8.0
Nature

- Green and Blue Infrastructure
- Landscape Plans
- Management and Maintenance
- Biodiversity
- Design Considerations

8.0 Nature

Enhanced and optimised.

▶	8.1	Introduction	84
▶	8.2	Integrating Green and Blue Infrastructure	84
▶	8.3	Integration of Development within the Landscape - Design Considerations	85
▶	8.4	Site layout	85
▶	8.5	Landscape Plans	87
▶	8.6	On site landscape considerations	87
▶	8.7	Landscaping of Verges and Roundabouts	90
▶	8.8	Management and Maintenance	91
▶	8.9	Trees in the Landscape – Design Considerations	91
▶	8.10	Biodiversity	94
▶	8.11	Design Considerations for all applications	95

8.1 Introduction

8.1.1 Nature must take a stronghold in the design process from the outset, with a push for sustainability and increases in biodiversity. Each proposed development within Central Bedfordshire should aim to boost the natural habitat, achieving biodiversity net gain and enhancing green and blue infrastructure. This section of the Design Guide provides guidance on green and blue infrastructure, trees and landscape and biodiversity.

8.1.2 This section should be read in conjunction with chapter 15 of the NPPF, the adopted Local Plan (policies EE1, EE2, EE3 and EE4) and the National Design Guide, in particular sections N1, N2 and N3.

8.1.3 Other key documents and resources that should be referenced include:

- Central Bedfordshire Sustainability Plan 2020-2030
- CBC Environmental Framework
- Biodiversity Net Gain Guidance
- Green and Blue Infrastructure Strategy
- Central Bedfordshire Landscape Character Assessment
- CBC Tranquillity Strategy
- The Forest of Marston Vale: Design Guidance SPD
- CBC Surface Water Advice Note
- CBC Sustainable Drainage SPD
- CBC Highway Construction Standards and Specifications Guide (2019)
- Chilterns Building Design Guide
- Trees in the Townscape
- Biodiversity Planning Toolkit - an online resource aimed at helping users to incorporate biodiversity into the planning system and new development. Created by the Association of Local Government Ecologists (ALGE) in partnership with a wide range of conservation and planning organisations.
- How to build a Living Landscape – Hertfordshire & Middlesex Wildlife Trust
- Rebuilding Biodiversity in Bedfordshire – biodiversity opportunity mapping
- Bats in Buildings – Bat Conservation Trust 2012
- Biodiversity by Design: A Guide for Sustainable Communities. London: Town and Country Planning Association TCPA (2004)
- Great Crested Newt Mitigation Guidelines
- Planning for a Healthy Environment – good practice guide for green infrastructure and biodiversity – TCPA/The Wildlife Trusts 2012
- Landscape and urban design for bats and biodiversity Bat Conservation Trust 2012
- Delivering Biodiversity Benefits through Green Infrastructure CIRIA 2011
- www.swift-conservation.org - Advice on siting of swift nest boxes, new build and retrofit.
- www.bats.org.uk Bat Conservation Trust, - advice on bats in buildings
- www.naturalengland.org.uk Natural England, - Statutory body advising on the natural environment.
- Designing for biodiversity; a technical guide for new and existing buildings. Bat Conservation Trust and RIBA publishing, 2013

8.2 Integrating Green and Blue Infrastructure

8.2.1 Green Infrastructure (GI) is a network of multi-functional green and blue spaces and other natural features, capable of delivering a wide range of benefits for nature, climate, local and wider communities and prosperity (National Planning Policy Framework, 2021). Early consideration should be given to green and blue infrastructure and sustainability in the design process, as it provides a number of social, economic and environmental benefits close to where people live and work including:

- Space and habitat for wildlife with access to nature for people
- Places for outdoor relaxation and play
- Climate change adaptation - for example flood alleviation and cooling urban heat
- Environmental education
- Local food production - in allotments, orchards, gardens and through agriculture
- Improved health and well-being – lowering stress levels and providing opportunities for exercise

8.2.2 Green infrastructure needs to be considered both within and beyond the 'red line' boundary of a development site, considering the context and setting of the development, and the connectivity of green spaces with the wider green infrastructure network. Green infrastructure should also be designed to be integrated with more traditional built infrastructure.

8.2.3 A joined-up design process that integrates green infrastructure, climate change adaptation and environmental sustainability enables good design solutions to be developed. It also allows for efficient use of space, where innovative design can allow for the multifunctional use of land within the development to deliver a range of green infrastructure and environmental sustainability benefits on one space.

8.2.4 The approach to green infrastructure should be evidenced at pre-application stage and when applying for planning permission. Proposals should support the Council's commitment to move to net zero by 2030 and ambition to support the planting of 1 million trees by 2030 (CBC Sustainability Plan).

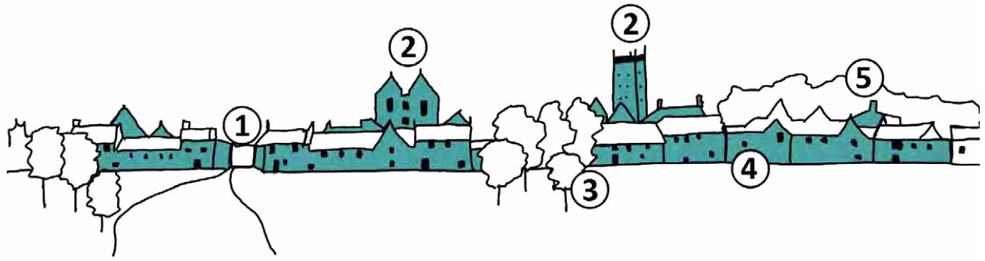
8.2.5 The Council have prepared a Green and Blue Infrastructure Strategy which presents an overarching vision for the green and blue infrastructure network in Central Bedfordshire, identifies strengths and opportunities for enhancement and provides the framework for a series of mutually supportive set of projects. These projects work toward the common goal of a wilder, more resilient and healthier Central Bedfordshire. Consideration should be given to the Green and Blue Infrastructure Strategy early in the design process.

