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1. About This Guidance

- 1.1** The National Planning Policy Framework (NPPF) indicates that Local Development Documents form the framework for making decisions on applications for planning permission. Decisions have to be taken in accordance with the development plan unless other material considerations indicate otherwise. **The** NPPF advises that a local planning authority may prepare Supplementary Planning Documents to provide greater detail on the policies in its Local Plan. Supplementary Planning Documents are a 'material' consideration when planning applications are decided.
- 1.2** As required by the Planning and Compulsory Purchase Act 2004 we have prepared a Statement of Community Involvement (SCI) which sets out how we will involve the community in preparing our Local Plan and consulting on planning applications. In accordance with the SCI we have involved people who may be interested in this Supplementary Planning Document (**SPD**) and asked them for their comments. We have produced a consultation statement which summarises all the comments people made to us and our response. This is available on request.

2. Introduction

- 2.1** ~~This Supplementary Planning Document **SPD** offers guidance to anyone seeking to develop land which may have, or is in proximity to a site that has, value for biodiversity and/or geological conservation. Paragraph 4.3 in the guidance section gives advice on how this is established.~~ sets out the council's approach to planning decisions in respect of biodiversity and geodiversity and is designed to be used by those considering and applying for planning permission in the borough, to ensure biodiversity and geodiversity is adequately protected through the planning process. This document provides practical advice and guidance on how to deliver proposals that comply with the NPPF and the Local Plan, adopted in 2019. Information and links to technical guidance is also included. We believe that biodiversity and geodiversity should not be seen as a hindrance to development, rather as a way of adding value to well-conceived design proposals. When considered at early design stage, biodiversity enhancements can be achieved, providing net gains for habitats, alongside additional benefits such as increasing habitat availability for species, natural flood management, carbon sequestration and broader benefits for people provided by access to natural green spaces, including increased mental health which was observed widely during the Covid-19 pandemic.
- 2.2** This SPD also provides developers with a list of useful links and contacts where further information can be found. The Council is not responsible for the accuracy of and updates to any of the information provided in the external links, they are provided as supporting technical material.
- 2.3** This SPD provides additional details on how local policies will be implemented while also building on relevant legislation, national policy, central government advice, and the British Standard BS42020:2013 Biodiversity – Code of practice for planning and development. Available information regarding the Environment Act, 2021 has also been referenced; the Act includes provisions to strengthen and improve the duty on public bodies to conserve and enhance biodiversity, including mandating BNG through the

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planning system and the requirement for the preparation and publication of a Local Nature Recovery Strategy (LNRS).

3. Local Priorities

- 3.1 The conservation of Biodiversity is imperative, we are seeing extinction events on local, regional, national and international scales. Habitat loss and species decline is a real threat, with habitats and species once considered common in the borough now facing increasing pressures from development, climate change and many other factors. To address this the council declared a climate emergency in 2019 with the aim of reducing carbon emissions; increasing the biodiversity of the borough can help achieve this through the planting of trees and the creation of sustainable landscapes that provide multiple benefits to help address the climate crisis and conserve the boroughs biodiversity.
- 3.2 Our Council Plan highlights the key points that are required for Barnsley to become a more sustainable place and to achieve our Net Zero Targets by 2045, these include;
- People live in great places, are recycling more and wasting less, feel connected and valued in their community;
 - Our heritage and green spaces are promoted for all people to enjoy; and
 - Fossil fuels are being replaced by affordable and sustainable energy and people are able to enjoy more cycling and walking.
- 3.3 For developments to result in the best outcome for biodiversity, planning has a key role to play, with a key objective being the protection and enhancement of biodiversity throughout the development management process.

4. Biodiversity and Geodiversity in Barnsley

- 4.1 Biodiversity coined “biological geodiversity” is the variety of life on earth, from complex ecosystems, through individual species of plants, animals, fungi and bacteria etc. to the genetic differences within a species. to large ecosystems; the concept is broad and complex. Biodiversity is important for its own sake, and human survival depends upon it. ~~The ground-breaking UK National Ecosystem Assessment (NEA) published in June 2011 provides a comprehensive account of how the natural world, including its biodiversity, provides us with services that are critical to our wellbeing and economic prosperity. The State of Nature figures 2016 states that between 1970 and 2013, 56% of species declined, with 40% showing strong or moderate declines.~~ The most recent State of Nature Report published in 2019, reported that in the UK more species have seen their populations decrease than increase; the report details a 41% decrease in species abundance since 1970, with the main issues being;
- Agricultural intensification;
 - An increase in average UK temperatures;
 - Negative impacts from pollution; and
 - Loss of habitats to meet the increasing needs of our population.

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- 4.2** Geodiversity is the term used to describe the variety of ancient rock, fossils, minerals, earth structures, sediments, soils and more recent landforms (depositional and erosional features) that create the foundations of physical landscapes and habitats. The recognition, management, and conservation of significant geological sites is important as it contributes to towards the understanding and maintaining of the natural environment, to scientific research and to teaching an understanding of the earth, as well as to leisure activities and the enhancement of green spaces. The industrial heritage of the area borough and building construction are closely linked to the geological resources of the area, particularly coal, clay, ironstone, sandstone and roofing flags. It is essential that geoconservation factors are taken into account in the planning process, the opportunities for educational, scientific and recreational advance are appreciated and realised and that significant features of geological interest are conserved.
- 4.3** The richness of the biodiversity of Barnsley's biodiversity owes its existence to the borough's varied geology giving rise to a range of landscapes – from the open moors in the west, to the lowlands of the Dearne in the east; each landscape, be it moorland, woodland, grassland, wetlands, parks and gardens or neglected former industrial land sites, supports its own habitats and species which contribute to local distinctiveness and character. Some of these habitats are recognised as being of national and even international importance, while other areas are recognised as important at a local level. They support a countless number of protected and notable wild species, many of which are noted as being rare or threatened in the UK.
- 4.4** Barnsley borough has, at the time of writing, two 2 Internationally-designated statutory nature conservation sites ('Natura 2000' sites) which are to the west, in the Peak District National Park Local Planning Authority (LPA) area. The Barnsley LPA area contains the following nationally-important statutory designated nature conservation sites: all or part of 7 seven Sites of Special Scientific Interest (SSSIs), all or part of eight 5 Local Nature Reserves (LNRs) and one Nature Improvement Area (NIA). The SSSIs list includes sites designated for their biodiversity or (separately) geodiversity value. Non-statutory Local Wildlife Sites (LWSs) and Local Geology Sites/ Regionally Important Geological and Geomorphological Sites (LGSs/ RIGS) have been designated in the borough for their local ecological or geological value respectively; at the time of writing there are 63 LWS and 31 RIGS within the borough Up to date lists/plans of statutory and non-statutory sites can be found at: <https://magic.defra.gov.uk/magicmap.aspx> <https://magic.defra.gov.uk/MagicMap.aspx>; <http://www.barnsleybiodiversity.org.uk/> and <http://www.sagt.org.uk/> <https://www.sagt.org.uk/> and on Barnsley's Local Plan interactive mapping tool <https://www.barnsley.gov.uk/services/planning-and-buildings/local-planning-and-development/our-local-plan/barnsleys-local-plan/>.
- 4.5** Of significant note within the Borough is the recently designated (January 2022) Dearne Valley Wetlands SSSI. The site comprises 22 compartments scattered throughout the east of the borough. The SSSI is an area of post-industrial urban fringe comprising large areas of wetland, woodland, scrub and other notable habitats located within the Dearne catchment. Its notifiable features include the following;
- Several species of breeding bird including gadwall, shoveler garganey, pochard, bittern, black-headed gull and willow tit;
 - Non-breeding gadwall and shoveler; and

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- A diverse assemblage of breeding birds of lowland damp grasslands and scrub and a mixed assemblage of lowland open waters and their margins including lowland fen.

4.6 The rocks underlying Barnsley borough are Upper Carboniferous in age, and ~~are mainly~~ comprise mudstones, siltstones and sandstones with coal seams, some of which ~~are/were~~ of major importance. There are also beds of ironstone and roofing flags. In the west of the borough, by Dunford Bridge, ~~are the~~ "Millstone Grit" sandstone outcrops of the Pennines are present. These rocks support expanses of peat and acid heathland habitats. The more resistant sandstones form hills and edges, which run roughly northeast – southwest and influence the shape of river catchments as well as the flow of groundwaters and geochemistry of the river ecosystems.

4.7 Many of Barnsley's older settlements are located on the slightly higher ground of the "Coal Measures" sandstones, above the less-well drained areas underlain by mudstone. Extractive industries still provide some employment in quarrying stone and pot clay, and many of the older buildings in Barnsley include local sandstones. Some of these sites have become a significant source of raw materials, including stone for appropriate building conservation within the region, enabling a distinctive sense of place and authenticity to be maintained.

5. Legislation, Policy and Strategies

5.1 ~~The NPPF lists in its sections 170, 171, and Nos. 174-177 issues of particular relevance to biodiversity and geological conservation. These are detailed in Appendix D.~~ There is a variety of legislation and policy provisions to ensure protection of the natural environment, these range from international to local level. This document supplements the following Local Plan policies:

Policy BIO1 Biodiversity and Geodiversity

Development will be expected to conserve and enhance the biodiversity and geological features of the borough by:

- Protecting and improving habitats, species, sites of ecological value and sites of geological value with particular regard to designated wildlife and geological sites of international, national and local significance, ancient woodland and species and habitats of principal importance identified via Section 41 of the Natural Environment & Rural Communities Act 2006 (for list of the species and habitats of principal importance) and in the Barnsley *Biodiversity Action Plan*;
- Maximising biodiversity and geodiversity opportunities in and around new developments;
- Conserving and enhancing the form, local character and distinctiveness of the boroughs natural assets such as the river corridors of the Don, the Dearne and Dove as natural floodplains and important strategic wildlife corridors;
- Proposals will be expected to have followed the national mitigation hierarchy (avoid, mitigate, compensate) which is used to evaluate the impacts of a development on biodiversity interest;

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- Protecting ancient and veteran trees where identified;
- Encouraging provision of biodiversity enhancements.

Development which may harm a biodiversity or geological feature or habitat, including ancient woodland and aged or veteran trees found outside ancient woodland, will not be permitted unless effective mitigation and/or compensatory measures can be ensured;

Development which adversely affects a European Site will not be permitted unless there is no alternative option and imperative reasons of overriding public interest (IROPI).

Policy GI1 Green Infrastructure

We will protect, maintain, enhance and create an integrated network of connected and multi-functional Green Infrastructure assets that:

- Provides attractive environments where people want to live, work, learn, play, visit and invest;
- Meets the environmental, social and economic needs of communities across the borough and the wider City Regions;
- Enhances the quality of life for present and future residents and visitors;
- Helps to meet the challenge of climate change;
- Enhances biodiversity and landscape character;
- Improves opportunities for recreation and tourism;
- Respects local distinctiveness and historical and cultural;
- Maximises potential economic and social benefits;
- Secures and improves linkages between green and blue spaces.

