Biodiversity net gain. Good practice principles for development

A practical guide

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A practical guide

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Summary

Biodiversity is vital to sustain the UK's society and economy. Improving biodiversity is integral to sustainable development, and biodiversity net gain (BNG) is an approach to embed and demonstrate this.

This guide offers practical advice to achieve BNG in the UK's land and freshwater environment. It is based on the UK's good practice principles for BNG and applies to all types and scales of development, at all stages in the life cycle of development. It is relevant to developers and all other stakeholders wishing to promote, facilitate and deliver BNG.

Biodiversity net gain. Good practice principles for development.

Part A: A practical guide

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Foreword

Executive summary

Biodiversity is essential to sustain our society and economy. Enhancing biodiversity is integral to sustainable development, and BNG is an approach to embed and demonstrate biodiversity enhancement within development. It involves first avoiding and then minimising biodiversity loss as far as possible, and achieving measurable net gains that contribute towards local and strategic biodiversity priorities.

This guide offers practical advice to achieve BNG in the UK's land and freshwater environment. It applies to:

- building, infrastructure and extractive industries, as well as sites used by developers, such as construction compounds
- all sizes of development from a single home build to large-scale projects in rural and urban locations
- developments requiring consents such as planning permission, and those not requiring consent such as those under permitted development rights
- developments with limited or no adverse effects on biodiversity to projects in sensitive environments
- individual projects, a portfolio of projects or management of a land-holding or an estate
- new projects, those already underway and routine maintenance activities.

The guide is for:

- those involved with commissioning, planning, assessing, designing, constructing and operating development projects, whether in a policy, regulatory or advisory capacity
- those exploring possibilities to adopt BNG within their business
- local planning authorities (LPAs) seeking to incorporate BNG within local plans and planning decisions
- landowners and managers, including companies undertaking development on or managing an estate, as well as organisations supporting developers to achieve BNG.

This guide focuses on how to achieve BNG by following good practice, but it is not prescriptive in terms of approaches or tools. Rather, the advice is relevant to all development while its application will be proportionate to the scale of a project and its effects on biodiversity.

Developments involving Environmental Impact Assessments (EIAs), Ecological Impact Assessments (EcIAs) or Preliminary Ecological Assessments (PEAs) will already be undertaking many activities in this guide. Links with these assessments are identified throughout with reference to guidelines from IEMA (Ricketts *et al*, 2016) and CIEEM (2018) on EcIAs and PEAs. They are also summarised in **Technical notes T6 and T7**.

The guide does not contain technical advice on enhancing individual habitats or specific features, but should be read with such technical references.

BNG does not apply to statutory designated sites or irreplaceable habitats. This guide advises that impacts on statutory designated sites or irreplaceable habitats are avoided where possible. Any impacts should be addressed as fully as possible by adhering to the mitigation hierarchy, as well as legislative and policy requirements on a case-by-case basis, usually in collaboration with the planning decision maker and statutory nature conservation advisor.