8.2.6 Across Central Bedfordshire, Green Infrastructure Plans have been prepared at a range of scales, identifying green infrastructure assets and opportunities from the strategic to the community level. These plans should be considered when new developments are proposed. County, District and Parish level Green Infrastructure Plans are available on the Bedfordshire Local Nature Partnership website.

8.2.7 The national Green Infrastructure Framework is a commitment in the Government's 25 Year Environment Plan. It supports the greening of towns and cities and making connections with the surrounding landscape. The initiative is being led by Natural England and further information can be found on their GI Framework Web Portal.

8.3 Integration of Development within the Landscape - Design Considerations

8.3.1 The character of a site and its surroundings needs to inform development. Utilising site topography, hydrology, planting structures, alongside wider landscape setting and views, can assist in integrating development and mitigating any impacts, ensuring development 'fits' and contributes to quality urban and landscape enhancement. Effective integration of development within the established landscape and setting of the site can reduce the need for additional 'add on' mitigation measures, and additional development costs.



Key:

1 - Clear entrance way
2 - Key buildings
3 - Tree groups
4 - Well-defined urban edge
5 - Planted backdrop

Figure 209: Landscape Character Assessment to ensure new development relates to the site context

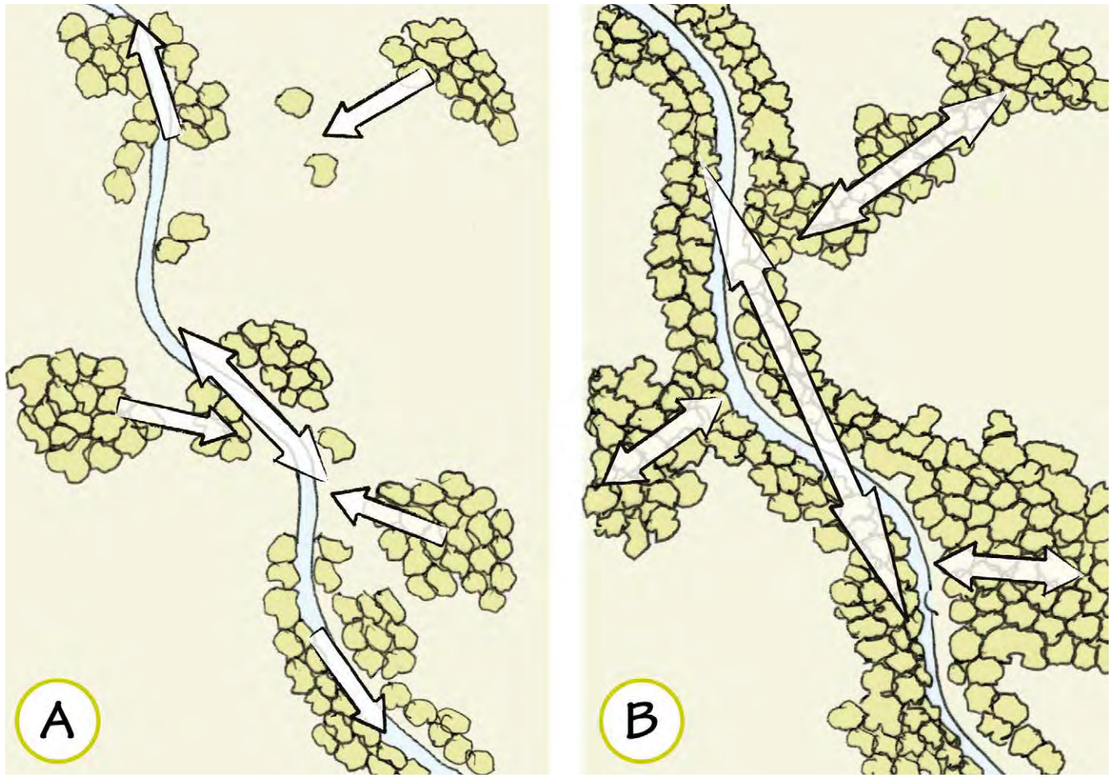


Figure 210: Existing landscape features (A) should be connected and reinforced to create a green framework (B) with development integrated within landscaped setting

8.4 Site Layout

8.4.1 Organising development in relation to landscape topography, existing development and planting can inform early design decisions. This will involve utilising natural features of the site to determine the location of built form and new structural planting to reinforce existing planting, whilst maintaining and creating views and vistas. There are landscapes where land use is extensive and little landscape structure and character remains. In these locations development can beneficially restore features.

8.4.2 Reciprocal views are important between town and country and can be highly significant where landmarks or green spaces are concerned. Rural land between settlements is significant in terms of retaining the individual identity of market towns and villages. The skyline of a new development should aim to enhance the landscape character of its setting, by determining if it should be either visible or should remain below established skylines.

Figure 211: Landscape connections extending green corridors through development

Figure 212: Informal and formal public open space with adequate space to allow extensive planting, including significant trees

Figure 213: High quality, well-maintained planting reflects quality in the environment, encouraging sense of place, outdoor recreation and community cohesion

Figure 214: Well designed and maintained landscaping along infrastructure corridors

Figure 215: Multifunctional landscapes offer opportunities for informal play

8.5 Landscape Plans

8.5.1 Policy EE5 of the adopted Local Plan requires all major development proposals to demonstrate how they incorporate landscape enhancement, in accordance with the guidelines in the Landscape Character Assessment, the Central Bedfordshire Design Guide and other relevant documents for specific areas. This includes the Chilterns Area of Outstanding Natural Beauty (AONB), Forest of Marston Vale and the Greensand Ridge Nature Improvement Area. Landscape and visual appraisals will be expected to support planning applications and include the assessment of local landscape character and views.

8.5.2 Landscape plans will be required to demonstrate the evolution of the design concept through to detailed drawings and planting specifications. For large planning applications, such as those over 100 dwellings or over 5 hectares of employment uses, or those with significant public interest or complex issues, the Council welcome the use of visualisation techniques such as fly-throughs, computer generated visualisation as well as photomontages and wireframe drawings.

