lighting)?</p> <p>What carbon reduction savings are predicted to be through retrofitting previously developed buildings on the site with renewable energy or low carbon energy generation?</p>
	SP8	Over 50 units or 1,000sqm of floorspace - Combined Heat and Power or connection to District Heating Schemes	<p>What approach has the development taken to district or community heating?</p> <p>What percentage of overall site energy demand will be produced from on-site renewable energy?</p>
	SP8	If CHP not utilised feasibility study must be provided to show that it is not efficient or viable or other energy reduction technologies are being used.	If CHP is not feasible on site what technologies will be?
	SP8	Small developments (less than 50 units of less than 1,000sqm floorspace) should connect to district heating systems	What approach has the development taken to district or community heating?
Where feasible	SP8	Developments are encouraged to include technologies that reduce energy consumption (such as SMART GRID)	Does the development include smart grid technology and smart metering?
	SP9	Development encouraged to use innovative technology to reduce carbon dioxide emissions including low carbon vehicles and (through installing recharging stations) and sustainable waste technologies such as anaerobic digestion and gasification processes	

Development Management

Use of Conditions and Planning Obligations

Where there are existing decentralised energy supply systems, or firm proposals, the Council will expect proposed developments to connect to an identified system, or be designed to be able to connect in future.

In allocating land for development, the Council will consider how the proposed development would be expected to contribute to securing the decentralised energy supply system from which it would benefit.

The Council will require the establishment of appropriate renewable energy infrastructure through the use of conditions linked to, and justified by the Sustainability Statement and Design and Access Statement for larger schemes.

The Council will consider contributions towards renewable energy infrastructure on a case-by-case basis.

Decentralised Energy Systems

To secure energy and CO₂ emissions reduction from decentralised and renewable / low carbon energy sources, the Council set specific requirements from developers.

Establishment

Where decentralised energy networks are established or proposed, there could be a requirement for contributions towards the establishment of energy generation infrastructure. It is suggested that applicants for planning permission should discuss with the Council how the proposals would be expected to contribute to securing the decentralised energy supply system from which it would benefit.

Landowners and developers should be made aware of the requirement to connect with decentralised energy networks during pre application discussions which take place with the Council.

Planning Obligations could be required towards establishment of facilities where centralised renewable energy generation facilities serving the site are provided off site.

Connection

This will require installation of pipe work on site and potentially across public highways to serve individual buildings and provision of equipment (or capability for equipment to be provided). Planning Obligations may be required for the provision of offsite infrastructure and connections.

Before obligations of this type are required it would be important that further feasibility work is carried out to develop the proposals and associated business case.

Operation

Normally this aspect will be addressed through conditions. It is important that there is a clearly identified strategy for the operation and long term management of renewable energy equipment. This will include:

- Consideration of appropriate connection costs including related electricity or heat distribution infrastructure;
- Proof of a business plan and demonstrating the viability of the preferred approach towards meeting targets including consideration of costs, revenue and the effect of incentives (major development);
- An identified supplier and agreement in principle (Power Purchase Agreement, CEM, ESCO) (Major development);
- Identification of how maintenance of renewables infrastructure will be dealt with (i.e. service charge etc.). The Council may also wish to seek contributions to secure the provision and longer-term management and maintenance of those aspects of a development required to ensure compliance with the policies set out in Birmingham's Emerging Core Strategy;
- Where it is proposed that biomass boilers should contribute towards meeting CO₂ emissions reduction targets these facilities should

comply with environmental regulations. Where the residual impact of such facilities would have a significant impact on air quality, then developers could be required to make developer contributions towards appropriate mitigation;

- Renewable energy facilities and associated infrastructure should be brought into use before first occupation; and
- Planning Obligations could be sought for the costs associated with monitoring of renewable energy facilities.

The approach should be fair and reasonable and, in particular, not restrict those with responsibility for providing energy to new development, or the occupiers, to any one energy provider in perpetuity.

Decommissioning

In certain situations, such as installation of temporary renewable energy infrastructure, it may be appropriate to include a condition requiring decommissioning and removal of infrastructure and facilities.

Smart Grid

A smart power grid and real-time simulator provides the capability to realistically simulate smart power grids with the integration of distributed power generation systems. Monitoring and control

capability as well as real-time information integration, monitoring, protection and closed-loop control functions.

Developers may install smart metering devices into development in order to read energy usage more accurately and allow for the appropriate management of energy, as well as reducing energy bills for households. Provisions of smart metering devices can provide credits to developments that can go towards the criteria assessing the energy efficiency ratings of a building.

Requirements for Inclusion in Design and Access Statements

Design and access statements should identify how renewable energy facilities will be successfully integrated with development. Key issues for consideration include:

- Location and siting of renewable energy facilities;
- Space requirements of proposed renewables portfolio;
- Conservation areas and listed buildings and archaeological sites;
- Siting and screening of plant;
- Access arrangements for maintenance and servicing;
- Connections to local energy networks; and
- Design guide sustainable design and construction.
- Potential for Local Development Orders

Where there are proposals to establish local energy networks the Council will give positive consideration to the use of local development orders (LDO) to secure renewable and low-carbon energy supply systems.

The LDO could in effect provide planning permission for certain categories of development required to deliver the network which are not covered by existing permitted development rights. It is likely that the main generation facilities would not be included within the order and that the LDO would focus on pipe work and ancillary equipment.

The LDO should be complemented by appropriate guidance relating to siting and design in order to ensure that local energy networks are delivered successfully.

Assessing Suitability of Technologies:

The applicant should consider a range of carbon reduction / renewable technologies applicable to the project. In the flow charts below considerations relevant to various common renewable technology systems and the decisions process for short-listing each type of technology are set out. For each decision box in the flow charts, "yes" would denote the next stage of the process while "no" would require the developer to seek alternative options.

LZC Hierarchy

In considering the range of solutions which are appropriate to the site the Council encourages an energy hierarchy approach set out below in Figure 6.1. This highlights sequence and priority afforded to CO₂ reduction choices which reflect renewable resources and opportunities within the city.

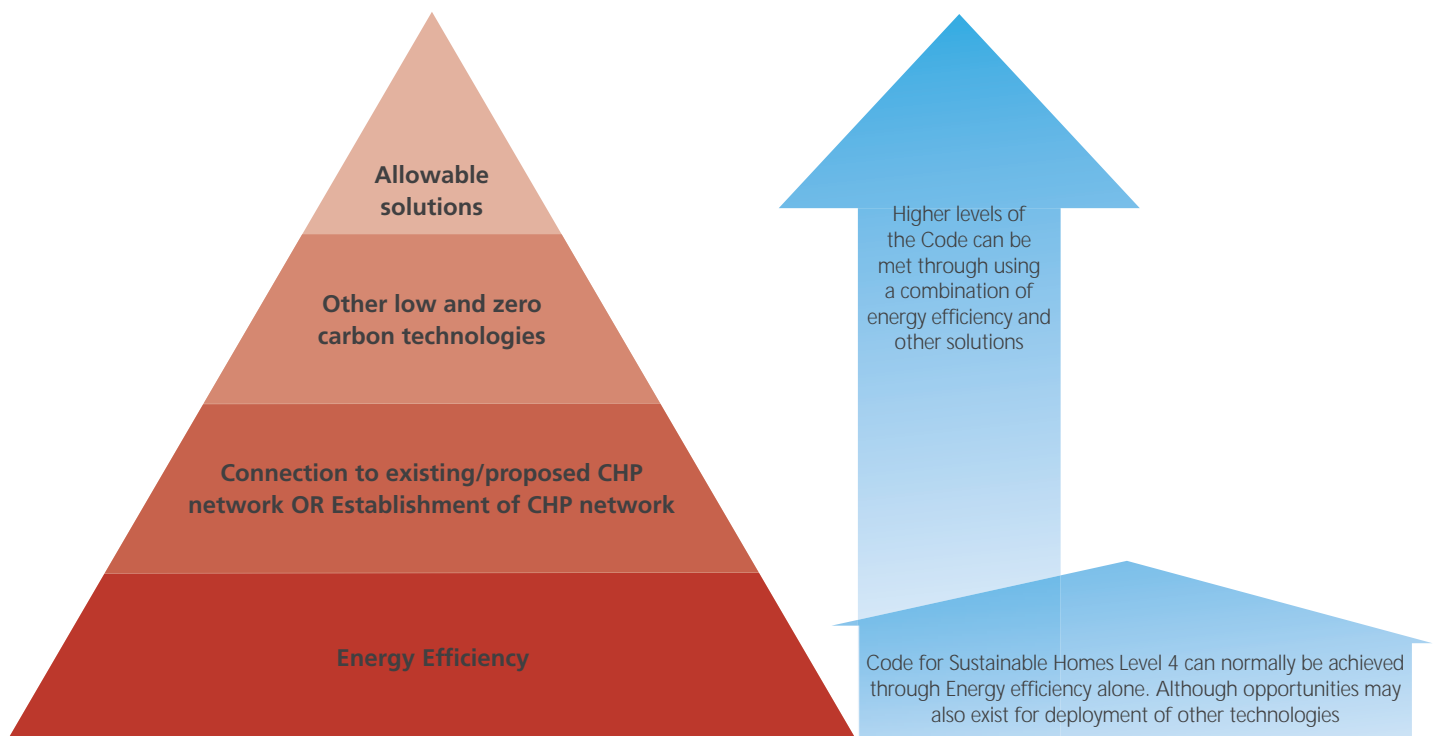
- Maximise Energy Efficiency - First priority, is to reduce energy demand through maximising the fabric energy performance, in line with the Part L Building Regulations and the Code for Sustainable Homes requirements.

- Utilise potential for Combined Heat & Power – Second priority is to connect with existing or planned CHP networks in the City. Establishment of a local or scheme CHP network is an option which should be considered where the scale and type of development planned supports this approach. Building scale CHP is also appropriate;
- Other technologies – Third priority is to meet the requirements on site through deployment of other low and zero carbon technologies. There is significant potential for Solar hot water and Solar PV in the city and other technologies may also be suitable.

- Allowable Solutions – Finally allowable solutions are likely to be suitable in physically constrained locations or where other means of reducing CO₂ emissions are unaffordable and would effect viability. This would entail a commuted sum payment equivalent to the CO₂ saving which is required by the Council's policies which would be pooled into a fund and used to deliver low and zero carbon and energy saving projects within the city.

Assessment criteria for particular technologies are set out below.

Figure 5 1: Birmingham Energy Hierarchy



Decentralised Energy Networks

There is significant potential for the establishment of local decentralised energy networks whereby, heat is supplied via CHP networks rather than on site. Existing networks already exist serving key locations within the City Centre.

Schemes of all sizes should normally be required to connect with planned networks.

In terms of decentralised CHP networks a standalone provision of a CHP network connected to residential development should normally have a minimum of 200 homes to be feasible; the exception is where non residential uses provide additional base load. This is because CHP is sized on the hot water demand of the properties. There is a need to provide suitable base load for the boiler to be efficient. If there is insufficient base load especially during the day, then any unused heat will be wasted / not utilised. The Heat Mapping and Decentralised Energy Feasibility Study prepared by Advantage West Midlands, further highlights the potential opportunities for area wide CHP networks anchored by high demand users which may also be extended to serve the wider local area.