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Glossary

Adaptive management	The modification of activities in the light of experience from rigorous monitoring (CIEEM, 2018).
Additionality	A property of measures to achieve BNG, where the conservation outcomes it delivers are demonstrably new and additional and would not have resulted without it (BBOP, 2018).
Avoidance	Prevention of impacts occurring, having regard to predictions about potentially negative environmental effects (eg project decisions about site location or design) (CIEEM, 2018).
Baseline conditions	In the context of ecological impact assessments, the conditions that would pertain in the absence of the proposed project at the time when the project would be constructed/operated/decommissioned. The definition of these baseline conditions should be informed by changes arising from other causes (eg other consented developments) (CIEEM, 2018). In the context of BNG, a description of existing conditions to provide a starting point (eg pre-project condition of biodiversity) against which comparisons can be made (eg post-impact condition of biodiversity), allowing the change to be quantified (BBOP, 2018).
Biodiversity	The variability among living organisms from all sources, including terrestrial, marine and other aquatic ecosystems and the ecological complexes that they are part of, which includes diversity within species, between species and of ecosystems (CIEEM, 2018).
Biodiversity/nature conservation	The deliberate management of biological resources to sustain key biodiversity components or maintain the integrity of sites so that they support characteristic types and levels of biodiversity. One of the motivations for biodiversity conservation is to maintain the potential of biodiversity to meet the needs of future generations. Conservation includes preservation, maintenance, sustainable use, restoration and enhancement of the natural environment (BBOP, 2018).
Biodiversity metric	Biodiversity metrics are often described as 'surrogate' or 'proxy' measures because it is impossible to inventory and assess the state of all biodiversity present. Even at the plot scale, it is not possible to know with certainty the true value of a state or condition metric. So, it is necessary to rely on either on samples or on selected indicators of the biodiversity present as proxies to represent the biodiversity present and its condition or state (BBOP, 2018).
Biodiversity net gain/ biodiversity offset management plan	Developers typically adopt some form of management plan to implement the mitigation measures set out in the EIA/EcIA. Biodiversity may be integrated throughout such environmental or ecological management plans, or may form a discrete component. These documents may incorporate biodiversity offsets, but they are generally more focused on project construction sites (and managing impacts on site) rather than in offset areas and activities. These plans address the full set of issues involved in design and implementation of BNG and/or an offset. Offset activities may be physically separate from companies' on-site biodiversity management, broader in scope and involve more detailed and longer term roles, responsibilities and legal, institutional and financial arrangements, so the biodiversity offset management plan (BOMP) may integrate a site-based plan, or they may be two separate documents (BBOP, 2018).
Biodiversity net gain	Baker (2016) defines BNG as *"development that leaves biodiversity in a better state than before"* and *"an approach where developers work with local governments, wildlife groups, land owners and other stakeholders to support their priorities for nature conservation"*. The BBOP (2018) definition is given as *"a goal for a development project, policy, plan or activity in which the impacts on biodiversity it causes are outweighed by measures taken to avoid and minimise the impacts, to restore affected areas and finally to offset the residual impacts, to the extent that the gain exceeds the loss. BNG must be defined relative to an appropriate reference scenario"* ('net gain of what compared with what?').
Biodiversity net gain receptor site	In the context of BNG, a receptor site is a location where it is possible to re-create or enhance biodiversity features affected by a development project in order to generate net gain. This can be within the site footprint of a development, or outside. See also *Biodiversity offsets*.
Biodiversity offsets	Measurable conservation outcomes resulting from actions designed to compensate for unavoidable significant negative effects on biodiversity. The goal of biodiversity offsets is to achieve no net loss (NNL), or preferably a net gain, of biodiversity (CIEEM, 2018). Biodiversity offsets are measurable conservation outcomes resulting from actions designed to compensate for significant residual adverse biodiversity impacts arising from project development after appropriate prevention and mitigation measures have been taken. The goal of biodiversity offsets is to achieve NNL and preferably a net gain of biodiversity on the ground with respect to species composition, habitat structure and ecosystem function and people's use and cultural values associated with biodiversity (BBOP, 2018).
Biodiversity unit	The product of the size or area, and the distinctiveness and condition of the habitat it comprises. An assessment of biodiversity units lost and gained from a development project can be calculated using the approach set out by Defra in its biodiversity metric published as part of its pilot on biodiversity offsetting (see Defra, 2012a).

Compensation

In the context of ecological impact assessments, measures taken to offset the loss of, or permanent damage to, ecological features despite mitigation. Any replacement area should be similar in terms of biological features and ecological functions that have been lost or damaged, or with appropriate management have the ability to reproduce the ecological functions and conditions of those biological features. Compensation addresses negative effects that are residual, after avoidance and mitigation have been considered. It is this objective of compensation, and not its location, that distinguishes compensation from 'mitigation'. Depending on circumstances, compensation measures may be located within or outside the project site (CIEEM, 2018).

With regards to biodiversity offsetting, compensation involves measures to recompense, make good or pay damages for loss of biodiversity caused by a project. In some languages 'compensation' is synonymous with 'offset', but in BBOP, compensation is contrasted with a biodiversity offset. BBOP defines a biodiversity offset as a NNL (or net gain) conservation outcome. Compensation can involve reparation that falls short of achieving NNL, for a variety of reasons, including the conservation actions were not planned to achieve NNL, the residual losses of biodiversity caused by the project and gains achievable by the offset are not quantified, no mechanism for long-term implementation has been established, it is impossible to offset the impacts (for instance, because they are too severe or pre-impact data are lacking, so it is impossible to know what was lost as a result of the project), or that the compensation is through payment for training, capacity building, research or other outcomes that will not result in measurable conservation outcomes on the ground (BBOP, 2018).

Competent authority

An organisation or individual responsible for determining an application for consent for a project. In the context of The Conservation of Habitats and Species Regulations 2017, competent authority has a wider meaning, which includes any minister, government department, public or statutory undertaker, public body of any description or person holding a public office. Competent authorities in relation to appropriate assessment in Ireland are set out in the European Communities (Birds and Natural Habitats) Regulations 2011 (CIEEM, 2018).

Condition of habitat (as defined for Defra's biodiversity metric)

Habitat condition is defined as the quality of a particular habitat. For example, a habitat may be in poor condition if it fails to support some of the rare or notable species for which it is valued or if there are certain threats or disturbances affecting it such as pollution, erosion or invasive species (Defra, 2012a, b, c).

Connectivity

A measure of the functional availability of the habitats needed for a particular species to move through a given area. Examples include the flight lines used by bats to travel between roosts and foraging areas or the corridors of appropriate habitat needed by some slow-colonising species if they are to spread (CIEEM, 2018).

Conservation bank

A parcel of land managed for its conservation values. In exchange for permanently protecting the land, the bank owner is allowed to sell credits to parties who need them to satisfy legal requirements for compensating environmental impacts of development projects (BBOP, 2018). See also *Habitat bank*.

Conservation objective

Objective for the conservation of biodiversity (eg specific objective within a management plan or broad objectives of policy) (CIEEM, 2018).