8.6 On site landscape considerations

Ground Modelling

8.6.1 Adjusting site levels may be required to facilitate development, but more significant changes in levels and earthworks can result in inappropriate features which are out of character and visually intrusive. Overuse of bunds can lead to the creation of awkward features, and the loss of soil as a resource.

8.6.2 Where required, the height and form of bunds and mounds must relate to local character within and beyond the site to ensure integration. Planting on top of bunds and earthworks can increase their impact, as can the selection of inappropriate tree and shrub species. If planting is required, it should be limited to the side of bunds, with appropriate species.

Landscape Integration

8.6.3 The pattern of landform and existing features will influence the landscape design, which should seek a sympathetic response to the setting and avoid overly linear solutions. Although screening will be an aspect, a successful scheme will unite the land use, including existing development and avoid sudden contrasts in character. The Forest of Marston Vale Development Design Guidance SPD includes good examples of how to integrate planting within the landscape setting, that could be a useful for informing other schemes across Central Bedfordshire.

The Development Edge

8.6.4 It is important to consider how the edges of development relate to external landscapes and the extent of buffer required. Access roads and backs of development can form a visually harsh, intrusive boundary and should be avoided. Turning development to face the site boundary with adequate and effective space and landscaping can assist in creating a positive edge to development and rural interface. It can sometimes benefit the development if it is not too hidden by landscaping, as this is a visual cue that drivers should reduce their speed.

8.6.5 Community and amenity use including sports pitches, allotments, pony paddocks and cemeteries could be considered as appropriate uses at development edges. However, the character of the landscapes associated with these activities can present an urban image at the rural interface and therefore great care in planning and design is required to ensure that adequate space is included for appropriate and effective landscape mitigation.

Boundary Treatments

8.6.6 Opportunities should be sought to use hedgerows and trees to define boundaries. They should reflect local landscape characteristics and should allow enough space for growth and maintenance without encroaching onto the surrounding footway, cycleway or highway. Mixed native hedgerows with trees are typical upon settlement edges and in rural areas. Close boarded fencing is not appropriate on settlement edges. Timber post and rail, or post and wire, are more appropriate, but where possible native hedging should be used, or a combination of the two.

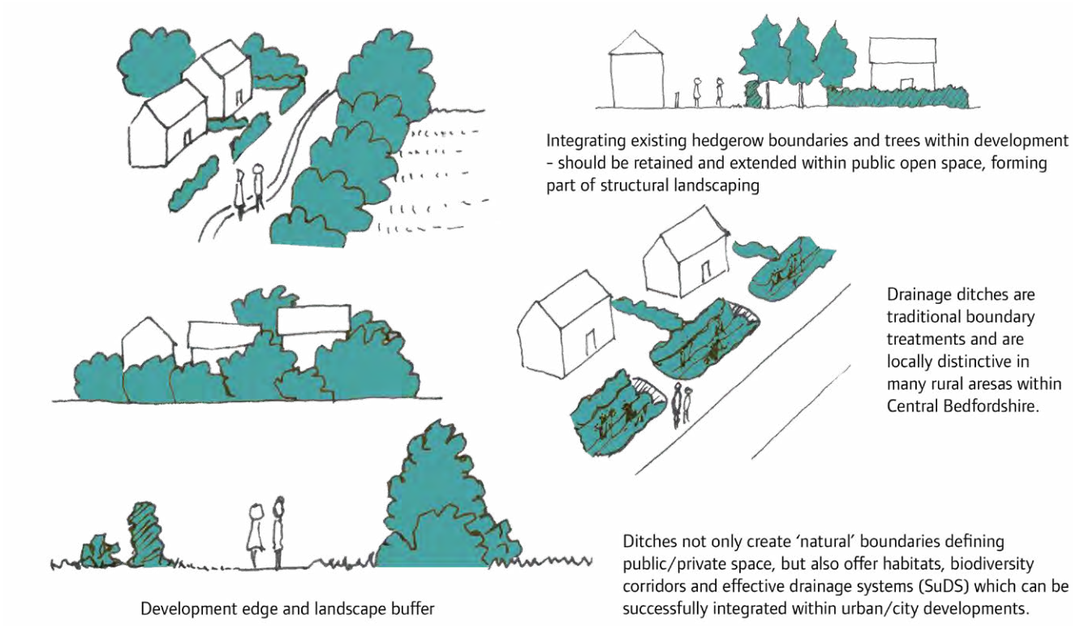


Figure 216: Types of landscape led boundary treatments

Figure 217: Drainage ditches, Steppingley

Figure 218: Woburn picket fences

Figure 219: Holly hedges, Eversholt

Figure 220: Ironstone walling

Planting

8.6.7 Structural planting can assist in integrating development within the landscape and it is essential that:

- The design of planting and selection of species compliments and reinforces local distinctiveness.
- Adequate space be allocated for structural planting within the public realm, and consideration is given to long term growth.
- Advanced planting be included especially on larger development sites according to phasing.
- Off-site planting (such as on sites which abut the public highway) can be considered to assist in mitigation of development and landscape enhancement. However, the appropriate species should be agreed by the Council.
- Street trees will not significantly overshadow roofs or buildings during their lifetime as this can reduce effectiveness of energy generation from solar technologies.

8.6.8 Planting has a key role in ensuring developments are able to adapt to climate change. Multi-functional green and blue infrastructure is important as it can reduce urban heat islands, manage flooding and help species adapt to climate change. It can also contribute to achieving a net gain in biodiversity and it also creates pleasant environments which encourages people to walk and cycle.

Form, Materials and Design of Structures

8.6.9 Structural planting should be appropriate to the site and surrounds, and alongside form, height, massing, materials, colours and textures of built development, will assist in integrating development. Often built form cannot be screened by planting and is not necessarily desirable as it can result in screening itself being out of character, visually intrusive and costly. The permanence of any screening cannot be guaranteed as it depends on maintenance in the long term.