At a strategic level Barnsley's Green Infrastructure network includes the following corridors which are shown on the Green Infrastructure Diagram (see below):

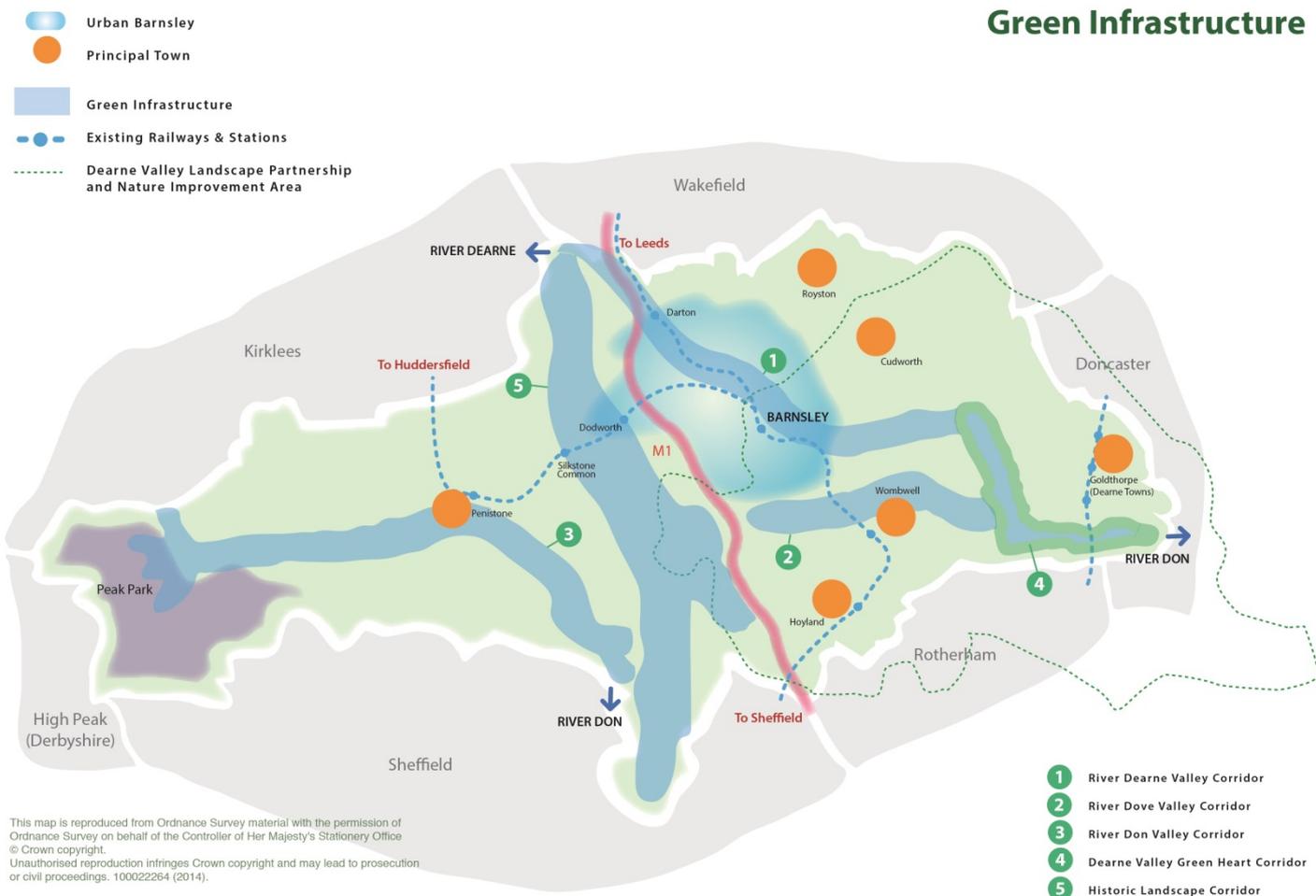
- River Dearne Valley Corridor;
- River Dove Valley Corridor;
- River Don Valley Corridor;
- Dearne Valley Green Heart Corridor;
- Historic Landscape Corridor .

The network of Green Infrastructure will be secured by protecting open space, creating new open spaces as part of new development, and by using developer contributions to create and improve

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Green Infrastructure

We have produced a Green Infrastructure Strategy for Barnsley which is informed by the Leeds City Region and South Yorkshire Green Infrastructure Strategies.



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Policy GS1 Green Space

We will work with partners to improve existing green space to meet the standards in our Green Space Strategy.

Green Spaces are green open areas which are valuable for amenity, recreation, wildlife or biodiversity and include types such as village greens, local open spaces, country parks, formal gardens, cemeteries, allotments, woodlands, recreation grounds, sports pitches and parks.

Proposals that result in the loss of green space, or land that was last used as green space, will not normally be allowed unless:

- An assessment shows that there is too much of that particular type of green space in the area which it serves and its loss would not affect the existing and potential green space needs of the borough; or
- The proposal is for small scale facilities needed to support or improve the proper function of the green space; or
- An appropriate replacement green space of equivalent or improved quality, quantity and accessibility is provided which would outweigh the loss.

In order to improve the quantity, quality and value of green space provision we will require qualifying new residential developments to provide or contribute towards green space in line with the standards set out in the Green Space Strategy and in accordance with the requirements of the Infrastructure and Planning Obligations Policy. The Supplementary Planning Document 'Open Space Provision on New Housing Developments' offers guidance to developers on what will be expected in terms of open space provision in order to achieve those standards.

Where there is a requirement to provide new green space an assessment will be carried out to determine the most appropriate provision, taking into account site characteristics and constraints. In cases where it is deemed unsuitable to make provision for open space within or adjacent to a development site, suitable off-site open space facilities may be acceptable either as new facilities or improvements to those existing. Where appropriate new green space should secure access to adjacent areas of countryside.

6. Biodiversity Net Gain

- 6.1** Biodiversity Net Gain (BNG) is an approach to development and/or land management that aims to leave the natural environment in a measurably better state than it was beforehand. The Environment Act 2021 mandated a minimum measurable BNG for all developments covered by the Town & Country Planning Act (TCPA) which requires the biodiversity value of a development to exceed the predevelopment biodiversity value of a site by a minimum of 10%.
- 6.2** BNG does not replace or undermine the mitigation hierarchy as the primary principle for the consideration of biodiversity within a development. BNG is additional to the mitigation hierarchy and only applies once impacts to biodiversity have been avoided,

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mitigated and compensated for. Where there are no anticipated impacts, developments should still secure a minimum 10% BNG.

- 6.3** Biodiversity value is measured using a metric produced by DEFRA and the baseline value is calculated from the condition of the site before any intervention has occurred. The metric should be completed by a suitably qualified and experienced ecologist. Submission of biodiversity gain information (in the form of a BNG Statement) should be provided with relevant applications alongside a copy of the most recent version of the metric. A Biodiversity Gain Plan will be required for submission and approval prior to the commencement of development. A template in which to include biodiversity gain information and the biodiversity gain plan is expected to be provided alongside secondary legislation.
- 6.4** Development that is exempt from mandatory net gain will still be required to provide biodiversity enhancements to meet planning policy BIO1.
- 6.5** As per Schedule 14 of the Environment Act 2021, where degradation and/or destruction of habitats is undertaken prior to a baseline survey being completed, the pre-development biodiversity value of a site should be taken to be its baseline biodiversity value immediately prior to the destruction/degradation of habitats; this is applicable to any works undertaken on or after the 30th January 2020.
- 6.6** BNG should be provided on-site in the first instance to create functional habitats that increase connectivity for wildlife. Where BNG cannot be achieved on site, off-site options can be sought. However, off-site locations must take regard of the emerging LNRS and should be located in strategic areas, where possible; the created/enhanced habitats should be secured for at least 30 years via planning obligations or conservation covenants. Where a minimum 10% BNG cannot be secured via on or off-site options, developers can secure the required biodiversity losses through the emerging statutory biodiversity credit scheme. Prior to the release of the statutory credit scheme, anticipated November 2023 developers can pay the council a BNG Contribution per Biodiversity Unit.

Local Nature Recovery Strategy

- 6.7** The council is working with the South Yorkshire Mayoral Combined Authority (SYMCA), other South Yorkshire Local Planning Authorities and partners to develop the Local Nature Recovery Strategy (LNRS) and Nature Recovery Network (NRN). The need for a LNRS is a statutory requirement of the Environment Act 2021. LNRS are to be produced by a responsible authority appointed by the Government. Until secondary legislation and guidance is received it is not known at the time of writing who will be the responsible authority for South Yorkshire. The LNRS strategy will map areas where there is an opportunity to improve habitat connectivity and functionality and the local environment to guide BNG and other policies to ensure the best outcome for biodiversity.
- 6.8** In collaboration with the four South Yorkshire Local Authorities and three additional partners, SYMCA commissioned a detailed mapping evidence base of the region's natural environment. The report details the benefits that the natural environment

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provides and opportunities to enhance them. The evidence within the report will be used to inform the LNRS.

- 6.9** The maps are derived from multiple datasets and are modelled estimates of natural environment characteristics. As such, the data are not intended to provide an exact or full account of natural environment characteristics for each land parcel, but instead to guide policy and project development decisions. The report can be found at https://southyorkshire-ca.gov.uk/Explore_Green-Campaign.

Nature Improvement Area

- 6.10** The Local Plan also refers to the Dearne Valley Green Heart 'Nature Improvement Area' (NIA), which includes covers parts of Barnsley, Doncaster and Rotherham. ~~boroughs.~~ NIAs are large, discrete areas that will deliver a step change in nature conservation, where a local partnership has a shared vision for their natural environment. NIAs were established to help address ecological restoration as part of series of actions at a landscape-scale to improve biodiversity, ecosystems and our connections with the natural environment identified by the Natural Environment White Paper (2011) and taking forward recommendations identified in the Lawton Review *Making Space for Nature* (2010). The Dearne Valley Green Heart has been designated as an NIA; and its extent within Barnsley's boundary can be seen in the map in figure 17.1 from the Local Plan (reproduced above, with a more detailed map plan in Appendix A).
- 6.11** The Dearne Valley supports nationally important assemblages of breeding birds of lowland damp grassland, lowland open water and their margins and scrub plus nationally important numbers of some individual species of breeding water birds. The Dearne Valley has the ambition to become an ~~new type of~~ urban area for living, working and relaxing, in which environmental quality, biodiversity and contact with nature underpin the choices people make to move to and invest in the area and create a sustainable future. ~~there.~~ The River Dearne ~~provides~~ is a key asset to in the valley and the surrounding communities, with its wetlands, washlands and marshlands providing a haven for wildlife. The valley has many publicly-accessible woodlands with networks of footpaths, cycle and bridle trails. Over recent years reclaimed colliery sites have been restored to create community green spaces and the valley is a model for large-scale environmental regeneration. Economic regeneration and prosperity are key to addressing social deprivation arising from the area's industrial past.
- 6.12** The vision of the NIA partnership is to restore and enhance ~~the~~ ecological networks ~~in the valley.~~ At its core will be areas of reedbeds, fen, wet grassland, wet woodland and woodland buffered by areas of farmland, amenity grasslands, parklands and reclaimed industrial areas whose biodiversity value will be enhanced. 'Stepping stone' sites exist along the river corridor where habitat should be enhanced and specific measures put in place for key species. ~~such as eels, otters and water voles.~~ The NIA area will support an even richer diversity of wildlife, including nationally important numbers of wintering waterbirds and breeding farmland birds.