Cumulative impact/effect

Additional changes caused by a proposed development along with other developments or the combined effect of a set of developments taken together (CIEEM, 2018).

In ecological terms cumulative effects may derive from a combination of effects from a development project with other past, present or reasonably foreseeable future projects. They may also result from time- or space-crowding of development combined with the effects of stochastic events/changes, including climate change. Cumulative impacts is the total arising from the project (under the control of the developer), other activities (that may be under the control of others, including developers, local communities, government) and other background pressures and trends that may be unregulated. The project's impact is one part of the total cumulative impact on the environment. The analysis of a project's incremental impacts combined with the effects of other projects can often give a more accurate understanding of the likely results of the project's presence than considering its impacts in isolation (BBOP, 2018).

Cultural value of biodiversity

The aesthetic, spiritual, educational and recreational significance that people associate with biodiversity. These may be intimately connected with their mores, traditions, customs and way of life (BBOP, 2018).

Distinctiveness of habitats (as defined for Defra's biodiversity unit metric)

A collective measure of biodiversity, including parameters such as species richness, diversity, rarity and the degree to which a habitat supports species rarely found in other habitats (Defra, 2012a, b, c).

Ecological feature

Habitats, species or ecosystems (CIEEM, 2018).

Ecological network

An interconnected system of ecological corridors (CIEEM, 2018).

Ecological equivalence

In ecology, this term generally refers to species that occupy similar niches in different geographical regions. In the context of biodiversity offsets, the term is synonymous with the concept of 'like-for-like' and refers to areas with highly comparable biodiversity components. This similarity can be observed in terms of species diversity, functional diversity and composition, ecological integrity or condition, landscape context (eg connectivity, landscape position, nearby land uses or condition, patch size), and ecosystem services (including people's use and cultural values) (BBOP, 2018).

Ecosystem	A dynamic complex of plant, animal and micro-organism communities and their non-living environment interacting as a functional unit (CIEEM, 2018).
Ecosystem services	The benefits that people derive from the natural environment. The natural environment can be considered as a stock of 'natural capital' from which many benefits flow – social, health related, cultural or economic (CIEEM, 2018).
Effect	Outcome to an ecological feature from an impact. For example, the effects on a dormouse population from loss of a hedgerow (CIEEM, 2018). See also *Impact*.
Enhancement	Improved management of ecological features or provision of new ecological features, resulting in a net benefit to biodiversity, which is unrelated to a negative impact or is 'over and above' that required to mitigate/compensate for an impact (CIEEM, 2018).
Habitat	The place or type of site where an organism or population naturally occurs. It is often used in the wider sense referring to major assemblages of plants and animals found together (CIEEM, 2018).
Habitat bank	A biodiversity compensation mechanism that is based on the concept of biodiversity offsets (CIEEM, 2018).
Hibernaculum/hibernacula	Shelter of a hibernating animal.
Indirect impacts	Indirect impacts (sometimes called secondary impacts or induced impacts), are those triggered in response to the presence of the development project, rather than being directly caused by the project's own operations. For instance, the presence of an oil and gas facility may lead to an increased local workforce and associated increases in demand for food. This may have knock-on effects on biodiversity, for example from increased land conversion for farming. Indirect impacts may reach outside project boundaries and may begin before or extend beyond a project's life cycle. Indirect impacts should be predicted through an environmental and social impact assessment (ESIA) process that includes biodiversity issues and explicitly links environmental and social issues. However, there is a risk that the potential for such impacts may not be identified until later in the project cycle. As a general rule, indirect impacts are more difficult to map and quantify than direct impacts (BBOP, 2018).
In-kind	Conservation (through the biodiversity offset) of the same type of biodiversity as that affected by the development project. Sometimes known as like-for-like (BBOP, 2018).
Impact	Actions resulting in changes to an ecological feature, for example, the construction activities of a development removing a hedgerow (CIEEM, 2018). See also *Effect*.
Lawton's principles	Principles for enhancing England's wildlife sites were developed as part of the Lawton Review (Lawton, 2010). They are commonly referred to as 'Lawton's principles', and have been summarised as enhancing wildlife sites to be "*bigger, better and more joined up*".
Like-for-like	Conservation (through the biodiversity offset) of the same type of biodiversity as that affected by the development project. Sometimes referred to as in-kind. Several biodiversity offset policies are based on a principle either of 'like-for-like' or of 'like-for-like or better' (BBOP, 2018).
Like-for-like or better	A common approach to biodiversity offsets is to require conservation of the same type of biodiversity as that affected by the project, which is known as like-for-like (sometimes modified to like-for-like or better). The offset conserves components of biodiversity that are a higher conservation priority (for example because they are more irreplaceable and vulnerable) than those affected by the development project for which the offset is envisaged. Also known as 'trading up' (BBOP, 2018).
Local sites	'Non-statutory' sites of nature conservation value that have been identified 'locally' (ie excluding Sites of Special Scientific Interest (SSSIs), Area of Special Scientific Interest (ASSIs) (Northern Ireland only), Special Areas of Conservation (SACs), Special Protection Areas (SPAs) and Ramsar Sites). Local nature reserves are included as they are a designation made by the local authority rather than statutory country conservation bodies. Local sites are often called wildlife sites, local nature conservation sites, sites of importance for nature conservation or other, similar names (CIEEM, 2018).
Mitigation	Measures taken to avoid or reduce negative impacts and effects. Measures may include locating the development and its working areas and access routes away from areas of high ecological interest, fencing off sensitive areas during the construction period, or timing works to avoid sensitive periods. An example of a reduction measure is a reed bed silt trap that is designed to minimise the amount of polluted water running directly into an ecologically-important watercourse. Depending on circumstances, mitigation measures may be located within or outside the project site (CIEEM, 2018). Measures that aim to reduce impacts to the point where they have no adverse effects. Examples of mitigation measures include avoidance of sensitive sites or disruptive work at sensitive times (eg breeding seasons), translocation of species to temporary or permanent alternative sites, post-project site restoration and recolonisation/stocking and the creation of similar habitats to offset residual impacts (BBOP, 2018).
Multipliers/ratios for biodiversity metrics	Use of a 'multiplier' represents a decision made to increase the area of an offset by a certain factor, with the aim of improving the chances of achieving NNL or net gain. The offset 'ratio' is the area occupied by an offset divided by the area affected by a project's impact. The offset area is often larger than the area affected (ie offset ratio >1) because the offset gains per unit area are often lower than the impact site losses per unit area. However the terms ratio and multiplier are often used interchangeably (BBOP, 2018).

