

NW Bicester

An application for the exemplar phase of the
NW Bicester Eco Development proposals submitted by
P3Eco (Bicester) Limited and the A2Dominion Group

Sustainability Statement



P3Eco Ltd

a2dominion



A2Dominon & P3Eco

Bicester Eco Town

Sustainability Statement – Exemplar Site

Final.v2

Author	Various	Various
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Checker	Marc Chapman	
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Approver	Philip Harker	
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SUMMARY

This report presents the global sustainability strategy for the NW Bicester eco development Exemplar site. An additional sustainability strategy will be produced to support the remaining eco development area, taking forward the measures identified within this strategy where appropriate. The strategy utilises the Hyder Heartbeat model to holistically respond to the environmental, social and economic factors related to the proposed development.

The Exemplar site is the forerunner to the development of the main eco development site, and is located within the north eastern portion of the overall site. It is recognised that as an Exemplar to the main eco development, it has the ability to showcase many of the key sustainability aspects, but also that its size and scale may reduce its capability to fully meet all of the aspects that may be achieved by the main development.

As such, throughout this sustainability strategy both the opportunities and constraints of the Exemplar site are recognised. Key aspects are drawn out that seek to maximise sustainable opportunities wherever possible, and identify where and how the Exemplar site can both best support and be supported by the main eco development.

The sustainability strategy is guided by 10 themes within the Hyder Heartbeat model that collectively embrace all the key principles of PPS1 supplement: Eco Towns, and respond to key aspects of national, regional and local policy. These sustainability themes have been used to help guide principles of the design, and have been able to promote win-win integral relationships. For example, the design of scheme incorporating schools and employment opportunities can have enormous impact on travel patterns, provided that safe and attractive alternatives are put in place such as easily accessible footpaths and cycleways.



Figure 1.1 Hyder Heartbeat Model

1.1 Key Sustainability Credentials

As the first phase of the eco development, the Exemplar site will be able to demonstrate how it will deliver sustainable benefits beyond that of a typical development. The key sustainability credentials that the Exemplar site will aim to deliver are summarised below.



2 Introduction

This report presents the Sustainability Strategy for the NW Bicester eco development Exemplar site. It has been produced following a review of key policy and guidance (see Appendix 1) and series of workshops and engagement with key stakeholders (see Section 2) with the aim of delivering a robust strategy that addresses the sustainability principles of the proposed development.

2.1 Proposed development

Development of Exemplar phase of NW Bicester eco development to secure full planning permission for 393 residential units and an energy centre (up to 400 square metres), means of access, car parking, landscape, amenity space and service infrastructure and outline permission for a nursery of up to 350 square metres (use class D1), a community centre of up to 350 square metres (sui generis), 3 retail units of up to 770 square metres (including but not exclusively a convenience store, a post office and a pharmacy (use class A1)), an Eco-Business Centre of up to 1,800 square metres (use class B1), office accommodation of up to 1,100 square metres (use class B1), an Eco-Pub of up to 190 square metres (use class A4), and a primary school site measuring up to 1.34 hectares with access and layout to be determined

The draft Sustainability Appraisal of the draft Core Strategy identifies that based on current evidence, the most sustainable strategic development site at Bicester is the proposed eco development at North West Bicester.

2.2 Approach to ensuring sustainability

2.2.1 Policy and Guidance

Fundamental to ensuring a sustainable approach is to understand how the development relates to key policy and guidance, and ensure that the appropriate standards and principles are adopted. Appendix 1 presents a review of relevant policy and guidance documents.

However, as the principles of this development are encompassed within the requirements of Planning Policy Statement supplement on Eco Town, the key elements are also summarised below:

PPS1 Eco Town supplement

PPS1 supplement for Eco-towns sets out a range of minimum standards which are more challenging and stretching than would normally be required for new development. The standards act to ensure that Eco-towns are exemplars of good practice and provide a showcase for sustainable living and allow Government, business and communities to work together to develop greener, low carbon living. The design of eco-towns should take full account of the impact on local eco-systems, mitigating negative impacts as far as possible and maximising opportunities to enhance their local environments.

The PPS 1 identifies that Eco-towns should:

- provide a good quantity of green space of the highest quality in close proximity to the natural environment
- offer opportunities for space within and around the dwellings

- promote healthy and sustainable environments through 'Active Design'2 principles and healthy living choices
- enable opportunities for infrastructure that make best use of technologies in energy generation and conservation in ways that are not always practical or economic in other developments
- deliver a locally appropriate mix of housing type and tenure to meet the needs of all income groups and household size, and take advantage of significant economies of scale and increases in land value to deliver new technology and infrastructure such as for transport, energy and community facilities.
- reduce the carbon footprint of development by ensuring that households and individuals in eco-towns are able to reduce their carbon footprint to a low level and achieve a more sustainable way of living through the provision of local services and innovative governance.

Specifically, Eco-towns must:

- Be zero carbon developments - The definition of zero carbon in eco-towns is that over a year the net carbon dioxide emissions from all energy use within the buildings on the eco-town development as a whole are zero or below. The initial planning application and all subsequent planning applications for the development of the eco-town should demonstrate how this will be achieved. The definition of zero carbon applies to the whole development rather than individual buildings.
- Climate change adaptation - Eco-towns should be sustainable communities that are resilient to and appropriate for the change in climate that is now accepted as inevitable. They should be planned to minimise future vulnerability in a changing climate, and with both mitigation and adaptation in mind.
- Homes - must achieve Building for Life Silver Standard and Level 4 of the Code for Sustainable Homes, meet lifetime homes standard and space standards, have real time energy monitoring systems, provide for at least 30% affordable housing, demonstrate high energy efficiency in the fabric of the building.
- Transport - travel in Eco-towns should be designed so that access to it and through it gives priority to options such as walking, cycling and public transport.
- Green infrastructure - 40% of the eco-town total area should be allocated to green space, of which at least half should be public.
- Biodiversity – Eco-towns should show a net gain in biodiversity.
- Water – Eco-towns should be ambitious in terms of water efficiency particularly in areas of serious water stress and should contribute to further improvement of water quality.

2.2.2 Hyder Heartbeat

Crucial to developing a sustainable vision and strategy for the eco development, is the ability to understand the often complex and varied environmental, economic and social impacts and interactions.

To generate a robust sustainability strategy, we have utilised our Hyder Heartbeat model (see Figure 2.1 below) to firstly identify specific sustainability objectives (generated through stakeholder workshops and key policy, planning / environmental documents).

Using Hyder Heartbeat has enabled the alignment of all key design aspects, such as building design, transport, energy, ecology and water etc; set within an overall framework that identifies key objectives and targets to ensure delivery of a sustainable development. Furthermore, this enables the scheme's sustainable credentials to be viewed and measured throughout the planning and development process (see Appendix 3 – Hyder Heartbeat matrix).

As the scheme develops, and more certainty around key aspects is revealed, such as the amount of CO₂ saved, then the detail within the model will be refined. As an initial basis, the model provides the framework within which the scheme can progress by identifying the various sustainability targets that can be achieved.

The model focuses on 10 aspects, recognising the interactions and interrelationships between them, such as the potential to use waste as a fuel source.



Figure 2.1 Hyder Heartbeat

2.2.3 SEEDA Sustainability Checklist

The South East England Development Agency (SEEDA) Checklist is an online tool that has been developed by SEEDA and BRE to guide the design of new developments by making sense of current policy. The Checklist highlights best practice, complementing Ecohomes and the Code for Sustainable Homes and covers regionally specific sustainability and planning issues, emphasising those of higher priority. It can also be adapted to reflect locally significant concerns.

Ecohomes/BREEAM and the Code for Sustainable Homes assess the sustainability of designs for individual new homes and buildings. The Checklist complements these by looking at issues relevant to the overall development scale, helping developers, local authorities and other interested parties to deliver sustainable communities.

The tool identifies a range of sustainability issues enabling users to assess to what extent a design proposal will deliver on each issue.

The Checklist is intended for use at the design and planning application stages of a new development. It focuses on the sustainability issues pertinent to spatial planning, although it does address those construction and "in-use" issues that can be anticipated or influenced at the design phase. The Checklist assumes that the sustainability of sites being brought forward for development in Local Plans has been subject to Sustainability Appraisal / Strategic Environmental Assessment and has been tested at Examination in Public. As a result there is less focus on the location of the site.

The Checklist includes questions and criteria arranged under 8 headings:

- Climate Change and Energy
- Community
- Place Making
- Transport and Movement
- Ecology
- Resources
- Business
- Buildings

The summary and detailed report outputs of the SEEDA Sustainability Checklist exercise is presented in Appendix 3. Overall the Exemplar scheme scored '**Best**', the highest score, in all categories.

This provides a useful cross-check and confirms that the planned Exemplar site will achieve a high sustainability standard.

2.2.4 Design Workstreams

To drive the input, and crucially to ensure that the design ethos and outputs have fully considered key sustainability principles, a number of Design Workstreams were established early on.

These Design Workstreams have been a central mechanism to ensure that key stakeholders have been engaged to ensure that the sustainability objectives have appropriately guided and incorporated within the Exemplar design.

There are 6 Design Workstreams that cover the following elements:

- Energy, Water and Waste;
- Design and Sustainable Construction;
- Transport and Access;
- Commercial and Employment;
- Social and Community (incl. governance); and
- Green Infrastructure.

Collectively, the Design Workstreams and the Hyder Heartbeat have provided the sustainability objectives, targets and measures that ensure the NW Bicester eco development is able to be brought forward as a truly sustainable development.

Stakeholders involved

As mentioned, a series of workshops with key stakeholders (including Cherwell District Council, Oxford County Council, Environment Agency, Berkshire Buckinghamshire and Oxfordshire Wildlife Trusts, Natural England, Thames Water and Bicester Vision) have taken place to help gather information, test design principles and gain feed-in to the design process and sustainability objectives.

2.2.5 Specific Analysis and Reports

Lastly, the sustainability strategy is both informed by and relies upon a series of specific analysis and reports that consider various key themes, such as the site specific Flood Risk Assessments, Site Waste Management Plans (SWMP) and Energy Strategies. These are referenced within the text of the document.

2.3 Developing the sustainability strategy

As mentioned above, the Hyder Heartbeat model and Design Workstreams combine together to provide a unique framework that steers the sustainability strategy and enables the process to be continually measured against it. The strategy is focused on the long term success of the eco development through realising and achieving the key aims and objectives.

To achieve a robust and comprehensive sustainability strategy it is important to have an overall vision, and a series of clear and defined objectives and targets. The following list outlines the approach taken.

- 1 Developing a **Vision and Aims**
- 2 Identifying key **Objectives**
- 3 Setting stretching **Targets**
- 4 Developing and agreeing **Measures** to achieve the aims, objectives and targets

2.3.1 Vision and Aims

A vision for the NW Bicester eco development has been developed that has responded to national and local policy, independent challenge and stakeholder involvement; and reflects the drive by the promoters for high sustainable standards and integration with the existing town. This has resulted in the development of the two vision statements that are presented in Section 3.1.

In addition, providing clear aims for each sustainability element focuses how the objectives and targets are developed.

2.3.2 Objectives and Targets

Translating the vision into a series of objectives relative to the loci genus of Bicester is essential. To achieve this, a review of key planning documents (see Appendix 1) was undertaken alongside the Design Workstream work. This has involved stakeholder consultation and workshops that have sought to draw out key issues, and agree a series of possible objectives and targets that will collectively deliver the highest sustainability standard achieved in a development of this size in the UK.

Using this information we have proposed a series of objectives and targets that comprises the core of the Bicester Eco Development Sustainability Strategy. These are presented in Section 3.2.

2.3.3 Measures

Developing a set of clear measures, initiatives and actions that will deliver the aims and objectives of each sustainability element is essential and forms the backbone of how the Eco-town principles will be achieved within this Exemplar eco development.

3 Sustainability Strategy

The sustainability strategy for the Bicester eco development is presented below divided into the Hyder Heartbeat themes that collectively represent the overarching strategy and seek to meet the vision.

3.1 The Vision

To create and enable more sustainable living is at the heart of this development. The PPS 1 Eco-town requirements help facilitate this, however, it is recognised that they can only go so far. Facilitating a step change in the way people interact with the environment, consume and behave are all critical aspects to achieve a more sustainable way of living.

That is why, alongside the design process and technical approaches, many of the measures proposed within this strategy are aimed at improving the social capital of the development; and involve community engagement and education as to how individual and group choices can make a positive impact. For example, by providing allotments, a community centre, an education programme and a thriving governance body; the community will be able to develop a programme for reducing the impacts of food miles, packaging and food wastage.

The measures proposed within this strategy also recognise the challenges faced by the semi rural/suburban nature of the site. The measures proposed offer a unique interpretation of sustainable living when compared to many high density urban models of integrated infrastructure or rural models of self sufficiency. This semi rural /suburban living is a challenge faced all over the world and the solutions we propose here will be valuable across and beyond the UK. For example, the density and setting of the Exemplar site allows for more significant roof based PV, rainwater harvesting and individual food production. It also enables greater biodiversity opportunities, however, achieving sustainable transport without significant infrastructure costs is challenging.

The following vision statements have been developed which set out what the NW Bicester eco development seeks to address.

Masterplan Project Vision

To provide a sustainable development to the North West of Bicester that will act as a catalyst for the regeneration of Bicester and the Eco Bicester project. The proposal will be designed to meet the aspirations of the PPS1 supplement 'Eco Towns' by taking advantage of existing features (e.g. water courses, vegetation and footpaths) on site whilst linking the rural and urban edges that adjoin the site to create a sustainable development.

The development will create a new thriving sustainable community that will contain: circa 5,000 design responsive residential units with supporting community facilities and employment opportunities; 40% open space; a high quality public realm; supporting green infrastructure; economic development; strong and sustainable links to Bicester and the facilities contained therein, through good design and the use of new and innovative technologies where appropriate.

Exemplar Project Vision

To demonstrate how the masterplan can be tested to provide a mixed use development as an initial phase of development that creates a community that is linked to the existing town and will ultimately link into the wider masterplan development.

Such development will contain residential, commercial, and community uses along with the provision of green space and sustainable links around the development and connections into Bicester and the facilities therein. The development will be designed to respect the constraints of the site (ecological and technical); the adjoining countryside land; the wider masterplan development; and the existing Bicester.

The exemplar phase of development will demonstrate that the PPS1 supplement aspirations are achievable and set the baseline for the future development contained within the wider masterplan area.

Sustainability Themes

The following sections identify how key information has been translated from the policy and guidance review, and design workstreams with key stakeholders into a series of objectives and targets set within the key themes of Hyder Heartbeat. In addition, the sections identify how these sustainability themes may be achieved and the evidence base that can be used to demonstrate this.

3.2 Energy

Aim:



To deliver a zero carbon development that follows the energy hierarchy; making buildings energy efficient and providing all heat and power demand through low or zero carbon technologies

Objectives:

	Objectives	Targets
1	Energy Efficiency – reduce energy consumption through adoption of the energy hierarchy	Achieve CSH Level 5 (effectively level 6 relative to energy efficiency measures) for all homes and BREEAM Excellent for all non residential buildings
2	Zero Carbon - Achieve reduction in carbon emissions relative to energy use within buildings	Achieve zero carbon energy within all buildings across development through the use of energy efficiency, low and zero carbon technologies
3	Energy Security - Achieve an affordable and sustainable LZC for the site that has future resilience	To enable the LZC solutions to be viable (able to achieve a commercial margin) and affordable (% below market value energy)

Measures to achieve the objectives

The basic approach is to minimise the amount of energy used across the site, and therefore the first objective is to adopt the energy hierarchy as a fundamental principle, the first tenet of which is to achieve energy efficiency. As an eco development, there is a requirement that the development must achieve 'zero carbon' status (defined as a net annual neutral carbon balance from energy used by buildings across the site); and therefore the second objective is to provide zero carbon energy. The third objective has been set to ensure that the solutions sought are robust and long term; and can provide sustainable zero carbon energy for the future.

These objectives have been used to guide the development of a suitable energy strategy for the development, drawing on feedback and comment from the workstream group as well as energy technology providers, ESCO and MUSCo operators through pre application discussions to ensure that the approach adopted not only meets the sustainability criteria but is also economically viable.