Reinforcing Local Distinctiveness

8.6.10 Strategic landscape planting sympathetic to Central Bedfordshire will largely comprise of species typical of lowland England. Within Central Bedfordshire there is scope to reinforce character through the selection of locally occurring native species. Although many species are common, there is scope to create variation across Central Bedfordshire not only with the trees but also with the shrub and grassland areas, with careful selection of grass and wildflower mixes. Inclusion of non-native species may be beneficial to increase resilience in planting in the longer term.

8.6.11 Ornamental trees and shrubs can be useful to reference a cultural feature or provide variation in the street scene. Planting should be appropriate to the landscape character typology. It is also of great ecological importance to use local stock where possible.

8.6.12 Figure 221 and Table 10: Landscape Character Areas and their planting requirements set out the different landscape character areas within Central Bedfordshire (defined within the Landscape Character Assessment) and the types of flora associated with them. This aims to advise on the types of plant species which may be appropriate when developing landscaping strategies as part of a new development.

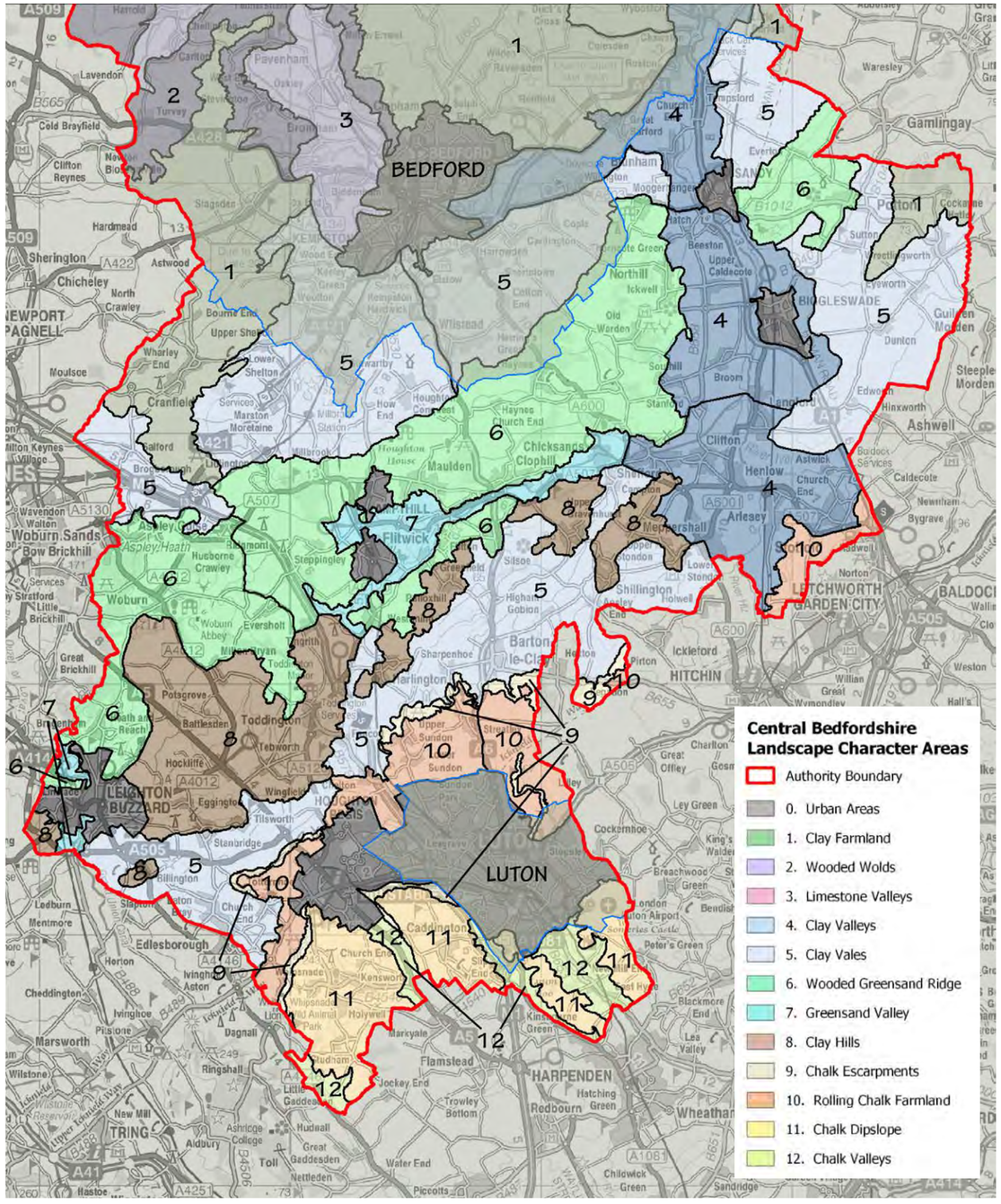


Figure 221: Map of Landscape Character Areas

Table 10: Landscape Character Areas and their planting requirements

Landscape Character Area	Landscaping Requirements
Clay Farmland, Clay Hills, Clay Vales (1, 5, 8)	▶ Landscapes which have almost entirely declined in character, where planting is required to renew and create features. Woodlands and roadside hedgerows may be locally significant. Urban fringe pressures. ▶ Structure planting based on oak, field maple, wild cherry, crab apple ▶ Specimen trees: lime – often linked to churches and estates, hornbeam ▶ Shrubs – hawthorn, blackthorn, spindle, dogwood ▶ Hedges – mainly hawthorn, blackthorn, hazel, dogwood.
Clay Valleys (4)	▶ River valleys of the Great Ouse and Ivel have declined in character and require renewal of traditional features and creation where structure lost. Remaining pasture a conservation priority. Urban fringe pressures. ▶ Structure planting based on – white willow, crack willow, ▶ Riverside planting – willow, sallow, alder ▶ Shrubs - Guelder rose, dogwood, sallow, osier ▶ Hedges - hawthorn with blackthorn, dogwood, field-maple
Wooded Greensand Ridge (6)	▶ Highly sensitive, extensively wooded landscape which is in decline. Strong vernacular of ironstone. Opportunities to create and enhance landscape features, particularly heathland and acidic grassland. ▶ Structure planting – oak, field maple, sweet chestnut, birch, rowan, Scot's pine, Corsican pine ▶ Shrubs – gorse, broom, holly ▶ Hedges - Holly characteristic of villages; well managed "Estate "hawthorn hedges frequent.
Greensand Valley (7)	▶ Flit Valley – declined landscape with urban fringe pressures, unique for wet fen woodland. Alder, willow as roadside features. ▶ Ouzel Valley and Grand Union Canal- declined landscape with strong character, riverside species such as willow, alder but also influenced by Estates and pastoral landscape. ▶ Structure planting -alder, willow, oak, sash, willow. ▶ Riverside planting- alder, willow, black poplar. ▶ Specimen trees- lime, hornbeam. ▶ Hedges- hawthorn with blackthorn, wayfaring tree, field maple
Chalk Escarpments (9)	▶ AONB protected landscape –with priority of chalk grassland conservation or planting unlikely unless linked to adjacent permission. If planting required, appropriate species include – beech, field maple, birch, wild cherry, wayfaring tree, dogwood, wild privet.
Rolling Chalk Farmland (10)	▶ Declining landscape, some within AONB; urban fringe influence in parts. Opportunities for landscape renewal. Connection to chalk hills important visually and for green infrastructure. ▶ Structure planting -oak, field maple, wild cherry, beech ▶ Shrubs- wild privet, wayfaring tree, dogwood, spindle ▶ Hedges – hawthorn, blackthorn, wayfaring tree, wild privet.
Chalk Dipslope (11)	▶ Declining landscape with scope for conservation and renewal – often elevated farmland, also strong Estate influence ▶ Structure planting -oak, field maple, wild cherry ▶ Specimen trees - lime, beech, hornbeam ▶ Hedges – hawthorn, spindle, dogwood, wild privet, field maple
Chalk Valleys (12)	▶ Series of valleys lacking identity through declined condition and urban fringe influence; scope for enhancement and renewal. ▶ Structure planting -oak, field maple, wild cherry, willow ▶ Shrubs - wayfaring tree, spindle, dogwood ▶ Hedges – hawthorn, blackthorn, field maple, shrubs as above