Other smaller developments should connect to an existing District Heat / Cooling Scheme, unless it is demonstrated by the developer that such a connection is not practical

or viable. In which case, on site renewable technology that meets the same level of energy reductions should be provided, unless the developer can demonstrate this is also an unviable option.

There are a range of decentralised energy CHP systems which should be considered including:

- Connection to city CHP network
- On site building CHP
- Scheme wide CHP

A major benefit associated with longer networks is that they offer a much lower cost solution through economics of scale. Furthermore, in improved market conditions there may be potential for the CO₂ emissions reduction to be complemented by the addition of further on site renewable technologies to secure further CO₂ reductions, if there is a sufficient business case and there would be no significant effect on viability.

Not all of the technologies which have been proven viable in financial terms will be suitable in every location. The deployment of biomass heating and CHP is dependent on having a sustainable feedstock source and strategy and transportation strategy. In addition, it is important that emissions from biomass heating/CHP facilities do not have a significant impact on air quality.

Wind Turbines

Wind turbine technology would need to depend on the average wind speeds available on the project site. Depending on the capacity and the land available for the project offsite/ onsite options of using a standalone turbine or the potential for using roof mounted turbines may be explored. The location of the project site would determine its access to consistent wind speeds for this option to be technically viable.

Wind Turbines - Roof Mounted

Roof mounted wind turbines have not been widely demonstrated, but are currently under trial by a number of manufacturers. The criteria for mounting a small (1.5kW) turbine on a roof are minimal - as they are designed to fit any roof design and are mounted on the wall.

They have been designed to work in turbulent wind conditions (as might be experienced on roof tops) and have been designed to minimize vibrations through use of damping systems. The turbines will work in lower wind speeds than larger turbines, estimated at 3.5m/s.

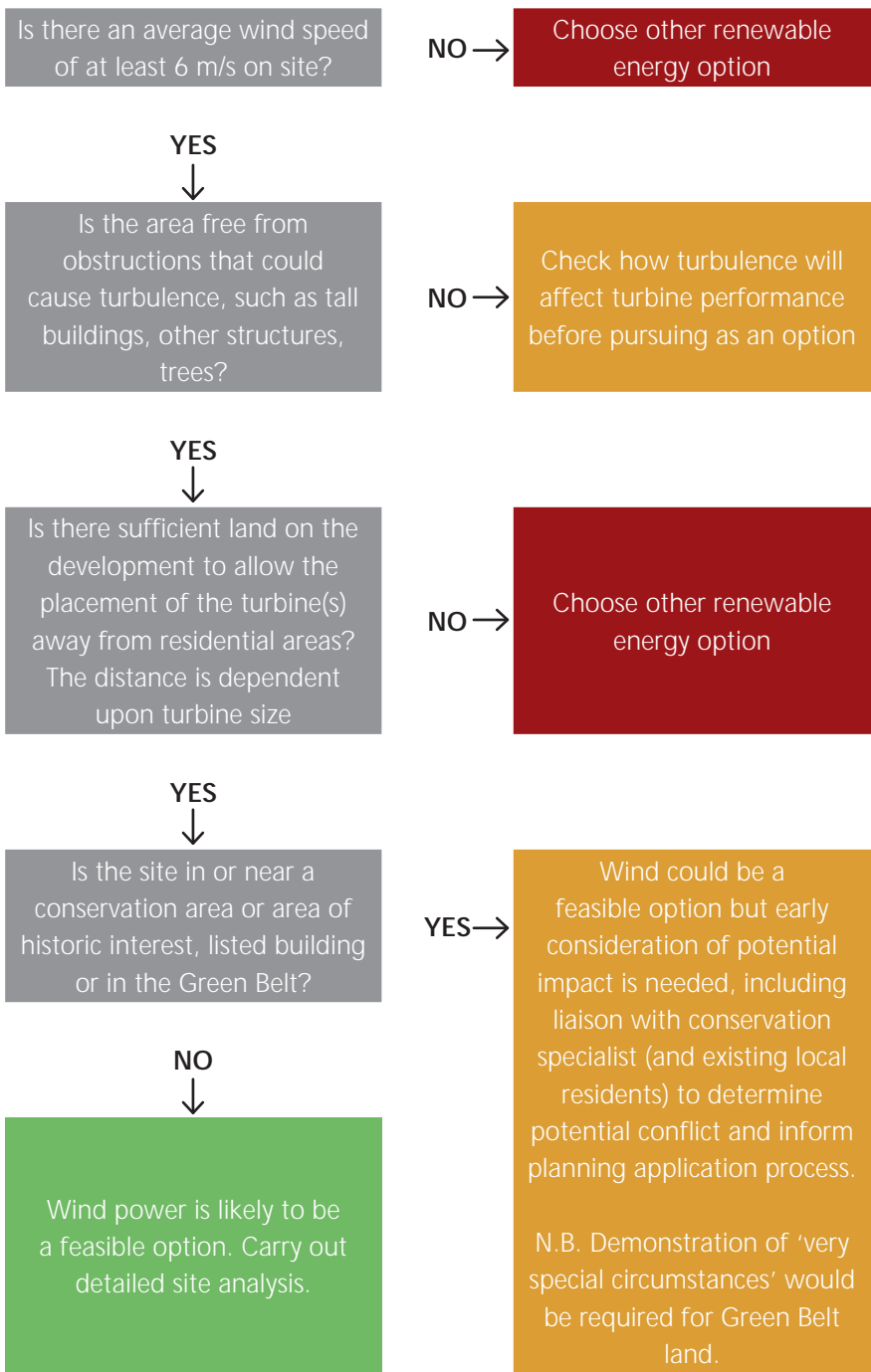


Figure 5.2 - Wind Turbines - Stand Alone

Solar Photovoltaics

Photovoltaics cells have become increasingly affordable with the Feed in Tariff (FIT's) initiatives. The developer would need to consider aesthetics and design requirements offer roof-top or any surface with sufficient access to sunlight to consider the PV technology option.

Due to the versatile nature of PV panels, their relative ease of integration into electrical systems and potential revenue source, PV technology is being considered more frequently for UK developments, both for new buildings and retrofits. Planning permission is not normally required for small scale systems except for special circumstances such as listed buildings.

According to Best Practice guidance on retrofitting PV or Solar Thermal panels, current panels in production have a fitted mass of around 20 kg/m², causing an average total rafter load of around 140 kg/m². It is the duty of the developer to assess the effect of this increase of loading in order to maintain an adequate factor of safety against failure.

Where PV or Solar Thermal panels have been incorporated into a development, their design must not be intrusive nor have negative visual effects on the property. The approval of the designs of the retrofitted panels shall have subject to the Council's approval.

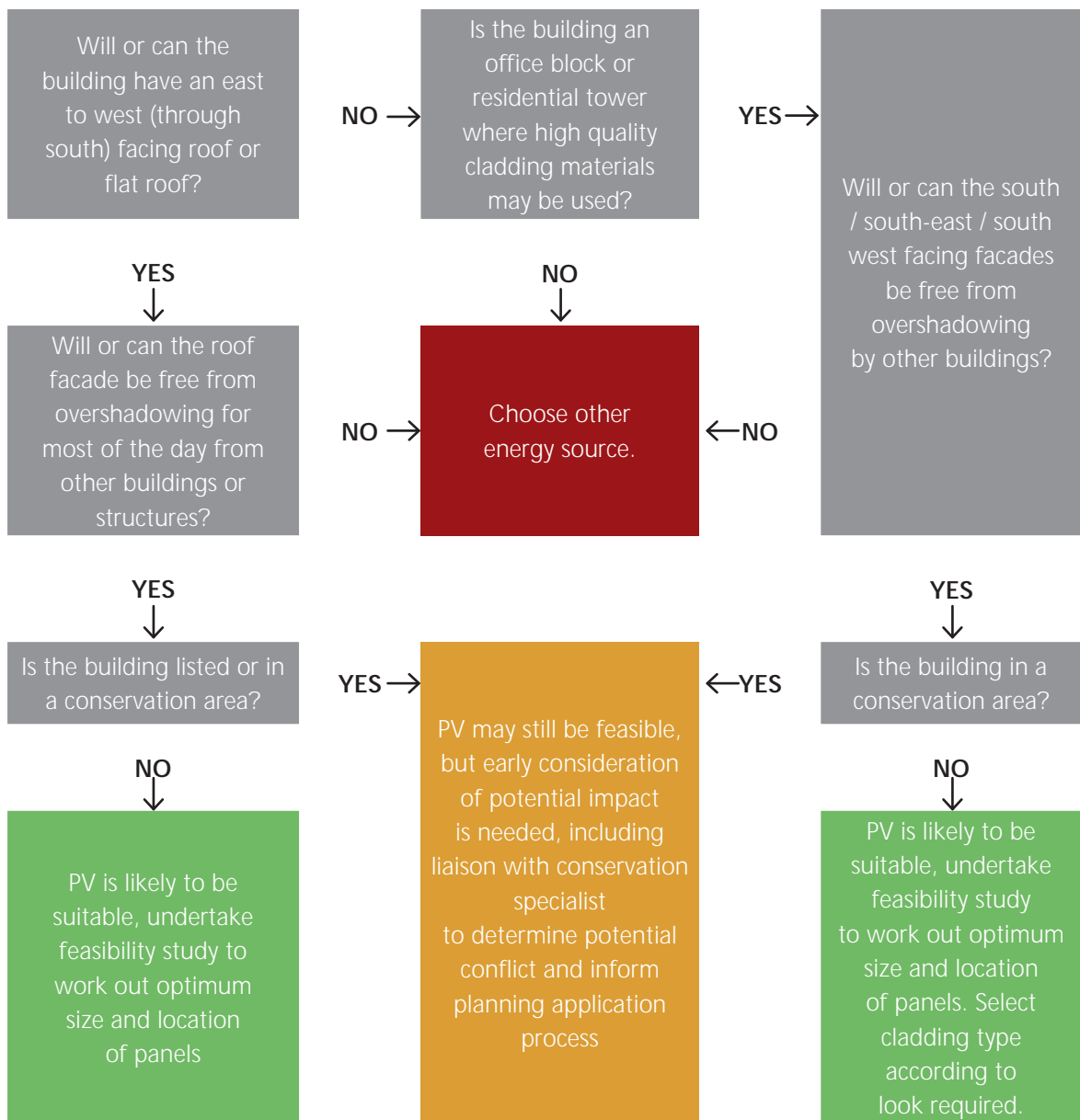


Figure 5.3 - Photovoltaics

Solar Thermal Systems

Solar Thermal Systems, would design requirements offer roof-top or any surface with sufficient access to sunlight similar to the PV technology option. Solar Thermal technology may be adopted for office, retail, industrial and residential development (small and large).