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Barnsley Biodiversity Action Plan

- 6.13** The Barnsley Biodiversity Action Plan (BAP) is produced by Barnsley Biodiversity Trust and is reviewed periodically. The BAP lists the key species and habitats targeted for specific conservation action in the borough. The list draws from nationally-approved BAP targets but also includes certain species and habitats which the Trusts' partners feel consider to be locally important too. The BAP indicates details conservation actions which should be taken implemented to help protect the key species and habitats and/or allow them to recover. Barnsley Council has adopted the BAP as part of the evidence-base supporting Local Plan decisions.
- 6.14** The presence of local priority habitats and species identified in the BAP is a material consideration in planning decisions
- 6.15** Barnsley does not as yet currently have a Geodiversity Action Plan, but relevant guidance is available in the West Yorkshire Geological Geodiversity Action Plan: A consultative Document, March 2008 published by the West Yorkshire Geological Trust (<http://www.wyorksgeologytrust.org/misc/Draft%20WYGAP.pdf>). A geological Geodiversity action plan for Rotherham is at present being written (see <http://www.sagt.org.uk>). Doncaster was adopted in June 2008 and can be found at <https://www.doncaster.gov.uk/services/planning/the-geodiversity-action-plan>

Green Infrastructure

- 6.16** Green Infrastructure is a combination of natural environmental assets, the functionality of which shapes the places we live, work, play and enjoy. Those assets include:
- Green or open spaces that can link together to create an informal but planned network across the Borough and beyond;
 - Parks, gardens, woodland, wildlife sites, watercourses, street trees and the open countryside; and
 - Spaces that can perform a number of different functions, such as formal and informal recreation, nature conservation, food production, enhanced settings for development, routes for cycleways/walkways, areas for flood risk management and education resources.
- 6.17** Together, these assets form an environmental system, the performance of which will increasingly determine how successful our cities, towns and villages will be in the future.
- 6.18** At a strategic level Barnsley's Green Infrastructure network includes the following corridors:
- River Dearne Valley Corridor;
 - River Dove Valley Corridor;
 - River Don Valley Corridor;
 - Dearne Valley Green Heart Corridor; and
 - Historic Landscape Corridor.
- 6.19** The recently released Green Infrastructure Framework by Natural England has been created with the aim of increasing the amount of green cover in urban areas, up to 40%.

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Good quality Green Infrastructure has an important role to play in urban and rural environments for improving health and wellbeing, air quality, nature recovery and resilience to and mitigation of climate change, along with addressing issues of social inequality and environmental decline.

- 6.20** The Green Infrastructure Framework is a commitment in the Government's 25 Year Environment Plan. It supports the greening of towns and cities and connections with the surrounding landscape as part of the NRN. Networks of green and blue spaces and other natural features can bring big benefits for nature, climate, health and prosperity.
- 6.21** Policy GI1 of the Local Plan states that we will protect, maintain, enhance and create an integrated network of connected and multi-functional Green Infrastructure in Barnsley (see Appendix C for additional details on Policy GI1).

Nature Based Solutions

- 6.22** Development should incorporate nature-based solutions, including an increase in the amount and connectivity of green and blue infrastructure. Nature-based solutions can provide natural carbon sinks, help deliver improvements to water quality and resilience against climate impacts, including flooding and overheating, as well as preventing further nature loss and protecting built assets.
- 6.23** Policy BIO1 of the Local Plan encourages maximising biodiversity and geodiversity opportunities in and around new developments and, as set out above, policy GI1 states that we will protect, maintain, enhance and create an integrated network of connected and multi-functional Green Infrastructure in Barnsley.

7. Integrating Biodiversity into Developments in Barnsley

- 7.1** BMBC has successfully implemented BNG as part of our planning requirement following adoption of the Local Plan in 2019; of which one of the objectives is to protect and enhance Barnsley's natural assets and achieve net gains in biodiversity. Prior to BNG becoming a statutory requirement, planning applications have had to demonstrate how proposals will result in no net loss of biodiversity, where applicable, and in the case of masterplan framework sites, a requirement of 10% BNG is required. Examples of applications where permission has been granted on masterplan framework sites includes planning reference 2020/0647 within the Hoyland South Masterplan area and 2021/1691 within the Hoyland North Masterplan area. Both sites demonstrated that a 10% net gain for biodiversity can be achieved through a combination of on and off-site habitat creation and enhancement measures appropriate to habitats on site prior to development.
- 7.2** All sites whether large or small have the potential to include opportunities for biodiversity through careful and well-designed schemes. The following provides advice and minimum requirements that are expected within development sites in Barnsley.
- 7.3** Landscaping proposals within development schemes should seek to retain, enhance and create habitats of value to biodiversity whilst adhering to the mitigation hierarchy *avoid, mitigate, compensate, offset*. The retention of front and rear gardens in

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householder development is encouraged as they can provide multiple environmental benefits, where this cannot be guaranteed then developers should, when completing the Defra Metric include “un-vegetated garden” as the post development habitat type within the Metric to ensure additional Biodiversity Units are not gained.

- 7.4** Landscape elements can be built into the scheme design to increase the biodiversity value of a site; this can include the creation or enhancement of boundary hedgerows, planting of street trees, the provision of wildflower grasslands, SuDS and other above ground water storage features. Where habitats are already present on a site they can provide the framework for the setting of the scheme layout. Landscaping features can help to achieve a minimum 10% BNG, as well as provide habitat connectivity in the landscape to aid the movement of species. Where possible developments should seek to provide a mosaic of habitats within landscaping designs to provide the greatest benefit for species.
- 7.5** Additionally, the use of native species of local provenance is encouraged as they generally offer more benefits to local wildlife than non-native species, as well as enhanced biosecurity and additional net gains.
- 7.6** Applicants are expected to provide landscape features in keeping and proportionate to the size of the development and appropriate with the local context.
- 7.7** Details regarding the minimum mitigation requirements for developments in Barnsley are detailed in Table 1 below.

Table 1 . Minimum mitigation requirements

<u>Feature</u>	<u>Minimum requirement in developments</u>	<u>National/Local Policy references</u>
<u>Habitats (area/linear/river)</u>	<u>Development proposals will have due regard to the baseline biodiversity value of a development site and landscaping plans should identify opportunities to retain and maximise the provision for biodiversity within the new development.</u> <u>Minimum 10% Biodiversity Net Gain based on baseline ecological assessment should be achieved.</u>	<u>NPPF 2021, GS1, G11, BIO1</u>
<u>Watercourses</u>	<u>20 m wide buffer either side of watercourses in the borough.</u>	<u>BIO1, CC5, G11</u>
<u>SuDS</u>	<u>The provision of Sustainable Urban Drainage Systems (SuDS) within development sites is to managing rainfall is the preferred approach.</u>	<u>CC4, CC1</u>
<u>Green roofs/living walls</u>	<u>All new roofs of more than 25m², which are flat or have a pitch of less than 25 degrees, should be a suitable type and design of living roof, unless conflicting with the rooftop provision of solar panels.</u> <u>Living walls should be considered as a possible option on buildings, though especially if needed to help mitigate visual impact on otherwise</u>	<u>BIO1, Sustainable Construction and Climate Change Adaptation Supplementary Planning Document</u>

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	<u>unacceptably blank and/or architecturally unrelieved façades.</u>	
<u>Bat and bird boxes</u>	<u>100% of all new dwellings to include integrated bat and bird boxes. In respect of birds, swift boxes are advised as these are also used by other common nesting species. On constrained sites, practical consideration should be given to prioritising boxes within optimum areas of the site.</u> <u>Hybrid/Commercial/public service infrastructure/householder/permitted development applications etc...will include integrated bat and bird boxes in keeping with the scale of development, i.e. minimum of 10 boxes for the first 1000 sqm footprint and one additional box for every 100 sqm.</u>	<u>BIO1</u>
<u>Bats</u>	<u>Sensitive lighting schemes to be developed where additional lighting from the development will impact habitats such woodland edges, hedgerows, and wetlands, or any other habitats considered suitable for foraging, commuting and roosting bats.</u>	<u>BIO1</u>
<u>Hedgehog</u>	<u>Hedgehog Highway gaps to be located in boundary fences in residential schemes ensuring connectivity between gardens for hedgehogs and other wildlife, increasing the extent of habitat availability.</u>	<u>BIO1</u>
<u>Invertebrates</u>	<u>Landscaping features within development sites should include flowering lawns / wildflower grasslands, pollen and nectar rich plants, shrubs and trees.</u> <u>Solitary bee bricks to be installed within 100% of the dwellings within residential schemes.</u> <u>Different requirements may be recommended by a consultant ecologist for other types of application.</u>	<u>BIO1</u>

7.8 BNG does not alter the protection afforded to protected/notable species and habitats within a development site. As such, statutory obligations need to be satisfied with regards to protected and/or notable species and habitats; where applicable, bespoke mitigation schemes relevant to the key ecological features of the site should be provided within an application.

8. Guidance Information Required to Support an Application

8.1 Considering biodiversity and geodiversity at project inception stage and ensuring proposals are supported with appropriate evidence, where relevant, is necessary and will help enable efficient and effective decision-making and help to achieve a minimum 10% BNG. The LPA will not support applications that would damage the NRN, or developments that do not provide a minimum 10% BNG.

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- 8.2 The council offers a paid pre-application advice service. This can help to ensure that policy requirements are fully understood at an early stage, and that any biodiversity and geodiversity features are identified, discussions can be held at an early stage, in order to seek advice and avoid impacts. Pre-application advice assists in streamlining the decision making process, and it enables the council to provide more comprehensive guidance to improve the quality of an application.
- 8.3 Suitable qualified ecologists are required to undertake ecological surveys and reporting to meet the council's requirements for providing adequate information to support an application. The Chartered Institute of Ecology and Environmental Management (CIEEM) provide a list of consultants on their Registered Practice Directory on the CIEEM website. The CIEEM website provides further information on ecological surveys and their purpose, and also describes the different types of report that may be required to support an application.

Desk Study

- 8.4 Existing ecological data should always be gained from Barnsley Biological Records Centre (BBRC) and from neighbouring authorities' BRC's where close to the borough boundary. Data should also be gained from other specialist data sources such as the South Yorkshire Bat Group, South Yorkshire Badger Group, and the RSPB, etc. if it is appropriate to the site and proposal. There may be exceptions to this requirement and the omission of a desk study from ecology reports should be fully justified within the report, as is detailed within the CIEEM Guidelines for Preliminary for Ecological Appraisal (2017)
- 8.5 Information on internationally and nationally designated sites can be found at the 'MAGIC' website. Most locally designated sites can be seen on the Barnsley Local Plan maps and are referred to as 'Biodiversity or Geological Interest Sites'. Applicants are required to use the SSSI Impact Risk Zone (IRZ) online tool to demonstrate a rapid initial assessment of potential impacts on statutory designated sites as part of the application. If the IRZ information indicates that the development type could adversely impact a SSSI, Natural England will be consulted by the Local Planning Authority (LPA). Natural England may request that further information is required to support the planning application, covering how impacts upon the SSSI will be addressed.
- 8.6 ~~Any development proposal which may do harm to a biodiversity or geodiversity interest should follow the mitigation hierarchy thus: *avoid, mitigate, compensate*. If it is not possible to avoid damage to the interest and planning permission is still requested for then the developer/applicant should seek to mitigate impacts by good design which not only retains as much of the value *in situ* as possible, but also reduces impacts during the construction phase and leaves behind value which is protected and maintained. On occasion, the LPA may allow compensatory works on other sites outside of the development where avoidance or mitigation are not possible/sufficient, but this should be seen as a last resort. The LPA will not support applications that would damage the ecological network and cause a net loss in biodiversity in line with the NPPF. Whilst the Environment Agency is the lead authority regarding implementation of the Water Framework Directive and the Humber River Basin District Management Plan, the LPA must have regards to them when determining development proposals.~~

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Ecological Survey and Assessment

- 8.7 Applications requiring consideration of biodiversity should be supported by a Preliminary Ecological Appraisal/Ecological Impact Assessment/Biodiversity Net Gain Assessment (where appropriate)/Preliminary Roost Assessment and such other secondary reports (i.e., detailed botanical assessment, protected species surveys, etc. see Appendix E: Criteria When Protected Species Surveys are Required), where necessary, which evaluate the ecological quality of the proposal site and recommend appropriate/proportionate mitigation, enhancement measures or off-site compensation proposals.
- 8.8 Surveys should be undertaken by competent persons with suitable qualifications and experience and carried out at an appropriate time within the year, or justifications provided if undertaken during sub-optimal timing and a robust assessment can still be made (see Appendix D for the Ecological Survey Season Calendar). Surveys should be undertaken using nationally recognised survey guidelines/methods, where available.
- 8.9 Reference should be made to CIEEMs Guidelines to assess when submission of a Preliminary Ecological Appraisal/Preliminary Roost Assessment is sufficient or where an Ecological Impact Assessment would be required. Ecology reports should include detail on how development proposals have taken into consideration the mitigation hierarchy in order to avoid, mitigate and compensate any negative ecological impacts. Ecological surveys should follow the:
- Guidelines for Accessing and Using Biodiversity Data (March 2020);
 - Guidelines for Preliminary Ecological Appraisal (December 2017);
 - Guidelines for Ecological Impact Assessment in the UK and Ireland published by CIEEM (September 2018);
 - BS42020:2013 Biodiversity – Code of practice for planning and development; and
 - BS8683:2021 Process for designing and implementing biodiversity net gain. Specification.
- 8.10 Relevant applications should also be supported by a Defra Metric (the most recently published version of the metric should be used) and an associated BNG report. The associated report should include detail on how the Good Practice Principles for Development have been followed, baseline and post-development habitat maps (on and off-site) and condition assessments for baseline habitats, where applicable (on and off-site). Condition assessments should include details of the condition assessment criteria passed/failed, justification/evidence provided for this, and the anticipated condition assessments of proposed habitats post-development (on and off-site). Condition assessment sheets are offered in support of more recently published Defra Metrics and should be completed to support the associated metric. When referring to the Biodiversity Metric User Guide it is advised that habitat surveys can be undertaken year-round, though it is important to note that the optimal survey season is April – September inclusive (for most habitat types). In the absence of seasonally appropriate survey data/evidence the assessor must use a precautionary approach to assessing condition criteria which are not measured at a time of year the survey is undertaken.