To achieve CSH level 5 relative to energy efficiency requires significant improvement to the current Part L Building Regulation standards, with 100% of the regulated emissions associated with energy use being required to be reduced. The PPS1 Ecotown supplement requires zero carbon to be achieved from all energy use within buildings. The first step to achieving this, as identified above, will be to improve energy efficiency through:

- High U values in materials used for insulation
- Reduce thermal bridging
- Increase air tightness coupled with mechanical ventilation with heat recovery
- Low energy appliances and lighting

A strategy Energy Strategy report (ref: 4502-UA001881.v2) has identified an approach to generate LDC energy for the Exemplar site, summarised below:

- District Heat Network – to provide hot water and space heating requirements
- Energy Centre – to generate both heat and electricity. Heat for space heating and hot water will be produced by a gas CHP, solar thermal and biomass boiler. The gas CHP will be sized efficiently to meet baseload hot water and space heating demand during summer months (June-September). The remaining space heating demand will be met by a biomass boiler. A thermal store will buffer peak demands. All plant will operate in parallel to enable operation efficiency.
- Building integrated PV – utilising roof space on all buildings to generate renewable electricity.

The proposed solution provides flexibility and robustness, as it doesn't rely on one technology only and through the provision of the district heat network, allows for future technologies and development phases to be connected to the network. In addition, it provides the ability to connect off-site waste heat sources to the network, if appropriate, which may reduce the future reliance on on-site generation.

The opportunity to utilise appropriate allowable solutions, to achieve the carbon reduction target, has not been fully appraised as the revised definition and approach to achieving zero carbon compliance has not yet been formally released by the Government. However, all information points towards the approved use of allowable solutions, which may include use of off-site solutions.

The following elements support the energy relative objectives:

- CSH pre-assessment – to ensure the design of the residential units meets level 5 and therefore will contribute towards the carbon emissions reduction target.
- BREEAM pre-assessment – to ensure that non-residential buildings are effectively contributing to the overall carbon emission reduction target by achieving BREEAM Excellent or above.
- Energy Strategy – that identifies the approach to providing LDC energy for the site, and demonstrates how zero carbon emission reduction is to be achieved.

3.3 Water

Aim



To ensure the development has adapted to climate change, ensuring it is safe from flood risk, reduces water consumption and maintains / enhances water quality.

Objectives:

Objectives	Targets
1 Mitigate and adapt to the effects of flood risk; and manage surface water drainage effectively	Mitigate the effects of flood risk, in line with PPS25; through: <ul style="list-style-type: none">• Not developing in flood risk areas• Achieving (or improving) upon Greenfield run off rates• Managing the ephemeral nature of catchment• Seeking opportunity to reduce flood risk elsewhere Creating strategic and locally sustainable drainage systems (SUDS)
2 Achieve water neutrality through water efficiency, reuse and recycling	Achieve CSH 5 water efficiency standards of 80L p/p/d. Achieve similar high standards of water efficiency relative to non residential buildings and uses
3 Maintain and enhance water quality and ecological status of watercourses	Ensure no deterioration of water quality status relative to WFD and River Quality Standards
4 Achieve affordable and sustainable solution to waste water treatment and potable water supply	Ensure long term solutions are viable, affordable and minimise impact to the environment

Measure to achieve the objectives

Through the progression of a site based Water Cycle Study (ref 5003-UA001881-WXR-01), the water related objectives have been drawn together. Key mechanisms to enable these objectives to be achieved are summarised below:

- A PSS25 compliant site specific Flood Risk Assessment has been undertaken (ref 5001-UA001881-WXR-01) for the Exemplar site, which has identified potential flood risk areas including an appropriate allowance for future climate change. This has informed the development layout; with no buildings located in areas of potential flood risk.
- Water reduction measures are recommended to be introduced into all residential and non residential buildings, including low flush toilets, aerated taps and low use appliances.
- Integrated drainage, SUDS and biodiversity features that effectively manage the surface water drainage, improve water quality and mitigate potential flood risk.

- Utilise SUDS that recharge the underlying ground water system, through soakaways close to source, infiltration conveyance swales and permeable ponds. Ensure SUDS achieve a run-off at no greater than agricultural green field rates.
- Encourage the use of green and brown roofs where practical and appropriate.
- Maintain and seek to improve the water quality and ecological status of the River Bure and its tributaries.
- Harvest rainwater for reuse within buildings to flush toilets and reduce reliance on potable water for non essential use.
- Provide rainwater harvesting opportunities to support community allotments.
- Establish and manage a Wastewater Treatment Working Group to review the Masterplan wide treatment options and develop the most sustainable option. Options currently under review for the Masterplan site include providing an on-site Waste Water Treatment Works (WwTW) or connecting to Bicester's sewerage network and town WwTW. The Exemplar site would be able to retrospectively connect to any on-site WwTW if this is identified as the most sustainable option. In the interim, the Exemplar site will connect to the town sewerage and WwTW network.

3.4 Materials and Waste

Aim



To reduce both construction and operational waste sent to landfill through firstly reducing waste generation, reuse and recycling, and treatment.

Objectives:

Objectives	Targets
1 Achieve zero construction waste to landfill through optimising designing out waste opportunities, effective site waste management plans; and specify reusable / recyclable and materials with high recycled content	No construction, demolition and excavation waste is sent to landfill, except for those types of waste where landfill is the least environmentally damaging option
2 Maximise recycling levels and landfill avoidance throughout the life of the development	Set and achieve recycling targets that are more ambitious than 2007 National Waste Strategy and local recycling rates Public participation is easy, safe and convenient Achieve through good system design
3 Minimise embodied carbon of primary construction materials	Use Green Guide materials in construction Utilise construction materials with lower embodied carbon.

Measures that will be adopted to achieve the objectives

Minimising waste taken to landfill is the fundamental driving force behind the waste related objectives. Key documents have been produced that identify a range of measures to enable these objectives to be met. These are the Site Waste Management Plans (ref 5501-UA001881), which are concerned with construction materials and waste, and the Sustainable Waste and Resource Plans (ref 5502-UA001881) which are concerned with operational waste.

The following are some of the key measures identified in these documents:

- Follow the waste hierarchy – reduce, reuse, recycle and compost, energy recovery and landfill as last resort.
- Follow best practice guidance from WRAP.
- Set appropriate construction waste targets; including zero construction waste to landfill and measure and report progress against these targets.
- Actively promote the waste minimisation through the design process, materials selection, construction techniques, and operational methods. This will include promoting the use of local materials (including materials with a higher level of recycled content) in line with CSH and BRE's Green Guide to Specification.

- Provide space to enable community 'swap shop' days, which can also act as a central point of information for locally sources of materials with a higher level of recycled content.
- Ensure appropriate procurement requirements for reducing waste and using resources efficiently are set.
- Ensure appropriate green procurement, storage and use of materials to reduce wastage and waste arisings. During the construction process implement a waste reuse and recycling hub on the site
- Follow best practice guidance from WRAP
- Set, manage and monitor appropriate operational waste targets, including an initial 70% operational recycling levels (rising to 80% by 2020); as identified and agreed within the Sustainable Waste Management Plan.
- Promote awareness of waste initiatives through the information packs, active promotion, campaigns and education programmes.
- Ensure that the design promotes active recycling and waste management, through providing space for bring banks, appropriate bin street furniture and individual units bins in accordance with CDC existing policy.
- Promote active waste minimisation, reuse and recycling of material as part of all business located on the Exemplar site; and support waste action planning via the governance organisation.
- As the Exemplar is to progress as Design and Build; the specification of the construction process and key materials has yet to be established. It is crucial that materials and construction processes are selected and adopted respectively that have low embodied carbon. The approach to ensuring that a low embodied carbon approach is adopted is presented in **Appendix 4**

3.5 Ecosystem Services

Aim:



To increase and manage the environmental quality of the site, increase net biodiversity of the site and provide 40% green infrastructure.

Objectives:

Objectives	Targets
1 Protect and enhance the environmental capital of the site, through a net increase in biodiversity	<p>Produce a green infrastructure strategy that promotes the conservation and wise use of open space, and identifies how 40% of overall area is useful green infrastructure.</p> <p>Establish a long term management strategy that identifies how biodiversity gains will be achieved.</p> <p>Develop landscape design and planting considering future climate change</p>
2 Protect and enhance green corridors, links and spaces across the site; and to promote healthy lifestyles.	<p>Produce a green infrastructure and sustainable transport strategy that identify accessible green space requirements and appropriate integrated footpaths and cycleways</p>
3 To respect and enhance the historic environment within the design	<p>Retention of all listed buildings</p> <p>No significant adverse effect on the setting of cultural heritage features</p> <p>Retention of historic landscape features</p>
4 Manage environmental quality and do not allow any significant deterioration or exposure of new receptors (air, noise, water, soil etc)	<p>Maintain or exceed compliance to environmental protection standards / criteria.</p> <p>No local noise nuisance (after mitigation)</p>

Measure to achieve the objectives

The Exemplar site has a PPS1 supplement: Eco town objective of achieving 40% green space as part of the development. A series of actions have culminated to achieve the objectives set out above, including extended surveys across the exemplar site to understand the ecological systems in place and inform and work alongside the design process to produce an integrated Masterplan. Key activities and measures that have and need to progress include:

- Phase 1 Habitat survey and targeted surveys for protected species have been undertaken across the site as appropriate to identify and map existing biodiversity.
- Production of a green space strategy that has developed alongside the Masterplan and design process and ensured that green infrastructure requirements are fully integrated.
- Ensure that the most valuable features to biodiversity, the hedgerows and stream corridors, are retained and enhanced on the site, with appropriate buffers so that they

retain their value to wildlife. Minimise fragmentation of these habitats as far as possible to ensure that they continue to provide movement corridors for wildlife across the site.

- Enhance habitats to provide benefits to biodiversity through sensitive management of the hedgerow network that allows the trees and shrubs to flower, set seed and produce fruit. Create/maintain a tall grass margin next to the hedgerows which should be mown infrequently dependent on the setting of the hedgerow.
- Create new habitats to benefit biodiversity within the green infrastructure and ensure resilience to future climate change. Such habitats could have more than one purpose, for example, any above ground SuDS features (reed beds, ponds, swales) can be designed so that they provide benefits to wildlife. Allotments created close to hedgerows will provide a semi-natural buffer, ensure that dark corridors are created (allotments are rarely lit) with benefits to bats. Native wildflower seed will be used to create areas of species-rich grassland either damp grassland as part of SuDS or dry calcareous grassland; and orchards may be planted. Many of these new habitats are BAP habitats.
- Manage existing and new habitats to ensure that they reach their full potential and to ensure that they maintain their value. Ensure that space for management is factored into the design.
- Provide every new home with a choice of native fruit tree to plant in their garden.
- Retain habitats and features that support protected species with appropriate buffers that ensure that these species can continue to thrive within the site once developed. This includes badger setts, bat roosts and habitat features that have the potential to support nesting birds and other protected fauna.
- Through landscape and streetscape design and appropriate species planting provide spaces that create shelter, shading and reduce 'heat island' effects as adaption to climate change.
- Undertake landscape character assessment and archaeological assessments to ensure that the design accounts for sensitive historical cultural setting.
- Ensure that the green infrastructure provides attractive amenity spaces and links to promote active lifestyles to provide both physical and mental well-being benefits.
- Preserving the setting of Home Farm listed building through appropriate buffering and sensitive design.
- Produce a landscape management plan that ensures all biodiversity assets are maintained and enhanced. Commit to delivering the plan.

3.6 Transport

Aim:



Reduce the need or desire to travel through integrated design and provide sustainable travel choice options that have less reliance on private cars seek to relieve congestion and reduce carbon emissions.

Objectives:

Objectives	Targets
1 Reduce the need or desire to travel through integrated design that promotes walking and cycling routes, provides for local needs and discourages car use.	Achieve at least 45% non private car use by 2016 (rising to at least 50% by 2026) by providing local services and facilities (including linked trips) and encouraging use of public transport, walking and cycling.
2 Provide attractive, economic and safe alternative forms of transport; promoting a Travel Choice of walking and cycling, public transport and alternative electric vehicles / car clubs.	Ensure that through design no one is more than 800m distance from a primary schools or the neighbourhood centres Ensure that all parts of the site are within 400m walking distance of a regular bus route Provide integrated transport links throughout the site and into the existing town centre and rail stations
3 Limit impact onto surrounding highway network	Achieve at least 45% non private car use in the short term (2016) (rising to 50%)
4 Reduce transport related carbon emissions	Seek to reduce transport related carbon emissions by 2026 through reduced car use and also through promoting low emission vehicles

Measure to achieve the objectives

The following measures will be adopted and will enable the objectives to be achieved:

- Reduce the need to travel by ensuring that key facilities and services, such as school, shops and businesses are located within easy walking / cycling distance.
- Provide safe, attractive and more convenient walking and cycling routes through the development and ensure these are linked to the town. Provide dedicated storage for bicycles within each homes and appropriate street furniture to enable cycles to be safely locked when visiting the neighbourhood centre and other services and facilities.
- Provide a bus services that runs at least every 15mins (every 30mins during the early stages of build out) from the site to the centre of Bicester and railway stations; and provide real time passenger information at bus shelters as well as being accessible through the community internet site. Ensure that all homes are within 400m of a bus stop.

- Provide facilities to promote working from home, such as high-speed broadband
- Facilitate business and personalise travel planning to raise awareness of travel choice, especially around walking and cycling routes, and promote modal shift
- Through the community web site, provide a car share club and car hire club to promote reduction in the need to own private cars.
- Through design, ensure car parking is provided and located so as to enable people to make a conscious decision relative to which form of travel they select.
- Design streets and spaces (i.e. homezones) that regulate the speed of vehicles and promote pedestrian and cyclist safety and alternative modes of travel
- Undertake transport modelling to determine impact to the surrounding road network and mitigate where appropriate
- Programme of information and promotion around options for low emissions vehicles both hybrids and electrics etc and also most efficient “conventional” cars.
- Achieve specific transport related carbon reduction targets:
 - By 2020, average vehicle emissions for cars owned by Exemplar Site residents will be less than 110gCO₂/km by 2020.
 - By 2020, average annual vehicle kilometres by private cars owned by Exemplar Site residents will be 10% lower than the 2008 UK average of 14,723
- Monitor carbon impact of travel through travel surveys every 2 years

3.7 Sustainable Development Design

Aim:



Develop a range of homes and buildings that people want to live in and use, respond to their environment and are adaptable to future use and climate change.

Objectives:

Objectives	Targets
1 Build homes and buildings that people want to live in and work in / visit respectively	Homes that meet Lifetime homes standards (affordable only), Building for life Silver (affordable only), CSH level 5 (all homes) and BREEAM Excellent; set within at context of Homezones and Secure by Design Affordable and economic homes
2 Homes that are adaptive to climate change.	Homes that meet CSH level 5 Develop homes that are adaptive to future climate change
3 Design public and commercial buildings that are adaptive to their environment and use, being energy efficient and responsive to future climate change	All other buildings that meet BREEAM Excellent Buildings that are economic to run and provide carbon reductions Multifunctional commercial and community buildings that can respond to future use changes.

Measure to achieve the objectives

Creating a sense of place and attractive buildings people want to live and work in is vital to a creating a sustainable community. Key elements that have been developed and will be included within the development include:

- All residential homes are built to Code to Sustainable Homes level 5 and commercial / public building built to BREEAM Excellent.
- Provide a mix of housing types, tenures and layouts that meet the needs of local and incoming residents, and the requirements of the local housing market. Provide 30% affordable housing, including rented and shared equity.
- Design buildings that will be comfortable to live and work in, both now and in the future, taking account of potential climatic change including overheating.
- To create a sense of place through both layout and distinct house design.
- The layout and design integrates green space within the development, to provide an attractive, safe and natural environment that promotes health and community living.
- All homes are orientated to take advantage of solar power, able to achieve at least 90 to 95% efficiency relative to photovoltaic panels.

- Promote local sourcing of materials and labour, and seek to specific materials with high rating in the BRE Green Guide to Specification, which seeks to minimise the carbon footprint of materials. Ensure that all timber used is sourced from FSC.
- Enable homes and other buildings to adapt to future climate change; including higher summer temperature and water resource stress; as well as more extremes such as heat waves and severe rainfall /storms. The application design has included adaptation feature including:
 - Orientation of units and windows – to enable passive solar gain
 - Orientation of units and roofs – to improve solar energy generation
 - Adaptability of building to enable home working – reducing travel
 - Rainwater harvesting – to enable reuse of water and reduce water demand
 - Location of units to avoid potential flood risk – located outside the 1:1000 yr (zone 2) modelled area.
 - Integrated SuDS – that direct and manage rainfall away from properties during exceedance (severe storm) events.
 - Use of timber on façades (on a number of units) – to lower embodied carbon and reduce radiated ‘heat island’ effect
 - Landscape / streetscape design that incorporates planting to create shade and shelter, and lessen potential heat island effects (including green roofs).
- Further adaption of buildings during the Design and Build phase through detailed construction design to include:
 - Ventilation and cooling options – passive and mechanical
 - Use of reflective and low thermal mass material on finishes
 - Selection of materials with low embodied carbon
 - Consideration of high thermal mass of building floors – to reduce heating demand
 - Provision of semi or permanent outdoor shaded areas for each home / building
 - Consideration of the effect that higher temperature may have on building materials, structural frames and air tightness
 - Consideration of the effect of high intensity rainfall on building foundations, cladding materials, weatherproofing and outside terrace drainage

3.8 Community & Employment

Aim:



To create a vibrant community that is empowered, takes responsibility for its interaction with the environment and successfully integrates with Bicester and the surrounding villages. A community that fosters education and employment opportunities for all.