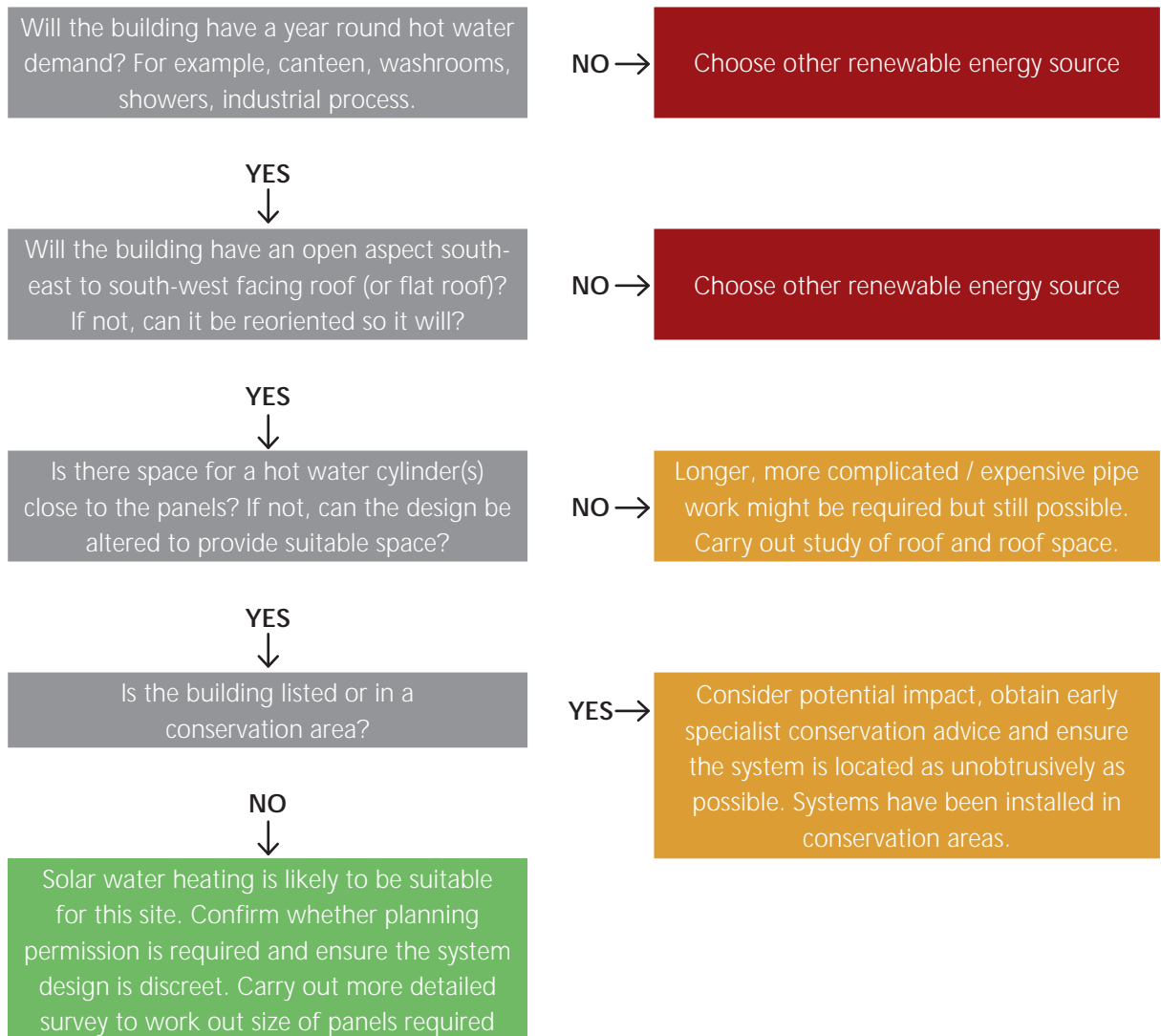


Figure 5.4 - Solar Thermal Systems – Office, Retail, Industrial and Apartment Development

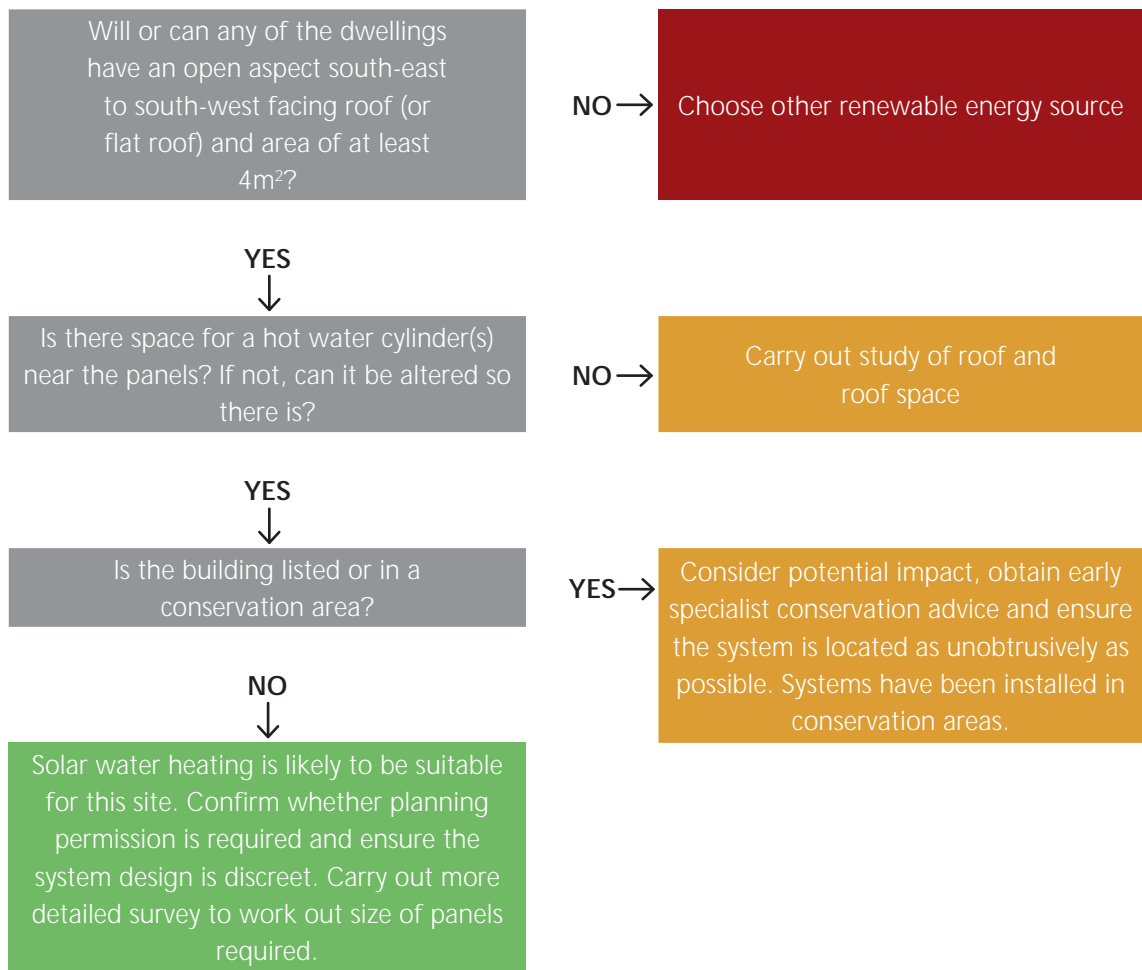


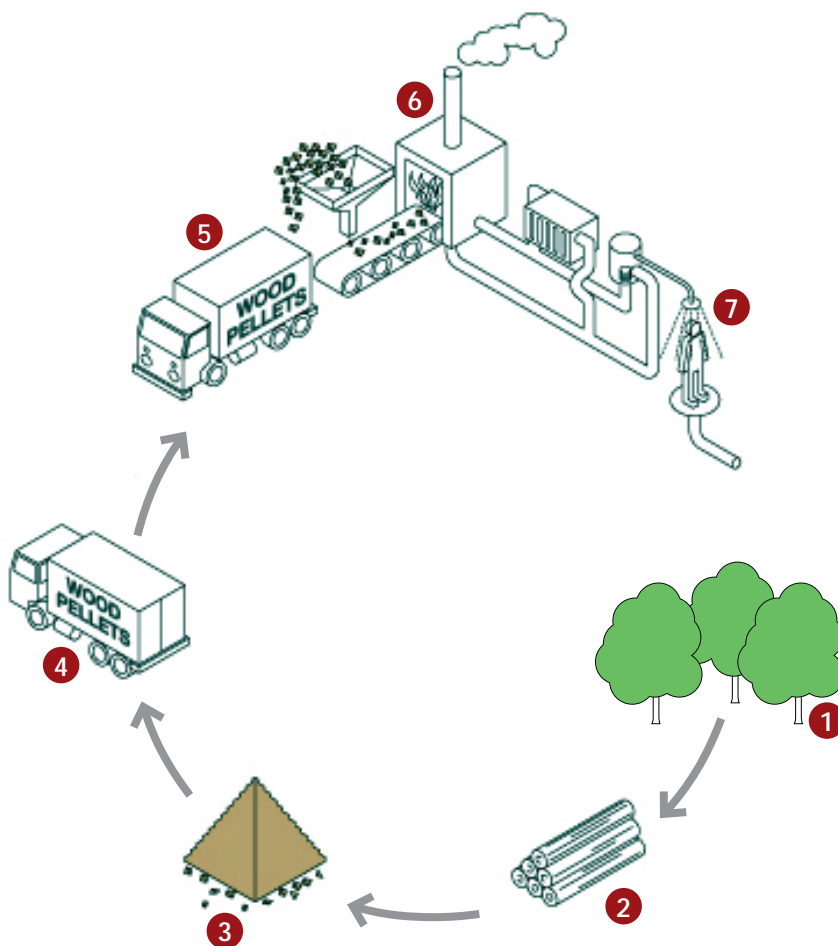
Figure 5.5 - Solar Thermal Systems – Homes or Small Apartment Development

Biomass Heating

Biomass Heating Systems will assist in Birmingham target of reducing its waste to landfill by half in 2015. However, Biomass heat would be dependent on the supply chains to be a practical solution to end users. The flow charts below explore Biomass heating systems for both domestic and non-domestic heating systems. A third option considers the potential to adopt community based Biomass heating system linking a number of sites.

Biomass heating utilising boilers with capacities from the tens of kilowatts range through to 500kW - 1MW and above which may become more widespread in the UK serving district heating (DH) networks either for retrofit purposes or new developments may become more prevalent in the UK in the near future. This is a consequence of the potential for lifetime efficiency and CO₂ savings and tightening Building Regulations and Code for Sustainable

Homes requirements. Biomass DH networks can be compatible with phased developments since if they are designed correctly, smaller networks can be linked to larger networks as the build progresses.