Natural capital	The elements of nature that directly and indirectly produce value or benefits to people, including ecosystems, species, freshwater, land, minerals, the air and oceans, as well as natural processes and functions (NCC, 2016).
Net ecological gain	The point at which the quality and quantity of habitats or species improves compared to their original condition, ie improvements over and above those required for mitigation/ compensation (CIEEM, 2018).
No net loss	The outcome resulting from losses [of biodiversity] being offset by gains (CIEEM, 2018). A goal for a development project, policy, plan or activity in which the impacts on biodiversity it causes are balanced or outweighed by measures taken to avoid and minimise the impacts, to restore affected areas and finally to offset the residual impacts, so that no loss remains. It must be defined relative to an appropriate reference scenario ('NNL [NNL] of what compared with what?') (BBOP, 2018).
No worse off (in the context of outcome for people from biodiversity net gain)	The Business and Biodiversity Programme (BBOP) requires development projects to achieve biodiversity NNL/gain while ensuring that affected people are *"no worse off and preferably better off"* (BBOP, 2012a). New international good practice builds on this, by defining this measurable social outcome from biodiversity NNL/net gain: "*people perceive the components of their wellbeing affected by biodiversity losses and gains to be at least as good as a result of the development project and associated biodiversity NNL/net gain activities, than if the development had not been implemented*" (Bull *et al*, 2018).
Out-of-kind	When the biodiversity conserved through the offset differs in-kind from the biodiversity impacted by the project. The option of 'trading up' to an out-of-kind offset may be advisable where an offset arising from project impacts on a common or widespread component of biodiversity may instead be switched to benefit a more threatened or rare component (BBOP, 2018).
Reference scenario	A reference scenario is a state or trajectory used as a comparator. In the context of the mitigation hierarchy including offsets, the reference scenario can be static or dynamic. Biodiversity losses and gains are assessed relative to the chosen reference scenario and the net outcome for biodiversity needs to be described relative to this reference state or trajectory. In the case of a NNL goal and desired outcome, the goal is – by definition – the same as the reference scenario. The terms 'baseline' and 'counterfactual' are often used instead of the broader term 'reference scenario'. Specifically, a counterfactual is the scenario that is expected to occur in the absence of a defined set of actions. A plausible counterfactual for a NNL or net gain outcome would be what is expected to happen to biodiversity in the absence of a specific set of development impacts and the associated mitigation measures (including offsets) (BBOP, 2018).
Rehabilitation	Rehabilitation shares with restoration a fundamental focus on historical or pre-existing ecosystems as models or references, but the two activities differ in their goals and strategies. Rehabilitation emphasises the reparation of ecosystem processes, productivity and services, whereas the goals of restoration also include the re-establishment of the pre-existing biotic integrity in terms of species composition and community structure. However, reclamation projects that are more ecologically based can qualify as rehabilitation or even restoration (BBOP, 2018). Also see *Restoration*.
Replacement	The creation of a habitat that is an acceptable substitute for the habitat that has been lost (CIEEM, 2018).
Restoration	The re-establishment of a damaged or degraded system or habitat to a close approximation of its pre-degraded condition (CIEEM, 2018). The process of assisting the recovery of an area or ecosystem that has been degraded, damaged, or destroyed. The aim of ecological restoration is to re-establish the ecosystem's composition, structure and function, usually bringing it back to its original (pre-disturbance) state or to a healthy state close to the original. Ecological restoration is frequently confused with rehabilitation. While restoration aims to return an ecosystem to a former natural condition, rehabilitation implies putting the landscape to a new or altered use to serve a particular human purpose (BBOP, 2018).
Service level agreement	A contract between a service provider and its internal or external cumbers that documents what services will be provided and over what timescale, and defines the service standards the provider is obliged to meet.
Scoping	The determination of the extent of an assessment (for an EcIA or full EIA) (CIEEM, 2018).
Statutory designated sites	Statutory designated sites include SSSIs, ASSI (Northern Ireland only), SACs, SPAs and Ramsar sites (CIEEM, 2018).
Time discounting	A method used to account for the situation when the project impacts and/or the offset costs and benefits vary over time and to take into account that the further into the future the costs (or benefits) occur the less they are likely to be worth in comparison to costs (or benefits) occurring now. Time discounting makes the net benefits in each year comparable to the present year (BBOP, 2018).
Trading up	Conserving through an offset components of biodiversity that are a higher conservation priority (for example because they are more irreplaceable and vulnerable) than those affected by the development project for which the offset is envisaged (BBOP, 2018).
Zone(s) of influence	The area(s) over which ecological features may be affected by the biophysical changes caused by the proposed project and associated activities (CIEEM, 2018).