8.7 Landscaping of Verges and Roundabouts

8.7.1 Development may require the introduction of roundabouts into a road with an otherwise rural character. The landscape treatment can help to mitigate this intrusion and should be subject to a landscape assessment.

8.7.2 The character of grass verges is also important. The width should relate to the historic pattern as far as possible but should be no less than 2 metres wide (in accordance with the Council's Highways Construction Standards and Specifications Guidance). Where possible, the aim should be to establish flower enriched verges, using native seed mixes:

- ▶ Clay soils - aim to introduce locally native, persistent species such as cowslip, meadow cranesbill, birds foot trefoil to native grass mix
- ▶ Sandy soils - seed at low density with appropriate grasses and allow natural colonisation where possible or sow an appropriate mix.
- ▶ Chalk soils – seed, if necessary, at low density with appropriate grasses and allow natural colonisation.

8.7.3 The exception to this is within visibility splays at junctions, where there should be no planting other than the verge grass. To allow for a corridor of native species planting, the verge would have to be widened so that any maintenance through cutting does not remove the planting corridor. The appropriate species used in planting should be agreed with the Council and where wildflower mixes cannot be used, species which encourage bee friendly mixes which can be mowed regularly should be considered. Further guidance on tree lined streets is set out in the Movement section of this Design Guide.

Figure 222: Barton roadside nature reserve serves to enrich and maintain the character of verge. Local character and identity can be developed through the use of low-nutrient soils and local stone. Wildflower grassland can be particularly successful on chalk.

8.8 Management and Maintenance

8.8.1 The future management and maintenance of planting and landscaping associated with development must ensure that landscaping can mature and remain a feature of the development in the long term. This needs to take into account the management of trees and hedges to ensure that solar generation is not compromised and there is no encroachment onto footpaths and cycleways. Structural landscaping must be provided within the public realm (rather than within private land / rear gardens) to allow better control and certainty over management and maintenance. Ownership and responsibility for maintenance needs to be agreed with the Council, and a landscape management plan established as part of the formal planning process.

8.9 Trees in the Landscape – Design Considerations

8.9.1 The trees of Central Bedfordshire enhance the landscape, its geological features and shape its character. Trees are also an important part of the urban landscape, complementing buildings, providing landmarks, and creating a sense of place. Trees make for a better place to live and work.

Key:

1 - Trees provide shading for seated areas
2 - Communal roof terrace
3 - Natural play alongside SuDS basin
4 - Formal hedging to mark out play space
5 - Pocket parks
6 - Rain gardens
7 - Soft landscaping boundaries
8 - Stormwater, to be collected by SuDS basin
9 - Green walls in panel form for building shading
10 - Smaller garden trees provide shading & screennng
11 - Trees create enhanced pedestrian experience

Figure 223: Trees provide several benefits when incorporated into the urban landscape

Woodland

8.9.2 Central Bedfordshire is lightly wooded with less than 10% of its area covered in trees and woods. Ancient semi-natural woodland is mostly found fragmented or planted for productive forestry. Historically Ash with an under-storey of Field Maple would have been a naturally occurring mix, with oak planted for timber. In the south of the county on calcareous soils, Beech have been planted for both timber and amenity since the 1750's and mature Beech now highlight the chalk ridges.

8.9.3 Commercial forestry is found on the Greensand Ridge managed by private estates or the Forestry Commission. The Forest of Marston Vale Community Forest has a specific target to increase tree cover by 30%, and the Council have prepared specific guidance to inform how this target should be delivered through new development. However, across the rest of Central Bedfordshire, opportunities may be sought to retain and increase woodland cover through development as much as possible.