1. Sustainable tree plantation
2. Forestry offcuts and felled timber
3. Wood converted to wood pellets, with controlled specification
4. Pellets transported
5. Pellets pumped by air blower into basement storage hopper from lorry in loading bay
6. Biomass boilers in basement generate 80% of heat for the development. Gas boilers supplement this
7. Heat is used for space heating and hot water in offices and apartments

Figure 5.6 - Biomass Heating Process

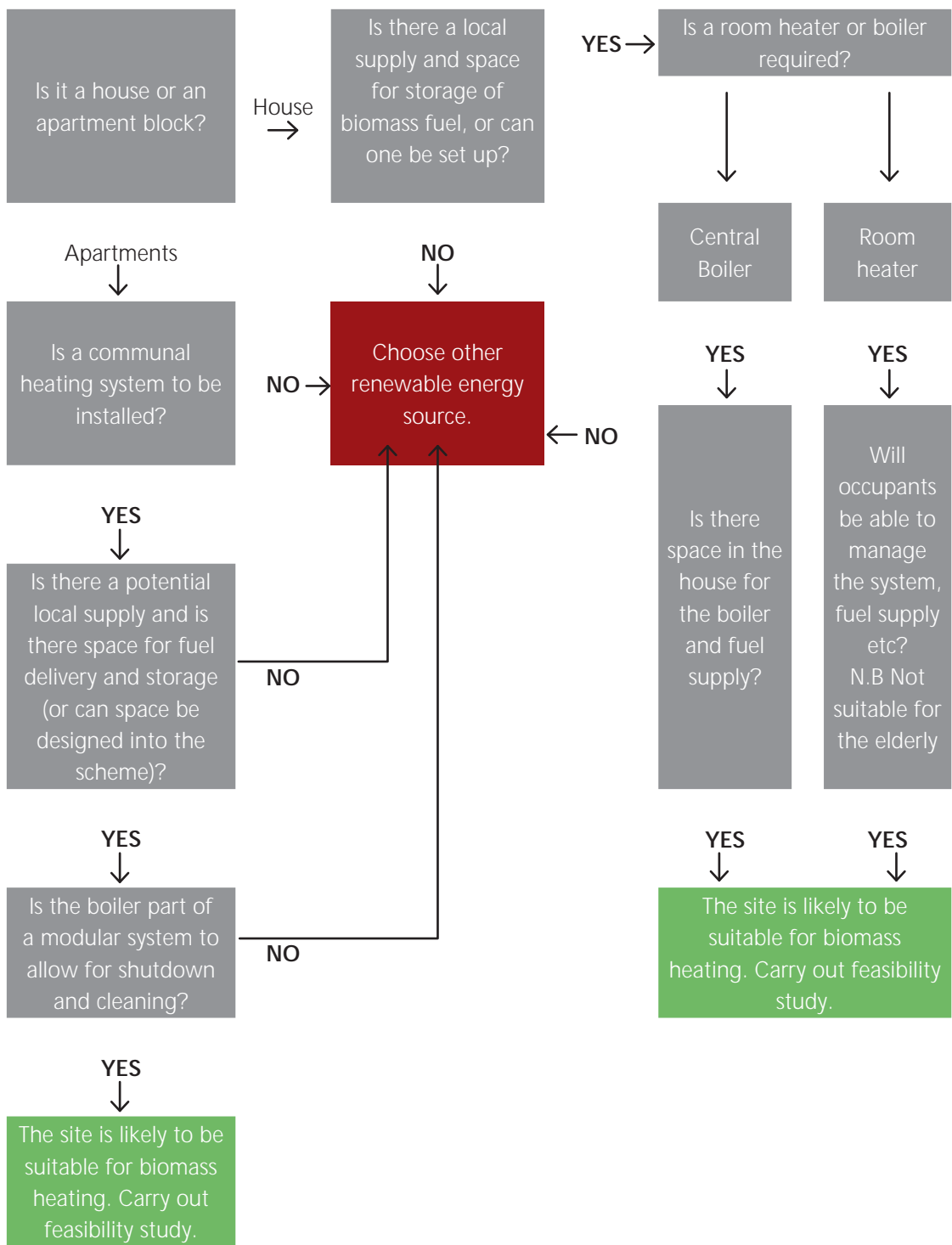


Figure 5.7 - Domestic Biomass Heating

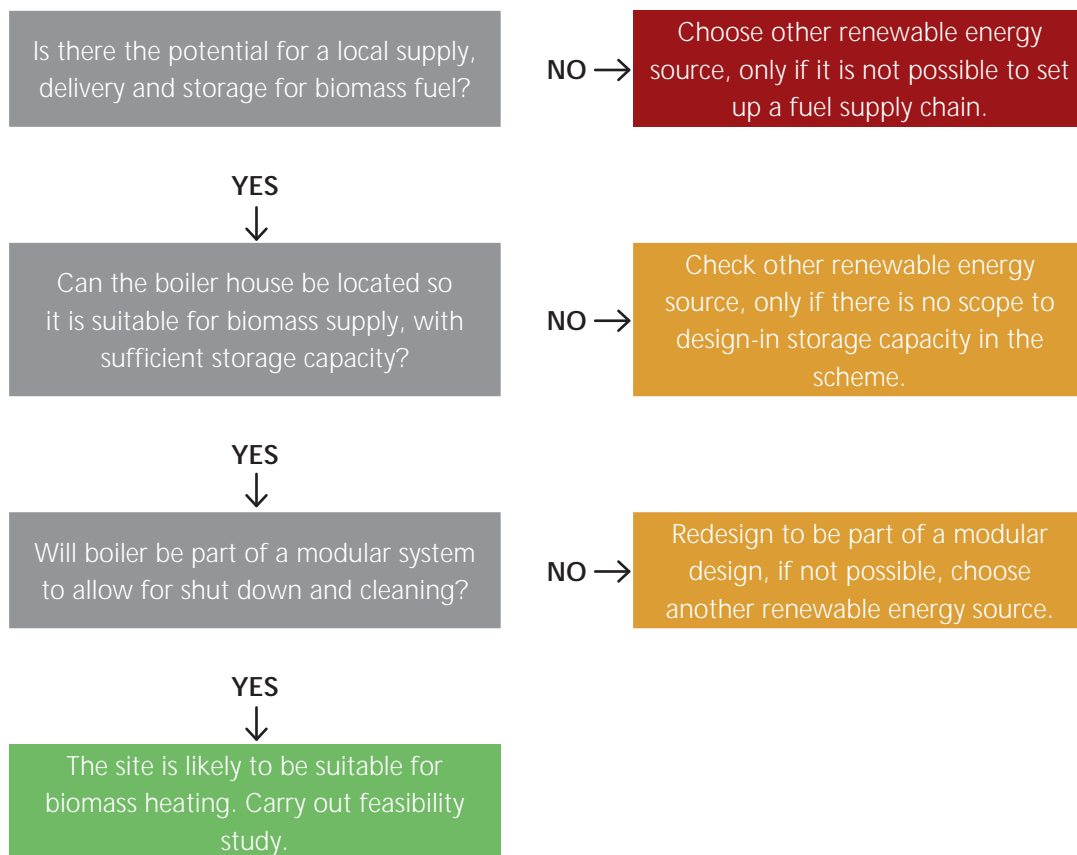


Figure 5.8 - Non-domestic Biomass Heating

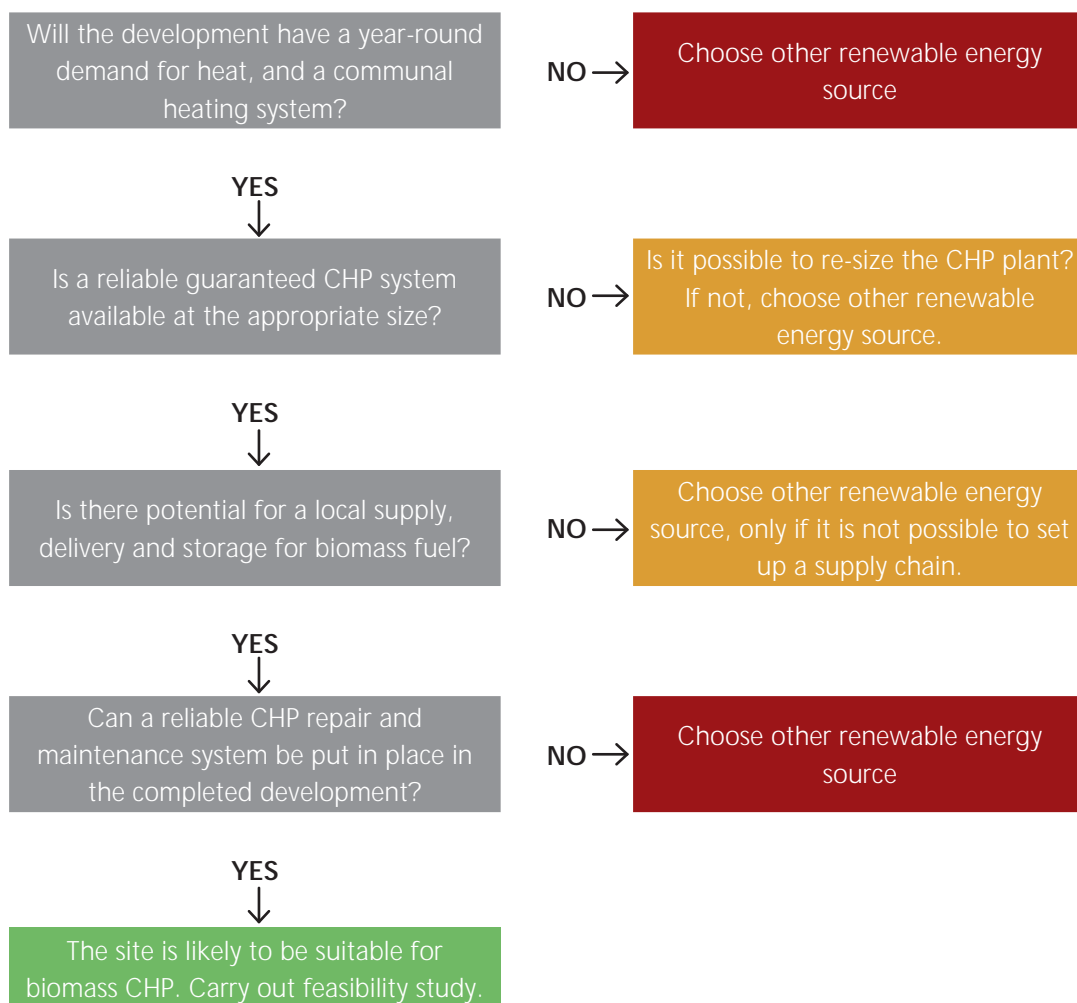


Figure 5.9 - Biomass CHP

Ground Source Heating and Cooling

Ground source heating and cooling technology would require sufficient space to provide horizontal pipes within the project. Ground source cooling would only be required in special circumstances where passive cooling is inadequate.