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Avoidance, Mitigation, Compensation and Management

- 8.11** ~~At present there is no nationally-agreed system for measuring biodiversity or geodiversity losses proposed on a site through a development and creating a comparable biodiversity element off-site (biodiversity compensation). It is likely that one will be made available in the near future. The LPA may choose to adopt such a 'metric' and apply it in cases where compensation works are the only possible solution—in which case a new policy will be produced and publicised. Until such time the LPA will continue to use its best judgement, based on precedents, as to what the appropriate compensation amount, as a monetary value, should be.~~
- 8.12** ~~Biodiversity and/or geodiversity mitigation plans should be designed-in from the outset, with suitably qualified and experienced professionals being part of the design team to prevent conflicts of interest—ensure the best outcomes for biodiversity and geodiversity. Any Landscape design plans/documents should clearly identify between ornamental plantings and 'green' features which are part of biodiversity retention /mitigation /enhancement. A maintenance plan for a minimum of 5 years should be provided—for example, if a valuable hedgerow or quarry is to be incorporated within a development, the application should state how it will be protected and managed. Planning applications will be expected to commit to not cover trees, hedgerows or other habitats with netting etc, prior to construction in order to exclude birds from nesting, etc.~~
- 8.13** ~~Mitigation and enhancement proposals are welcomed that contribute to enlarging creating, enhancing bigger, better and more connected existing wildlife sites are welcomed. eCreating new sites, and providing joined up and resilient ecological networks throughout the borough that contribute to the LNRS and the enhancement of biodiversity is crucial. This includes conserving and enhancing the form, local character and distinctiveness of the borough's natural assets such as the river corridors of the Don, the Dearne and Dove as natural floodplains and important strategic wildlife corridors.~~
- 8.14** ~~Ecology and /or geodiversity reports submitted in support of planning applications should not only evaluate the site's importance, but also detail the mitigation, etc proposals. Relevant externally-held data sources should be contacted to provide their data as appropriate given the likely value of the features in the locality and proportionate to the development proposal. Report recommendations such as 'the applicant could should install.....' are insufficient: report authors consultant ecologists should work with applicants to offer clear measures which could that can be conditioned at planning decision stage. 2 key reference documents, the British Standard, BS 42020: 2013: Biodiversity: Code of Practice Planning and Development, and the CIEEM (2016) Guidelines for Ecological Impact Assessment in the UK and Ireland: Terrestrial, Freshwater and Coastal, 2nd edition, should be used by the applicant's ecologists when writing ecology reports to guide their evaluation and recommendations. Local Validation Requirements for planning applications have been adopted by the LPA which include biodiversity and geodiversity elements that state when relevant reports are required and outline what, broadly, is needed within them, these should also be referred to when completing reports to support an application.~~

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- 8.15** A Habitat Management and Monitoring Plan (HMMP) will be secured by a legal agreement to secure the gain site and will need to be approved prior to commencement of development works. Information required within the HMMP will include;
- A recent landscape plan detailing the location of mitigation works and the size of each habitat/linear feature to be enhanced and/or created;
 - Management aims and prescriptions detailing the methods required to create and/or enhance each habitat/linear feature at the required quality for a period of 30 years;
 - A timetable of delivery for each habitat/linear feature created and/or enhanced;
 - A schedule of ecological monitoring for a minimum 30 year period, identifying when key indicators of habitat/linear feature maturity should be achieved;
 - Details on the monitoring of habitats and linear features and the provision of a report, which shall be provided to the LPA on the 1st November of each year of monitoring (years one, three, five, ten and every five years thereafter), which will assess the condition of all habitats and linear features created and/or enhanced and any necessary management or replacement/remediation measures required to deliver the Net Gain values set out in the HMMP; and
 - A schedule of actions to be undertaken in case signs of failing are identified; the schedules must include details of technique(s) to be used, equipment to be used, roles and relevant expertise of personnel and organisations involved and timing of actions including submission of monitoring report to the Council.
- 8.16** Precautionary measures to be adopted on site during construction works should also be detailed at the application stage (i.e. protection of retained vegetation, adjacent water course, etc.) and relevant guidance referred to. Again, further detail of this can be provided within a Construction Environment Management Plan (CEMP) required at the reserved matters/discharge of conditions stage.
- 8.17** ~~— for example, if a valuable hedgerow or quarry is to be incorporated within a development, the application should state how it will be protected and managed. Planning applications will be expected to commit to no~~The covering of trees, hedgerows or other habitats suitable for nesting birds with netting etc, prior to construction in order to exclude birds from nesting, will not be permitted.
- 8.18** ~~Local Plan allocations have been assessed for their biodiversity value. Some site specific policies contain biodiversity requirements. Where the ecological assessments carried out to inform the Local Plan site selection process assessed a site as having medium or high biodiversity value, and that value has been eroded through the actions of a landowner, the site will still be expected to deliver net gains in biodiversity assessed against the Local Plan ecological assessment.~~
- 8.19** ~~Barnsley's history of quarrying, mining and the building of regional transport infrastructure created a variety of old and valuable geological surface exposures but many of these are now becoming lost to infilling, neglect and development in both urban and rural situations. This dwindling of exposures takes on added significance since the ending~~ cessation ~~of coal mining has prevented underground study of faults and strata in three dimensions, thereby leaving surface exposures as the only source of primary evidence. Some compensation for loss of the sub-surface data can be achieved by applying new technologies and techniques to surviving surface exposures, resulting in a~~

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wealth of valuable information on the geodiversity/geomorphological feature and its local/ regional structure. For these reasons, geoconservation is important. Some developments can create new geoconservation/geomorphological sites and opportunities, either temporarily, or possibly permanent. Where an application proposes that geoconservation/geomorphological assets will be lost or diminished, the applicant and their geoconservationists should consult the LPA and its geological advisors, Sheffield Area Geology Trust (SAGT) in drawing up proposals to mitigate any impacts.

- 8.20** ~~Some compensation for loss of the sub-surface data can be achieved by applying new technologies and techniques to surviving surface exposures, resulting in a wealth of valuable information on the geodiversity/geomorphological feature and its local and regional structure. For these reasons, geoconservation is important. Some developments can create new geoconservation/geomorphological sites and opportunities, either temporary, or possibly permanent. Where an application proposes that geoconservation/geomorphological assets will be lost or diminished, the applicant and their geoconservationists should consult the LPA and its geological advisors, Sheffield Area Geology Trust (SAGT) in drawing up proposals to mitigate the effects.~~
- 8.21** Prior to submission of any a planning application, all relevant geodiversity datasets should be gained, particularly those held by SAGT if a Regionally Important Geodiversity Site is located within 0.25 km of any given development. Geological sites should be recorded by suitably qualified and experienced geoconservationists/ geomorphologists using the best means available, including photography and sampling, before the loss of/damage to the feature occurs. Information obtained in this way, by the cooperation of the developer, will be shared freely with the local museum ~~service~~ records centre and other publicly-owned stakeholders, for the benefit of the wider community with geological geomorphological interests.
- 8.22** The geoconservation and biodiversity needs at any one site are considered on a case by case basis but geoconservation aims to achieve the following goals:
- †To preserve the geological/geomorphological integrity of the site;
 - †To preserve its visibility and availability for scientific and educational use;
 - †To ensure workable, ongoing access arrangements after completion, and;
 - †To work to protect the value from any subsequent risks from the new landowners, tenants, or residents.

Nature Improvement Area

- 8.23** ~~Within the NIA (Nature Improvement Area) we require specific biodiversity enhancements with developments over and above the minimum mitigation/ compensation measures. Great nature-spaces provide the ideal background for investment in housing and industry.~~
- 8.24** The NIA Partnership has 2 main aims for development in the area:

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1. ~~The network of sites and places for nature across the NIA is restored and enhanced. This makes our important natural assets more useful for wildlife and more resilient in the future. In reality this means that the partnership will actively seek opportunities to infill and augment the nature network with new and restored wildlife sites.~~
2. ~~Where development of housing and Industry is appropriate, the LPA will support developers in the creation of sustainable sites that include good examples of sustainable drainage, incorporated high quality habitats and wildlife corridors and encourage the use of sustainable transport.~~

8.25 ~~This SPD does not describe detailed design guidance on how to realise the aims of the NIA Partnership. Instead, it identifies the key issues that should be reconciled, through good practice points, whilst also drawing attention to relevant policies, documents and contact names. A combination of all these components will, through appropriate negotiations, achieve a development proposal that will accord with the aims of the NIA.~~

8.26 ~~The quality of design of new development is a critical factor in ensuring the overall success of the NIA. The design of development should reflect the specific objective(s) for each site (e.g. biodiversity, public access, wood products etc). It is important that good design is used to provide and promote accessibility to the NIA for everybody in the borough. In turn, this will help to promote the economic vitality and viability of the area.~~

8.27 ~~Minor developments will not be required to contribute to ecological improvements in the NIA. Small housing developments, up to ten units, and conversions of traditional buildings have not been covered in the specific guidance relating to the NIA but would be subject to the existing validation process and planning policy requirements of the relevant planning authority. Therefore, only development proposals of a scale that can contribute a significant, quantifiable benefit, or conversely undermine the ability, i.e. a loss of wetland areas, of the NIA to meet its aims and objectives should be subject to this SPD.~~

8.28 ~~Such quantifiable, significant benefits could include:~~

- ~~• New woodland;~~
- ~~• New wetland;~~
- ~~• Enhancing areas of poor environmental quality;~~
- ~~• Improving public access, or~~
- ~~• Improving the management of existing habitats;~~

8.29 ~~Development proposals considered by the LPA to be of a scale that would significantly impact on the delivery of the aims and objectives of the NIA, shall seek to enhance and improve the ecological network of the valley by incorporation of features and design principles that follow the conservation principles supported in the Natural Environment White Paper.~~