Objectives:

Objectives	Targets
1 To create a community which has its own identity but which links to the town and surrounding villages.	Ensure there are suitable homes available and affordable for everyone, through the provision of a range of homes, including 30% affordable. Establish an appropriate governance structure
2 Provide appropriate education facilities	Provide a primary school on site and access to secondary, further and higher education.
3 Create opportunities for employment.	Demonstrate how green job opportunities will be created. Promote sustainable and ethically responsible commercial operations.
4 Promote healthy lifestyles	Provide access to sports facilities, open space and play areas. Provide access to appropriate health care, GP surgery and pharmacy.

Measure to achieve the objectives

Building a community is reliant on empowering people and giving them the means by which they can effect change. The following measures will seek to achieve the objectives identified.

- Creation of a Governance organisation, such as a Community Interest Company (CIC), Trust or local management body, that is at least part owned / run by the residents and has responsibilities regarding the management of space, buildings and community facilities. The governance body would provide advice to residents and business relative to services and ways to live / operate more sustainably.
- Provision of community facilities including a community centre, local shops and businesses centred along the village high street. These buildings will be built to achieve a BREEAM Excellent standard.
- Provide a site for a primary school and provide a nursery
- Provide commercial space and incubation facilities, through the provision of an Eco Business Centre, to facilitate creation, innovation and fostering of new businesses particularly in the low carbon economy.

- Promote all commercial, retail and community uses to create a Sustainable Operation plan, including green travel plan, waste minimisation and energy efficiency; with help and support from the governance organisation.
- Explore ways to integrate use of the school playing fields within the wider community, thereby making best use of facilities, managed by the governance body, and promote healthier lifestyles
- Provide amenity and play space within the 40% green infrastructure, and promote walking and cycling throughout the development and beyond

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3.9 Resource Security

Aim:



To promote local production, generation and ownership of food, energy and social cohesion.

Objectives:

Objectives	Targets
1 To promote local production of food, either on site or within the local area.	Provide allotments and gardens that enable food production. Incorporate fruit bearing trees within the green infrastructure. Provide space and support farmers markets to be held
2 To facilitate on-site and local energy generation with reduced reliance on fossil and non sustainable fuels.	Provide and enable energy to be generated on site
3 To foster a community spirit that engenders responsibility and social inclusion through the provision of social infrastructure	Design that helps to create social interaction Ensure appropriate social infrastructure (schools, recreation, community facilities and essential shops) are provided

Measures to achieve the objectives

The following measures will be progressed to achieve the objectives:

- Setting up a Community Interest Company or Community Trust that has key remit to promote social cohesion will be of major importance to generating a sense of community and social responsibility.
- Provide community allotments and gardens that can be used for the production of food.
- Ensure that all homes are orientated to enable solar power to be generated (with at least 90% efficiency).
- Through the design, provide space to enable local farmers markets to be held
- Provide local community facilities; including: primary school, nursery, GP surgery, pharmacy, local grocery shop.

3.10 Information Technology

Aim:



To enable next generation broadband / technologies now to enable flexible working and social inclusion; and to provide 'smart' information relative to the community and individual.

Objectives:

	Objectives	Targets
1	Use technology to promote business working and networking.	Provide fibre optic cables that enable super fast broadband
2	Use technology platforms to help generate a sense of community	Create a Bicester eco development website full of local information, community groups and tips on how to lead a health life
3	Allow for next generation technologies in terms of future proofing	Provide ICT infrastructure conduits and fibre optic cables to enable super fast broadband

Measure to achieve the objectives

The key measures to achieve the objectives are:

- Provide fibre optic network to the development, which will in the future enable super fast broadband speeds.
- Provide real time information system that enables people to:
 - monitoring and manage building performance through SMART metering; including energy consumption
 - check public transport timetables and plan their journeys with real time passenger information
 - check local service information by providing direct access to the local authorities web portal
 - be informed of local community news and activities through direct links to the governance organisations web site
- Create a Bicester network portal for use by community, schools and business

3.11 Construction

Aim:



To minimise the impact of construction operations on the surrounding environment, local communities and transport network, and seeking to source materials and labour locally.

Objectives:

Objectives	Targets
1 To be a considerate construction site that minimises impact of construction operations	Achieve a CEEQUAL Excellent Award Ensure Considerate Contractors registration for all contractors is achieved Utilise efficient and effective construction practices to improve build costs, sustainable construction practices and build quality
2 Consider the life cycle of all materials used and select to minimise environmental impact	Seek to use material and processes that have a low carbon footprint Promote use of locally sourced materials
3 To maximise the use of local labour wherever possible	Seek to achieve a high percentage of labour from the local area including promoting apprentice schemes
4 Operate a safe working environment and ensure the health and welfare of all workers	Provide appropriate welfare facilities Ensure safe working practices at all times

Measures to achieve the objectives

Although only temporary, the construction process can have significant impacts if not appropriately managed. Ensuring that the construction process is optimised and undertaken in a sustainable manner will be paramount to this development. The key measures are:

- Develop a Code of Construction Practice for managing and monitoring construction activities. Contractors to prepare and maintain Construction Environmental Management Plans that account for potential impact and demonstrate suitable mitigation.
- Achieve Civil Engineering Environmental Quality Assessment (CEEQUAL) Excellent award
- Considerate Contractors registration for all contractors
- Promote use of local labour and create (or link into) local apprentice schemes.
- Utilise the BRE Green Guide specification to specify and source materials.
- Specify and use materials with lower embodied carbon than standard; focusing on those materials used in the highest quantities (such as concrete and aggregates) and those with the highest total embodied impact to achieve maximum benefit. In addition, ensure

construction processes minimise carbon emissions. Further guidance is presented in Appendix 4

- Ensure appropriate H&S policy, procedures, risk assessments and method statements are in place to create a safe working environment. Provide appropriate welfare facilities. Operate a zero tolerance approach to H&S.

Appendix 1

Policy Review

Appendix 1 – Review of Key Policy and Guidance Documents

Summary of Policy / Guidance	Ref
<p>Our Towns and Cities: The Future – The Urban White Paper (2000)</p> <p>This paper is fairly general and descriptive therefore not many points need to be considered other than to make sure the housing is affordable and sustainable.</p> <p>The vision set out is for our towns, cities and suburbs to offer a high quality of life and opportunity for all. In order to fulfill this people must be living, in well kept attractive towns which have good design and planning which makes it practical to live in a more environmentally sustainable way, with less noise, pollution and traffic congestion. Places must be created which provide attractive homes which are sustainable and served by efficient and reliable public transport.</p>	<p>Our Towns and Cities: The Future – The Urban White Paper (2000)</p> <p>Available at:</p> <p>http://www.communities.gov.uk/publications/citiesandregions/ourtowns</p>
<p>Securing the Future – UK Government Sustainable Development Strategy, HM Government (2005)</p> <p>This plan highlights the international push for sustainable development, it includes five main priorities which include; living within environment limits, ensuring a strong healthy and just society, achieving a sustainable economy, promoting good governance and using sound science respectively. There is a chapter which describes sustainable production and consumption which includes improvement on resource efficiency and reduction of waste and harmful emissions. It also includes commitments on sustainable procurement in the public sector to make the UK a leader within the EU by 2009 and to review of our waste strategy, with increased emphasis on reducing waste at source and making use of it as a resource.</p>	<p>Securing the Future – UK Government Sustainable Development Strategy, (2005)</p> <p>Available at :</p> <p>http://www.defra.gov.uk/sustainable/government/publications/uk-strategy/documents/ExecSum.pdf</p>
<p>PPS1- Delivering Sustainable Development (2005)</p> <p>PPS1 reiterates that the key principle underpinning planning is sustainable development and that planning can facilitate and promote sustainable patterns of urban and rural development by creating (para 5):</p> <ul style="list-style-type: none"> • Sustainable land available for development in line with economic, social and environmental objectives; • High quality development through good and inclusive design, and the efficient use of resources; and • Development that supports existing communities and contributes to the creation of safe, sustainable, liveable and mixed communities with good access to jobs and key services for all members of the community. 	<p>Planning Policy Statement 1</p> <p>Available at:</p> <p>http://www.communities.gov.uk/publications/planningandbuilding/planningpolicystatement1</p>

<p>Planning Policy Statement: Ecotowns – A Supplement to Planning Policy Statement 1.</p> <p>PPS1 supplement for ecotowns sets out a range of minimum standards which are more challenging and stretching than would normally be required for new development. Many of the principles and stretching standards required by this PPS could potentially be adopted by other developers as a way of meeting the wider objectives of the Planning Policy Statement on Climate Change planning policy. The standards act to ensure that ecotowns are exemplars of good practice and provide a showcase for sustainable living and allow Government, business and communities to work together to develop greener, low carbon living. The design of eco-towns should take full account of the impact on local eco-systems, mitigating negative impacts as far as possible and maximising opportunities to enhance their local environments.</p> <p>The Government's objectives for planning are set out in PPS 1 and include:</p> <p>to promote sustainable development by</p> <ul style="list-style-type: none"> • ensuring that eco-towns achieve sustainability standards significantly above equivalent levels of development in existing towns and cities by setting out a range of challenging and stretching minimum standards for their development, in particular by: • providing a good quantity of green space of the highest quality in close proximity to the natural environment • offering opportunities for space within and around the dwellings • promoting healthy and sustainable environments through 'Active Design'2 principles and healthy living choices • enabling opportunities for infrastructure that make best use of • technologies in energy generation and conservation in ways that are not always practical or economic in other developments • delivering a locally appropriate mix of housing type and tenure to meet the needs of all income groups and household size, and • taking advantage of significant economies of scale and increases in land value to deliver new technology and infrastructure such as for transport, energy and community facilities. <p>to reduce the carbon footprint of development by:</p> <ul style="list-style-type: none"> • ensuring that households and individuals in eco-towns are able to reduce their carbon footprint to a low level and achieve a more sustainable way of living. 	<p>Planning Policy Statement: Ecotowns – A Supplement to Planning Policy Statement 1.</p> <p>Available at</p> <p>http://www.communities.gov.uk/documents/planningandbuilding/pdf/pps-ecotowns.pdf</p>

<p>Locational Criteria</p> <p>Ecotowns must meet functional characteristics of a settlement and have a minimum of 5000 homes.</p> <p>Zero carbon in ecotowns</p> <p>The definition of zero carbon in eco-towns is that over a year the net carbon dioxide emissions from all energy use within the buildings on the eco-town development as a whole are zero or below. The initial planning application and all subsequent planning applications for the development of the eco-town should demonstrate how this will be achieved.</p> <p>Climate change adaptation</p> <p>Eco-towns should be sustainable communities that are resilient to and appropriate for the climate change now accepted as inevitable. They should be planned to minimise future vulnerability in a changing climate, and with both mitigation and adaptation in mind.</p> <p>Homes</p> <p>Homes must achieve Building for Life Silver Standard and Level 4 of the Code for Sustainable Homes, meet lifetime homes standard and space standards, have real time energy monitoring systems, provide for at least 30% affordable housing, demonstrate high energy efficiency in the fabric of the building.</p> <p>Transport</p> <p>Travel in Ecotowns should be designed so that access to it and through it gives priority to options such as walking, cycling and public transport.</p> <p>Green infrastructure</p> <p>40% of the ecotown total area should be allocated to green space, of which at least half should be public.</p> <p>Biodiversity</p> <p>Ecotowns should show a net gain in biodiversity.</p>	
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<p>Water</p> <p>Ecotowns should be ambitious in terms of water efficiency particularly in areas of serious water stress and should contribute to further improvement of water quality.</p>	
<p>PPS3 Housing</p> <p>Achieving high quality housing</p> <p>Design which contributes to the creation of sustainable mixed communities. Streets and spaces must meet the needs of people and must be visually attractive, safe, accessible, functional and inclusive. The designs and layouts must make efficient and effective use of land with sustainable and environmentally friendly new housing developments. Housing must be well integrated with, and complements, the neighbouring buildings in the local area. They must facilitate the efficient use of resources during construction and in use and seek to adapt to and reduce climate change.</p> <p>Achieving a mix of housing</p> <p>Key characteristics of a mixed community are a variety of housing, in terms of tenure and price, with a mixture of different households such as families with children and single person households. Developers should bring proposals for market housing which reflects demand for it and the same should be done for affordable housing. Set targets should be set for social rented and intermediate affordable housing, the size and type of affordable housing should be addressed and the range of circumstances in which affordable housing will be required should be set out.</p> <p>Effective use of land</p> <p>A key objective is to re use land that has previously been developed and the national annual target for this is 60%.</p> <p>Efficient use of land</p> <p>There should be a regard to: the spatial vision and strategy for housing development in the area and the current and future level and capacity of infrastructure, services and facilities.</p> <p>Delivering flexible supply of land for housing</p> <p>The Government's objective is to ensure that the planning system delivers a flexible, responsive supply of land, reflecting principles of 'Plan, Monitor, Manage'. Deliverable housing should be identified, where housing can be</p>	<p>Planning Policy Statement 3 – Housing.</p> <p>Available at http://www.communities.gov.uk/publications/planningandbuilding/pps3housing</p>

delivered in the next 5 years, next 6-10 years and, where possible, for the next 11-15 years.	
<p>PPS9 – Planning and Biodiversity and Geological Conservation</p> <p>The Government's objectives for planning are:</p> <p>To promote sustainable development by ensuring that biological and geological diversity are conserved and enhanced as an integral part of social, environmental and economic development, so that policies and decisions about the development and use of land integrate biodiversity and geological diversity with other considerations.</p> <p>To conserve, enhance and restore the diversity of England's wildlife and geology by sustaining, and where possible improving, the quality and extent of natural habitat and geological and geomorphological sites; the natural physical processes on which they depend; and the populations of naturally occurring species which they support.</p> <p>Planning decisions should be based upon current information about environmental characteristic of their areas; these should include relevant biodiversity and geological resources of the area. Planning decisions should aim to maintain and enhance, restore or add to biodiversity and geological conservation interests. There should be a strategic approach to the conservation, enhancement and restoration of biodiversity and geology and recognition of important areas for these.</p> <p>To contribute to rural renewal and urban renaissance by: enhancing biodiversity in green spaces and among developments so that they are used by wildlife and valued by people, recognising that healthy functional ecosystems can contribute to a better quality of life and to people's sense of well-being; and ensuring that developments take account of the role and value of biodiversity in supporting economic diversification and contributing to a high quality environment.</p>	<p>Planning Policy Statement 9 – Planning and Biodiversity and Geological Conservation.</p> <p>Available at : http://www.communities.gov.uk/planningandbuilding/planning/policyguidance/historicenvironment/pps9/</p>
<p>PPG13 Transport</p> <p>Linking Planning and Transport</p> <p>Local authorities should seek to ensure that strategies in the development plan and the local transport plan are complementary: consideration of development plan allocations and local transport priorities and investment should be closely linked. Local authorities should also ensure that their strategies on parking, traffic and demand management are consistent with their overall strategy on planning and transport. In developing the</p>	<p>PPG13 – Transport.</p> <p>Available at: http://www.communities.gov.uk/planningandbuilding/planning/policyguidance/planningpolicystatement</p>