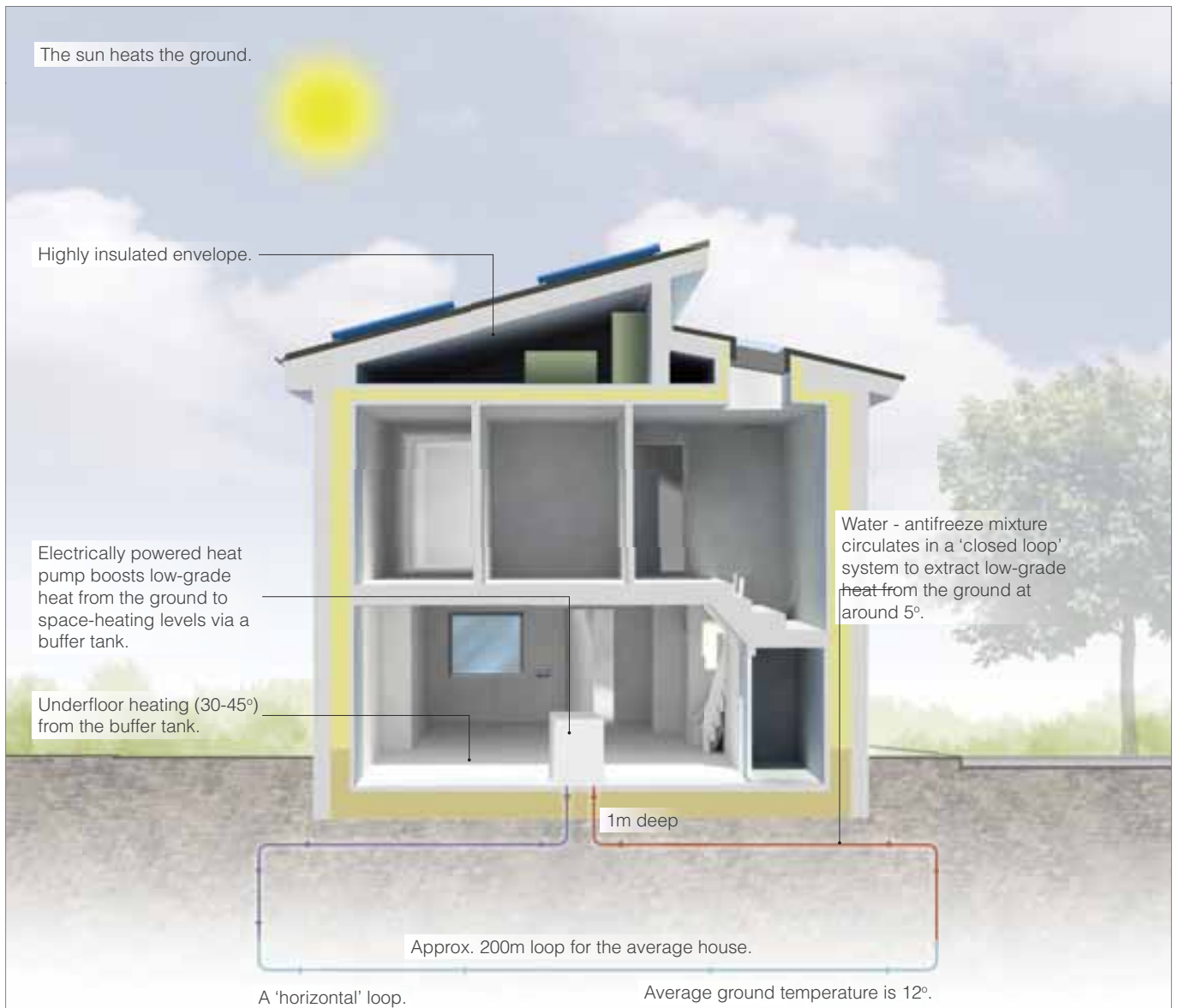


Figure 5.10 - Ground Source Heating System

Based on Greenwatt Way, Slough, designed by PRP Architects

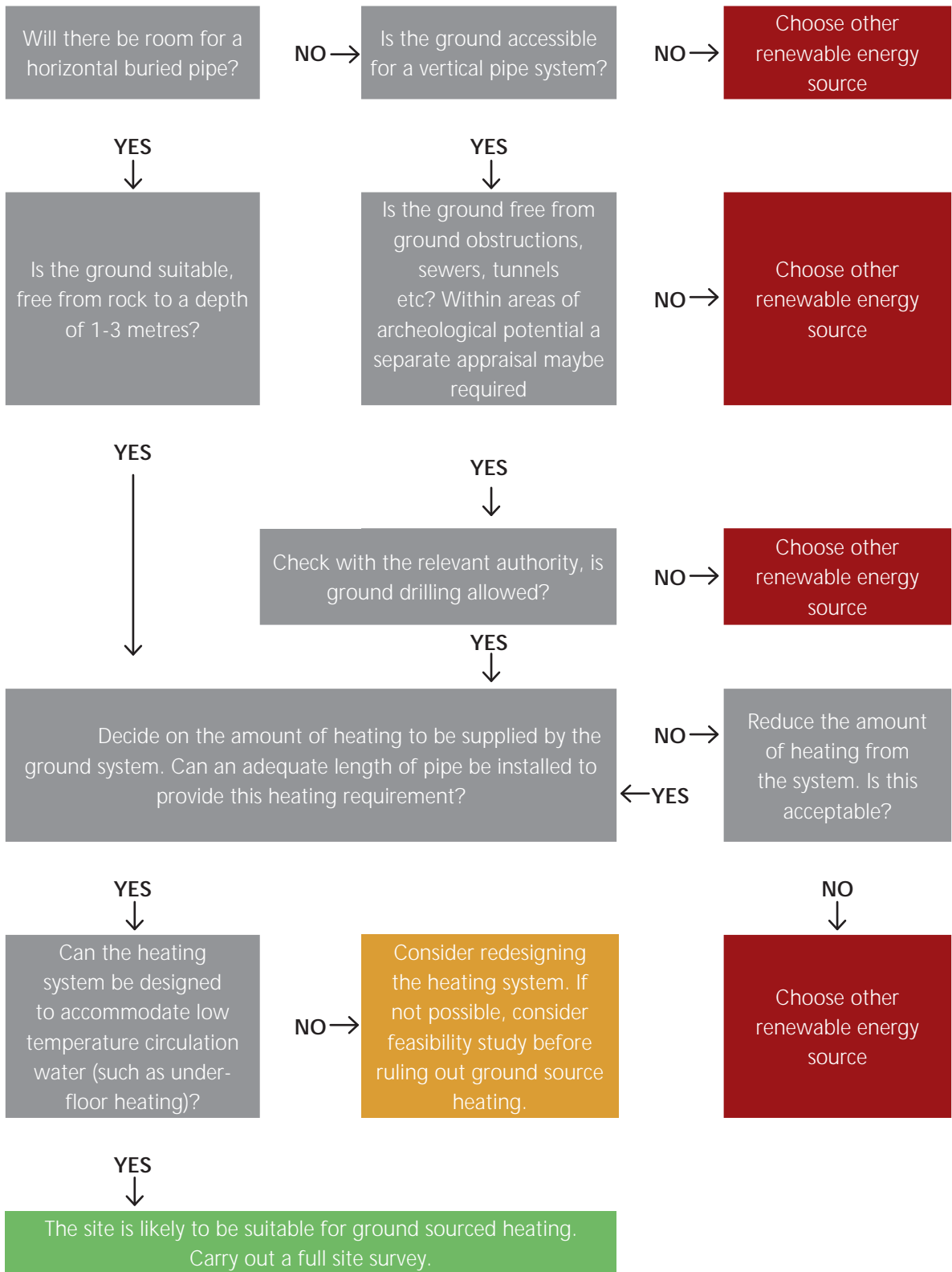


Figure 5.11 - Ground Source Heating

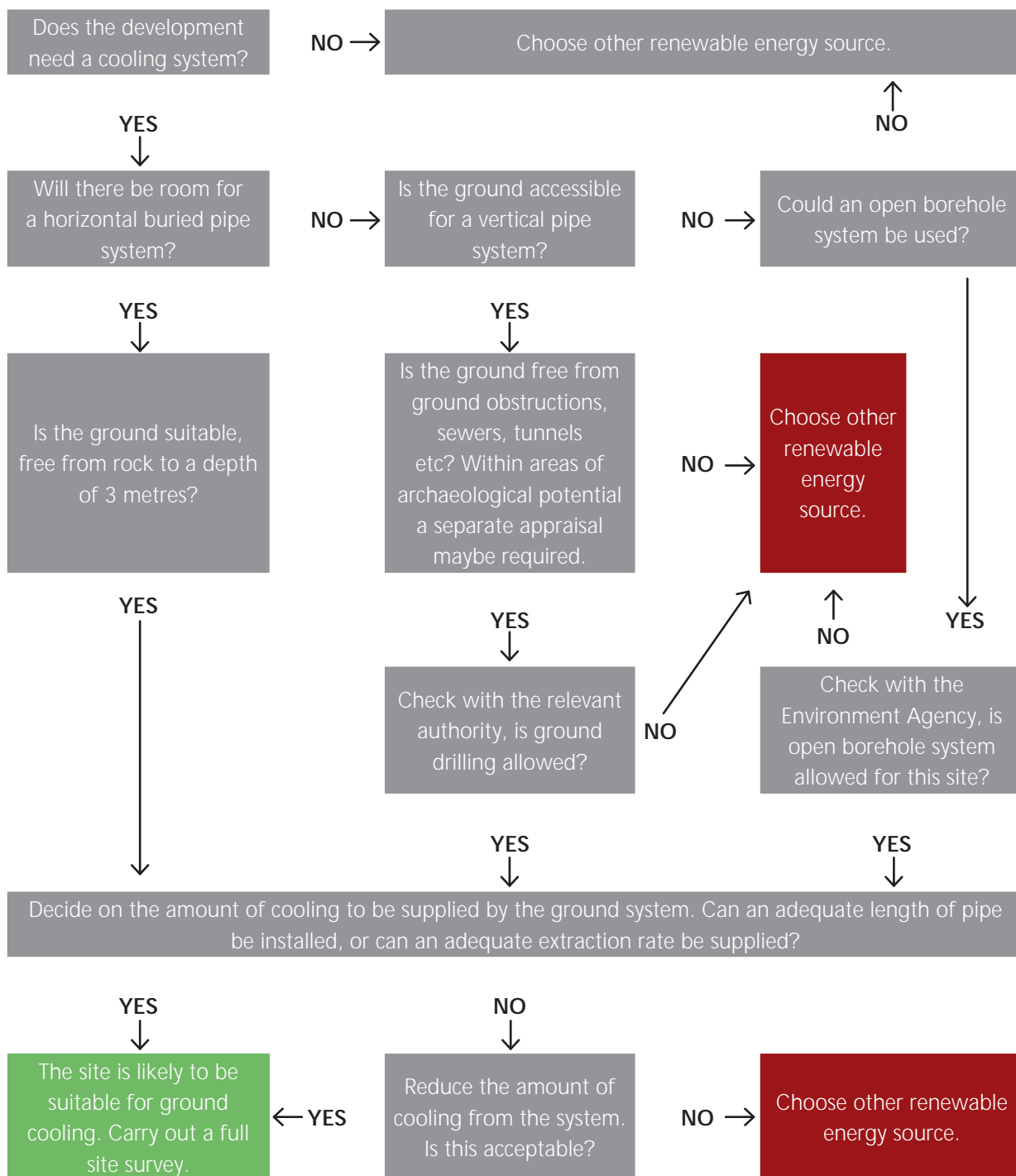


Figure 5.12 - Ground Cooling Systems

Urban Design Issues and Principles

The landscape and visual effects of renewable energy developments vary according to type of development, its location and landscape setting. Developers should seek to minimise these effects through appropriate siting, design and landscaping schemes.

Renewable energy developments should be located and designed in such a way to minimise increases in ambient noise levels, and should be set out at a minimum separation distance between different types of renewable energy projects and existing or forthcoming developments.

In handling planning applications for anaerobic digestion, Birmingham City Council carefully considers the potential impacts of odour and the proposals for its control. In cases where odour would have an impact, such plants should not be located in close proximity to existing residential areas.

Allowable Solutions

The analysis of the costs on installing different renewable technologies has demonstrated that it may not be possible to meet the requirement on site without recourse to allowable solutions for all development sizes.