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- 8.30** ~~Within the NIA we would expect to see developments come forward where the natural environment has been taken into consideration early in the design process and connection through and around the development site with the wider habitat networks is delivered. Small commercial and retail development sites (less than 1,000 m²) and sites with limited ecological interest are expected to provide modest enhancements. Major developments¹, including business parks, particularly those in close proximity to river corridors or NIA key sites, will be supported to incorporate positive full-site biodiversity measures including comprehensive sustainable drainage systems and landscape schemes. Such sites will be expected to provide connectivity throughout the site and link to sites and features outside the site. It is recommended that such schemes are included in master planning and are agreed at an outline stage to prevent inconsistent and piece-meal delivery.~~
- 8.31** ~~Where a development agreement involves a commuted sum arrangement in relation to the delivery of biodiversity (or drainage) elements the NIA partnership should be involved in discussions to agree those elements. Where possible, such arrangements should aim to support the delivery of NIA aims.~~
- 8.32** ~~We would welcome applications that seek to provide improvement for the priority species listed in Appendix B.~~
- 8.33** ~~Opportunities for biodiversity enhancements in developments by size of development are suggested in Appendix C.~~
- 8.34** ~~Case studies relating to innovative biodiversity enhancements on new developments can be viewed in Appendix C.~~

9. Further information

- ~~UK National Ecosystem Assessment, <http://uknea.unep-wcmc.org> (2011)~~
- ~~National Planning Policy Framework (NPPF) – review 2018: <https://www.gov.uk/government/publications/national-planning-policy-framework-2> includes sections copied in the text above to the following footnotes:~~
 - ~~56 Circular 06/2005 provides further guidance in respect of statutory obligations for biodiversity and geological conservation and their impact within the planning system.~~
 - ~~57 Where areas that are part of the Nature Recovery Network are identified in plans, it may be appropriate to specify the types of development that may be suitable within them.~~
 - ~~58 For example, infrastructure projects (including nationally significant infrastructure projects, orders under the Transport and Works Act and hybrid bills), where the public benefit would clearly outweigh the loss or deterioration of habitat.~~

¹ As defined in Article 2(1) of the Town and Country Planning (Development Management Procedure) (England) Order 2015 and subsequent updates

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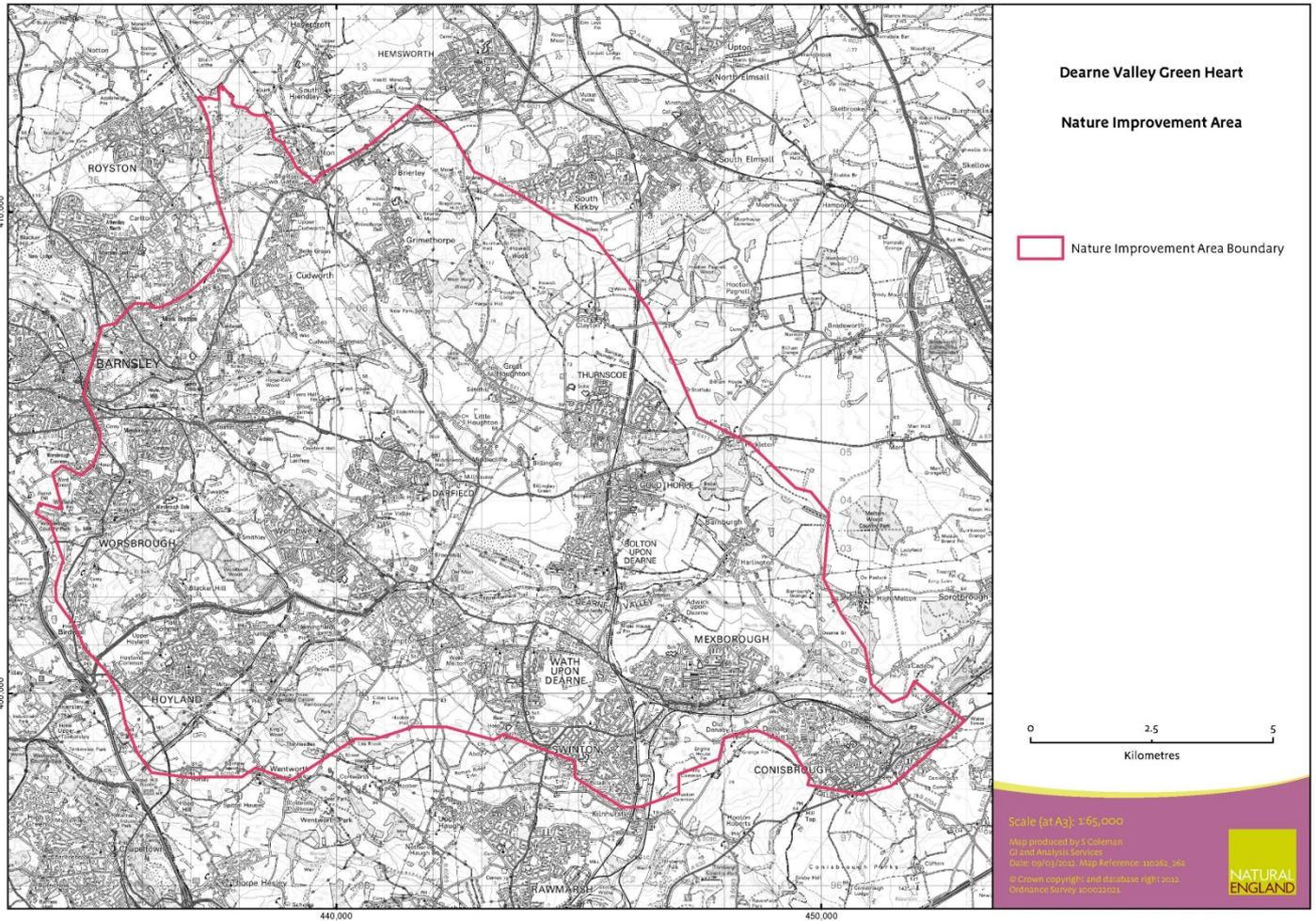
- Natural Environment White Paper (2011):
<https://www.gov.uk/government/publications/the-natural-choice-securing-the-value-of-nature>
- Barnsley Biodiversity Trust: <http://www.barnsleybiodiversity.org.uk/>
- The current Barnsley *Biodiversity Action Plan* is viewable either directly from the Trust's homepage or here:
<http://www.barnsleybiodiversity.org.uk/Barnsley%20BAP%202009.pdf>
- British Standard **BS 42020: 2013**: *Biodiversity: Code of Practice Planning and Development*: <https://shop.bsigroup.com/ProductDetail/?pid=000000000030258704>
- *CIEEM (2016) Guidelines for Ecological Impact Assessment in the UK and Ireland: Terrestrial, Freshwater and Coastal, 2nd edition.* (CIEEM)
- Links to updated lists of current Local Sites in Barnsley (non-statutory sites): Local Wildlife Sites (LWS): <http://www.barnsleybiodiversity.org.uk/localsites.html> Local Geology Sites/ Regionally Important Geological and Geomorphological Sites: <http://www.sagt.org.uk/>
- Multi-Agency geographic information website:
<https://magic.defra.gov.uk/MagicMap.aspx> – click on ‘designations’ and make ‘live’ tab for ‘land-based designations’ and ‘statutory’; uncheck ‘less-favoured areas’ and ‘nitrate vulnerable zones’.
- Environment Agency – Humber River Basin District Management Plan
<https://www.gov.uk/government/publications/humber-river-basin-district-river-basin-management-plan>
- <https://www.legislation.gov.uk/ukpga/1981/69>
- <https://www.legislation.gov.uk/ukdsi/2019/9780111176573>
- <https://www.legislation.gov.uk/ukpga/1992/51/contents>
- <https://www.legislation.gov.uk/ukpga/2021/30/contents/enacted>
- <https://www.legislation.gov.uk/ukpga/2006/16/contents>
- <https://www.legislation.gov.uk/uksi/1997/1160/contents/made>
- <https://www.legislation.gov.uk/ukpga/2000/37/contents>
- <https://www.legislation.gov.uk/uksi/2012/605/contents/made>
- <https://www.legislation.gov.uk/uksi/2012/605/contents/made>
- https://assets.publishing.service.gov.uk/government/uploads/system/uploads/attachment_data/file/7692/147570.pdf
- www.barnsleybiodiversity.org.uk
- <https://www.barnsley.gov.uk/media/17249/local-plan-adopted.pdf>
- <http://jncc.defra.gov.uk/page-6189>
- <https://magic.defra.gov.uk/>
- <https://www.barnsley.gov.uk/services/parks-and-open-spaces/wildlife-conservation-and-biodiversity/>
- <https://cieem.net/resource/guidelines-for-accessing-and-using-biodiversity-data/>
- <https://cieem.net/resource/guidelines-for-accessing-and-using-biodiversity-data/>
- <https://cieem.net/resource/guidelines-for-ecological-impact-assessment-ecia/>
- <https://shop.bsigroup.com/ProductDetail/?pid=000000000030258704>
- <https://knowledge.bsigroup.com/products/process-for-designing-and-implementing-biodiversity-net-gain-specification/standard>
- <https://cieem.net/wp-content/uploads/2019/02/Biodiversity-Net-Gain-Principles.pdf>

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- <https://www.barnsley.gov.uk/media/15707/barn-conversions-spd.pdf>
- <https://nbn.org.uk/stateofnature2019/reports/>
- <https://www.gov.uk/government/consultations/consultation-on-biodiversity-net-gain-regulations-and-implementation/outcome/government-response-and-summary-of-responses>

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Appendix A. Detailed map of Dearne Valley Green Heart 'Nature Improvement Area'



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Appendix B. ~~Priority Species for Dearne Valley Green Heart 'Nature Improvement Area'~~

~~We would welcome applications that seek to provide improvement for the focal species of the NIA as set out below:~~

- ~~● Lapwing~~
- ~~● Redshank~~
- ~~● Snipe~~
- ~~● Wintering teal~~
- ~~● Wintering wigeon~~
- ~~● Wintering bittern~~
- ~~● Barn owl~~
- ~~● Willow tit~~
- ~~● Water vole~~
- ~~● Brown hare~~
- ~~● Noctule bat~~
- ~~● Grass snake~~
- ~~● Dingy skipper~~
- ~~● Wild flowers~~

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Appendix C. Opportunities for biodiversity enhancement in new development

Applicants are expected to provide biodiversity features from the below lists proportionate to the size of the development, the proposed impacts of the site and in relation to nearby habitats.

Smaller scale commercial and industrial buildings e.g. retail, factories, offices and warehouses (less than 1000m²)			
Native species hedgerow planting	Provide shelter and screening for development. Nesting sites, food and shelter for birds, insects and small mammals. Provide corridors for wildlife linking areas of habitat.	http://apps.rhs.org.uk/advice/profile.aspx?pid=377	Hedges can be predominantly hawthorn, with a mixture of blackthorn, hazel, dog rose, holly, willow and elder included.
Insect boxes/ Bee hotel	Shelter and nesting sites for invertebrates including bees.	www.wildaboutgardens.org.uk	
Bird boxes	Encourages and supports nesting birds, can be incorporated into roof space.	www.rspb.org.uk	Aim to install minimum 2 artificial nest sites per new unit. Unless there are trees or buildings which shade the box during the day, face the box between north and east, thus avoiding strong sunlight and the wettest winds.
Tree planting	Improves setting of development, provides shelter. Attracts birds, mammals and insects providing food, shelter and nesting sites.	www.woodlandtrust.org.uk	Frogs, toads, hedgehogs, beetles and other insects shelter underneath or among the gaps of rotting logs. Create a log pile by loosely arranging together old branches or pieces of log. Leave bark on and use a variety of species if possible.
Ponds and soak-a-ways	Improve setting of development. Habitat for amphibians, birds and wetland plants.	https://freshwaterhabitats.org.uk/news/pond-conservation-now-freshwater-habitats-trust/	
Living Roofs	Provide habitat for insects and birds. Reduce water runoff and increase insulation.	www.livingroofs.org www.grassroofcompany.co.uk	
Swift bricks/ internal nest boxes	Provide access to nesting sites for swifts and other birds which use buildings.	www.concernforswifts.com/ www.swift-conservation.org/	Incorporate swift nest bricks around the top of commercial buildings, they do not have to be on a visible façade.