Abbreviations and acronyms

AMR	Annual monitoring reports
BAP	Biodiversity Action Plan
BBOP	Business and Biodiversity Programme
BNG	Biodiversity net gain
BNP	Biodiversity net positive
BOMP	Biodiversity offset management plan
BRE	Building Research Establishment
BREEAM	Building Research Establishment Environmental Assessment Method
CSGN	Central Scotland Green Network
DCO	Development consent order
EcIA	Ecological Impact Assessment
eftec	Economics For the Environment Consultancy
EIA	Environmental Impact Assessment
ES	Environmental Statement
ESIA	Environmental and Social Impact Assessment
FCERM	Flood and Coastal Erosion Risk Management
GCN	Great Crested Newt
GI	Green infrastructure
GiGL	Greenspace Information for Greater London
GLA	Greater London Authority
HRA	Habitats Regulations Assessment
ICMM	International Council on Mining and Metals
IUCN	International Union for Conservation of Nature
ISO	International Organization for Standardization
JNCC	Joint Nature Conservation Committee
KPI	Key performance indicator
LDP	Local development plan
LERC	Local environmental records centre
LNP	Local nature partnership
LPA	Local planning authority
MMP	Midland Mainline Programme
NBDA	National Biodiversity Data Centre
NDP	National Development Framework
NGO	Non-governmental organisations
NIA	Nature improvement area
NIEA	Northern Ireland Environment Agency
NNL	No net loss
NPPF	National Planning Policy Framework
NRW	Natural Resources Wales
NSIP	Nationally significant infrastructure project
PEA	Preliminary ecological assessments
PV	Present value
RSPB	Royal Society for the Protection of Birds
RTPI	Royal Town Planning Institute
S106	Section 106 (of the Town and Country Planning Act 1990)
SAP	Species Action Plan
SEF	Strategic Ecology Framework
SNH	Scottish Natural Heritage
SPA	Special Protection Area
SPD	Strategic development plan
SPG	Supplementary planning guidance
SSSI	Sites of Special Scientific Interest
TCPA	Town and Country Planning Association
TfL	Transport for London
TWT	The Wildlife Trusts
WCC	Warwickshire County Council
WENP	West of England Nature Partnership

Context and structure

This guide was written while UK policy, standards and practice on biodiversity net gain (BNG) was rapidly developing. As these mature, and wider evidence emerges, this additional knowledge will be reflected in further guidance. The aspects that have influenced the structure and contents of the guide are:

- **Defra's biodiversity metric.** While this guide was being developed, Natural England was updating Defra's biodiversity metric This guide acknowledges that this metric is the most established and commonly used within the UK, although during consultation for this project, concerns regarding the limitations of the 2012 metric were expressed. The PSG agreed that while this guide acknowledges the pre-eminence of the metric, and recommends its use in the absence of any other metric, it does not specify its exclusive use.
- **Policy change.** Legislation and policy in relation to planning and the environment regularly change across the devolved governments. This guide reflects good practice and should be used in the context of current legislation and policy.
- **British Standard on BNG**. A two-part British Standard on BNG was being developed at the time of publishing this guide. While there is representation from the author team and PSG responsible for producing this guide and the preceding BNG principles, the standard may introduce requirements that differ from this guide, based on emerging evidence.
- **Ecological Impact Assessment (EcIA).** The guide highlights links between activities for BNG and EcIA. The EcIAs represent a range of assessments from small-scale to larger comprehensive assessments undertaken as part of an EIA or strategic environmental assessment. **Technical notes T5, T6 and T7** cover links between BNG and development consent orders, EIA and EcIA activities respectively. Where references are made to EcIA in the main sections of this guide, the wider framework (especially EIAs) should be acknowledged.
- **Achieving BNG.** A development project can demonstrate achievements in BNG when there is evidence on various factors, one important factor being measurable evidence of net gains (eg from monitoring data) in comparison with a credible reference scenario, such as the baseline of biodiversity before the project started. At the time of writing, many development projects were progressing BNG at various life cycle stages. This is reflected in the case studies accompanying this guide, as many describe the process of achieving BNG, but do not provide evidence of having fully achieved BNG.