Further, other policy objectives may preclude the installation of some renewable technologies due to site conditions, or where installation would cause significant effects. The circumstances where this may arise are:

- Where the site is located within a conservation area or its setting;
- Where the site has an effect on a listed building;
- In relation to stand alone wind turbines, this may be due to inappropriate site conditions and effects relating to noise, visual impact and residential amenity;
- In relation to biomass boilers and Biomass CHP where it is not possible to secure a sustainable feedstock source and method of transportation or where the proposed equipment to be installed would have a significant effect on local air quality; and
- Where there is insufficient space to install ground source heat pumps and other solutions are not appropriate.
- Where there are archaeological remains.

In these circumstances it is appropriate to meet the shortfall in energy demand and associated CO₂ reductions through an offsite allowable solution. These should be an alternative off site renewable solution, where a firm proposal is identified and delivery is certain. Alternatively planning obligations through a commuted sum payment could be pooled and used to support specific carbon reduction projects in the city.

A fund is likely to be established for this purpose.





The issues

Rainfall patterns are predicted to change as a result of climate change, with summer rainfall reducing overall; winter rainfall increasing, but with an increased incidence of intense rainfall events, that can lead to flash flooding throughout the year. This predicted summer reduction could lead to a reduction in water levels in rivers and groundwater, meaning that the frequency of water shortages in summer increases. As well as changes in patterns of rainfall, temperatures are expected to increase which could result in a greater need for water in artificial cooling processes.

Population growth in the City will place additional pressure on water resources, placing further strain on this precious natural resource. This means there is an increasing need to manage water resources efficiently to ensure water is available. Treating and supplying water is an energy intensive and costly process, so reducing water use can therefore have an impact on carbon emissions and can be economically beneficial.

As water resources are placed under increasing stress due to a reduction in rainfall and greater use there is also pressure on water quality. Rivers with low flows are less able to dilute pollutants. Problems include eutrophication (caused by excessive nutrients) and flooding leading to pollutants entering the rivers. Water for People and the Environment, Water Resources

Strategy for England Wales published by the Environment Agency (2009) maps the availability of water for abstraction (including surface water and groundwater at a Catchment scale, this shows that there are already significant pressures on the water environment. Birmingham is shown as an area that is over licensed, this means that current abstraction is such that no water is available at low flows. If existing licences were used to their full allocation they could cause unacceptable environmental damage at low flows. Climate change will have an impact on river flows and groundwater, with increases in winter river flows, but large reductions in summer and early autumn.



Birmingham's Approach

The Council will expect developers to show that they have considered water use in their developments and to show how they have sought to reduce the amount of water that will be used in their development. There is a need to reduce both internal water use (water used within a building) and external water use (water used outside a building for irrigation etc). For external water use it is important to reduce the amount of mains potable water use, as these uses do not require water of drinking water quality.

The Code for Sustainable Homes includes minimum standards for water use at every level of the code. The standards are for internal potable water consumption measured in litres per person per day as follows:

- Code Level 1 – 120 litres per day
- Code Level 2 – 120 litres per day
- Code Level 3 – 105 litres per day
- Code Level 4 – 105 litres per day
- Code Level 5 – 80 litres per day
- Code Level 6 – 80 litres per day

There are various measures that can be included in the design of buildings that can be used to reduce internal water use this includes:

- Greywater recycling (see below for further information).
- Low water appliances and fixtures and fittings - dual flush toilets and reducing/aerating taps, low water use showers and appliances, smaller shaped baths (which still allow lying down but require less water to fill).


To reduce external water use, one of the main methods is to use rain water harvesting (RWH) techniques to capture and store rainwater. The water is stored and may be treated for uses that include irrigation or cleaning. Basic RWH systems can easily be incorporated in the design of each building, by connecting roof gutters and rainwater downpipes to a storage tank, which can either be sited externally (above ground or

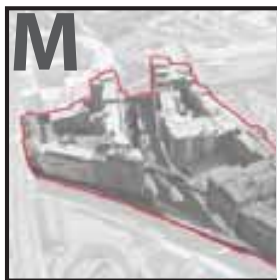



underground) or internally. However, in large scale developments there is scope to integrate a site wide system into the design of the development, to collect rain from multiple buildings storing it in larger tanks for site wide use.

As well as reducing demand for water, RWH systems can help to reduce the risk of flooding during storms by storing rainwater and buffering run off before it reaches the drainage system.

Other methods of reducing the need for water include using drought resistant/low water use planting and landscaping, and using permeable pavements and surfaces to allow water to reach vegetation naturally, therefore reducing the need for irrigation, and recharging ground water. Permeable pavements and surfaces also have the benefit of reducing storm water runoff, and improve water quality by reducing pollutants in the runoff.

 <p>S</p>	<p>Small Development</p> <ul style="list-style-type: none"> - Small, single plot commercial developments - Residential blocks, business centres etc. 	<p>Potential Measures</p> <ul style="list-style-type: none"> - Water efficient fixtures and fittings - Usage awareness, visible metering - Attenuation measures: green roofs, grey water harvesting/ storage, permeable paving
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 <p>M</p>	<p>Medium Development</p> <ul style="list-style-type: none"> - Multi unit residential/ mixed use schemes - Modest commercial regeneration - Brownfield site infill 	<p>Potential Measures (Small +)</p> <ul style="list-style-type: none"> - Integrated SUDS measures - Greywater treatment and recycling - Automated greywater landscape irrigation
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 <p>L</p>	<p>Large Development</p> <ul style="list-style-type: none"> - Major City centre commercial and mixed use - Sustainable Urban Neighbourhoods 	<p>Potential Measures (Small and Medium +)</p> <ul style="list-style-type: none"> - On site waste water treatment or reed bed filtration - Substantial attenuation measures (balancing pond, engineered wetlands etc)
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Birmingham City Council Offices, 10 Woodcock Street - Example of BREEAM excellent building

The Council's new office development at Woodcock Street, in Aston, will providing 22,000 sqm accommodating approximately 3,000 Council employees. The project highlights Best Practice across a range of issues which include: collaborative design through value management and engineering; on site work activity studies to improve productivity and collaborative planning and project management.

The design has incorporated many sustainable and energy efficient solutions, whilst recognising the need to achieve value for money.

The project has delivered a highly sustainable and flexible facility which has already achieved Construction Excellence demonstration project status and is on target to achieve an 'Excellent' BREEAM rating. Several sustainable solutions have been incorporated into the project including rainwater harvesting, and photo-voltaic panels on the roof to generate electricity.

The installation of a brown roof was also created to provide an ideal habitat for local wildlife including the Black Redstart, also assisting in the insulation of the building together with an effective waste management system during construction. The innovative solutions are helping the council to reduce its carbon footprint and reduce energy bills.



Decentralised wastewater treatment

Much of the water we consume domestically or for commercial uses, does not need to be potable. However, much of the water we consume is used for toilet flushing (about a third of water use in a typical UK household) or irrigation. By decentralising the treatment of wastewater it is possible to reduce water demand.

Decentralising water treatment includes greywater recycling. Greywater is wastewater collected from baths, showers, washing machines, sinks and dishwashers, but not water collected from toilets. Greywater can be collected, filtered and treated (either biologically or chemically). Once treated it is non-potable but can be reused for various residential, industrial or public uses that include:

- flushing toilets
- landscape irrigation
- street cleansing
- filling ponds or lakes
- street tree watering
- other applications such as laundry, car washing
- industrial use – cooling or manufacturing
- office heating or cooling.

Principles of safeguarding water quality and pollution control

Neighbourhood – separate drainage systems for surface water and foul water, storm overflow management, SUDs (see Section 3).

7. Sustainable Construction and Waste



The Issues

Construction and demolition waste currently represents around 19% of the country's total waste¹². The reduction of this figure is reliant on better construction and waste management measures that will contribute to lowering the carbon footprint impact of new building developments. There is a need to reduce the amount of raw materials, increase the use of recycled materials and equip buildings with adequate facilities for waste and recycling.

Birmingham's Approach

Emerging Core Strategy Policy SP7: Sustainable Construction supports a number of measures to encourage more sustainable construction. New residential development must comply with design requirements set out in the Code for Sustainable Homes and BREEAM standards. Developers need to demonstrate how their proposals accord with the above standards through their Design and Access Statement and will need to undertake a post construction review certificate.

The Birmingham Waste Management Strategy 2006 – 2026 seeks to reduce the amount of waste sent to landfill and encourages recovering value from waste wherever economically and environmentally practicable through energy recovery and measures to increase re-use, recycling and composting.

Table 7.1 - Sustainable Construction and Waste Requirements

	Policy	Requirement	Applicant to consider and show evidence of
Mandatory	SP7	All new residential development to meet at least CfSH Level 3, Code Level 4 by 2013, and Code Level 6 by 2016.	Have you consider the requirements of CfSHs fully and how is the development meeting the required level?
	SP7	All non residential development (over 1,000sqm or on site of 0.5ha +) should meet BREEAM standard excellent	Have you considered the requirements of BREEAM fully and how is the development meeting the required level?
	SP7	Developers will need to show how they accord with the standards and undertake a post construction review certificate.	
	SP43	Maximised onsite recycling of construction and demolition waste.	Sustainable construction: What proportion of building materials will be from recycled sources? What proportion of construction waste will be recycled? What proportion of construction materials will be sourced locally? Are building materials from a sustainable source? Waste management: Does the development include appropriate on-site facilities to allow storage of recyclable material? Does the development provide appropriate facilities to allow on-site composting or biodegradable waste to be converted to energy (biomass)? What approach does the development adopt towards waste management, and to what extent is waste managed at the top of the waste hierarchy?

¹² Environment Agency, Sustainable Construction, 2003



Sustainable Construction Standards

Code for Sustainable Homes (CfSH)

The Code for Sustainable Homes is a rating and assessment method for certifying the performance of new homes. It is intended to be a national standard to guide industry in the design and construction of sustainable homes. The CfSH measures the sustainability of a home against design categories rating the whole home as a complete package.

CfSH goes further than the current Building Regulations, but over time aspects of the code are superseded by the Building Regulations for example the thermal standards and the energy requirements set in Part L October 2010 make the thermal standards and the energy requirements of the CfSH levels 1-3 redundant. In 2010 Code Level 3 compliance became mandatory for all new homes, and it is anticipated that Building Regulations as well as the mandatory code level will increase over time until 2016.

The CfSH use a rating system of Level 1 to 6, rating a range of categories. Each category includes a number of environmental issues, each issue is assessed against a performance target and awarded one or more credits.