<p>overall strategy, local authorities should:</p> <ul style="list-style-type: none"> • Focus land uses which are major generators of travel demand in city, town and district centres and near to major public transport interchanges. City, town and district centres should generally be preferred over out of centre transport interchanges. • Actively manage the pattern of urban growth and the location of major travel generating development to make the fullest use of public transport. • Take into account the potential for changing overall travel patterns, for instance by improving the sustainability of existing developments through a fully co-ordinated approach of development plan allocations and transport improvements. • Locate day to day facilities which need to be near their clients in local and rural service centres, and adopt measures to ensure safe and easy access, particularly by walking and cycling. Such facilities include primary schools, health centres, convenience shops, branch libraries and local offices of the local authority and other local service providers. <p>Key Sites</p> <p>Local authorities should seek to make maximum use of the most accessible sites, such as those in town centres and others which are, or will be, close to major transport interchanges. They should develop a clear vision for development of these areas, prepare site briefs and, where appropriate, consider using compulsory purchase powers to bring development forward. Local authorities should review their development plan allocations and should:</p> <p>Allocate or reallocate sites which are (or will be) highly accessible by public transport for travel intensive uses (including offices, retail, commercial leisure, hospitals and conference facilities), ensuring efficient use of land, but seek, where possible, a mix of uses, including a residential element.</p> <p>Allocate or reallocate sites unlikely to be well served by public transport for uses which are not travel intensive.</p>	<p>ts/planningpolicyguidance/ppg13/</p>
<p>PPG17 – Planning for Open space, sport and recreation.</p> <p>Assessments of Needs of Opportunities - To ensure effective planning it is essential that needs of the local communities are known so robust assessments of the existing and future needs should be undertaken. As a minimum the assessments need to cover the differing and distinctive needs of the population. Audits should be undertaken to consider both the quantitative and qualitative elements of open space.</p> <p>Setting Local Standards - Standards are set regionally not nationally and should be set from audits and</p>	<p>PPG17 – Planning for Open space, sport and recreation</p> <p>Available at:</p> <p>http://www.communities.gov.uk/publications/planningandbuilding/planningpolicyguidance17</p>

<p>assessments undertaken in the area. These local standards should include quantitative elements, qualitative components and accessibility.</p> <p>Maintaining an Adequate Supply of Open Space and Sports and Recreational Facilities - Existing open space, sports and recreational buildings and land should not be built on unless assessment regard it surplus.</p> <p>Planning for New Open Space and Sports and Recreational Facilities - In identifying where to put these new areas local authorities should: promote accessibility by walking, cycling and public transport, locate more intensive recreational sites where they can contribute to town centre vitality and viability, avoid loss of amenity to residents, neighbouring uses or biodiversity. The Security and personal safety should be carefully considered, as should the scope for using any surplus land for use.</p>	
<p>PPG23 Planning for Pollution Control</p> <p>Government Policies on Planning and Pollution Control</p> <p>Planning should promote a sustainable pattern of land use that will contribute to meeting the country's economic, social and environmental needs, whilst recognising the precautionary principle.</p> <p>In considering proposals for development, LPAs should take account of the risks of and from pollution and land contamination, and how these can be managed or reduced.</p> <p>It is important that pollution issues are taken into account as appropriate in planning decisions. Planning authorities should remain alert to the possibility of environmental impacts for proposals of any scale, regardless of whether a formal EIA is required.</p> <p>Government Policies on Land Affected by Contamination</p> <p>A balanced approach is required which addresses the risk of pollution, whilst recognising the benefits of recycling previously developed land and the damage to community and business confidence caused by failing to remediate contaminated land.</p> <p>The Government's objectives for contaminated land are set out in DETR Circular 02/2000, <i>Contaminated Land</i>. These are:</p> <ul style="list-style-type: none"> – to identify and remove unacceptable risks to human health and the environment; 	<p>PPG23 – Planning for Pollution Control</p> <p>Available at:</p> <p>http://www.communities.gov.uk/planningandbuilding/planning/planningpolicyguidance/planningpolicystatements/planningpolicystatements/pps23/</p>

<p>– to seek to bring damaged land back into beneficial use; and</p> <p>to seek to ensure that the cost burdens faced by individuals, companies and society as a whole are proportionate, manageable and economically sustainable.</p> <p>It remains the responsibility of the landowner/developer to identify land affected by contamination and to ensure that remediation is undertaken to secure a safe development.</p> <p>Matter for Consideration in Preparing Local Development Documents and Taking Decisions on Individual Planning Applications</p> <p>The possible impact of potentially polluting development on land use should be considered as should the potential sensitivity to the area from adverse effects of pollution. The environmental benefits that the development may bring and the economic and social need for the development should be considered as does the need to ensure that land after development is not capable of being determined as contaminated land and the need to limit greenhouse gas emissions. Possible adverse impacts on water quality, the suitable provision of the drainage of surface water, provision of sewerage and sewage treatment should also be considered.</p>	
<p>PPG24 - Noise</p> <p>Noise policies in development plans</p> <p>Area specific noise policies may be useful in some circumstances and in such cases relevant boundaries should be illustrated on the proposals map. Plans should ensure in that noise – sensitive developments are located away from existing sources of significant noise and that potentially noisy developments are located in areas where noise will not be such an important consideration where its impact may be minimised. It is considered that housing, hospitals and schools should generally be regarded as noise-sensitive development. Where it is particularly difficult to separate noise-sensitive development plans should contain an indication of any general policies which the local planning authority propose to apply in respect of conditions or planning obligations.</p> <p>Development Control – Noisy developments</p> <p>Planning authorities must ensure that development does not cause an unacceptable degree of disturbance. They should also bear in mind that a subsequent intensification or change of use</p> <p>may result in greater intrusion and they may wish to consider the use of appropriate conditions. Sudden impulses, irregular noise or</p>	<p>PPG24 - Noise</p> <p>Available at:</p> <p>http://www.communities.gov.uk/publications/planningandbuilding/ppg24</p>

<p>noise which contains a distinguishable continuous tone will require special consideration.</p> <p>Development Control – Noise sensitive development</p> <p>Local planning authorities should consider carefully in each case whether proposals for new noise-sensitive development would be incompatible with existing activities. Such development should not normally be permitted in areas which are - or are expected to become</p> <p>-subject to unacceptably high levels of noise. Local planning authorities should consider both the likely level of noise exposure at the time of the application and any increase that may reasonably be expected in the foreseeable future, for example at an airport.</p>	
<p>PPS25 - Development and Flood Risk</p> <p>Key Planning Objectives</p> <p>Appraising risk</p> <p>Land at risk must be identified and the degree of flooding from river, sea and other sources in the area. RFRAs or SFRAs should be prepared as freestanding assessments that contribute to the Sustainability Assessments.</p> <p>Managing risk</p> <p>Development in areas of flood risk can only be permitted where there are no reasonably available sites in areas of lower flood risk and benefits of the development out weigh the risks of flooding. Mitigation should also be evaluated for extreme flood events.</p> <p>Reducing risk</p> <p>Land should be safeguarded from development that is required for current and future flood management and flood risk should be reduced to and from the new development through location, layout and design incorporating sustainable drainage systems</p>	<p>Planning Policy Statement 25 – Development and Flood Risk</p> <p>Available at:</p> <p>http://www.communities.gov.uk/planningandbuilding/planning/planningpolicyguidance/planningpolicystatements/planningpolicystatements/pps25/</p>
<p>One Shared Vision for Bicester</p> <p>Aims and Objectives:</p> <ul style="list-style-type: none"> • To ensure all new development is of the highest eco standards deliverable and supports the 	<p>One Shared Vision for Bicester – July 2010</p>

<ul style="list-style-type: none"> achievement of the vision for Eco Bicester. To promote Bicester as a world class low carbon local economy and place focus on clean and green technology that supports regeneration. Protecting and enhancing the biodiversity and natural habitats within and close to the town and providing the highest quality green spaces accessible to residents and visitors to the town for recreation and relaxation. To be a “green town” defining what makes an eco town and demonstrating sustainable growth. <p>Community first – places and people</p> <p>The initial focus will be on energy efficiency of homes to reduce carbon emissions and reduce fuel poverty.</p> <p>Vision seeks to:</p> <ul style="list-style-type: none"> Create high quality community facilities and play space for all making best use of public open space streets and gardens. Provide local cultural facilities such as a performance hall and sports stadium. Provide a new cemetery/green burial site by the end of 2011. Provide an environment that encourages healthy lifestyles through access to local health care provision, greenspace and sports provision and attractive and convenient walking and cycling routes. 	
<p>Cherwell Local Plan (1996)</p> <p>With regards to transport related matters, policy TR1 (Transportation Funding) requires that where any development will have an impact on an existing highway, public transport facility or other transport measure there will be a need for a developer contribution to be paid to enable the works to be undertaken.</p> <p>To consider the open space provision, policy R12 (General Recreation Policies) requires that at least 2.43 hectares (6 acres) of public open space per 1,000 people should be provided within all new housing developments which can be split as 1-1.25 acres as amenity open space; 0.5-0.75 acres of children’s playspace; and 4-4.5 acres as sports ground.</p> <p>Policy C4 (Creation of new habitats) indicates that the Council will seek to promote the creation of new habitats and seeks to promote the interests of nature conservation within the context of new development. Such provision should seek to further the opportunity for environmental education and passive recreation. In terms of protecting the existing landscape policy C7 (Landscape Conservation) indicates that development will not</p>	<p>Cherwell Local Plan (1996)</p>

<p>normally be permitted if it would cause demonstrable harm to the topography and character of the landscape.</p> <p>The other key landscape policies are C9 (Scale of Development Compatible with a Rural Location) and C16 (The Urban Fringe). Policy C9 indicates that beyond the existing and planned limits of the towns of Banbury and Bicester development of a type, size or scale that is incompatible with a rural location will normally be resisted. Further, policy C16 highlights that sporadic development in the countryside beyond the existing and planned limits of the towns of Banbury and Bicester will not normally be permitted.</p>	
<p>Non-Statutory Cherwell Local Plan 2011</p> <p>Chapter six relates to Transport and covers a number of issues that need to be considered within any development proposals. The aspiration of this chapter and the policies contained therein is to ensure that developments are conveniently located and are designed to incorporate the use of alternative travel modes than the private car. To demonstrate whether this can be achieved applications need to be submitted with a Transport Assessment and a Travel Plan which will need to demonstrate how the impact of the development can be mitigated against; how the scheme has been designed to improve road safety; how the scheme will facilitate the use of public transport; and how the development will be designed to minimise the visual impact of parking and parking areas.</p> <p>Furthermore the policies in the local plan seek to reduce vehicle speeds in residential areas to 20mph on principal estate roads and 15mph on all other roads to increase the safety of the roads for other road users. Finally in relation to transport the policies indicate that there may be a need for developer contributions to be paid to enable some of the strategic highway enhancements identified for Bicester within the Local Transport Plan to be implemented.</p> <p>Recreation and Community Facilities are commented upon within chapter seven of the plan. The policies set out that there is a need to ensure that adequate recreation and community facilities are incorporated into the development to provide for all types of play space. In this regard there is a need to provide informal and formal play space along with seeking to connect the facilities through sustainable travel modes to reduce the demand for the private car. Furthermore, regard should be had to retaining or adequately diverting existing Rights of Way within the site.</p> <p>Chapter 9 relates to ‘Conserving and Enhancing the Environment’ and requires that development must have an acceptable impact on the natural and built environment within which the development is located. Furthermore, policies require that any development is designed to minimise the environmental impact through pollution that it creates. In this regard the policies indicate that where critical standards are not met or adhered to it is likely that planning permission will be refused. To confirm this impact needs to be considered on both the existing</p>	<p>Non-Statutory Cherwell Local Plan 2011</p>

residents and the future residents.

With regards to water there are various policies that set out to ensure that there is adequate water resource, that the quality of the water is acceptable, that any development adjoining a water course conserves the area to include its ecological value, is designed to reduce the risk of flooding and to ensure that surface water run-off is limited.

Policy EN21 suggests that renewable energy schemes will be permitted assuming there is an acceptable landscape impact, that habitats are protected, that the scheme doesn't have a detrimental impact on residential amenity or traffic generation. In considering this impact regard must be had to the consideration of alternative power sources and whether that which is proposed is the most appropriate.

Policies on Biodiversity, Ecological Surveys and Protection of Sites and Species require that developments protect the biodiversity value and character of the area. This will be achieved by ensuring that developments comply with the appropriate wildlife and countryside act and by ensuring that an ecological survey is undertaken to understand the quality or otherwise of the environment within which the development is set. Furthermore, there is a need to ensure that developments incorporate the creation of new habitats to attract species back to the development site.

Landscape is covered within a number of policies. Policy EN31 indicates that any development beyond the boundaries of Bicester town will not be supported if it is of a type, size and scale that is incompatible with its location. This is obviously the case in this instance and therefore reinforces that the current proposals are a departure from local plan policy. Further, the landscape character policies seek to conserve and enhance the character and appearance of the landscape through controlling development so as to ensure that no undue visual intrusion occurs.

In addition to ensuring no undue visual harm is caused there is also a need to seek the retention of existing trees, hedges and landscape features to protect the character of the area. Furthermore, where development is allowed there is a need to ensure that opportunities are taken to enhance the character of the area.

Policies on Archaeology and the Built Heritage will seek to ensure that the historic character of the environment is protected throughout the development and that any archaeological remains are protected throughout.

Chapter ten of the plan entitled 'Urban Design and the Built Environment' sets out design and environmental design related policies. The majority of policies within this chapter are relevant to the Eco-town proposals. Collectively the policies seek to ensure that any development is built to a high standard of design that complements its surrounding and setting whilst having an acceptable impact on the adjoining uses / structures.

<p>Furthermore, the policies seek to provide connectivity and permeability to make the development an attractive and desirable place to live, work and recreate. In considering the public realm there is a need to ensure that existing features such as landscape and ecology are retained and are designed into the scheme.</p> <p>Policy D9 sets out that energy efficient design principles should be incorporated into developments by minimising energy loss; maximising natural solar heating; minimising energy consumption; ensuring that the aesthetic implications of green technologies are considered; by ensuring that all residential development has some private amenity space; and by providing adequate accommodation for waste separation and recycling facilities.</p>	
<p>Strategic Economic Objectives for Cherwell</p> <p>SO 1. To facilitate economic growth and a more diverse local economy with an emphasis on attracting and developing higher technology industries</p> <p>SO 2. To support the diversification of Cherwell's rural economy</p> <p>SO 3. To help disadvantaged areas, improve the built environment and make Cherwell more attractive to business by supporting regeneration</p> <p>SO 4. To maintain and enhance the vitality, viability, distinctiveness and safety of Cherwell's urban centres.</p>	<p>Cherwell District Council Draft Core Strategy, February 2010,</p>
<p>Strategic Community Objectives for Cherwell</p> <p>SO 5. To accommodate new development so that it maintains or enhances the local identity of Cherwell's settlements and the functions they perform</p> <p>SO 6. To meet the housing needs of all sections of Cherwell's communities, particularly the need to house an ageing population and to meet the identified needs of Gypsies and Travellers and Travelling Showpeople, in a way that creates sustainable, inclusive and mixed communities</p> <p>SO 7. To improve the affordability of housing in Cherwell and to provide social rented and intermediate housing to meet identified needs whilst ensuring the viability of housing development and a reliable supply of</p>	<p>Cherwell District Council Draft Core Strategy, February 2010,</p>

<p>new homes</p> <p>SO 8. To improve the availability of housing to newly forming households in rural areas</p> <p>SO 9. To seek a balance between economic growth, the development of new homes and the provision of sufficient, good quality services, facilities and infrastructure including green infrastructure, to meet health, education, transport, open space, sport, recreation and other community needs.</p>	
<p>Strategic Environmental Objectives for Cherwell</p> <p>SO 10. To incorporate the principles of sustainable development in mitigating and adapting to climate change impacts including increasing resource efficiency, minimising carbon emissions, promoting decentralised and renewable or low carbon energy where appropriate and ensuring that the risk of flooding is not increased</p> <p>SO 11. To focus development in Cherwell's sustainable locations, making efficient and effective use of land, conserving and enhancing the countryside and landscape and the setting of its towns and villages</p> <p>SO 12. To reduce the dependency on the private car as a mode of travel, increase the attraction of and opportunities for travelling by public transport, cycle and on foot, and to ensure high standards of accessibility for people with impaired mobility</p> <p>SO 13. To provide high quality, locally distinctive and well designed environments which increase the attractiveness of Cherwell's towns and villages as places to live and work and which contribute to the well-being of residents</p> <p>SO 14. To protect and enhance the natural environment and Cherwell's core assets, maximising opportunities for improving biodiversity and minimising pollution in urban and rural areas</p>	<p>Cherwell District Council Draft Core Strategy, February 2010,</p>
<p>Policy SD 1: Mitigating and Adapting to Climate Change</p> <p>Measures will be taken to reduce the impact of development in the district on climate change. At a strategic level, this will include:</p> <ul style="list-style-type: none"> • Distributing growth development to the most sustainable locations • Delivering development that seeks to reduce the need to travel and which encourages walking, cycling and public transport • Designing developments to reduce carbon emissions and use resources more efficiently 	<p>Cherwell District Council Draft Core Strategy, February 2010,</p>