This guide focuses on implementing good practice for designing and achieving BNG. It provides outline advice on communication in **Technical note T10**. As practice develops, additional guidance on communication and claims regarding BNG is anticipated to follow. It has been structured as a single document to reflect the various stakeholders and project stages involved with BNG. As knowledge and application of BNG expands, the guide may be followed by the publication of separate guides reflecting the specific needs of different stakeholders and industry sectors.

Achieving BNG relies on the different stakeholders recognising the aims, and sometimes constraints, of each stakeholder involved. In recognition of the needs and interests of different stakeholders, the guide comprises the following five parts:

- **Part A Introduction (Chapters 1 and 2)**

  Introduces the topic, followed by a summary 'in a nutshell' of what implementing BNG involves at each stage of a project life cycle.
- **Part B Guidance for local planning authorities (Chapters 3 and 4)**

  Details the benefits, and gives advice on adopting BNG within local plans and planning decisions.
- **Part C The business case for biodiversity net gain (Chapter 5)**

  Sets out the business case for commercial organisations of adopting BNG.

- **Part D Implementing the biodiversity net gain good practice principles (Chapters 6 to 13)**

  Provides guidance for each stage of a development project life cycle. **Chapters 6 to 8** provide guidance on aspects that relate to all stages of the life cycle, with **Chapters 9 to 13** dealing with a specific life cycle stage.

- **Part E Technical notes**

  Throughout the guide, policies and processes are introduced or outlined, many of which are common to many chapters. For readers requiring additional information on these topics, a set of eleven technical notes has been produced.

- **Additional information**

  Organisations were invited to submit short case studies to illustrate how they are approaching BNG. These are summarised throughout with the full case studies presented in a separate publication (Butterworth *et al*, 2018). Some case studies mention awards or metrics that were applied to the project. However, these have not been subject to any form of audit by CIRIA and are published as submitted, at face value.

This guide also includes a comprehensive list of references, and further guidance and website links (correct at the time of writing) are included throughout.

Part A
Introduction and overview

1 What is biodiversity net gain?

Summary

This chapter discusses the background to this guide and the UK's good practice principles on BNG. It defines BNG, describes the mitigation hierarchy and outlines the roles of various stakeholders in achieving BNG. It also highlights key aspects to demonstrate measurable net gains in biodiversity.

1.1 BACKGROUND

The need for this guide came from a growing interest in how, by enhancing biodiversity, development projects can generate long-lasting benefits for society and the economy (see **Box 1.1**). It also came from calls for development to be more sustainable, given the continued significant decline in wildlife.

Box 1.1
The benefits and decline of biodiversity

Ecosystems, and the biodiversity they contain, provide benefits for people. These are called 'ecosystem services' and broadly comprise:

- provisioning services, eg food, fibre, fuel and water
- regulating services, eg soil formation, climate control, flood regulation, disease control, waste purification and pollination
- supporting services, eg nutrient cycles and oxygen production
- cultural services, eg recreation, spiritual, educational, intrinsic and aesthetic value (MA, 2005).

The UK Government (2008) states that: *"The natural world underpins our nation's prosperity and wellbeing. We often talk of being 'enriched' by our environment. In recent years we have come to realise that the environment does indeed deliver calculable economic benefits."*

These economic benefits include, for example, the £1.8 billion value of UK woodlands from removing pollution and carbon dioxide in 2015 (ONS, 2017). **Technical note T11** describes links between BNG and assessments of ecosystem services and natural capital.

However, biodiversity continues to decline at significant rates, a report by Hayhow *et al* (2016) showed that 56 per cent of UK species declined between 1970 and 2013, and that biodiversity in the UK is faring worse than in many other countries.

1.2 DEFINING BIODIVERSITY NET GAIN: GOOD PRACTICE PRINCIPLES

In 2016, CIRIA, CIEEM and IEMA developed the UK's first good practice principles for BNG (Baker, 2016). This publication defines BNG as *"development that leaves biodiversity in a better state than before, and an approach where developers work with local governments, wildlife groups, landowners and other stakeholders in order to support their priorities for nature conservation".*

The good practice principles underpin this guide and provide a framework for development projects to show that they are following good practice (see **Table 1.1**).