The categories and the issues that are related to them are (M denotes mandatory requirements):

Requirement	How Measured
Energy and Carbon Dioxide Emissions	<ul style="list-style-type: none"> • Dwelling emissions rate (M) • Fabric Energy Efficiency (M) • Energy Display Devices • Drying space • Energy labelled white goods • External lighting • Low and zero carbon technologies • Cycle storage • Home office
Water	<ul style="list-style-type: none"> • Indoor water use (M) • External water use
Materials	<ul style="list-style-type: none"> • Environmental impact of materials (M) • Responsible sourcing of materials – basic building elements • Responsible sourcing of materials – finishing elements
Surface Water Run-off	<ul style="list-style-type: none"> • Management of surface water run-off • Flood Risk
Waste	<ul style="list-style-type: none"> • Storage of non-recyclable waste and recyclable household waste (M) • Construction site waste management • Composting • Pollution • Global warming potential (GWP) of insulants • NOx emissions
Health and Well Being	<ul style="list-style-type: none"> • Daylighting • Sound insulation • Private Space • Lifetime Homes (M)
Management	<ul style="list-style-type: none"> • Home user guide • Considerate constructors scheme • Construction site impacts • Security
Ecology	<ul style="list-style-type: none"> • Ecological value of site • Ecological enhancement • Protection of ecological features • Change in ecological value of site • Building footprint

Mandatory performance targets are set for some issues. For three of these environmental impact of materials; management of surface water run-off from developments; and storage of non-recyclable waste and recyclable household waste a single mandatory requirement is sought for whatever level of the code is sought. For two other issues: dwelling emission rate and indoor water use credits are awarded at increasing levels of achievement (i.e. the better the performance the more credits achieved). For a further two issues Fabric Energy Efficiency and Lifetime Homes Code rating level 5 can not be achieved without receiving at least 7 credits for energy efficiency, whilst a level 6 rating can not be achieved without receiving 7 credits in energy efficiency and 3 credits in lifetime homes.

Further credits are available on the other issues identified above so that developers may choose how to gain credits to achieve the desired code rating. However, not all categories are of equal importance, and a weightings factor is applied to each issue.

Assessments of developments against the code are normally carried out at two stages:

- Design stage – leading to an interim certificate
- Post construction stage – leading to a full certificate

At both stages developers would need to provide evidence to the licensed assessor (the developer chooses a CfSH service provider to carry out the assessment). At the design stage assessors can be used to inform the design process, so that the design can be developed or amended to gain the required CfSH level.

The process is largely the same for the post construction stage with the developer providing evidence to the licenced assessor (this does not have to be the same assessor as for the design stage assessment). If a design stage assessment has been carried out this can be used as a starting point for post construction stage assessment. The post construction assessment is carried out to confirm that the dwellings are either built to the design stage specifications or if there are variations from these specifications, they are documented and reassessed and a new score and Code level calculated. If no design stage assessment was carried out then full assessment will be completed. Where dwellings are planned over phases, the assessment evidence must show the same specifications have been incorporated into all phases of development.

For further detail provided in Code for Sustainable Homes: technical Guide November 2010. This was the latest guidance at the time of publication, but it should be noted that this is updated at regular intervals. www.communities.gov.uk

Zero Carbon house

A unique zero carbon housing development in inner city Birmingham meets the stringent requirements of Level 6 of the UK Code for Sustainable Homes. The ground-breaking carbon-neutral building will produce at least as much energy as it consumes, and has been built around an existing house.

The residential development is an extension of a redbrick Victorian house, converting a 2-bedroom semi-detached into a 4-bedroom dwelling with a studio loft. The original 1840 brick house is preserved, as are the mature ash trees in the garden. Integration with the surroundings is important, and the design takes account of the neighbouring architecture.



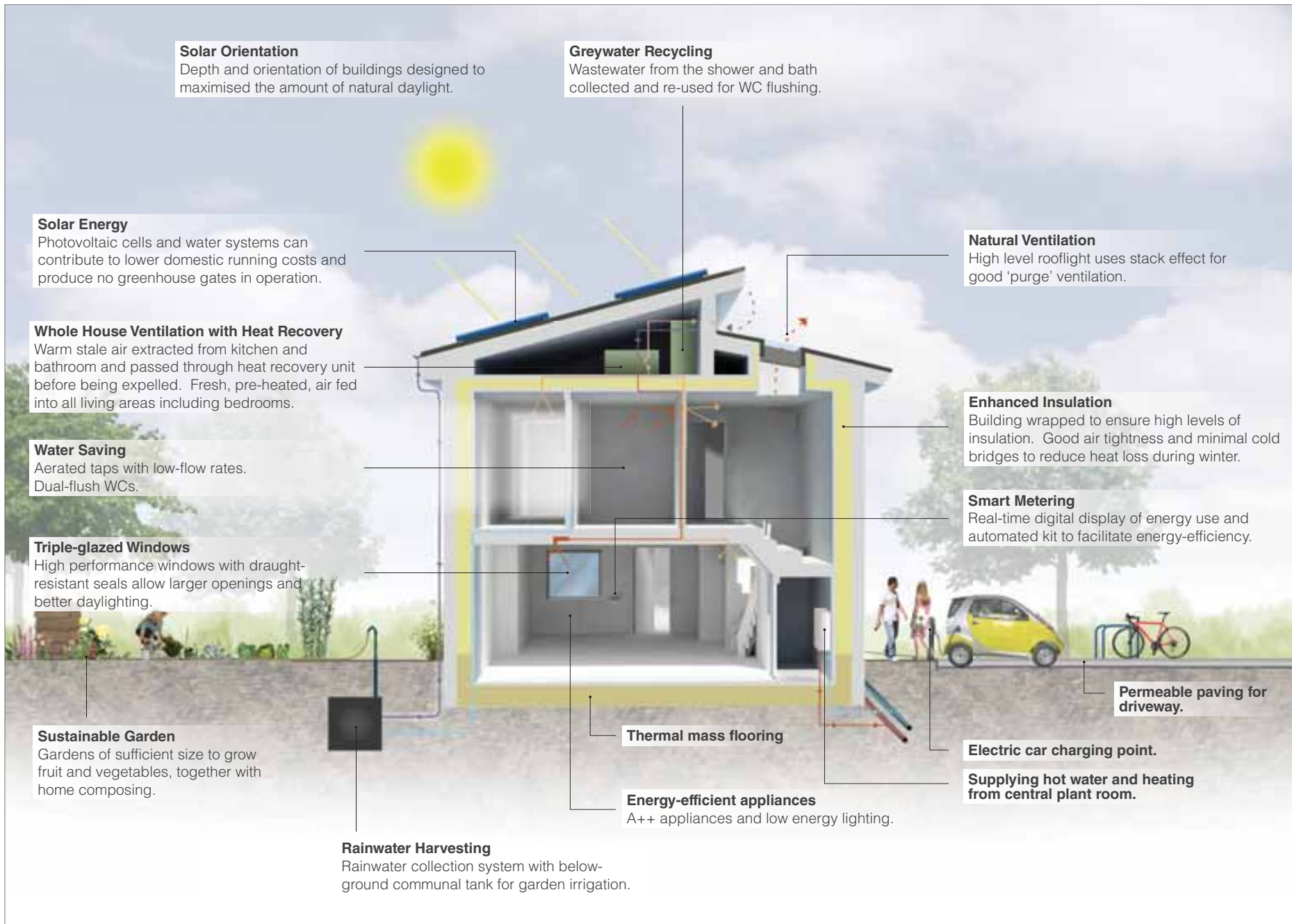


Figure 7.1 - Sustainable homes – principles for sustainable construction

Based on Greenwatt Way, Slough, designed by PRP Architects

BREEAM

BREEAM is an environmental assessment method rating system for buildings, which is managed by BRE Global Ltd. BREEAM covers various building types including retail, offices, education, offices, industrial, healthcare and multi-unit residential. BREEAM uses recognised measures of performance, which are set against established benchmarks, to evaluate a buildings specification, design and construction and use.

BREEAM includes a two stage assessment process; design stage and post construction stage.

BREEAM assesses a wide range of environmental and sustainability issues that includes:

- Management – including sustainable procurement, construction practices, life cycle costs

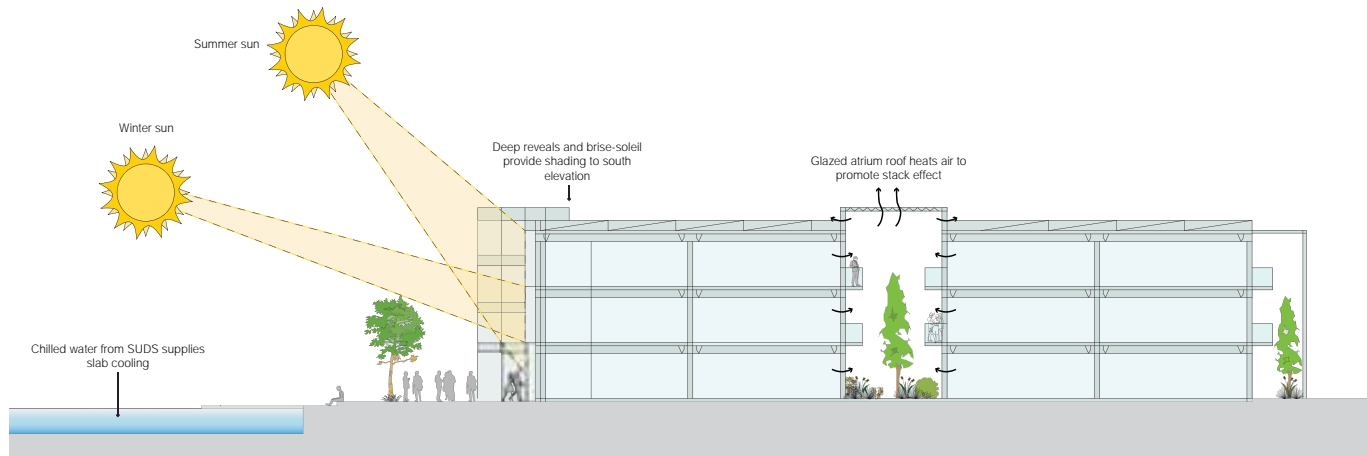
- Health and well being – visual comfort, indoor air quality, thermal comfort, water quality, acoustic performance, and safety and security.
- Energy – Reduction of CO₂ emissions, energy monitoring, external lighting, low and zero carbon technologies, energy efficiency.
- Transport – public transport accessibility, proximity to amenities, cyclist facilities, maximum car parking capacity and travel plans.
- Water – water consumption, water monitoring, water leak and detection and prevention, water efficient equipment.
- Materials – life cycle impacts, hard landscaping and boundary protection, responsible sourcing of materials, insulation, designing for robustness.
- Waste – construction waste management, recycled aggregates, operational waste
- Land use and ecology – site selection, ecological value and protection of ecological features, mitigating ecological impact, enhancing site ecology, long term impact on biodiversity
- Pollution – impact of refrigerants, NOx emissions, surface water run off, reduction of night time light pollution, noise attenuation
- Innovation

For more detail on the requirements of BREEAM assessment see www.breeam.org

Sustainable Construction Measures

The environmental impact of construction can be reduced by minimising the amount of waste to be disposed from the site and by reducing the need for new raw materials. Better planning of the construction process will reduce costs by allowing more efficient use of building materials and increase the attractiveness of development to potential customers.

Figure 7.2 - Sustainable work places - principles for sustainable construction



6 The 'waste hierarchy' is a legal requirement of the revised EU Waste Framework Directive enshrined in Law through the Waste (England and Wales) Regulations 2011.

The reduction of waste and its efficient disposals can provide cost and environmental benefits to developers which include:

- Decreased removal and landfill tax
- Reduced materials
- Reduced labour costs for sorting and transporting waste
- Minimises environmental impacts of waste sent to landfills

Developers should also consider more sustainable waste disposal measures and prioritise efforts in line with the Government's waste hierarchy⁶ and reduce the carbon impact of waste:

- Prevention (using less materials in the design and construction, waste minimisation)
- Re-use (checking, refurbishing whole or part of building)
- Recycling (including composting)
- Other recovery (incineration with energy recovery)
- Disposal (landfill and incineration without energy recovery).