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SuDS	Habitat for wetland plants and invertebrates. Valuable for amphibians especially where standing water provided. Add to the setting of a development as part of the green-space requirement.	https://www.rspb.org.uk/globalassets/download/documents/positions/planning/sustainable-drainage-systems.pdf https://www.ciria.org/Resources/Free-publications/SuDS-manual-C753.aspx	Developers should be careful to check with bodies adopting/maintaining any new SuDS scheme for any restrictions in relation to planting and maintenance.
Use of native tree and shrub species in landscaping	Provide shelter and screening. Provide nesting sites and food for birds and insects.	http://www.tdag.org.uk/trees-in-the-townscape.html https://www.tcpa.org.uk/fact-sheet-green-infrastructure-and-biodiversity	Species to consider depend on site conditions and location and include oak (pedunculate and sessile), rowan, willow sp, wych elm, ash, birch (downy and silver), bird cherry, hazel, elder, alder, aspen, guelder rose, crab apple, hawthorn, blackthorn, broom, gorse, dog rose, juniper, holly.
Green walls/habitat walls, Willow fedge (fence/hedge).	Can provide excellent visual features. Shelter, food and nesting sites for birds and insects. Willow in particular is inexpensive and easy to establish from cuttings.	www.livingroofs.org www.grassroofcompany.co.uk	Hedges require annual maintenance.
Introduce wildflowers into verges.	Food plants for butterflies and other insects.	https://plantlife.love-wildflowers.org.uk/road-vergecampaign	Many grasses are tolerant of fairly high levels of salt but the following are particularly salt tolerant and may be suitable for roadside verges; red fescue, creeping bent, Yorkshire fog, creeping soft grass.
Major development including residential, commercial, minerals or waste *			
As above plus SuDS	Creation of ponds or wetland habitats will support a variety of wetland plants and attract birds and insects. Even small areas of permanent water or wetland vegetation in detention basins can be beneficial.	See links for SuDS and ponds and soak-a-ways above.	Consider reed beds or willow filtration systems as alternatives for water treatment. Living roofs may be most appropriate to deal with surface water where space is limited.

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Incorporate habitats/features within green space to create green corridors.	Retain existing wildlife habitat within the development. Links with other natural areas and the surrounding countryside are important to allow movement of wildlife along corridors. This contributes to a developments green space requirements.	www.woodlandtrust.org.uk	Link existing wildlife habitat and/or newly created green spaces with strategically placed trees, shrubs, hedges, dry stone wall or grass verge.
Habitat creation and restoration of existing habitats.	Contribute to meeting Local Biodiversity Action Plan targets for priority habitats. Creating/restoring high quality green space to enhance development. Consider wildflower grassland, native species woodland and wetland habitats. This contributes to a developments green space requirements.	http://jncc.defra.gov.uk/page-5706 https://www.tcpa.org.uk/fact-sheet-green-infrastructure-and-biodiversity	Consider opportunities to re-meander canalised streams and rivers.
Use of nectar rich species and food plants for caterpillars in landscaping.	Benefits for butterflies, moths and other insects.	https://butterfly-conservation.org/	
Buffer strips along watercourses and ditches.	Improvements to quality of water, habitat for wildlife, linear habitat and corridor for the movement of wildlife. This contributes to a developments green space requirements.	Natural England Technical Information Note TIN099-2011 Protecting water from agricultural run-off: water retention measures https://www.gov.uk/guidance/rules-for-farmers-and-land-managers-to-prevent-water-pollution https://www.buglife.org.uk/sites/default/files/Ponds_web_0.pdf	
Use show home garden or demonstration area on industrial site to demonstrate wildlife gardening.	Food and shelter for birds, insects and amphibians.	http://downloads.gigl.org.uk/website/Wildlife%20Gardening%20Pack.pdf	Include use of bat boxes/bird boxes/bee hotels, log piles, planting to encourage butterflies, bumble bees and birds. Wet areas/pond for common frog, newts and damselflies.
Develop a site/Company Biodiversity Action Plan (BAP).	Contribute to Local and English Biodiversity Action Plan targets and create a work/development site providing a network of habitats.	http://www.businessandbiodiversity.org/action-company_bap.html	All/any of the options listed above could be incorporated into a Site/Company BAP.

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* Major development as defined in Article 2(1) of the Town and Country Planning (Development Management Procedure) (England) Order 2015

Case Studies: Urban Green Infrastructure for Biodiversity



Introduction

The intention is to provide examples of a range of urban green infrastructure interventions, including green roofs, living walls, sustainable drainage schemes and species-rich grasslands. These examples are multi-functional and demonstrate how biodiversity can be enhanced whilst various ecosystem services are provided, including flood management and cooling. Costs are provided where available and are only indicative. It should be noted that for relatively small, novel schemes, establishment costs may be relatively high. Installation or establishment costs will fall as the industry adapts to new techniques. Maintenance costs of small schemes also tend to be relatively high when compared with larger schemes on a pro-rata basis.

Biodiverse Extensive Green Roofs

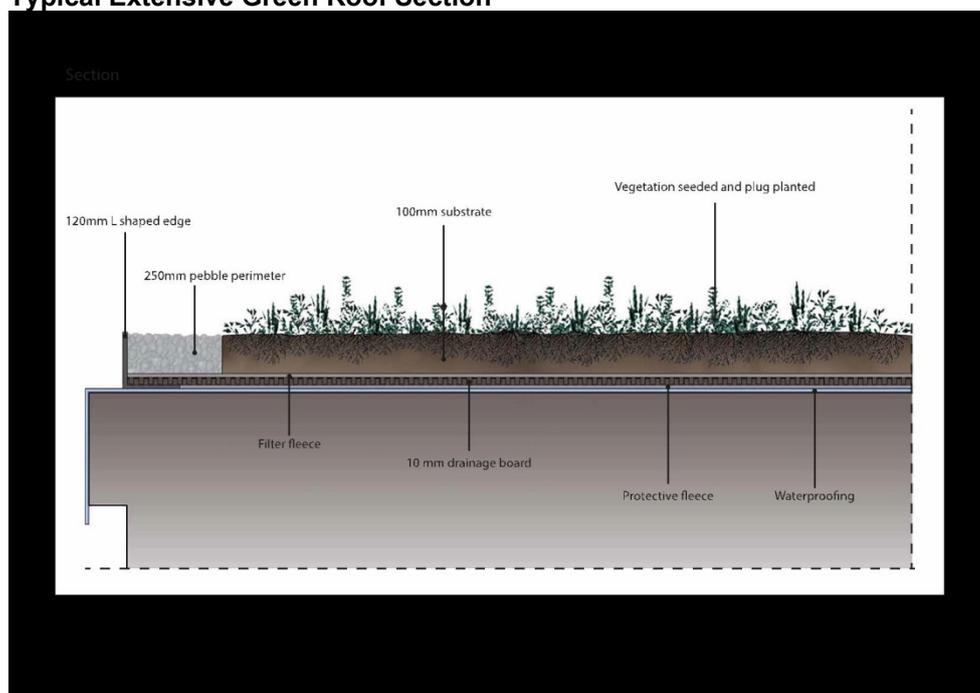
Biodiverse extensive green roofs are typified by free draining and water absorbent substrates of varying depth. They often include dead wood habitat, stones or pockets of bare sand. They are vegetated with predominantly native drought tolerant wildflowers. Sedum is usually included, however the industry norm of Stonecrop (*Sedum* sp.) dominated vegetated blankets should be avoided because they do not support a sufficiently diverse assemblage of flora and fauna and may not provide sufficient water attenuation. There should be a presumption for any proposals for biodiverse extensive green roofs to include a minimum of 80 mm substrate depth, a standard set in the UK by the Green Roof Code from The Green Roof Organisation (2011 to be updated 2014).

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Biodiverse extensive green roofs are relatively lightweight and low maintenance. Specifications with proven ecological value for foraging birds and invertebrates were pioneered by the Green Roof Consultancy <http://greenroofconsultancy.com>. For further information on how to attract invertebrates to green roofs see also the report by Buglife — The Invertebrate Conservation Charity.

<http://www.buglife.org.uk/sites/default/files/Creating%20Green%20Roofs%20for%20Invertebrates%20Best%20practice%20guidance.pdf>

Typical Extensive Green Roof Section



Green Roof Example 1: Ruislip Central Line Depot Roof London Underground Limited

This is a retrofit demonstration project. The primary purpose is to absorb and slow down rainfall runoff and to reduce the risk of surface water flooding, however the brief also required an approach that enhanced biodiversity. It was important that saturated weight did not exceed 100kg/m^2 , a requirement of this roof and many other London Underground train sheds with relatively lightweight structures.

Two adjacent biodiverse extensive green roofs types covering a total area of 122m^2 have been installed on a flat roof section at the depot. One section has a typical extensive green roof build up with protection sheet over the original waterproofing, drainage board, filter fleece with Optigreen extensive green roof substrate and the other section has been constructed using an experimental approach. Both plots are vegetated with sedum cuttings and seeded/planted with native annual and perennial wildflowers.

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Monitoring devices have been installed in two downpipes of one of the biodiverse green roofs and two down pipes of a conventional control roof to measure the water attenuation.

Construction Costs: £80/m² (Total £10,000)

Running Costs: £200 (annual check of drainage outlets)

Design and Installation by Green Roof Consultancy Ltd

Monitoring by University of East London

Funding by Greater London Council through Drain London

Image: Green Roof Consultancy



Green Roof Example 2: Factory, Sins, Switzerland Gemperle AG

Swiss Federal law requires green roofs on all large commercial buildings. The conservation of biodiversity is usually the primary objective with roof greening in Switzerland. In this case the owners also wanted to keep the building cooler in summer to improve the comfort of workers. This is an example of an extensive green roof on a new-build factory/storage building.

There are two sections, one flat and the other barrel vaulted. The build-up includes 100mm depth of commercially available recycled crushed-brick based substrate placed above a filter sheet and polystyrene drainage board. Areas of pebbles, stone and logs are also included to provide habitat diversity. There is also an area of shallow ephemeral pond. The roof is vegetated by wildflower seed and sedum cuttings of local provenance.

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Maintenance of the roof is minimal, with an annual check of downpipes. Although this roof is not designed for ground nesting birds and may be too small for that purpose, many of the larger green roofs on industrial buildings in the Zurich area provide nesting habitat for Lapwing.

Area: Total of 1250m²: the flat roof section measuring approximately 450m² and the other barrel vaulted section, measuring approximately 800m².

Construction Cost: £50 per m² (70 CHF)

Running Costs: £100 (estimated) – annual check of drainage outlets

Roof shortly after installation with annuals prominent (Image: Green Roof Consultancy)



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Overview after establishment (Image: Gemperle AG)



General view of factory (Image: Gemperle AG)



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Green Roof Example 3: Kemp House, Soho, London City West Homes

Two biodiverse extensive green roofs covering an area of 330m² retrofitted on a social housing block with the primary aim of meeting the City of Westminster and London's Biodiversity Action Plan targets, creating habitat for the rare Black Redstart and invertebrate species. Further targeted benefits were also to cool the rooms below and to reduce surface run-off by storing rainwater. The build-up comprises Optigreen substrate at a depth that meets the GRO Code (80mm) with plug-planted sedum mat, with some areas that have been mounded with additional material and seeded. There are over 30 species of native wildflowers. In addition spring bulbs and log piles provide a range of habitats for both rare invertebrates. Immediately after installation three Black Redstarts were observed on the roofs and this species is now breeding for the first time in Soho. Residents within this social housing complex are able to view both green roofs from their windows and from the roof top garden adjacent to one area of biodiverse green roof.