Table 1.1 The UK's good practice principles for biodiversity net gain (after Baker, 2016)

Principle	In practice
Apply the mitigation hierarchy	Do everything possible to first avoid and then minimise impacts on biodiversity. Only as a last resort, and in agreement with external decision makers where possible, compensate for losses that cannot be avoided. If compensating for losses within the development footprint is not possible or does not generate the most benefits for nature conservation, then offset biodiversity losses by gains elsewhere.
Avoid losing biodiversity that cannot be offset elsewhere	Avoid impacts on irreplaceable biodiversity – these impacts cannot be offset to achieve NNL/net gain.
Be inclusive and equitable	Engage stakeholders early, and involve them in designing, implementing, monitoring and evaluating the approach to net gain. Achieve net gain in partnership with stakeholders where possible.
Address risk	Mitigate difficulty, uncertainty and other risks to achieving net gain. Apply well-accepted ways to add contingency when calculating biodiversity losses and gains in order to account for any remaining risks, as well as to compensate for the time between the losses occurring and the gains being fully realised.
Make a measurable net gain contribution	Achieve a measurable, overall gain[1] for biodiversity and the services ecosystems provide while directly contributing towards nature conservation priorities.

Principle	In practice
Achieve the best outcomes for biodiversity	Achieve the best outcomes for biodiversity by using robust credible evidence and local knowledge to make clearly justified choices when: ■ delivering compensation that is ecologically equivalent in type, amount and condition and that accounts for the location and timing of biodiversity losses ■ compensating for losses of one type of biodiversity by providing a different type that delivers greater benefits for nature conservation ■ achieving net gain locally to the development while also contributing towards nature conservation priorities at local, regional and national levels ■ enhancing existing or creating new habitat ■ enhancing ecological connectivity by creating more, bigger, better and joined areas for biodiversity.
Be additional	Achieve nature conservation outcomes that demonstrably exceed existing obligations, ie do not deliver something that would occur anyway.
Create a net gain legacy	Ensure net gain generates long-term benefits by: ■ engaging stakeholders and jointly agreeing practical solutions that secure Net Gain in perpetuity[2] ■ planning for adaptive management and securing dedicated funding for long-term management ■ designing net gain for biodiversity to be resilient to external factors, especially climate change ■ mitigating risks from other land uses ■ avoiding displacing harmful activities from one location to another ■ supporting local-level management of net gain activities.
Optimise sustainability	Prioritise BNG and, where possible, optimise the wider environmental benefits for a sustainable society and economy.
Be transparent	Communicate all net gain activities in a transparent and timely manner, sharing the learning with all stakeholders.

Note

1 Net gain has been described as a measurable target for development projects where impacts on biodiversity are outweighed by a clear mitigation hierarchy approach to first avoid and then minimise impacts, including through restoration and/or compensation. Adhering to these net gain principles (ie pursuing all principles together) will help in underpinning good practice for achieving and sustaining net gain.

2 Biodiversity compensation should be planned for a sustained net gain over the longest possible timeframe. For development in the UK, the expectation is that compensation sites will be secured for at least the lifetime of the development (eg often 25–30 years) with the objective of net gain management continuing in the future.

Case study 1.1
Enhancing biodiversity as part of a quarry extension

The Gill Mill Quarry Extension will create one of the largest connected priority wildlife habitats, including one of the largest reedbeds, in southern England. Working in partnership with RSPB, Smiths and Sons designed the 97 ha quarry extension to supply five million tonnes of sand and gravel over 25 years, and to enhance biodiversity including creating 61 ha of reedbeds, and 66 ha of other priority habitats. The site will have new paths and bridleways to promote public access, as well as eco-lodges to help fund the biodiversity enhancements for the long term. The project is an example of collaborative working for designing and delivering biodiversity enhancement.

For further details see Case study 11 in C776b.

Figure 1.1 Quarry extension at Gill Mill, Witney, Oxfordshire

1.3 KEY STAKEHOLDERS

Many stakeholders can influence a development project's BNG. For this guide, stakeholders are defined as *"individuals and organisations who are actively involved in the project, or whose interests may be positively or negatively affected as a result of project execution or successful project completion"* (PMI, 2017). At the strategic level, national policies set the context for LPAs (see **Technical note T1**) and corporate strategies drive an organisation's BNG agenda. At the project level, stakeholders influence decisions through consultations and how they communicate and collaborate.

The primary influences of key stakeholders include:

- setting biodiversity priorities within local plans
- requiring BNG
- developing corporate strategies on BNG
- designing, implementing and maintaining BNG throughout a project life cycle.

1.3.1 Setting biodiversity priorities within local plans

LPAs can set priorities for biodiversity within their administration area, for example, targets on creating woodland or enhancing ecological networks. Such priorities enable developers to make meaningful contributions locally through their BNG activities.

Many LPAs establish biodiversity priorities in collaboration with wildlife conservation organisations, local environmental record centres and other stakeholders. They also formalise the priorities within local plans, associated strategies and planning decisions.

Chapter 4 gives advice to LPAs on establishing priorities in relation to BNG.

Chapter 10 gives advice to developers on contributing to local biodiversity priorities.

1.3.2 Requiring biodiversity net gain

The revised National Planning Policy Framework (NPPF) states that *"planning polices and decisions should … identify and pursue opportunities for securing measurable net gains for biodiversity"* (MHCLG, 2018). An increasing number of LPAs are now requiring BNG through the planning process (see **Box 1.2**). These requirements should link to local priorities for biodiversity and be supported with guidance on how BNG should be delivered and measured, such as the guidance in **Chapter 4**. The advantage for developers is a 'level playing field', which is especially important for developers working in different administration areas or with projects that span several local authorities.