<ul style="list-style-type: none"> Promoting the use of decentralised and renewable or low carbon energy where appropriate <p>In terms of adaptation:</p> <ul style="list-style-type: none"> In identifying areas for development, the known physical and environmental constraints are to be considered including vulnerability or risks that could increase as a result of climate change Development will be expected to consider design approaches resilient to climate change impacts including the use of passive solar design approaches for heating and cooling, minimising the risk of flooding and making use of sustainable drainage methods, and reducing urban heat island effects (by the provision of open space and water, planting, and green roofs, for example) 	
<p>Policy SD 2 – Energy Hierarchy</p> <p>This seeks to contribute to the regional targets for carbon emissions reductions as set out in South East Plan policies CC1 and CC2. We will promote an 'energy hierarchy' as follows:</p> <ul style="list-style-type: none"> Prioritise being LEAN - use less energy, in particular by the use of sustainable design and construction measures Then CLEAN - supply energy efficiently and give priority to decentralised energy supply, and Then GREEN - use renewable energy 	<p>Cherwell District Council Draft Core Strategy, February 2010,</p>
<p>Policy SD 3 - Assessing Renewable Energy Proposals</p> <p>The Council supports renewable and low carbon energy where appropriate, and the potential local environmental, economic and community benefits of renewable energy schemes (including the contribution to national and regional targets for carbon emissions reduction/renewable energy generation) will be a material consideration in determining planning applications.</p> <p>In assessing planning applications, the South East Plan's 'Development Criteria' policy (NRM16) will be considered as well as the following issues which are of particular local significance in Cherwell:</p> <ul style="list-style-type: none"> Impacts on landscape and biodiversity designations (with reference to the South East Plan policy NRM15 on AONB) Visual impacts on local landscapes Impacts on the historic environment Impacts on residential amenity Impacts on aviation activities Highways and access issues, and Impacts on the Green Belt 	<p>Cherwell District Council Draft Core Strategy, February 2010,</p>

<p>Policy SD 4: Combined Heat and Power and District Heating</p> <p>Given the importance of the role of Combined Heat and Power (CHP)/District Heating (DH) in delivering renewable and low carbon energy in the District, this policy requires that:</p> <ul style="list-style-type: none"> • All applications for non domestic developments above 1000m2 floorspace include a feasibility assessment for CHP and DH, including consideration for biomass fuelled CHP • All residential developments in off-gas areas for 50 dwellings or more include a feasibility assessment for biomass CHP and DH. 	<p>Cherwell District Council Draft Core Strategy, February 2010,</p>
<p>Policy SD 5: Sustainable Construction</p> <p>Requires that: All new homes will be required to meet Code Level 3 of the Code for Sustainable Homes with immediate effect, Code Level 4 from 2012 and Code Level 6 from 2016. On larger sites where Combined Heat and Power/District Heating schemes are feasible, Code Level 4 is required with immediate effect. All new non residential development over 1000m2 is required to meet BREEAM 'Very Good' with immediate effect.</p> <p>Development proposals in the district (whether new build, conversion or refurbishment) need to show how sustainable construction methods have been considered including, but not limited to:</p> <ul style="list-style-type: none"> • Minimising both energy demands and energy loss • Maximising passive solar heating, lighting and natural ventilation • Incorporating sustainable construction methods including the use of recycled and energy efficient materials • Making adequate provision for the recycling of waste • Making use of sustainable drainage methods, and • Reducing urban heat island effects (by the provision of open space and water, planting, and green roofs, for example) • All development proposals should demonstrate consideration of resource efficiency (including water and energy) and the reduction of waste and pollution. The use of recycled construction materials is encouraged where appropriate. 	<p>Cherwell District Council Draft Core Strategy, February 2010,</p>
<p>Policy SD 6: Sustainable Drainage Systems (SuDS)</p> <p>The use of sustainable drainage systems (SuDS) for the management of surface water run off generated by developments will be encouraged. Site specific Flood Risk Assessments should be used to determine how SuDS can be used on particular sites and to design appropriate systems.</p>	<p>Cherwell District Council Draft Core Strategy, February 2010,</p>
<p>Policy SD 11: Local Landscape Protection and Enhancement</p>	<p>Cherwell District Council Draft Core</p>

<p>Opportunities will be sought to secure the enhancement of the character and appearance of the landscape, particularly in urban fringe locations, through the restoration, management or enhancement of existing landscapes, features or habitats and where appropriate the creation of new ones, including the planting of woodlands, trees and hedgerows.</p> <p>Development will be expected to respect and enhance local landscape character, securing appropriate mitigation where damage to local landscape character cannot be avoided. Proposals will not be permitted if they would:</p> <ul style="list-style-type: none"> • Cause undue visual intrusion into the open countryside • Cause undue harm to important natural landscape features and topography • Be inconsistent with local character • Harm the setting of settlements, buildings, structures or other landmark features, or • Harm the historic value of the landscape <p>Development proposals should have regard to the information and advice contained in the Council's Countryside Design Summary Supplementary Planning Guidance, and the Oxfordshire Wildlife and Landscape Study (OWLS).</p>	<p>Strategy, February 2010,</p>
<p>Policy SD 13: The Built Environment</p> <p>New development will be expected to complement and enhance the character of its context through sensitive siting, layout and high quality design. Where development is in the vicinity of any of the district's distinctive natural or historic assets, delivering high quality design will be essential.</p> <p>New development should:</p> <ul style="list-style-type: none"> • Respect local topography and landscape features, including skylines, valley floors, significant trees, historic boundaries, landmarks, features or views, in particular within designated landscapes, within the Cherwell Valley and within conservation areas and their setting. • Preserve and enhance designated historic assets, features, areas and their settings, and ensure new development is sensitively sited and integrated • Respect the traditional pattern of routes, spaces, blocks, plots, enclosures and the form, scale and massing of buildings • Reflect or, in a contemporary design response, re-interpret local distinctiveness, including elements of construction, elevational detailing, windows and doors, building and surfacing materials and colour palette • Demonstrate an holistic approach to the design of the public realm following the principles set out in 	<p>Cherwell District Council Draft Core Strategy, February 2010,</p>

<p>The Manual For Streets</p> <ul style="list-style-type: none"> • Be compatible with up to date urban design and Secured By Design principles • Incorporate energy efficient design, whilst ensuring that the aesthetic implications of green technology are appropriate to the context (also see Policies SD 1 - 5 on climate change and renewable energy) • The Council will provide more detailed design policies in the Delivery DPD. • Where the Council prepares site specific Supplementary Planning Documents (SPDs), generic SPDs on non-site specific issues and Informal Development Principles, applicants should have regard to these when drawing up design proposals for these sites. • The design of all new development will need to be informed by an analysis of the context, together with an explanation and justification of the principles that have informed the design rationale. This should be demonstrated in the Design and Access Statement that accompanies the planning application. • For major sites and complex developments, Design Codes will need to be prepared in conjunction with the Council and local stakeholders to ensure appropriate character and that co-ordinated high quality design is delivered throughout. 	
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<p>Policy NWB 1 : Strategic Allocation 1: North West Bicester Eco-Development</p> <p>An eco-development of 5,000 homes and jobs will be developed on land identified at North West Bicester in accordance with the standards set out in the Eco-towns Planning Policy Statement (PPS) or any higher standards set out in the development plan. The Key Diagram (Appendix 7) and NW Bicester Proposals Map (Map 1) identify the location and the area within which the eco-town proposals will be delivered respectively. Eco-town proposals should ensure:</p> <ul style="list-style-type: none"> • The eco-town will be a net zero-carbon development as defined in the PPS • Delivery of a high quality local environment taking into account climate change adaptation • Homes should achieve Level 6 of the Code for Sustainable Homes • Access to one employment opportunity for each new dwelling within easy reach by walking, cycling and/or public transport • At least 50% of trips originating from the development to be made by means other than the car with potential to rise to 60% • 40% of the total gross site area will be provided as green space of which half will be public open space. <p>The development will be designed as an exemplar sustainable community in terms of places of employment, schools, travel planning, promoting and supporting healthier lifestyles, provision of local services and sustainable use of resources. An eco-town master plan will be required to demonstrate how proposals will achieve the standards set out in the Eco-towns PPS. It will integrate with and complement the function and urban form of Bicester and not undermine Bicester town centre's role as the primary retail and service centre. It is expected that 3,000 new homes and associated infrastructure will be developed by March 2026 and 3200 by December 2026.</p>	<p>Cherwell District Council Draft Core Strategy, February 2010,</p>
<p>Policy H 5: Affordable Housing Requirements</p> <p>At Banbury and Bicester, all proposed developments that include 10 or more dwellings (gross), or which would be provided on sites suitable for 10 or more dwellings (gross), will be expected to provide at least 30% as affordable homes on site.....All qualifying developments will be expected to provide 70% of the affordable housing as social rented dwellings and 30% as other forms of intermediate affordable homes.</p>	<p>Cherwell District Council Draft Core Strategy, February 2010,</p>
<p>Policy H 6: Housing Mix</p> <p>New residential development will be expected to provide a mix of homes to meet current and expected future requirements in the interests of meeting housing need and creating socially mixed and inclusive</p>	<p>Cherwell District Council Draft Core Strategy, February 2010,</p>



communities.....	
<p>Policy I 2: Green Infrastructure Network</p> <p>The district's green infrastructure network will be maintained and enhanced through the following measures:</p> <ul style="list-style-type: none"> • Pursuing opportunities for joint working to maintain and improve the green infrastructure network • Protecting and enhancing existing sites and features of value to the green infrastructure network and improving connectivity between sites in accordance with policies on biodiversity and the natural environment (policy SD 8), conservation target areas (policy SD 9), open space, sport and recreation (policy I 3), and adapting to climate change (policy SD 1). • Providing new areas of multi-functional open space to address identified deficiencies in accordance with policies I 3 and I 4. • Ensuring that green infrastructure network considerations are integral to the planning of new development. Green infrastructure master plans should be developed for strategic development sites and proposals should maximise the opportunity to maintain and extend green infrastructure links to form a multi-functional network of open space, connecting the towns to the urban fringe and the wider countryside beyond. • Encouraging the use of sustainable drainage systems in new development in accordance with policy SD 6. • Establishing a series of linked open spaces in Bicester and Banbury in accordance with policies BIC 5 and BAN 10. 	<p>Cherwell District Council Draft Core Strategy, February 2010,</p>
<p>Policy I 3 - Open Space, Sport and Recreation Provision</p> <p>The Council will encourage partnership working to ensure that an appropriate quantity and quality of open space, sport and recreation provision is secured through the following measures:</p> <ul style="list-style-type: none"> • Protecting existing sites of value; • Addressing existing deficiencies in provision through qualitative enhancement of existing provision, improving access to existing facilities or securing new provision; and • Ensuring that proposals for new development contribute to open space, sport and recreation provision commensurate to the need generated by the proposals. <p>In determining the nature of new or improved provision the Council will consult with town and parish councils, together with potential users of the green space wherever possible, to ensure that provision meets local needs.</p>	<p>Cherwell District Council Draft Core Strategy, February 2010,</p>
<p>Policy I 4 - Local Standards of Provision</p> <p>Development proposals will be required to contribute to the provision of open space, sport and recreation, together with secure arrangements for its management and maintenance. The amount, type and form of open space will be determined having regard to the nature and size of development proposed and the community</p>	<p>Cherwell District Council Draft Core Strategy, February 2010,</p>



needs likely to be generated by it. Provision should usually be made on site in accordance with the minimum standards of provision set out in Table 12 below. Where this is not possible or appropriate, a financial contribution towards suitable new provision or enhancement of existing facilities off site will be sought, secured through a legal agreement.	
Economic Objectives for Bicester LO 1.To provide employment opportunities, particularly for higher value and knowledge based businesses, which will contribute to reducing the proportion of out-commuting and to improving Bicester's self-containment. LO 2. To ensure new development provides employment, training and education possibilities for existing as well as new residents. LO 3. To deliver attractive employment space to meet modern business needs, to deliver town centre redevelopment and environmental improvements, and to improve the image of the town as a place to work.	Cherwell District Council Draft Core Strategy, February 2010,
Community Objectives for Bicester LO 4. To deliver growth which improves the self-sufficiency of Bicester as a place to live and which addresses identified deficiencies in the provision of services, facilities and infrastructure. LO 5. To improve social cohesion by ensuring new development integrates and interacts with existing neighbourhoods, is accessible from those neighbourhoods by non-car modes of transport, and provides for a range of uses and dwellings that will contribute to delivering mixed communities.	Cherwell District Council Draft Core Strategy, February 2010,
Environmental Objectives for Bicester LO 6. To deliver environmental improvements to Bicester town centre and ensure that new development is delivered to the highest environmental standards to help improve the image and attractiveness of the town LO 7 . To provide for new development which maximises opportunities for improving and integrating with Bicester's existing built environment LO 8. To enhance Bicester's biodiversity and provide new 'green' infrastructure of benefit to the whole town and which will contribute in sustainably accommodating rapid growth	Cherwell District Council Draft Core Strategy, February 2010,


<p>Policy BIC 5</p> <p>Meeting the Need for Open Space, Sport and Recreation in Bicester</p> <p>As part of measures to address current and future deficiencies in open space, sport and recreation provision in the town this policy seeks to establish an urban edge park around the outskirts of the town, linking existing green spaces with public footpaths/cycleways to create a circular route with connections to the town centre and the countryside beyond. Development that would prejudice this objective will not be permitted.</p>	<p>Cherwell District Council Draft Core Strategy, February 2010,</p>
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Appendix 2




Hyder Heartbeat Matrix

Hyder Heartbeat Main Theme	Sub Themes	Objectives	Priority	Targets	'How to' Options
Sustainable Development Design 	Liveable buildings	Homes that people want to live in Homes in which people feel safe Buildings that are economic to run	H	Pre assessment CSH*5 certificate Building for life – Silver Lifetime homes standards Designing out crime BREEAM Excellent	Build design, energy efficiency, LZC technology. % buildings meeting secure by design standards
	Sustainable buildings	Building that can provide carbon savings and need less energy Homes and buildings that are adaptive to climate change Homes that are integrated into their environment Commercial / Public buildings that are multifunctional use building, that can adapt to differing uses through their life Buildings that use less energy and provide carbon savings	H	CSH pre-assessment BREEAM Excellent	Integrated energy solution Building energy solutions UKCIP analysis
Energy 	Energy Efficiency	Reduce energy consumption (follow the energy hierarchy)	H	Code Level 4, 5 and 6 BREEAM Excellent and Outstanding	Energy hierarchy Building design Technologies Amount of carbon saved via energy efficiency measures CSH & BREEAM assessment
	Zero carbon Energy	Achieve Zero Carbon across development Reduce energy consumption (follow the energy hierarchy) Utilise low and zero carbon solutions	H	% energy via carbon neutral or carbon positive sources (renewable solutions) % energy via carbon negative sources (low carbon solutions)	Energy hierarchy Building integrated solution District solutions On-site or off-site solutions Consideration of using waste as a fuel % energy via carbon neutral or carbon positive sources (renewable solutions) % energy via carbon negative sources (low carbon solutions)
	Energy Security	Achieve an affordable and sustainable LZC for the site that has future resilience Local energy solutions	M	Viable (able to achieve a commercial margin) and affordable solution (% below market value energy)	Viability analysis Business plan Sales profile including tariffs Energy from Waste Local Biomass production Solar / Wind options

Hyder Heartbeat Main Theme	Sub Themes	Objectives	Priority	Targets	'How to' Options
Water 	Surface Water and Flood Risk	Identify and reduce flood risk Identify appropriate mitigation measures No sensitive development on flood risk areas Adapt to climate change	H	Do not develop in flood risk areas Achieve or improve upon Greenfield run off rates Manage ephemeral nature of catchment Seek opportunity to reduce flood risk elsewhere Create an exemplar SUDS scheme	PPS25 compliant Combine with habitat creation SUDS Recharge aquifer (if possible / suitable) Flood Risk Assessment Surface water management plan (drainage strategy)
	Water Neutrality	Achieve water neutrality through water efficiency, reuse and recycling	H	Residential - CSH 5 and 6 water efficiency standards – 80L p/p/d Non residential - to meet similar high standards of water efficiency	Consider total resource zone Water efficiency Water reuse and recycling Water Cycle Strategy
	Water Quality	Maintain and enhance water quality and ecological status of watercourses	H	Ensure no deterioration is water quality status relative to WFD River Quality Standards	Appropriate waste water treatment Future discharge consents Habitat creation – use of wetland / reedbeds WCS Surface water management plans
	Water Services Infrastructure	Achieve affordable and sustainable solution to waste water treatment and potable water supply Minimise environmental impact	M	Viable (able to achieve a commercial margin) and affordable solution (appropriate tariff for consumers)	Local (on-site solution) Consider using discharge to create wetland habitats Consider phasing of development Water Cycle Strategy Water Services Infrastructure Plan
Materials & Waste 	Construction waste	Optimise Designing out Waste opportunities Communicate and implement effective waste management process Specify reusable / recyclable and materials with high recycled content Achieve zero construction waste to landfill	H	No construction, demolition and excavation waste is sent to landfill, except for those types of waste where landfill is the least environmentally damaging option	Waste hierarchy Adhere to WRAP Best practice guidance Utilise WRAP tools and process % waste diversion from landfill % recycled content in new-build
	Operational waste	Maximise recycling levels and landfill avoidance Public participation is easy, safe and convenient Achieve through good system design Select environmentally sound treatment method	H	Recycling targets that are more ambitious than 2007 National Waste Strategy and District recycling rates	System design (including storage and collection) Education Fit collection system to treatment method How waste will be stored and collected Consideration of using waste as a fuel % waste recycled/ reused/ composted/AD % waste landfilled