Figure 224: Ancient woodland - Everton Bluebells

Trees & Hedgerows

8.9.4 Individual trees contribute greatly to the appearance and character of Central Bedfordshire. Dramatic changes in the landscape due to agriculture, development and disease (such as Elm Disease) has left individual mature trees as important local landmark trees with high amenity value. Trees and hedgerows form vital habitats for wildlife and can provide important corridors between woodland and other isolated habitats. Existing trees and hedgerows should therefore be retained where possible, and opportunities taken to create new areas of tree and hedgerow planting to provided spaces and links for wildlife. Further detail on tree planting are available on the Council's website. Trees planted in the highway need to be agreed and permission provided by the Highway Authority and in accordance with the Councils Highways Construction Standards and Specifications Guidance. Hedges and/or vegetation should be planted 1 metre back from the highway boundary to allow for vegetation growth without obstruction. Planting adjacent to where pedestrians and other non-motorised traffic is likely to pass should be of a non-spikey and non-thorny variety.

8.9.5 Central Bedfordshire's heritage trees are mostly confined to ancient oak. Veteran tree management and retaining veteran trees safely within development is an important consideration requiring long-term commitment. Edges are predominantly hawthorn with post Enclosure Act hedges, created in Sutton in 1741 until the last Enclosures in Totternhoe in 1891, being mostly of this single species. Older hedges are more likely to include a mix of native species, including hazel, blackthorn, dogwood, and spindle. Some hedges contain a large proportion of cherry plum.

Figure 225: (top) Ancient hedgerow
Figure 226: (bottom left) Bunyan's Oak
Figure 227: (bottom right) Bunyan's Oak - part of the Harlington Heritage Trail

Figure 228: The Old Wood at Linslade Wood

Orchards

8.9.6 Fruit trees were once an important feature of every town and village. Many pre-1950 orchards have been cleared or are now fragmented with individual trees surviving within private gardens. The restoration of orchards, planting new and conserving old varieties is considered important in preserving local heritage. Development sites including or close to orchards should ensure that they are protected and enhanced through replanting where appropriate.

Retaining Trees on Development Sites

8.9.7 Trees on development sites are protected by BS5837 'Trees in relation to Design, Demolition and Construction' 2012. The retention of large trees adds value to a development. Trees within Article 2(3) land (areas designated as Conservation Areas) are considered protected by virtue of their location within a Conservation Area.

8.9.8 A tree survey must be conducted early in the design and planning stage. Special note should be made of retaining veteran trees for wildlife habitat, which may have protected species already associated with them. Old orchard trees may be particularly valuable and create a sense of heritage within a new development. A tree protection plan and method statements should be in place as early as possible and throughout the development as recommended in BS5837. Soil compaction happens very quickly, and therefore root protection areas should be identified prior to construction, before any machinery is allowed on site.

Figure 229: Fruit Trees at Sewell Farm

Pests and Diseases

8.9.9 The Bedfordshire landscape has been greatly affected by tree pests and diseases, notably Dutch Elm Disease in the 1970s. Current diseases are affecting Elm, Oak, Horse Chestnut, Larch, Poplar and Ash. The latest guidance on plant health and plant movement is available from the Forestry Commission and DEFRA and should be adhered to.

Figure 230: Ash makes up approximately 7% of urban trees, of which all European species and are susceptible to Ash Dieback Disease

New Planting

8.9.10 Diversification using a mix of species, rather than single species in streets or large blocks in woodland planting schemes, is recommended. Planting stock should be from traceable and disease-free local nurseries. Where local provenance is not available plants should be of UK origin with traceable provenance. Species should be selected that:

- Represent the character of the landscape
- Tolerate local soil conditions
- Will grow to maturity within the confines of buildings and underground services
- Will not create excessive nuisance or likely to pose future risks to property and other structures
- Have minimal long term management considerations and will not cause damage to the highway from roots

Figure 231: (top) Victorian street planting, Dunstable
Figure 232: (bottom left) 1950's ornamental planting
Figure 233: (bottom right) New hedge planting

8.9.11 Other considerations for new planting are as follows:

- Source quality planting stock
- Ensure planted trees have access to nutrients, oxygen, and water
- Plan for post-planting maintenance
- Watering durations
- Be aware of the location of water supply and sewer infrastructure and ensure the species planted do not disrupt the network or underground services in general
- Building foundations should consider local soil conditions and the potential mature size of existing young trees and proposed new planting.

Figure 234: Adam's Laburnum, a feature of post war planting in Dunstable, now considered rare.

8.10 Biodiversity

8.10.1 Central Bedfordshire contains a variety of habitats, contributing to its character, and the quality of life of its residents. However, biodiversity is becoming fragmented, with various habitats becoming isolated islands. It is important that development does not further reduce this trend. Designing in biodiversity at the start of the process, building on opportunities and mitigating impacts will help to secure a net gain for biodiversity, as required by national and local planning policy (Local Plan Policy EE2). The Council have prepared guidance that explains how to assess the value of biodiversity and what evidence should be provided alongside planning applications to demonstrate a net gain in biodiversity. It also explains where improvements to biodiversity should be provided.

8.10.2 Ecological impacts will vary depending on the scale of the development, from large areas of open grassland to individual bat roosts in a single dwelling. Through ecological site assessment, developers will be able to understand opportunities and constraints on the site. Much of our wildlife survives in small pockets and natural movements restricted by development. Stepping stones between remnant habitats are crucial and can provide opportunities to connect otherwise isolated species. Sites may be surrounded by land on which it may be possible to create new habitat or to establish less intensive management regimes to buffer adverse impacts on the key sites. It is in these locations that it would be sensible to seek opportunities to link habitats or to create new habitat blocks to form steppingstones, allowing species to move more easily between habitat areas.

8.10.3 The following features can provide valuable habitats and be included into well-designed development:

- Existing and Proposed Allotments
- Existing and Proposed Wildlife Gardens
- Existing and Proposed Woodlands
- Existing and Proposed Hedges
- Rewilding of Church Yards
- Proposed sustainable drainage such as retention ponds, swales, and raingardens.
- Proposed green roofs, including extensive (light weight) and intensive deep landscaped, and brown roofs (naturally seeded from the immediate ecosystem).
- Proposed Community Orchards
- Managed Landscaped Open Space

Figure 235: Sewell Cutting, Houghton Regis

8.11 Design Considerations for all applications

Biodiversity Opportunity Networks

8.11.1 Biodiversity opportunity networks have been identified and mapped (BRMC - Beds and Luton LERC (bedscape.org.uk). These show where the areas of greatest potential for the conservation enhancement, restoration and creation of priority habitats are, and what opportunities there are to reduce fragmentation of habitats by building ecological networks across landscapes. The context of development in relation to the biodiversity opportunity network, and other designated biodiversity sites, should be identified to ascertain the priority biodiversity improvements appropriate to the location of the development, and to inform what ecological benefits the development should aim to deliver.