Construction Cost: (£75 per m² (Total £ 25,000)

Maintenance Costs: £200 per annum (check of drain outlets, weeding)

Design by Green Roof Consultancy, materials supplied by Optigreen, seed from Emorsgate, plug plants from Boningales and installation by Landmark Living Roofs

Image: Landmark Living Roofs/Optigreen



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Green Walls**Green Wall Example 1: Vertical Rain Garden****Tooley Street, London****Team London Bridge**

This is a 25m² modular living wall combined with rainwater storage tanks. Downpipes from the pitched roof above are diverted into the tanks which are at the rear of the planters, between the planters and the supporting wall. Water slowly seeps through the modules, which makes the living wall self-watering thereby avoiding the need for pumped irrigation or use of potable water. The purpose is to reduce localised surface water flooding during intense summer storms where Tooley Street meets Tower Bridge Road. The planters are filled with intensive green roof substrate and native and non-native planting is combined to provide value for biodiversity and visual amenity.

Species include ivy *Hedera helix*, elephant's ears *Bergenia cordifolia*, hart's-tongue fern *Asplenium scolopendrium*, scaly male fern *Dryopteris affinis* and periwinkle *Vinca major*. Maintenance is four visits per annum for weeding and replacement of lost/damaged plants

Construction Cost: £ 10,000

Maintenance Costs: £400/annum (two annual inspections for weeding/replanting)

Designed by Green Roof Consultancy and supplied and installed by Treebox Ltd.

Funding provided by the Greater London Authority through Drain London.



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Green Wall Example 2: Wire Trellis Stucki Shopping Centre, Basel, Switzerland

A vegetated façade created by tensioning stainless steel wires between anchors in the ground and on the roof of a commercial building. Climbing and trailing plants have been trained onto the wires from the beds below and the roof above to provide screening and habitat. The beds below receive run-off from the adjacent path so that the intervention constitutes a SuDS feature and the plants and do not require irrigation (except during establishment).

Such planting can attract invertebrates and birds seeking shelter, food and nesting opportunities in otherwise unused space. A range of attractive wildlife friendly native species can be selected to provide interest that is evergreen or deciduous, flowering and fruiting and can be utilised even in shaded conditions. Species used include Honeysuckle *Lonicera* species, Clematis *Clematis armandii*, vines *Vitis cignetiae*, ivy *Hedera helix*, Boston ivy *Parthenocissus quinquefolia* and star jasmine *Trachelospermum jasminoides*. Ivy a native evergreen climber with glossy foliage and nectar rich flowers which will provide bee species with much needed food sources over autumn and winter. Annual maintenance is required to cut back unwanted shoots and replace any losses.

Shading and reduction of airborne pollutants are amongst the other benefits to this type of planting.

Area: 50 linear metres with height of 20m (1000m²)

Cost: £7500 (based on estimate of £150 per linear metre) Cost per unit area is highly variable depending on height.

Information provided by Dr. Nathalie Baumann, University of Zurich

Image: Gary Grant



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Sustainable Drainage Features

The principles of the design concept of Sustainable Drainage Systems (SuDS) are to mimic natural drainage by intercepting rain via vegetation, storing runoff in the soil or waterbodies and releasing it slowly (attenuation) and by promoting evapo-transpiration. Where ground conditions permit water may also soak into the ground (infiltration). Water may also be slowly transported on the surface through swales. In this way the risk of flood is reduced, pollution is reduced, biodiversity increased and amenity improved. SuDS can involve a wide range of components including green roofs, permeable paving, specially designed tree pits, rain gardens, swales and ponds. This section concentrates on schemes which include ponds. Reviews by DEFRA and CIRIA have shown that when SuDS are considered early in a project, considerable savings can be made in the capital cost of drainage projects, because the use of most expensive underground pipework can be avoided and replaced by soft, surface features.

SuDS Example 1:

The Manor Pond Estate, Sheffield, South Yorkshire

Manor and Castle Development Trust, Bellway Homes, Local Authority

This project includes a series of ponds and basins within a regenerated housing estate comprising 300 houses and service roads. The SuDS scheme is located on adjacent council-owned public open space. Water enters the site and is then managed through a series of basins, dropping down through the contours of the site. The opportunity of using the adjacent park, with its watercourse, to store and treat water seemed appropriate and an opportunity to demonstrate better practice. The top basin acts as the main facility for silt collection and pollution interception. Lower down are sand filters installed behind mortar-free stone walling on vertical faces in the lower courses to allow water movement. These filters manage flow at a rate determined by the resistance of the filter and the exit pipe size. This low flow passes down to the next basin below through a shallow low flow channel. If either of the upper two basins is unable to contain and release water through their filters, overflow occurs through a grassed by-pass swale, which leads down to the next basin. The third basin has a volume release control out to an existing dry valley, which leads to the watercourse. If the third basin is unable to handle flow this overflows onto a grass arena as shallow flow and exits through a further control device down to the dry valley. Turf was used to vegetate and stabilise vulnerable areas of the system such as overflow channels and the wet benches of the basins so that the system could be operational at an early date. The permanent ponds are vegetated with reed mace and other marginal aquatic vegetation.

Construction Cost: (Pond elements only) £200/m².

Maintenance Costs: (for whole Manor Pond Estate SuDS system): £10,000 per annum (commuted sum of £250,000 provided for 25 years)

Both capital and revenue costs of the scheme are claimed to be less than a conventional system. As the conventional system which was originally included in the budget was extremely expensive this gave the project team a strong position to argue for a suitable commuted sum for maintenance.

Information from [Susdrain case studies Website](#)

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Image: SusDrain

**SuDS Example 2:****Upton, Northampton**

English Partnerships, Pell Frischman Engineers, The Prince's Foundation, Northampton Borough Council and County Council, Anglian Water, The University of Northampton's School of Science and Technology

This example demonstrates the use of retention ponds and wetland habitat within a 43ha housing development on green field land. The development — 6000 residential homes, schools, works and retail and community units — was intended to provide an exemplar sustainable community that forms the first part of a major urban extension to Northampton.

The SuDS scheme comprised surface drainage designed to capture roof and road rainwater runoff from the estate (with an additional conventional underground piped system). This runoff travels via permeable paving and open, linked swales (many of which hold water behind stop logs) leading to a series of retention ponds located in a new area of parkland beyond the site into the local green infrastructure; the River Nene Country Park.

The SUDS components were designed to address hydraulic balance, reduce flood risk to Northampton, trap sediment and improve water quality whilst enhancing biodiversity.

Public engagement and monitoring of the SuDS within this housing development site has been carried out since 2003. This project has been used to inform how SuDS can be managed to benefit wildlife, residents and will enable planners and developers to use best practice in providing additional SUDS habitats for local biodiversity and people.

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Monitoring by ecologists at the University of Northamptonshire has shown that the ponds attract 14 species of dragonfly as well as other wildlife.

Construction Cost: £150-200/m² (pond elements only varies according to overall size and control structures)

Maintenance: £2/m² per year (estimated)

Information from English Partnerships – now the [Homes and Communities Agency](https://www.homesandcommunities.gov.uk/) (HCA) and <https://www.northampton.ac.uk/>.



Invertebrate 'Hotel' Lend Lease HQ Staff Roof Garden The Green Roof Consultancy

Two large invertebrate hotels were installed as part of the Lend Lease's HQ staff roof garden. One panel was fixed to a wall and another formed a screen. Each panel was constructed of a number of modules. Each model consisted of untreated reclaimed timber and hardwood logs with a large number of drilled holes. In order to attract a range of species (primarily but not limited to those from the *Osmia* genus of solitary bees) holes varied in diameter from 2mm to 10mm and were 90mm deep. The panels were oriented to face south to maximise use by a range of invertebrate species, including solitary bees, wasps and spiders. The invertebrates can gain shelter and breed during the year, and the panels are also an overwintering habitat for some species. Such a resource can aid local populations, which in turn conduct essential ecological roles including pollination and pest control and provide a food source for other species such as birds and bats. The panels provide nesting conditions mimicking brood chambers for egg laying and larva development. Suitable locations would include sunny facades sheltered from wind or rain, with

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planting of wildlife value located nearby to provide nectar, fruits, seeds and pollen. The panels are fixed to walls or frames but could be is free standing if required. Roof top or ground level installations are possible.

Area: 9m².(one panel)

Supply/Installation Costs: £500/m²

Running Costs: Nil

Lend Lease Roof Garden Invertebrate Hotel (Image: Green Roof Consultancy)



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~~Biodiverse Grassland~~

~~Preamble:~~

~~The costs of establishing biodiverse or species-rich grassland are similar to the costs of establishing conventional amenity grassland. The cost of maintaining biodiverse grassland is lower, because frequent mowing regimes are usually replaced by one or two annual cuts, however adjusting to new maintenance regimes does require slightly different equipment and techniques.~~

~~The establishment of biodiverse grassland and conventional amenity grassland are similar processes, involving seeding or turfing, however with biodiverse swards, low nutrient levels are desirable to ensure that aggressive grasses do not dominate. Therefore the use of nutrient-rich topsoil should be avoided wherever possible when establishing species-rich grasslands. Sub-soil or sandy or stony material is ideal. Direct seeding of existing amenity or improved grassland with wildflowers or a simple relaxation of cutting regime rarely has the desired effect of creating a species-rich sward. Some enhancement may be possible by plug-planting wildflowers, although this is relatively expensive. It is advisable to strip and re-seed or re-turf improved or amenity grassland wherever possible.~~

~~Existing or proposed areas of amenity grassland or any plot of unutilised land may be enhanced through re-seeding or planting and amended management practices. Such techniques will increase the plant and insect diversity, which will in turn attract bird and mammal species.~~

~~When selecting a wildflower mix it is important to choose species ecologically suited to the site. Cornfield annuals and short-lived biennials establish easily to give immediate effect and act as a nurse crop. This will support long-lived perennial species that are nationally common and typical of the area. Where possible, less common plant material should be sourced locally under licence. Projects should also reflect cultural links and local character and the overall effect should be visually attractive and varied throughout the growing season.~~

~~A wide range of commercially available plants/seeds of value to wildlife can be utilised, including wildflower seed mixes, bulbs and plug plants of perennial flowers. A carefully selected locally appropriate palette of native plants used in natural associations can provide ornamental value for the majority of the year as well as providing valuable habitat including seed, pollen, nectar sources for invertebrates and birds from early summer through to winter.~~

~~A wildflower seed mix can be sown into a prepared bed or combined with a suitable grass seed mix such. Several seed houses provide mixes for specific soils and situations (e.g. the [Emorsgate EL1F](#) wild flowers for lawns). Timing of cutting to allow self-seeding to occur, and the removal of arisings will control nutrient levels whilst enabling flowering plants to persist along with relaxed mowing around trees and margins will provide undisturbed over-wintering habitat for invertebrates and important foraging resources for birds.~~

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Grassland Example 1: London House Sparrow Parks Project, RSPB, London Parks and SITA

A three year research project in nineteen London parks using 25 trial areas sown with grass and wild flower mixes. The aim of the project was to study the use of the plots for insect and seed based food sources by the House Sparrow with a view to selecting the best mix to support local populations. Parks included Waterlow Park in Camden; Hampstead Heath in City of London; Laycock Green, Paradise Park and Whittington Park in Islington; Leyton Marshes, Tottenham Marshes and Water Works Nature Reserve in Lee Valley Regional Park; The Green park, Hyde park, Kensington Gardens and Primrose Hill in the Royal Parks; Burgess Park and Peckham Rye Park in Southwark; Beddington Park, Cheam Park, Perrets Field, Rose Hill park East and St. Helier Open Space in Sutton; and Tooting Bec Common in Wandsworth.