Hyder Heartbeat Main Theme	Sub Themes	Objectives	Priority	Targets	'How to' Options
	Environmental impact of materials	Consider the life cycle of all materials used and select to minimise environmental impact	H	Specify low Embodied Carbon materials % green build products used	Green Build specification Use of material and processes that has a low carbon footprint
Ecosystem Services 	Environmental capital	Protect and enhance biodiversity and geodiversity Promote conservation and wise use of open space Minimise use of non renewable natural resources Establish a long term management strategy To provide biodiversity gains	H	40% of overall area to be green space % of existing vegetation to be retained % open space to be provided Prepare green space strategy To assist water neutrality and SUDS	Masterplan & landscape design Develop plans for future management Consideration of green spaces – community forests, wetlands, public parks, plays areas and community allotments Masterplan and Environmental Statement Landscape character assessment Strategy for conserving and enhancing biodiversity
	Green links	To protect and enhance green corridors, links and spaces across the site To promote healthy lifestyles	H	Accessible green space requirements (CS) To provide appropriate footpaths and cycleways	Masterplan & landscape design Develop plans for future management Masterplan and Environmental Statement Green space strategy
	Cultural Heritage	To respect and enhance the historic environment within the design	M	Retention of all listed buildings No significant adverse effect on the setting of cultural heritage features Retention of historic landscape features	Masterplan design Masterplan and Environmental Statement Historic landscape characterisation Archaeology assessment
	Environmental Quality	No significant deterioration in environmental quality or exposure of new receptors (air, noise, water, soil etc)	H	Comparison to environmental protection UK significance criteria. No local noise nuisance (after mitigation)	Minimise transport impacts (See Transport) Environmental Statement & Transport Impact Assessment / Travel Plans
Transport	Reduce the need or desire to travel	Achieve a significant shift away from non-private car travel – modal shift Reduce the need / desire to travel	H	Achieve at least 50% non private car use (rising to at least 60%) Providing land uses that encourage linked trips Identify suitable parking strategy	Reduce the need to travel: Local schools; Local employment; Local facilities and high speed ICT Public transport system Network of footpaths and cycle paths Travel Plan Design

Hyder Heartbeat Main Theme	Sub Themes	Objectives	Priority	Targets	'How to' Options
					% of trips Link trips (travel diary)
	Travel Choice	Provide attractive, economic and safe alternative forms of transport Promote walking and cycling Provide for public transport Explore opportunities for electric vehicles	H	No more than 800m distance from schools, neighbourhood centres etc Integrate into the existing town	Foot and cycle paths, car clubs, public transport Bus usage Car parking utilisation
	Limit congestion	Limit impact onto surrounding highway network	H	Achieve at least 50% non private car use (rising to at least 60%)	Restrict number of vehicular access points Provide more convenient pedestrian/cycle links Junction capacity
	Healthy lifestyles	Promote healthy lifestyles Ensure access to health facilities	H	Access to sports facilities - % people taking part in activities Access to open space	% open space with easy access No. of sports facilities accessible Transport plan
	Inclusivity and Governance	To provide a mixed and balanced community; ensure there are suitable homes available and affordable for everyone To integrate the development with Bicester	H	30% affordable homes of mixed tenure, type and mix To establish an appropriate governance structure	Identify needs of the community Identify level of facilities needed to support community Population profiles
	Education and Employment opportunities	Ensure everyone has access to education Ensure everyone has access to employment opportunities To demonstrate how green job opportunities will be created	H	Access to school places (by non car means)	Diverse employment opportunities Create a vibrant area that people want to invest in Create the right conditions for innovation particularly in the low carbon economy No of primary and secondary school places No of employment opportunities
Resource Security	Food security	To promote and enable local food production	M	Provide allotments and gardens that would enable home grown food. Provide space and a mechanism to enable farmers markets to be held	Community trust Promote Co-operative local farmers markets Allotments Gardens that can be used for food production Community gardens

Hyder Heartbeat Main Theme	Sub Themes	Objectives	Priority	Targets	'How to' Options
	Energy Security	Facilitate local energy generation	M	Provide and enable energy to be generated on site	Energy Strategy Security of fuel source
	Social Infrastructure security	Ensure appropriate social infrastructure provided	H	Provide appropriate schools, health care, recreation, community facilities and essential shops	Community Trust Provide primary school Nursery GP surgery Pharmacy
	Information Technology	Technology to promote business working	M	High speed broadband	Optic cabling Broadband operator Free WiFi hub
	Intelligent Communication Technology	Use technology platforms to facilitate business and community needs	M	SMART Metering	SMART meters
	Next generation technology	Allow for next generation technologies in terms of future proofing	M	Provide ICT infrastructure conduits and fibre optic cables to enable super fast broadband	Conduits – for future cables
	Construction process	Minimise impact of construction operation on surrounding environment, transport corridors and communities	H	CEEQUAL Award Considerate Contractors registration for all contractors	Develop a Code of Construction Practice for managing and monitoring construction activities. Contractors to prepare and maintain Construction Environmental Management Plans. CEEQUAL award Considerate Contractors registration for all contractors
	Labour	To maximise the use of local labour wherever possible	H	% of labour from the local area	Local recruitment and training schemes Link into (or create) local apprentice schemes
	Health & Safety	Operate a safe working environment and ensure the health and welfare of all workers	H	No major accidents No reportable accidents Appropriate welfare facilities	Ensure appropriate H&S policy, procedures, risk assessments and method statements in place. Zero tolerance to H&S Provide welfare facilities Appropriate notification to HSE

Appendix 3

SEEDA Sustainability Checklist report

Bicester eco development

Exemplar development

- Author: Philip Harker
 - Organisation: Hyder Consulting
 - Region: South East
 - Authority: Cherwell District Council
 - Questions: South East
 - Size: Medium mixed use (393 units)
-

Climate Change and Energy

Objective

To ensure that new developments are appropriately adapted to the impacts of present and future climate change and to minimise their own impact on greenhouse gases, flooding, heat gain, water resources and water quality.

Checklist Rating for Climate Change and Energy

Based on the 10 applicable questions, the predicted score is: 80% (Best)

Flooding

1.1 To ensure that sites and developments take due account of flood risk, and where it is present, take appropriate measures.

Is the development sited and designed in accordance with the sequential test set out in PPS 25?

- A. Site is within Zone 1 on Environment Agency floodmap. For sites over 1ha: Flood Risk Assessment produced as per PPS25, vulnerability to flooding from sources other than river and sea considered, and the impact of hard surfaces and surface water run-off considered. Layout and design of development to reduce risk of flooding and impact of flooding, and mitigation measures to reduce the potential of the development to increase flooding elsewhere.
- B. For Zone 2 sites: No suitable Zone 1 sites available. No “highly vulnerable” uses within the development application. Flood Risk Assessment produced as per PPS25, layout and design of development to reduce risk of flooding and impact of flooding, and mitigation measures to reduce the potential of the development to increase flooding elsewhere. Design measures incorporated to reduce the depth and speed of flooding to adjacent and surrounding properties. Demonstration that residual risks of flooding (after existing and proposed flood management and mitigation measures are taken into account) are acceptable. Management and mitigation risks may include flood defences, flood resistant and resilient design, escape/evacuation, flood warning and emergency planning, robust infrastructure and utility provision.

- C. For Zone 3a sites: No suitable Zone 1 or Zone 2 sites available. Only “less vulnerable” or “water compatible” uses within the development proposal. Flood Risk Assessment produced as per PPS25, layout and design of development to reduce risk of flooding and impact of flooding, and mitigation measures to reduce the potential of the development to increase flooding elsewhere. Design measures incorporated to reduce the depth and speed of flooding to adjacent and surrounding properties. Demonstration that residual risks of flooding (after existing and proposed flood management and mitigation measures are taken into account) are acceptable. Management and mitigation risks may include flood defences, flood resistant and resilient design, escape/evacuation, flood warning and emergency planning, robust infrastructure and utility provision.
- D. For Zone 2 sites: No suitable Zone 1 sites available. Development proposal includes “highly vulnerable” uses. Proposed development passes the Exception Test set out in PPS 25, and meets the requirements of B above.
- E. For Zone 3a sites: No suitable Zone 1 or 2 sites available. Development includes “more vulnerable” uses (but not “highly vulnerable” uses). Proposed development passes the Exception Test set out in PPS 25, and meets the requirements of C above.

NB: Essential infrastructure developments of the type acceptable in Zone 3b is unlikely to be covered by this checklist.

4 Selected target: Best

A

5 Justification

FRA and drainage strategy demonstrating no increased risk to d/s areas.

1.2 To reduce the risk of flooding on proposed development sites and adjacent areas of land

Following a comprehensive Flood Risk Assessment, what measures have been taken to reduce the contribution the development may make to flash flooding?

- A. Site is demonstrated to be able to contain rainfall from 1:100 year rain events
- B. Site is demonstrated to be able to contain rainfall from 1:250 year rain events
- C. Site is demonstrated to be able to contain rainfall from at least 1:500 year events

6 Selected target: Minimum

A

7 No Justification given

Heat Island

1.3 To reduce the heat island effect inherent to urban areas through passive design measures.

Will the development seek to reduce the likelihood of contributing to a heat island effect through:

- A. Provision of appropriate shaded green space and tree cover
- B. Green roofs and vegetated walls
- C. Design to enable air-flow throughout the development

- D. Passive cooling designed-in
- E. Open water and fountains in public spaces
- F. Shaded public spaces and footpaths

Note: On warm summer days, the air in urban areas can be 6-8°F hotter than surrounding areas. Scientists call these areas “urban heat islands”. This is due to building materials (particularly darker materials such as tarmac, and heavier materials such as concrete) absorbing and radiating heat.

8 Selected target: Good

A design strategy which addresses at least the above points

9 Justification

Green infrastructure will reduce the likelihood of heat island effects

Water Efficiency

1.4 To reduce the overall consumption of clean water for non-potable uses.

What percentage of household baths, showers, hand basins and washing machines connected to grey water recycling systems to enable water re-use within the home or wider development?

10 Selected target: Minimum not met

11 Justification

water efficiency measures for CSH 5 are met through rainwater re-use (rather than greywater recycling)

1.5 To ensure that roof space is used productively to minimise water demand and manage water run-off on the site.

What percentage of the total roof area in the development is designed to allow the harvesting of rain water for re-use and/or is covered by green roofs?

12 Selected target: Best

More than 50% of the roof area used for rainwater harvesting or green roofs; captured water used for irrigation and/or toilet flushing and/or washing machines

13 Justification

Rainwater harvesting incorporated

Sustainable Energy

1.6 To increase the overall efficiency of the development through energy efficient design and management.

What steps will the developer take to prepare an energy strategy for the proposed development to optimise the energy consumption of the site?

- A. Minimising energy demand for the site through orientation and passive solar design
- B. Maximising the thermal efficiency of individual buildings through thermal mass and insulation
- C. Minimising demand for water heating, space heating and cooling, lighting and power in individual dwellings through efficient equipment and controls
- D. Calculating the residual energy demand for the site
- E. Maximising the amount of the residual demand which can be provided through on-site generated renewable energy (either collective or on individual dwellings)
- F. Meeting the remaining demand efficiently, e.g. CHP (non-biomass or waste powered), district heating and cooling, ground source heating and cooling

14 Selected target: Best

Steps A to F completed

15 Justification

Zero carbon energy strategy

1.7 To promote the increased use of renewable energy sources to reduce dependence on fossil fuels producing CO₂ emissions.

What % of total site energy demand will be produced from an on-site renewable scheme (e.g. wind, solar, hydro, photovoltaic bank, CHP operating on biomass or waste)?

16 Selected target: Best

Zero carbon emissions

17 Justification

Zero carbon Energy Strategy

1.8 To increase the use of sustainable heating techniques.

To what extent will the development take into account the hierarchy for feasible heating systems

- A. Solar Water heating
- B. Tri-generation or co-generation, preferably powered by renewable energy, like commercial fuel cell systems
- C. Community Heating
- D. Heat pumps
- E. Gas condensing boilers

18 Selected target: Best

B, A

19 Justification

Energy hierarchy followed as part of Zero Carbon energy strategy

1.9 To encourage the integration of solar/pv technologies during the design stage.

What percentage of buildings will be designed for and to be equipped with solar water heating and/or photovoltaic cells?

20 Selected target: Best

>25%

21 Justification

All building will be fitted with solar PV as part of the Energy Strategy

1.10 To encourage the future use of active solar technologies where they are not initially supplied.

What percentage of the development not intended to be fitted with active solar devices such as photovoltaic and solar hot water heating by the developer will be designed to allow future installation of these technologies by occupiers?

22 Issue was marked as non-applicable

Site Infrastructure

1.11 To evolve an energy management scheme and provide the public with easy access to renewable energy information.

Will the site be smart metered, showing site occupiers net energy use, quantified over separate time periods?

23 Selected target: Best

As Good Practice, plus metering data accessible for site occupants. Publicly accessible meter provided at energy source

24 No Justification given

Community

Objective

To ensure that the development supports a vibrant, diverse and inclusive community which integrates with surrounding communities.

Checklist Rating for Community

Based on the 2 applicable questions, the predicted score is: 81% (Best)

Involvement in decision making

2.1 To promote community involvement in the design of the development to ensure their needs, ideas and knowledge are taken into account to improve the quality and acceptability of the development.

Has the community been actively involved in the development proposal:

- A. Local community stakeholders have been told about the proposal (eg public notices and adverts) so that they can comment to the Planning Authority
- B. Local community stakeholders have been consulted for opinions on a pre-prepared scheme (eg leaflets and return forms)
- C. Local community stakeholders have been asked to select their preferred option from a range of schemes and their preferred proposal has been put forward (eg through remote surveys or through a public meeting)
- D. Local community stakeholders have been involved in the preparation of this proposal (eg through workshops or participative processes)
- E. Local community stakeholders produced the guidelines for the development of this proposal (eg Village Design Statements, Place Check, Charrettes)

25 Selected target: Good

C or D

26 Justification

series of workshops throughout process, with feedback used to implement design changes

Supporting Public Services, Social economy and community structure

2.2 To encourage sustainable lifestyles and help integration into the local community.

Will a pack be provided to each dwelling containing information on:

- A. Local transport services
- B. Utility suppliers
- C. Energy efficiency – including measures incorporated into the development and/or dwelling
- D. local amenities
- E. refuse collection
- F. recycling facilities
- G. local organisations and community groups
- H. environmental technologies installed in the development and dwelling
- I. water efficiency information pack

27 Selected target: Best

As good practice but includes information on services provided by other organisations

28 No Justification given

Place Making

Objective

To ensure that the most sustainable sites are used for development and that the design process, layout structure and form provide a development that is appropriate to the local context and supports a sustainable community.

Checklist Rating for Place Making

Based on the 16 applicable questions, the predicted score is: 76% (Best)

Efficient use of land

3.1 To ensure the most effective and efficient use of land, applying a sequential approach.

How can the site be best characterised?

- A. Contaminated land – remediated or awaiting remediation
- B. Brownfield – derelict urban land
- C. Undeveloped – includes residential gardens.
- D. Other: including brownfield – rural land, designated open space, designated sports pitches or recreation land, green belt, high quality agricultural land, land designated as of ecological importance, land with workable or potentially workable minerals, land at moderate or significant risk of flooding (Environment Agency Flood Zones 2 & 3 in England)

29 Issue was marked as non-applicable

3.2 To ensure effective re-use of apt buildings.

What percentage of the existing buildings on site will be re-used / refurbished?

30 Issue was marked as non-applicable

Design Process

3.3 To ensure that the preparation of a statement of design intent, that is informed by studies of the site and its surroundings, is discussed with the appropriate parties prior to finalisation.