Overcoming Barriers to Movement

8.11.2 Good design will limit any barriers to ecological connectivity. However, where barriers cannot be designed out, the following can be used to overcome them:

- Hedgehog Highways, providing a gap in the boundary fences in developments to allow hedgehogs to roam from garden to garden
- Eco passages/underpasses provide more than culverts but also allow for dry habitat connectivity
- Green Bridges provide safe access across roads

Figure 236: Underpass on the canal provides a means of dry habitat connectivity

Figure 237: The green bridge over the A21 near Scotney Castle in Kent is seamlessly integrated with the context and allows for wildlife to cross.

Legislation

8.11.3 The presence of protected habitats and species within a development is a material consideration and licences may be required. The relevant legislation is as follows:

- European Protected Species are covered by the Conservation of Habitats and Species Regulations 2017 (updated 2019 re exit from EU) and includes all species of bat, otter, and Great Crested Newt (GCN)
- The Wildlife and Countryside Act 1981 covers native plants, birds, and animals, includes water vole.
- Section 41 of the Natural Environment and Rural Communities Act 2006 habitats and species of principal importance for biodiversity (Priority habitats and species). Includes brown hare and hedgehog.
- Protection of Badgers Act 1992 – protects against killing, injury or interference with setts.

8.11.4 Bats account for almost a third of all mammal species in the UK, occupying a wide range of habitats. Loss of natural roosts has increased the importance of man-made structures in providing artificial roost sites such as in houses, barns and under bridges. Having bats does not mean that building work cannot take place but, as they are protected species, ecological advice will be required to ensure no offence occurs. If a development hosts bats, the design should ensure the securing of food sources for bats and roosting opportunities using appropriate green vegetation. The design of buildings will also be key and the insertion of bat boxes into new buildings should always be considered to support the bat population. Lighting will also become a key issue as this affects how bats migrate from one place to another.

8.11.5 The nests and eggs of all birds are protected during the nesting season. Clearance of scrub should be undertaken outside the breeding season. Failure to do so could result in legal implications and delays in construction. Several building dependent birds (particularly swift and house sparrow) have declined in recent years. Protection of existing nests and the provision of new nests within the fabric of a building will contribute to maintaining existing populations and should always be considered.

8.11.6 The great crested newt and its habitat are protected by law because the species has declined significantly over recent decades, largely due to habitat loss. Great crested newts breed in ponds but spend much of their lives on land, sometimes venturing several hundred metres from the pond. Their populations are often dependent on there being several ponds close together, linked by suitable land habitats. Developments for which planning permission is not required still need to take account of great crested newts, and licensing may still be necessary.

Design Principles

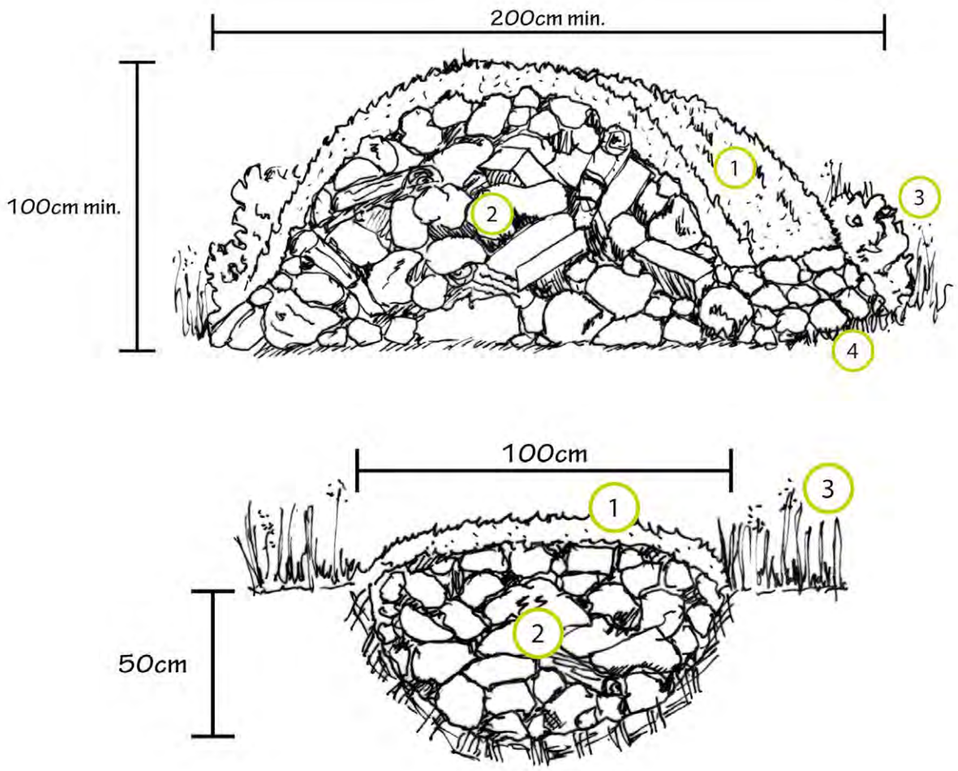
8.11.7 Sites can include appropriate areas of habitat, along with a wide range of more formal green spaces enhanced for wildlife, even where nature conservation may not be the primary objective. The built environment should aim to be permeable to wildlife, incorporating design features aimed at sustaining and increasing the population of species and facilitating climate change adaptation and planting that can respond to long periods of drought. This could be achieved by:

- Retaining and enhancing existing semi-natural habitats.
- Creating new habitats, including semi-natural grasslands, woodland, wetland, and ponds.
- Minimising fragmentation of habitats and increasing linkages through 'green corridors', linear habitat features, etc.
- Providing buffers of less intensively managed land around key habitat features.
- Ensuring new planting uses native species of local provenance.
- Considering lighting impacts on wildlife corridors and using directional lights with no spillage.