The plot types were as follows:

- Long grass – comprising the existing park grassland, but instead of regular mowing this was left uncut to go to seed, which would then be utilised by seed eating bird species including house sparrow, and to provide overwintering habitat for invertebrates.
- A native wildflower meadow mix – where a mix of native grass and flower species were seeded in order to produce nectar and seeds and sheltering habitat for invertebrates. Maintenance involved annual cut with cuttings removed.
- ‘Wildlife Seed’ plots – using a bespoke mix of flowers and field margin species that will produce seeds for birds and also be beneficial to invertebrate species. Re-seeding is necessary each year.

Seed mixes were sourced from [Kings Seed](#) and [Emorsgate](#).

All of the trial plots showed biodiversity benefits achieved by improvements to local habitat quality and increased abundance of local invertebrate populations than the traditionally managed amenity grassland. House sparrows need a high protein diet for chicks during weaning in spring and summer and are typically fed insects by their parents; adult birds need more carbohydrate rich foods and so tend to utilise seeds.

Areas: <0.1 ha for wildlife seed plots, average of 0.5ha for the other two treatments.

Establishment Costs:

‘Long grass’: £680 per hectare (7p/m²)

Wildflower Meadow: £3,452 per hectare (34p/m²)

‘Wildlife Seed’: £12,120 per hectare (£1.21/m²)

Maintenance Costs: Typically £1200 per hectare or 12p/m² (for larger wildflower meadows) Management costs and effort were lowest for the longer grass plot type (although this is the least effective). Costs and management efforts were highest in the first year of wildflower establishment. Costs and management effort for the wildlife seed plots were higher in each year as these plots were established annually and dormant weeds had to be controlled.

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Information from John Day, RSPB

Green Park wildflower meadow



Waterlow Park Wildflower Meadow



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Grassland Example 2:

**~~Popley Fields Residential Development, Basingstoke, North Hampshire
Wildflower Turf Limited, David Wilson Homes, Hickman Bros Landscape Contractors,
Natural England, The Landmark Practice~~**

~~The site incorporated an area designated for wildlife importance – a Site of Importance for Nature Conservation (SINC) due to the presence of a breeding population of great crested newts. As part of the Protected Species Management Plan high quality habitat was required that connected to the wider site and beyond.~~

~~Using products from Wildflower Turf species-rich wildflower meadows were created to provide a dispersal corridor for newts between ponds and meadows. The meadows have been established quickly, are attractive to residents and require little maintenance. Interpretation boards have been situated to help residents learn about the importance of the habitat enhancements.~~

~~A variety of products are available from Wildflower Turf including shade tolerant flower mixes for use around mature trees. The turf has a wide selection of native flower and grass species – up to 41 different species, with a minimum of 75% wildflowers. Non-native perennial species can also be used to extend the flowering season. The turf produces nectar, pollen and seeds which support birds, mammals, bees, butterflies and other invertebrate species. The wildflower turf can be used on sites with all soil types; will perform well under shade and in drought conditions, as well as in open meadow conditions.~~

~~A species rich lawn turf is available which can be treated as a conventional lawn i.e. regularly mowed short, and used heavily. Unlike standard monoculture amenity lawns the turf will support 26 species of native grasses and wildflowers.~~

~~Maintenance such as watering is required for the first two weeks after installation, with occasional soaks required during prolonged dry periods. Cutting regime – one to two cuts per year, once in autumn including clearance of cuttings, leaves and other vegetation under trees in particular, to avoid mulching and the addition of nutrients.~~

~~The four years of post-development monitoring indicate that the development has not impacted negatively upon the newt population which in fact appears to be increasing.~~

~~Area: 32.2ha estate, 6000m². meadow~~

~~Establishment Cost: £60m² to include design and planning (including a species list and management plan), site preparation. For purchase of turf alone the cost is £10m².~~

~~Maintenance Cost: Information not supplied, however typical cost of annual cut with arisings removed is 12p/m²~~

~~Information provided by [Wildflower Turf](#)~~

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Grassland Example 3: North-west Target Wellbeing Programme, Knowlsey, Liverpool Landlife and Groundwork Northwest

This is a programme of over 90 projects run by Landlife (National Wildflower Centre) for the benefit of targeted disadvantaged communities across the Northwest. Locations include Kirkby (Towerhill, Northwood, Central), North Huyton (Woolfall Heath, Stockbridge Village — see photo below), Halewood (Torrington, Wood Road, New Hutte), South Huyton, North Liverpool (Everton) Projects have an emphasis on public engagement to provide wildflower improvements to greenspaces in Knowlsey. Linked to Natural England's national 'Walking for Health' campaign, this initiative aimed to provide biodiversity gains whilst promoting physical and mental health and wellbeing. Techniques vary depending on the location, but a favoured technique is to strip the existing turf and re-seed with a wildflower seed mix.

One example from this scheme is an area of Public Open Space, in Quarry Green Heights, Northwood, Kirkby. This involved scratch cultivation for cornfield annuals on an area of amenity grassland which had previously been heavily mown. The project was delivered by Landlife and the Community Environmental Task Team in 2004. A variety of successful treatments took place: herbiciding and sowing into short dead turf in autumn, and scratch cultivating and sowing in spring. Additional sowing in subsequent years has helped to build up a substantial seedbank.

After flowering the site was flailed, leaving seed to overwinter providing winter food for birds. Re-cultivating in spring mimics the traditional farming practices that would have sustained cornfield annuals on light soils in the past. Costs: Entire area of all projects of 5.5 ha; since 2008 over 1.5ha of wildflower meadows have been sown into parks and green spaces. Funded by £8.9m from the National Lottery through the Big Lottery Fund (equivalent to £161/m²)

Costs for specific projects are typically lower than this.

Wildflower seed mixes cost around to £90/kg (which provides sufficient seed for 200m² — equivalent to 45p/m²). Preparation and establishment costs vary depending on local conditions however £10/m² is a typical figure for turf stripping and disposal and reseeded.

Information from [Landlife](#) and [Groundwork](#)

North Huyton. Image: GroundWork



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**Appendix D. Appendix B National Planning Policy Framework (2018).
Sections of relevance to biodiversity and geodiversity**

153. Plans should take a proactive approach to mitigating and adapting to climate change, taking into account the long-term implications for flood risk, coastal change, water supply, biodiversity and landscapes, and the risk of overheating from rising temperatures.

174. Planning policies and decisions should contribute to and enhance the natural and local environment by:

- a) protecting and enhancing valued landscapes, sites of biodiversity or geological value and soils (in a manner commensurate with their statutory status or identified quality in the development plan);
- b) recognising the intrinsic character and beauty of the countryside, and the wider benefits from natural capital and ecosystem services – including the economic and other benefits of the best and most versatile agricultural land, and of trees and woodland;
- c) maintaining the character of the undeveloped coast, while improving public access to it where appropriate;
- d) minimising impacts on and providing net gains for biodiversity, including by establishing coherent ecological networks that are more resilient to current and future pressures;
- e) preventing new and existing development from contributing to, being put at unacceptable risk from, or being adversely affected by, unacceptable levels of soil, air, water or noise pollution or land instability. Development should, wherever possible, help to improve local environmental conditions such as air and water quality, taking into account relevant information such as river basin management plans; and
- f) remediating and mitigating despoiled, degraded, derelict, contaminated and unstable land, where appropriate.

175. Plans should: distinguish between the hierarchy of international, national and locally designated sites; allocate land with the least environmental or amenity value, where consistent with other policies in this Framework⁵⁸; take a strategic approach to maintaining and enhancing networks of habitats and green infrastructure; and plan for the enhancement of natural capital at a catchment or landscape scale across local authority boundaries.

179. To protect and enhance biodiversity and geodiversity, plans should: a) Identify, map and safeguard components of local wildlife-rich habitats and wider ecological networks, including the hierarchy of international, national and locally designated sites of importance for biodiversity⁶¹; wildlife corridors and stepping stones that connect them; and areas identified by national and local partnerships for habitat management, enhancement, restoration or creation⁶²; and b) promote the conservation, restoration and enhancement of priority habitats, ecological networks and the protection and recovery of priority species; and identify and pursue opportunities for securing measurable net gains for biodiversity.

180. When determining planning applications, local planning authorities should apply the following principles:

- a) if significant harm to biodiversity resulting from a development cannot be avoided (through locating on an alternative site with less harmful impacts), adequately mitigated, or, as a last resort, compensated for, then planning permission should be refused;

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b) development on land within or outside a Site of Special Scientific Interest, and which is likely to have an adverse effect on it (either individually or in combination with other developments), should not normally be permitted. The only exception is where the benefits of the development in the location proposed clearly outweigh both its likely impact on the features of the site that make it of special scientific interest, and any broader impacts on the national network of Sites of Special Scientific Interest;

c) development resulting in the loss or deterioration of irreplaceable habitats (such as ancient woodland and ancient or veteran trees) should be refused, unless there are wholly exceptional reasons and a suitable compensation strategy exists; and

d) development whose primary objective is to conserve or enhance biodiversity should be supported; while opportunities to improve biodiversity in and around developments should be integrated as part of their design, especially where this can secure measurable net gains for biodiversity or enhance public access to nature where this is appropriate.

181. The following should be given the same protection as habitats sites:

a) potential Special Protection Areas and possible Special Areas of Conservation;

b) listed or proposed Ramsar sites; and

c) sites identified, or required, as compensatory measures for adverse effects on habitats sites, potential Special Protection Areas, possible Special Areas of Conservation, and listed or proposed Ramsar sites.

~~170. Planning policies and decisions should contribute to and enhance the natural and local environment by:~~

~~a. protecting and enhancing valued landscapes, sites of biodiversity or geological value and soils (in a manner commensurate with their statutory status or identified quality in the development plan);~~

~~b. minimising impacts on and providing net gains for biodiversity, including by establishing coherent ecological networks that are more resilient to current and future pressures;~~

~~171. Plans should: distinguish between the hierarchy of international, national and locally designated sites; allocate land with the least environmental or amenity value, where consistent with other policies in this Framework; take a strategic approach to maintaining and enhancing networks of habitats and green infrastructure; and plan for the enhancement of natural capital at a catchment or landscape scale across local authority boundaries.~~

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~~a. Identify, map and safeguard components of local wildlife-rich habitats and wider ecological networks, including the hierarchy of international, national and locally designated sites of importance for biodiversity; wildlife corridors and stepping stones that connect them; and areas identified by national and local partnerships for habitat management, enhancement, restoration or creation; and~~

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- ~~a. if significant harm to biodiversity resulting from a development cannot be avoided (through locating on an alternative site with less harmful impacts), adequately mitigated, or, as a last resort, compensated for, then planning permission should be refused;~~
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- ~~c. development resulting in the loss or deterioration of irreplaceable habitats (such as ancient woodland and ancient or veteran trees) should be refused, unless there are wholly exceptional reasons and a suitable compensation strategy exists; and~~
- ~~d. development whose primary objective is to conserve or enhance biodiversity should be supported; while opportunities to incorporate biodiversity improvements in and around developments should be encouraged, especially where this can secure measurable net gains for biodiversity.~~

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~~176. The following should be given the same protection as habitats sites:~~

- ~~a. potential Special Protection Areas and possible Special Areas of Conservation; and~~
- ~~b. sites identified, or required, as compensatory measures for adverse effects on habitats sites, potential Special Protection Areas, possible Special Areas of Conservation, and listed or proposed Ramsar sites.~~

~~177. The presumption in favour of sustainable development does not apply where development requiring appropriate assessment because of its potential impact on a habitats site is being planned or determined.~~