Will a design statement, incorporating the findings of context appraisals and explaining emerging design principles be discussed with the Local Authority prior to the application?

31 Selected target: Best

Yes and involving SEEDA Design Champion and referencing Urban Design Compendium (English Partnerships)

32 Justification

Emerging design discussed with ATLAS and CABE as well as LPA and stakeholders. The Urban Design Compendium vol 1 and 2, as well as Manual for Streets have been used to develop the design principles

3.4 To ensure that the landscaping scheme is attractive and appropriate to the local environment.

Will a landscaping scheme be drawn up for the site – to include POS, street scenes, public/private space boundaries and site boundaries, with landscape and ecological assets preserved?

33 Selected target: Best

Drawn up with landscape architect AND ecologist

34 Justification

Landscape strategy evolved alongside design; including ecologists and key environmental stakeholder group discussions. Key boundaries and ecological assets are preserved and enhanced as part of the design. Examples of detailed street scenes and homezones demonstrate the design principles

Form of Development

3.5 To achieve visual and physical connectivity that makes it easy to find the development and to navigate around.

Are there physical and visual links between the development and the surrounding area, and how do they integrate the development with the surrounding area?

- A. Are new routes into the site continuations of existing access points from the surrounding area?
- B. How direct are sight lines of existing neighbourhood streets continued through the site?
- C. Are main routes within the site connected directly to main routes in the wider area without feeding through existing routes with less capacity or with a primarily residential function?

35 Selected target: Good

A design strategy addressing all three issues

36 Justification

Network of routes connecting to existing road, cycleways and footpaths as part of an integrated transport strategy. Network infrastructure to enable connection to future phases has been incorporated.

3.6 To make pedestrian movement attractive and safe, reducing reliance upon private cars for local journeys.

Will the proposed street network provide a high quality public realm with a pedestrian friendly environment?

- A. Has a choice of good pedestrian routes connecting to services and places people want to use been provided?
- B. Are pedestrian routes direct with safe crossings at points where pedestrians want to cross?
- C. Has a design strategy been produced to ensure that pedestrian routes are attractive, well-lit and safe?

D. Will street design calm traffic where appropriate?

37 Selected target: Good

A design strategy that addresses all the above issues

38 Justification

Significant homezone areas and 'green lanes' have been created; which effectively calm traffic and provide a pedestrian dominated environment. In addition, a bus only link promotes non car travel within the site. More direct, safe and attractive cycle and pedestrian routes have been developed.

3.7 To create a place with a clear identity that is easy to understand and navigate.

Will the development be designed to be easy for users to understand and orientate themselves in, and does it promote a neighbourhood identity?

- A. Will entrances to the development and its different areas be designed as gateways?
- B. Will landmarks, including memorable buildings, be used to help users orientate themselves?
- C. Will clear views and deflected views of landmarks be created?
- D. Will corner buildings be heightened or building line altered to act as landmarks?
- E. Will nodes be emphasised through surface treatment?

39 Selected target: Good

A design strategy that addresses all the above issues

40 Justification

The use of 'enriched' dwellings and landscape / streetscape will be used to promote legibility and orientation. The layout creates strong definable edges for spatial definition and legible route hierarchy through controlled vistas and deflected views. This will be supported in key locations with heightened and enriched buildings. Node will be emphasised through surface treatment by applying homezone principles.

3.8 To ensure that building frontages encourage pedestrian usage of streets contributing to vitality.

Will the 'Active Frontage Guidelines' of the English Partnerships Urban Design Compendium be met in order to promote vitality? *Note active frontages means encouraging pedestrian entrances and exits onto streets, which are frequently used (see table 5/3 Active frontage guidelines)*

41 Selected target: Good

100% achieves at least Grade C frontage, 25% Grade A

42 Justification

100% frontages are on streets, however landscape concept of houses facing the perimeter results in some lanes which are less frequented than central areas

3.9 To create defensible spaces that clearly define public and private spaces.

Will the development make a clear distinction between public fronts and private backs, allowing for secure gardens, parking, or delivery access at the rear and an overlooked, safe public realm?

43 Selected target: Good

100% building frontages face onto street

44 Justification

100% frontages on street, however houses with gardens on corner result in some limited but overlooked exposed backs

3.10 To ensure that the development responds to local character whilst reinforcing its own identity.

Will the appearance of the development be visually appropriate, taking into consideration local character studies, and will it complement local character whilst creating a strong identity for the new neighbourhood?

- A. Building materials and colour complementing local character
- B. Building style and form enhancing local character
- C. Roofscapes visually respecting the developments location within a local context
- D. Continuity of local building details such as windows and doors
- E. Residential component of the development fostering a potential for personalisation by prospective residents
- F. Contemporary approach to reflecting the local vernacular.

45 Selected target: Best

Yes to A - F

46 Justification

Materials palette of brick, stone, render elevations and stone, slate roof tiles reflects locality and use of timber and green roof is a contemporary and sustainable addition

Open space

3.11 To ensure access to high quality public green space for all.

How far will the local community have to travel to reach high quality public green space?

47 Selected target: Good

100% of dwellings are within 500m of designated public green space where children can play

48 Justification

Green infrastructure network has been developed to be multifunctional and as far as practicable an equitable spread across the development. This includes distribution of play provision to a recognised hierarchy which includes LEAP and a NEAP. A LAP and supporting environments for

natural play are also provided within exemplar homezones. Collectively these offer opportunities for play on a distribution within 500m of each dwelling.

3.12 To promote outdoor recreation, health and community interaction.

Will there be provision of accessible play space for the new development?

49 Selected target: Good

Meets good practice guide "Developing accessible play space: a good practice guide" DCLG

50 Justification

The design has been developed to be inclusive to all children and incorporates natural play.

Adaptability

3.13 To ensure that new buildings can be adapted to the demands of new uses.

Will flexibility be designed into commercial units to provide adaptability to changing market needs?

- A. Optimum adaptability to future use changes in terms of building depth (9-13m)
- B. Optimum adaptability to future uses in terms of building width (5-7m frontages) or multiples thereof
- C. Floor to floor heights to allow for vertical segregation of mixed uses and provide adaptability for future changes of use

English Partnership Urban Design Compendium figures

51 Selected target: Good

A design strategy which addresses points 1 - 3 for some commercial units

52 Justification

Subject to detail design but the premise is that the commercial building will optimise future adaptability

Inclusive communities

3.14 To prevent social inequalities and foster a socially inclusive community.

Will the affordable housing be indistinguishable from the rest of the development in terms of aesthetics and distribution?

53 Selected target: Good

Yes

54 Justification

Affordable housing units will be spread throughout the development in small clusters and be indistinguishable relative to unit type / design.

3.15 To attract a diverse new community that reflects the surrounding demographic trends.

Will a statement be prepared explaining how the development contributes to the required mix of housing for the area, in terms of type, size, tenure and reflecting the needs of the current and prospective community demographics?

55 Selected target: Good

Yes

56 Justification

Appropriate housing need and mix statement prepared

Crime

3.16 To apply design principles to increase the security of the development.

Will development be designed to “Secure By Design” or equivalent standards?

57 Selected target: Good

Principles from named standard used to develop design for development

58 Justification

Appropriate secure by design standards used.

Street lighting/pollution

3.17 To ensure that street lighting is as energy efficient as possible and to minimise light spillage.

How much of the street lighting will be energy efficient with limited upward light transmission?

59 Selected target: Best

As good practice plus renewable energy generation

60 Justification

The street lighting will be designed to meet the lighting strategy which specifies dark corridors for ecology and lit corridors for safe passage. All lighting will be linked to renewable energy and minimise light spill.

Security lighting

3.18 To ensure that the security lighting is a carefully designed element, installed with due consideration of its suitability for the task and its effect on neighbours and the environment.

Will the security lighting strategy be designed to minimise light pollution and disruption to neighbours?

61 Selected target: Best

Good practice plus: Domestic external security lighting designed into dwellings and provided by developer.

62 Justification

Security lighting will be directional and minimise light pollution. Domestic external lighting will be fitted as part of the development by the developer

Transport and Movement

Objective

To ensure people can reach facilities they need by appropriate transport modes, encouraging walking and public transport use and reducing the use of private cars for shorter journeys.

Checklist Rating for Transport and Movement

Based on the 12 applicable questions, the predicted score is: 81% (Best)

General policy

4.1 To encourage and enable the use of public transport.

Will the development be within an existing public transport corridor?

63 Selected target: Good

Yes, sufficient capacity to accommodate users of development can be brought on-stream during the build process

64 Justification

Bus services will be provided at early stage to encourage travel by public transport

4.2 To promote the use of virtual communications as an alternative to transport where possible.

Will the developer install infrastructure in homes and commercial/industrial buildings which will allow the use of virtual communications as an alternative to transport?

65 Selected target: Best

Fibre Network throughout

66 No Justification given

Public transport

4.3 To ensure the availability of frequent and convenient public transport links to train, tram or tube.

What will be the furthest distance that 80% of occupiers will have to walk via a safe route to either a major fixed public transport node (train, tube, tram) or a regular link (every 10-15 mins at peak times) to major fixed public transport node? *Standards from Ecohomes*

67 Selected target: Best

500m

68 No Justification given

4.4 To allow for easy access to public transport.

What will be the furthest distance that any occupier will have to travel to a bus stop (new or existing) providing a regular bus service to a local centre?

69 Selected target: Good

1000m

70 No Justification given

4.5 To encourage more frequent use of public transport during the entire year, by having waiting areas which are considered safe and out of the weather.

What provision will be made for a comfortable/safe bus shelter or waiting rooms?

71 Selected target: Good

Bus shelters provided

72 No Justification given

Parking

4.6 To reduce levels of car parking available as an incentive to use public transport and other methods of mobility and communication.

How will car parking standards compare with local authority requirements?

73 Selected target: Good

Less than local authority maximum with parking restraint measures (limited on-site spaces, limited garage space, cycle parking space in dwellings and on-street)

74 No Justification given

4.7 To provided flexible space which can accommodate other uses outside the areas of peak parking demand.

What % of car parks will be designed to be for flexible use? (e.g. play space, market space, when not being used for parking)

75 Selected target: Good

10-20%

76 Justification

Areas of homezones

4.8 To reduce the impact of heavy goods vehicles loading on public highways.

Will provision be made for off-road HGV/delivery vehicle loading space for retail, commercial and industrial units?

77 Selected target: Best

Yes, for > 80% of cases

78 No Justification given

Pedestrians and cyclists

4.9 To promote cycling as a real alternative to the use of private cars for shorter journeys, whilst reducing the fear of crime.

Will there be a network of safe bike routes to local facilities near to and overlooked by, roads and pavements?

79 Selected target: Best

Site wide network with direct links to neighbouring routes

80 No Justification given

4.10 To promote cycling as a real alternative to the use of private cars for shorter journeys, whilst reducing the fear of crime.

What provision will be made for secure bicycle storage at local facilities and at transport nodes?

81 Selected target: Minimum

See relevant local planning authority standard for minimum required

82 No Justification given

Traffic management

4.11 To ensure vehicle speeds are appropriate to all road users.

Will there be a traffic management plan in place which encourages the safe passage of vehicles through the development at an appropriate speed and without rat runs? Note this could include passive design measures (e.g. Road narrowing, surface treatments etc).

83 Selected target: Best

Design strategies for entire site

84 No Justification given

4.12 To enable residents to use and enjoy space around homes whilst maintaining vehicular access.

Will the development have residential/mixed use streets (excluding primary and public transport routes) designed for pedestrian priority (eg [The Home Zone concept](#)).

85 Selected target: Best

Yes- focus on both road traffic accident reduction and provision of amenity space

86 No Justification given

Ecology

Objective

To ensure that the ecological value of the site is conserved and enhanced maintaining biodiversity and protecting existing natural habitats which can contribute to and enhance the amenity of the area.

Checklist Rating for Ecology

Based on the 4 applicable questions, the predicted score is: 100% (Best)

Conservation

5.1 To determine the ecological value of the habitats in and around the site in order to maintain and enhance biodiversity and protect existing natural habitats.

Will a full ecological survey be carried out, by a qualified ecologist, to examine habitats in and around the site and migration routes across the site?

87 Selected target: Best

As good practice with strategy for enhancements (see PPS 9)

88 Justification

Full suite of ecological surveys undertaken within the site, the survey area was widened, as appropriate, to assess the value of adjacent habitats and confirm the presence/absence of protected species. Landscape designed in conjunction with ecology to achieve net biodiversity gain

Enhancement of ecology

5.2 To improve the ecological value of the site and existing habitats.

Will there be an increase in important or sensitive habitats identified in the local biodiversity action plan (LBAP), either by area or increased ecological value (as assessed by an ecologist) or support for a species identified in the Biodiversity Action Plan?

89 Selected target: Best

Yes in more than one habitat/species OR no LBAP habitats/species identified

90 Justification

Hedgerows and watercourses retained and value enhanced through appropriate management. BAP habitats created in the form of areas of diverse grassland and ponds.

5.3 To improve the ecological value of the site and support the viability of species by linking populations and habitats.

Will any new wildlife corridors be created to link habitats within the site or link to habitats outside the development?

91 Selected target: Best

Links to more than 2 habitats

92 Justification

New habitats created in the form of diverse grasslands, new orchards, new hedgerows, areas of woodland and new wetlands including ponds. Wildlife corridors created and maintained across the site in association with the retained watercourses and hedgerows and in the form of linear bands of open space associate with SuDS features. These corridors link the green space within the site to woodlands and stream outwith the development boundary.

Planting

5.4 To ensure that the trees and shrubs that are specified contribute to the ecological value of the site.

Has a mixture of locally occurring native trees and shrubs been specified?

93 Selected target: Best

>90% native and as specified in LBAP or HAP

94 Justification

Native species have been included within that landscaping proposals that are appropriate to the area and the ground conditions that will be created.

Resources

Objective

To promote the sustainable use of resources, including the reduction and re-use of wastes, related to both the construction and operation of new developments.

Checklist Rating for Resources

Based on the 11 applicable questions, the predicted score is: 91% (Best)

Appropriate use of land resources

6.1 To ensure that heritage or archaeologically important features are conserved or preserved if present.

What will happen to heritage/archaeologically important features and their settings which could be affected by the development?

95 Selected target: Good

Important features are protected

96 Justification

No features on site. Relationship with off site features are protected

Environmental impact

6.2 To increase the volume of low environmental impact materials used during the construction of developments.

What proportion (by mass) of building materials used in the construction of the public realm and infrastructure will be specified as low environmental impact?

97 Selected target: Best

>80% green guide A rated (or equivalent)

98 No Justification given

6.3 To increase the percentage of timber used in construction sourced from sustainably managed and temperate sources. Recognised accreditations include the Forest Stewardship Council Certification Scheme and Pan European Forest Certification.

What proportion of timber used in the construction of the public realm and infrastructure will be from an independently verified sustainable source?

99 Selected target: Best

100% from FSC/PEFC source

100 No Justification given

Locally reclaimed materials

6.4 To increase the proportion of locally reclaimed or recycled materials used in the construction of roads, pavement, public spaces and car parks.

How much local reclaimed or recycled materials will be used for road construction?

See [Highways](#) for table showing Permitted uses of secondary aggregates in the Specification for Highway Works.

101 Selected target: Best

>30%

102 No Justification given

6.5 To increase the proportion of locally sourced materials used in the construction process.

Does the developer have a strategy to use locally sourced materials in the development (we would generally expect this to be within 35 – 50 miles of the site)?

103 Selected target: Good

Strategy in place for a number of material or component streams

104 No Justification given

6.6 To increase the proportion of low environmental impact materials used in water supply and sewerage piping system construction.

Does the developer have a strategy to use low environmental impact and/or recycled materials in the water and sewerage systems infrastructure?

See [Waste & Resources Action Programme](#)

105 Selected target: Best

Yes for more than one component

106 Justification

specification of materials to ensure low environmental impact

Water Resource Planning

6.7 To develop a sustainable water efficiency strategy at a masterplanning level for the whole site.

How will the development meet the required water demands placed upon the site?

107 Selected target: Best

Good Practice plus greywater recycling

108 Justification

Water Cycle Study identifying how water efficiency to 80L ppd will be achieved and further measure towards water neutrality

6.8 To ensure that any development on site does not adversely impact upon local public or private water supply through polluting aquifers or groundwater.

If there are any public or private surface or groundwater abstractions on or close to the site (within 2 km), are pollution prevention measures being installed to ensure that water quality is not adversely affected during and after development.