8.11.8 Hibernacula (a shelter occupied during the winter by a dormant animal) would be suitable for locating on an impermeable substrate. On free-draining substrates the bulk of the fill would be sited in an excavated depression. Hibernacula should always be positioned in suitable terrestrial habitat.

Sustainable Drainage Systems (SUDs)

8.11.9 Sustainable Drainage Systems can benefit many priority habitats and species, including Great Crested Newts and Water Voles. Sustainable Drainage Systems should be identified at the outset of the design process, and often determine the structure, form and layout of a development. Ecological advice should also be sought as part of this process to secure a positive outcome for wildlife. Policy CC5 of the adopted Local Plan provides the requirements of how sustainable drainage schemes should be designed into all new developments. Further guidance on sustainable drainage is set out in Resources section, and reference should also be made to the Council's Sustainable Drainage SPD and the Advice Note for the provision of surface water drainage systems on new developments.



1 Cap: topsoil ideally with turf or moss covering

2 Inert clean fill: hardcore, split logs, dead wood, rocks, brick rubble, loose topsoil fill

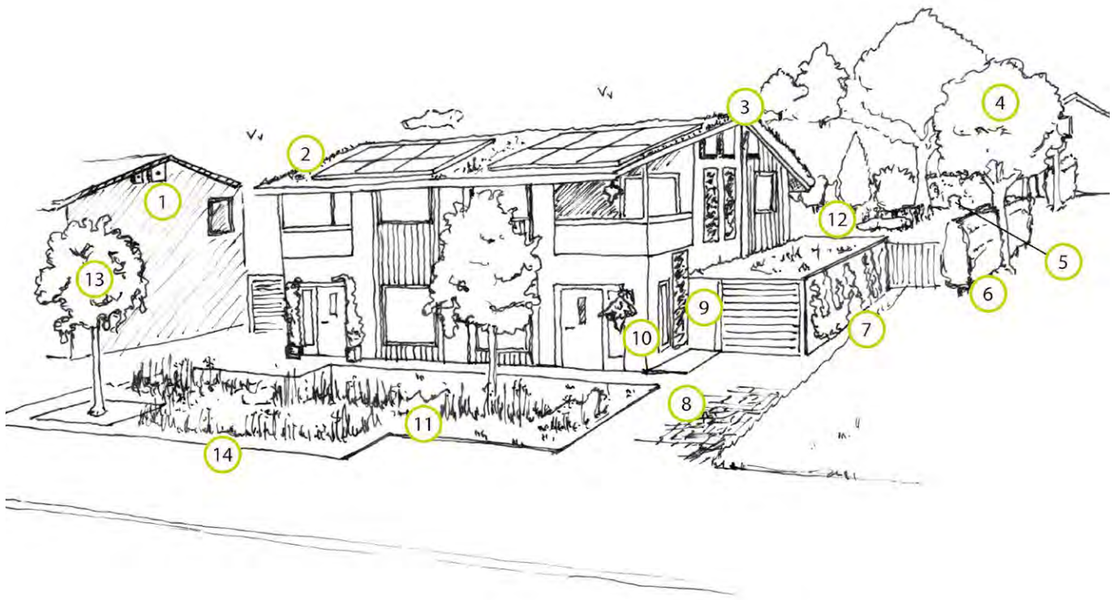
3 Surrounds: rough vegetation

4 Margins: fill exposed to allow and encourage access

Figure 238: Hibernacula suitable for Reptiles and Amphibians

Plot Scale

8.11.10 Figure 239 shows several design solutions that should be considered to improve ecology within buildings and their surrounding plot.



01 Bird boxes (shady orientation)
02 Green/brown roofs
03 Integrated bat boxes
04 Trees
05 Hedgehog passages (+15cm gap)
06 Hedgerows
07 Climbing plants
08 Permeable paving
09 Habitat walls
10 Planters and hanging baskets
11 Rain gardens
12 Wildlife ponds
13 Street trees
14 Unmown edges and verges

Figure 239: Ecological features that can be included on plot as part of the building design to increase biodiversity

Biodiversity requirements

8.11.11 Environmental Impact Assessment applies to development that is given planning permission under Part III of the Town and Country Planning Act 1990. The regulations only apply to certain types of development but can also apply to 'permitted development' which is development for which you do not need to get planning permission. For further information refer to Government Guidance on Environmental Impact Assessment.

8.11.12 A phase 1 environmental survey and protected species surveys will be required for all major developments of 10 dwellings or over. If there are protected species identified on or near the site, measures will need to be incorporated into the design to protect and mitigate against any loss. If strategic sites are within a Biodiversity Opportunity Network (BON), measures to enhance this will need to be demonstrates. All other smaller sites adjoining a BON should connect into it.

8.11.13 Efforts should be made to retain any hedgerows on a site as these can be the focus of new routes or landscaped spaces and contribute to biodiversity net gain. Permission from the Local Planning Authority will be required to remove any important hedgerow which is over 30 years old and marks parish boundary, is next an archaeological site, is part of a field system which existed prior to 1845 or contains any protected species.

8.11.14 Biodiversity enhancements and net gain will be required in accordance with Policy EE2 of the adopted Local Plan and the NPPF. The Environment Act 2021 introduces a requirement for all new development proposals to provide at least 10% improvement in biodiversity (Biodiversity Net Gain (BNG)) over a 30 year period from 2023. This pre-requisite has been inserted the Town and Country Planning Act 1990 and is a significant step-change, moving away from the requirement to simply mitigate the impact of a development. Major development sites of 10 homes or over are likely to require the stakeholder engagement of local conservation groups. In addition, strategic and large commercial sites are likely to require future management or stakeholder involvement from the Wildlife Trust and Greensand Trust.