Sustainable construction measures that could be applied to new development schemes include the following:

- Existing buildings on a site, particularly historic buildings (whether or not they are listed) should be retained, adapted, reused or refurbished where possible.
- Re-use existing building materials if it is not feasible to re-use the entire building. For

example, historic features or characteristics of a building may be appropriate to preserve. It is important that these materials are identified early-on in the process and carefully stored so that they can be easily accessed at the appropriate part of the development build process.

- A pre-demolition and refurbishment audit should be conducted to determine which materials on the existing site can be incorporated into the new development, for example providing infill, landscaping. This can reduce the cost and environmental impact of waste disposal by re-using existing materials.
- Demolition materials or surplus materials from the new development could be collected and reused in other building schemes, which could provide additional earnings from selling those materials that are not required.
- Transporting waste to waste disposal sites in Birmingham should occur in as minimum journey time as possible.
- Recycled materials should be prioritised if additional building materials are required for a development. These should be locally or sustainably sourced where possible, as these will contribute to a lower carbon footprint.

- Selection of new building materials that are long-lasting and robust to the environmental conditions to reduce the need for additional materials to maintain the building. Exact calculations should be made for the new building materials in order to ensure waste is reduced.

By increasing resource efficiency and reducing and managing construction waste this can provide cost and environmental benefits that can contribute to SWMP Regulations, BREEAM and CfSH ratings.

- Further guidance on the responsible sourcing of construction materials:
- FSC (Forest Stewardship Council) Certification – ensures that the forest products used for construction are from responsibly harvested and verified sources www.fsc.org
 - Centre for Sustainable Construction building research establishment (BRE) www.bre.org.uk
 - WRAP (Waste and Resources Action Programme) www.wrap.org.uk
 - British Standard BS 7543:2003 – Guide to durability of buildings and building elements, products and components



Sustainable Waste Management and Recycling

There is a need to promote sustainable energy use and waste management. Development schemes should aim to meet CfSH and BREEAM excellent ratings through appropriate site waste management and provision of adequate waste and recycling facilities:

Site Waste Management Plan

A site waste management plan requires the monitoring of waste on site and the setting of targets to promote resource efficiency. This plan is a legal requirement in England for projects costing more than £300,000. Procedures and commitments that minimise waste could include the following:

- Re-use on site (in situ or for new applications)
- Re-use on other sites
- Salvage/reclaim for re-use
- Return to the supplier via a 'take-back' scheme
- Recovery and recycling using an approved waste management contractor
- Compost.

Waste Management

The CfSH and BREEAM Standards require developments to provide adequate internal and external storage space for non-recyclable waste and recyclable residential and commercial waste. These facilities need to comply with inclusive design principles necessary to provide access and usability.

The storage space for residential waste facilities should be designed in line with the following principles:

- The storage facilities should not be placed more than a 30 metre walk away from the occupants.
- Bins should be stored at a ground level with a direct flat route between the storage area and the collection point.
- The collection point should be accessible by the collection vehicles used by Birmingham City Council.
- The storage area should be accessible for all, easy to use and appropriately screened.

The Birmingham City Council Municipal Waste Management Strategy 2006-2026 identifies that waste recycling facilities should be part of new build households.

Compost facilities

Developers should also consider the incorporation of composting facilities within a residential development, such as individual home composting facilities that are suitable for food and other compostable household wastes or the development of a communal/composting service that could convert biodegradable waste to energy (biomass).

These compost facilities should be designed as part of a private or communal greenspace on a site and should be located in an easily accessible location that is well-drained and has good exposure to sunlight.

Further Guidance on waste management facilities:

- BS 5906:2005 Waste Management in Buildings – Code of Practice, British Standards Institute (2005)
- Department for Communities and Local Government, Code for Sustainable Homes, November 2010

Tesco, Hodge Hill

The overall waste arisings for the Tesco development in Hodge Hill, Birmingham, were minimised through the offsite pre-fabrication and production of many parts of the building's infrastructure. This has reduced on site wastage significantly and is consistent with the principles of the waste hierarchy.

The development featured integrated source waste segregation and off site separation service. A mixture of types and sizes of waste containers are provided on site, chosen at each phase in the development to achieve a balance between reducing the number of waste movements off site and adequately providing for material to be source segregated. To maximise the efficiency and reduce the cost of the waste collection and recovery service, the largest practical sizes of containers were used and materials were separated to minimise the volume of general waste to be sorted off site. Regular site inspections monitored the fill level and rate of the containers so that only full containers were removed.

The waste management approach resulted in a small amount of residual waste equivalent to 5-10% of the waste (by weight) collected. The residual waste was sent for energy recovery at a plant near Stoke-on-Trent, thus avoiding landfill altogether. There was a clear linkage in this project between the provision of a primary off site sorting of the general waste and a resultant reduction in the volume of waste sent for energy recovery.

Appendix A

Policy Context

The following is a list of the relevant National and Local policy Context that should be read in conjunction with this SPD.

Type of Policy	Document Title
National Policy	UK Sustainable Development Strategy
	Low Carbon Transition Plan
National Planning Policy	PPS1: Delivering Sustainable Development
	PP1 Supplement: Planning and Climate Change
	PPS3: Housing
	PPS4 Planning for Sustainable Economic Growth
	PPS5: Planning for the Historic Environment
	PPS9: Biodiversity and Geological Conservation
	PPS10: Planning for Sustainable Waste Management
	PPG13: Transport
	PPS22: Renewable Energy
	PPS25 Development and Flood Risk
	Draft National Planning Policy Framework
National Building Regulations	Code for Sustainable Homes
	The Building Research Establishment Environmental Assessment Standard (BREEAM)
Birmingham Strategies	Sustainable Community Strategy
	Climate Change Action Plan 2010+
	Draft Climate Change Adaptation Action Plan 2012+
	Draft Green Infrastructure Strategy (2012)
	Draft Low Carbon Transport Strategy
	Biodiversity Action Plan for Birmingham & Black Country
	Waste Management Strategy 2006 - 2026

Type of Policy	Document Title
Draft Core Strategy Policies (Dec 2010)	SP3: Quality of Life
	SP4: Sustainable Neighbourhoods
	SP5: Reducing the City's Carbon Footprint
	SP6: Adapting to Climate Change
	SP7: Sustainable Construction
	SP8: Low Carbon Energy Generation
	SP9: Low Carbon Economy
	SP10: managing Flood Risk
	SP11: Green Infrastructure
	SP30: The Design and Quality of New Housing and the Residential Development
	SP35: Sustainable Transport Systems
	SP36: Accessibility Standards for New Development
	SP37: Digital Connections
	SP42: Sustainable Management of the City's Waste
	SP45: Open space, playing fields and allotments
	SP48: Urban Design
	SP49: Biodiversity and Geology
SP50: Archaeology and the historic environment	
SP51: Health	
Birmingham City Council SPD	Sustainable Management of Urban Rivers and Floodplains (SMURF) SPD
	Places for All SPD (not yet published)
	Public Realm SPD (not yet published)

Appendix B

Glossary

Glossary

Term / Word	Definition
Allowable Solutions	Used in the Definition of Zero Carbon Homes and Non- Domestic Buildings consultation (CLG, 2008) to describe a range of solutions that can deal with the remaining building emissions, after maximising solutions that are on the site of the development.
Building Research Establishment Environmental Assessment Method (BREEAM)	Environmental assessment method of rating buildings.
Broadband (internet access)	Internet access that is always on and faster than the traditional dial-up access.
Code for Sustainable Homes (CfSH)	Environmental impact rating system.
Combined Heat and Power (CHP)	The capture and use of heat that is generated during electricity generation.
Chartered Institute of Building Services Engineers (CIBSE)	Professional body that supports building services engineers.
Decent Homes Standard	Is a technical standard for public housing. It aims to provide a minimum standard for housing conditions.
Density	Refers to the density of development, the amount of built development in a given area. For housing development this is usually expressed as dwellings per hectare amount
District Heating / Cooling	Is a system for distributing heating or cooling generated in a centralised location for residential or commercial heating or cooling requirements (for space heating or cooling and water heating).
Energy Service Company (ESCO)	Commercial business providing a range of comprehensive energy solutions including power generation and energy supply.
Feed-in-Tariffs (FITs)	Policy mechanism designed to accelerate investment in renewable energy technologies. A UK Government cash back scheme guaranteeing payment to people who generate low carbon electricity up to 5 mega watts (MW).
Green Infrastructure (GI)	A strategically planned and delivered network of high quality green spaces and other environmental features.
Greywater	Wastewater generated from domestic activities such as laundry, dishwashing or bathing which can be recycled on site for uses such as irrigation.
Heat pumps	Heat pumps use heat from either the ground or the outside air to heat a building. Ground- and Air- source heat pumps are not completely 'renewable' as they require electricity to drive their pumps or compressors
Lifetime Homes Standard	Set of 16 Design Criteria that when applied to the design of new homes enable the home to be adapted to support the changing needs of families at different stages of life.

Local Development Orders (LDOs)	Allow the local authorities to extend permitted development rights for certain forms of development.
Louvres	Window, blind or shutter with horizontal slats that are angled to admit light and air, but to keep out rain, direct sunshine
Natural Health Improvement Zones	A draft initiative that will provide a supplement to SP 11 and they are endorsed within the Birmingham Health Protection Strategy 2011 and the Air Quality Action Plan 2011. Areas of the city to be highlighted where health and environmental factors are considered poor; below a set benchmark. They will represent a partnership delivery mechanism to bring about positive change.
Natural surveillance	Is where the design and placement of physical features and activities is such that it allows maximise visibility of public spaces. This constant surveillance by people going about there business ensures that potential offenders feel a sense of increased scrutiny of their activities.
Power Purchase Agreement	Agreements between two parties one who generates electricity for the purpose of sale and one who is looking to purchase electricity.
Renewable Heat Incentive (RHI)	The Energy Act 2008 allows for the setting up of a Renewable Heat Incentive (RHI), which would provide financial assistance to generators of renewable heat and to some producers of renewable heat, such as producers of bio-methane.
Renewable Obligations Certificates (ROCs)	Green certificate issued for eligible renewable electricity generated within the UK and supplied to customers by a licenced supplier. ROCs are issued by Ofgem
Standard Assessment Procedure (SAP)	Is a measure of energy performance of buildings. Every new house in the UK has to have an SAP rating. Expressed as a scale of 1 to 100 (the higher the number the better the rating).
Section 106 Agreement	Section 106 agreements are legal agreements between a planning authority and a developer, or undertakings offered unilaterally by a developer, that ensure that certain extra works related to a development are undertaken
Solar Photovoltaics (Solar PV)	Renewable system for converting sunlight into electricity
Solar Thermal	This is primarily a hot-water technology. It works by absorbing energy from the sun and then heating water (using heat exchangers).
SUDs	A sequence of management practices and control structures designed to drain surface water in a more sustainable fashion than some conventional techniques.
Technology Payback	Length of time (in years) before the initial capital investment in a renewable technology will be paid back through cost savings in reduced energy charges.
Walkable City	The concept of the walkable city puts the needs of pedestrians at the heart of the movement strategy for the city centre. See Emerging Core Strategy 5.1