109 Selected target: Best

Water interception and cleaning facilities in place during construction and in water run-off management system to ensure that clean water is returned to ground

110 Justification

All appropriate construction mitigation practises and use of SuDS to ensure operational water quality run off is maintained

Refuse Composting

6.9 To promote increased levels of kitchen and garden / landscaping composting.

What facilities will be provided to encourage building occupiers to compost kitchen and garden waste?

111 Selected target: Good

On site communal composting facilities from which residents and occupiers can purchase compost for their own use

112 Justification

Each resident provided with compost unit in addition to communal compost areas.

Noise pollution

6.10 To reduce the impact of noise upon the development.

Will the site be designed to minimise the impact of noise from external sources?

113 Selected target: Best

As Good Practice with advice from an acoustic engineer

114 Justification

Noise sources and mitigation taken into account as part of EIA

Construction waste

6.11 To minimise the waste produced from the development going to landfill.

Will a waste management/minimisation scheme be implemented by the developer when undertaking construction of the development?

115 Selected target: Best

Waste management/minimisation scheme implemented throughout development with full waste segregation and the use of a waste contractor with dedicated recycling, reclamation and composting facilities

116 No Justification given

Business

Objective

To ensure that the development contributes to the sustainable economic vitality of the local area and region.

Checklist Rating for Business

Based on the 7 applicable questions, the predicted score is: 81% (Best)

Competitive business

7.1 That new business space should complement and enhance those businesses already in the local area.

Will new business space increase/maintain the viability of existing businesses?

117 Selected target: Best

Economic study shows that the facility will meet the needs of existing businesses in the area

118 Justification

An economic strategy has identified that the scheme will provide the quality of business space needed within the areas (and which is currently unavailable)

7.2 To promote business growth within regionally prioritised sectors.

Will the development be designed to suit the needs of prioritised business sectors as identified in the RES?

119 Selected target: Best

More than one sector

120 Justification

The Exemplar will target the following growth sectors: eco construction, environmental goods and services, advanced manufacturing, and business and professional services. It will therefore support the aspiration of the RES to achieve global leadership for the SE region in environmental technologies, and to increase the sustainability of the built environment, and the application of science, technology and innovation in areas such as advanced manufacturing

7.3 To attract inward investment from businesses and organisations from outside the immediate area to increase economic well being.

Will the development be designed to attract inward investment?

121 Selected target: Good

Demonstrated unmet demand

122 Justification

The scheme is environmental goods and services sector and eco-construction sector

Business Opportunities

7.4 To improve the connectivity and communication between different businesses to enhance viability.

Is new business space being developed close to current business centres to enable bulk purchasing, shared costs eg landscaping, shared Green Transport plan, facilities etc?

123 Selected target: Good

On identified transport corridor

124 No Justification given

Employment

7.5 To create additional permanent jobs within the local area.

What is the potential for the development to create additional permanent jobs either through new business or for maintenance of the development?

125 Selected target: Best

A net increase in jobs that draw upon the local skills base or where training opportunities will be provided to help local workers to upskill

126 Justification

there will be a net increase in jobs as the site will provide business space for expanding local firms and the promoters will work with OCVC to provide training in targeted sectors.

7.6 To ensure that the development contributes to regeneration initiatives.

If the development is part of a publicly funded regeneration scheme, will the contractors engage local labour?

127 Selected target: Good

Yes, temporary engagement of local labour or subcontractors

128 Justification

There will be an opportunity for these jobs to become permanent.

Business types

7.7 To provide space for all business types, both start up or expanding, to maintain a diverse and flexible business sector within the area, and provide for facilities for future growth.

Will the development include a range of size of business premises, for example incubator units and flexible space, to encourage both start up and expanding business?

129 Selected target: Good

Yes provided

130 Justification

The Exemplar will provide an Eco business centre providing incubator space. In addition grow-on space for expanding firms.

Buildings

Objective

To ensure that the design of individual buildings does not undermine the sustainability of the overall development.

Checklist Rating for Buildings

Based on the 1 applicable question, the predicted score is: 100% (Best)

Specified BREEAM

8.1 To ensure individual buildings underpin the sustainability of the development.

What is BREEAM/EcoHomes rating sought for the proposed buildings? For a building type not covered by BREEAM use the “Offices” scheme as the basis for a bespoke evaluation, or contact BREEAM for further advice.

131 Selected target: Best

Excellent

132 Justification

All buildings to be CSH 5 and BREEAM Excellent

Appendix 4

Embodied Carbon guidance

Embodied Carbon Strategy

Embodied Carbon

Embodied carbon tends not to be based on direct measurement unless a process is under scientific investigation. Instead, embodied carbon is typically calculated through the application of emission factors to units of energy (e.g. kWh consumption per year).

This summary report identifies how the embodied carbon associated with energy consumed in the acquisition of raw materials, their processing, manufacturing, transportation to site and construction of the NW Bicester Exemplar site shall be calculated using the Environment Agency (EA) Carbon Calculator. This is considered in two parts; firstly, the embodied carbon emissions associated with the key materials and secondly the embodied carbon emissions associated with the key construction activities.

This report also considers the following boundaries that have been set to capture those activities over which project design and build contractors have most control:

- *Inclusion of the production of materials used in the project.* This is typically the major source of greenhouse gas emissions from a construction project. These emissions are often referred to as “embodied” carbon emissions, created over the material life cycle from extraction of raw materials to manufacture of finished materials. Although contractors have little control over embodied carbon emissions, they do have control over the decision to use these materials.
- *Exclusion of future fuel-related greenhouse gas emissions from vehicles using the finished infrastructure.* This is the most significant source of emissions over the life-time of the project. However, most of the factors that determine these emissions (including the number of infrastructure users and vehicle fuel efficiency) are outside the control of project contractors. There may be some scope for selection of low friction surface materials that increase vehicle fuel economy, but safety and other regulations greatly reduce the options.
- *Energy used in design phase activities.* The office-based and limited site-based activities during the design phase are a minor source of emissions, and emission sub-totals will be “lost in the noise” associated with the total estimate.
- *Emissions created from decomposition of waste in landfill.* Methane produced from landfill sites is an important greenhouse gas, with a global warming potential over twenty times that of carbon dioxide. However, methane is produced mainly from putrescible waste rather than construction waste. Non-putrescible waste containing carbon (such as plastics) can actually serve as a carbon sink in landfill, although this is not a recognised technique for sequestering carbon because of other adverse environmental impacts.
- *Emissions created from waste processing activities.* Reusing or recycling waste that is transported off-site requires energy. It is assumed that the emissions produced are not the responsibility of the contractors on the project.

As such, the emissions associated with the production, haulage and use of construction related materials and the primary construction techniques are the key focus of this report.

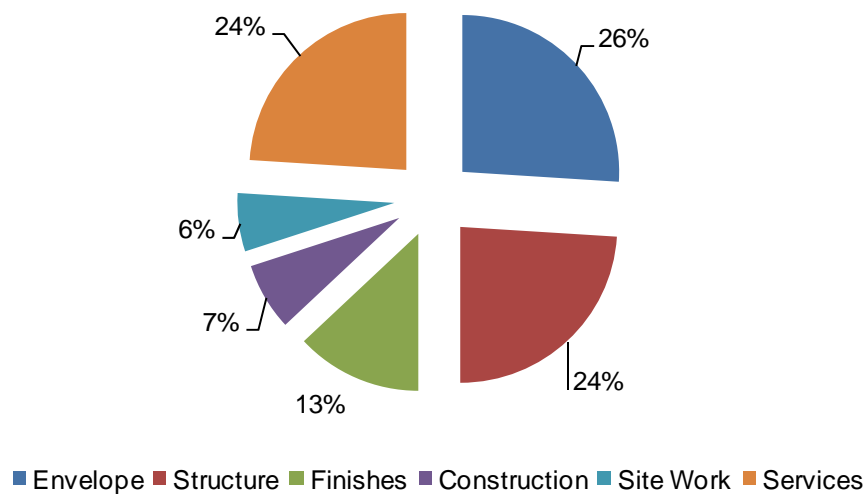
Embodied carbon associated with key materials

In order to calculate carbon emissions from key construction materials, the first step is to derive area-based carbon emissions factors in units of kgCO_2/m^2 for the buildings and infrastructure. In the absence of detailed material design information, we have assumed that all new buildings conform to the following specification:

- the upper floors, external walls and roof of the kind of 2-storey house typically account for 37% of the total building mass, with a further 50% contained within the substructure and ground floor;

- the upper floors, external walls and roof of the kind of 3 storey building typically account for 42% of the total building mass, with a further 44% contained within the substructure and ground floor;
- 25% of the embodied carbon arises from the external walls and roof, and further 15% arises from the substructure and ground floor; and
- at least 20% of total material value will derive from reused and recycled content.

For example, the embodied carbon associated to construct a generic 4 620 m² (50,000 ft²) three-storey building with underground parking generates 4.82 GJ/m². The following figure shows the breakdown of embodied carbon by typical building components averaged over wood, steel and concrete structures¹:



The building envelope, structure and services contribute fairly equally and account for about three-quarters of total initial embodied carbon. The finishes, which represent only 13% of the embodied carbon, typically account for the highest increase in recurring embodied carbon. Embodied carbon may not be significantly different between building systems (e.g., wood versus steel versus concrete), however, the environmental impacts associated with one material versus another can be dramatically different.

At detailed design stage, key construction materials from the upper floors, floor surfacing, floor finishes, external walls, windows, roofs and infrastructure shall be entered in tonnes in the EA Carbon Tool, which includes carbon emission factors for the following construction materials:

- quarried materials;
- timber;
- metals;
- plastics;
- miscellaneous (e.g. membranes)
- mortar; and
- cements.

¹ Cole and Kernan, 1996

Other key materials not already covered by the tool shall be inserted to ensure comprehensive coverage. The carbon emission factors shall be obtained from the Inventory of Carbon & Energy (ICE) Version 1.6a, produced by the University of Bath in the UK. These depend on the energy efficiency of the manufacturing process used and the materials rating. However, it should be noted that carbon emission factors may vary for a given material by up to 40%. The selection of an emission factor that reflects the efficiency of the manufacturing process is, therefore, an important step. In the absence of information on specific suppliers, average factors from the Inventory of Carbon shall be used.

The selection of an emission factor also reflects the recycled content level of the materials. We have assumed that at least 20% of the total material value will derive from reused and recycled content. Examples of materials with higher recycled content that should be used are provided in Table 1:

Table 1: Examples of the range in recycled content

Product type	Option with lower recycled content	Option with higher recycled content
Dense block	0%	Hanson Conbloc (up to 70%)
Wall insulation	0%	Superglass Superwall Cavity Slab (>80%)
Concrete roof tile	0%	Lafarge – various, e.g. Grovebury (17%)
Ceiling tiles	>10%	Armstrong tiles (28-52%)
Intermediate floors	20-70%	Sonae - Sonaefloor (90-95%)
Floor coverings - safety	0%	BSW Regupol Everroll rubber flooring (80%)

Other choices that offer much lower embodied carbon are as follows:

- Timber and wood products are better than most alternatives
- Pre-cast and prefabricated products are better than insitu and wet-trade options
- A steel structure is better than concrete or masonry structure
- Substituting brick cladding with timber, slate or metal will reduce embodied carbon
- Open plan layout is better than cellular offices
- Underfloor heat distribution is better than traditional copper pipework and radiators
- Shortening of bridge spans to reduce on materials. High strength concrete and steel could be reduced
- Use of existing access roads to reduce quarried aggregates and asphalt
- Optimisation of use of the paths and routes to reduce quarried aggregates and asphalt
- Minimisation of access roads
- Use of recycled material
- Use PFA in concrete mixes
- Recycling and reuse onsite the waste

Also, the Design and Build contractors should adopt a 'low environmental impact' principle on materials selection by reviewing the Green Guide summary ratings. The Green Guide presents a range of material options for each main building function, and the summary rating combines thirteen environmental issues of which climate change and fossil fuel depletion are the only two that reflect elements of embodied carbon. Table 2 indicates the relative embodied carbon impacts for the main components of buildings. However, the

selection is limited to those materials assumed, and therefore shall be updated at detailed design stage during the D&B process:

Table 2: Relative embodied carbon impacts for the main components of buildings

<div>Low embodied carbon ●</div> <div>Medium embodied carbon ●</div> <div>High embodied carbon ●</div>			
Structure	Concrete, steel & timber glulam ●	Concrete, insitu and block ●	Steel frame on concrete ●
Floors	Hollow pre-cast concrete with structural topping ● Raised access floor system ●	Hollow pre-cast concrete with 100mm structural topping ●	Hollow pre-cast concrete with 50mm lightweight screed ●
Roof	Standing seam aluminium profile cladding ●	Single-ply membrane on concrete deck ●	Single-ply membrane on timber & steel frame ●
External walls*	Mostly rendered blockwork with areas of brick & timber clad blocks ●	Blockwork with copper, timber and slate cladding ●	Brick & block cavity wall ●
Internal walls	Concrete block & plywood stud, all with plasterboard ●	Steel stud & plasterboard ●	(Very little) lightweight block & plasterboard ●
Glazing & doors	Aluminium framed double-glazing ● Aluminium coated timber core external doors ● Timber internal doors ●	Aluminium coated timber core windows; external doors ●	Aluminium windows ● Steel external doors ● Timber internal doors ●
Stairs	Pre-cast concrete & galvanised steel ●	Steel with timber treads ●	Galvanised steel ●
Landscaping	Concrete block paving & asphalt with recycled aggregate sub-base ● Timber & steel fencing ●	Concrete block paving & asphalt with aggregate sub-base ● Timber fencing ●	Concrete block paving & asphalt with aggregate sub-base ● Timber fencing; gabion walls ●
Building services*	Gas boiler to radiators ●	Gas boiler to radiators ●	Gas boilers to underfloor heating ●

Embodied carbon associated with Construction

The embodied carbon emissions associated with key construction activities include the construction emissions from the waste removal, plant, portakabins, site movements (haulage) and personal travel. However, they do not include the emissions occurred from the activities on site. To calculate the emissions, we have made a number of assumptions (see Table 3) for distances travelled, but without any indication of the precise locations of manufacturing plant, distances materials travel by road are approximate. The following tables (included in the EA Carbon Calculator) shall be updated at Design and Build detailed design stage.

Table 3: Construction input assumptions**Waste removal**

Waste type	Km to landfill	CO ₂ emissions per tonne
Inert waste	0	0
Hazardous waste	100	0.032

Plant emissions and personal travel input

Size of the whole project	Project duration (weeks)	Total CO ₂ emissions
Very large (construction cost more than £10million)	783	1,656

Portakabins

Size	Season	Weeks in use	Total CO ₂ emissions per portakabin
Small (2 people)	Summer	1,305	40.2
	Winter	2,088	140.9
Medium (4 people)	Summer	1,305	47
	Winter	2,088	151.7
Large (8 people)	Summer	1,305	65.9
	Winter	2,088	219.5

Emission factors from the onsite construction activities, including personal travel, site energy use and waste management, will be calculated using the Carbon Calculator for Construction Activities Tool, produced by the Environment Agency. We have erred on the cautious (high) side so as not to underestimate carbon emissions.

The project management team shall also deploy a number of measures to reduce the embodied carbon emissions. Some of these carbon reduction measures also serve other environmental goals, such as increasing resource efficiency or reducing air pollution. This section only focuses on the measures that yield carbon saving benefits.

The carbon reduction benefits of those measures that are listed in Table 4 cannot realistically be quantified. Quantification would require monitoring and/ or other data that are either not available or could not be collected cost-effectively during the project. The measures are listed here to show how they could be deployed.

Table 4. Carbon reduction measures in design/ construction phase

Measure	Category	Type of measure
Site offices insulated	Energy	Offices - energy consumption
Timers placed on all office heaters	Energy	Offices - energy consumption
No idling policy adopted by vehicles on site	Energy	Vehicles and plant - fuel consumption
New vehicles used for main earthworks	Energy	Vehicles and plant - fuel consumption
Larger machines used to reduce movements	Energy	Vehicles and plant - fuel consumption
Maximised use of dozers rather than excavators/ dumpers	Energy	Vehicles and plant - fuel consumption
Programme adjusted to minimise double handling of material and plant	Energy	Vehicles and plant - fuel consumption
Reduction in ground improvement works through careful monitoring and testing of actual ground conditions encountered during excavation	Energy	Vehicles and plant - fuel consumption
Location of a materials laboratory located on site	Materials	Design - material use
Band drains with surcharging maximised to reduce dig and replace ground improvement methods	Materials	Design - material use
Optimised alignment through lagoon area to minimise ground improvement works	Materials	Design - material use
Optimised alignment of infrastructure to avoid relaying pipe-work and cables	Materials	Design - material use