Chapter 3 describes the benefits to LPAs from integrating BNG into local plans and planning decisions.

Box 1.2
Council and district authorities with BNG requirements

By 2018, several council and district authorities had adopted BNG. Here are some examples.

- Essex County Council (2016) has developed supplementary planning guidance on the biodiversity restoration and net gain requirements for minerals developments.
- Dorset County Council applies a BNG requirement for all authorities within the county to any development site of a minimum 0.1 ha.
- Warwickshire County Council (WCC) applies a BNG requirement to all the local planning authorities for which it provides an ecological service.
- Lichfield District Council (2015) guidance stipulates a 20 per cent net gain in biodiversity for development proposals that pose a risk to key ecological features.

1.3.3 Developing corporate strategies on biodiversity net gain

Businesses are a catalyst for BNG. Their starting point can be to establish a corporate strategy on delivering BNG, such as those in **Box 1.3**, and many businesses involve wildlife conservation organisations when setting corporate strategies on biodiversity.

Chapter 5 describes the business case for developers to adopt BNG.

Chapter 6 provides advice on developing corporate strategies on BNG.

Box 1.3
UK commissioning agencies with biodiversity commitments or statements

By 2018, several commissioning agencies had biodiversity commitments or statements including the following:

Transport	Highways England: no biodiversity net loss by 2020 and net gain by 2040 (Highways England, 2018)
	Network Rail Infrastructure Projects: to make a net positive contribution to biodiversity in the UK
	Crossrail 2: aiming for net gains in biodiversity (TFL, Mayor Of London, Network Rail, 2016))
	Transport for London: a net positive impact on biodiversity (Mayor of London, 2018)
	Gatwick Airport: where possible provide BNGs (Gatwick Airport, 2014)
Housing	Berkeley Group: develop and apply an approach to ensure that all new developments create a net biodiversity gain
	Redrow: committing to develop a partnership-led biodiversity strategy to enrich biodiversity and connect communities with nature by 2019 and to achieve verified increases in biodiversity across their developments by 2022
	Barratt Developments PLC: by 2020, seeking to create a net positive impact on biodiversity and ecology across their development portfolio
Energy	National Grid: drive net gain in environmental value (including biodiversity) on major construction projects by 2020 (National Grid, 2017)
Other commercial development	Land securities: achieve a 25 per cent BNG across the five sites offering the greatest potential by 2030

1.3.4 Designing, implementing and maintaining biodiversity net gain throughout a project life cycle

Key stakeholders and their roles during a project life cycle to deliver BNG include:

- commissioning agencies stipulating that their projects deliver BNG, establishing mechanisms for delivery and ensuring that budgets cover BNG over the long term
- consultants, contractors, operators and maintainers demonstrating the business case for a commissioning agency to adopt BNG for individual projects, and for land under routine maintenance, and also implementing the good practice principles to design and deliver BNG
- consultants driving good practice, particularly during the feasibility, scoping and design stages when major decisions about a project are made. For projects involving EIAs, EIA co-ordinators embedding BNG within the wider context of the EIA
- LPAs, landowners, land managers, wildlife organisations and local interest groups testing the feasibility of BNG designs, especially given their local knowledge, and linking these designs with local priorities
- contractors, operators, maintainers, landowners and land managers implementing BNG designs and management and monitoring plans and acting on additional opportunities to enhance biodiversity
- all stakeholders being transparent in progress towards, and achievements in, BNG throughout a project, not just at the end.

1.4 APPLYING THE MITIGATION HIERARCHY

The mitigation hierarchy is the cornerstone of achieving BNG. It is a sequential order of mitigation actions described in **Table 1.2**.

Applying the mitigation requires taking each stage in turn, focusing on all possibilities before moving on to the next stage. Aiming for BNG does not mean that the mitigation hierarchy can be side-stepped: projects cannot go straight to the compensation stage without first seeking to avoid and minimise their effects on biodiversity.

Projects should achieve gains or net gains in biodiversity at every stage of the mitigation hierarchy, not just at the end. For example, projects that avoid losses of biodiversity should seek biodiversity enhancements as part of the development, the advantage of doing so is that the biodiversity gains are simpler and more cost-efficient than if losses of biodiversity were incurred.

Table 1.2 Applying the mitigation hierarchy

Stage	In practice	
1 Avoidance	This first stage is to avoid harm to biodiversity, for example by locating to an alternative site. It is the most important stage and can ease the consent process, whereas missing this stage can lead to criticism, objections and refusal of permission for the development.	Achieving biodiversity gains or net gain at all stages of the mitigation hierarchy
2 Minimisation	If avoiding all adverse effects is not possible, action is taken to minimise these effects, such as those in the CIEEM EcIA guidelines (CIEEM, 2018), which include timing works to avoid sensitive periods.	
3 Compensation	Addressing residual adverse effects is the final stage, only considered after all possibilities for avoiding and minimising the effects have been implemented. Compensation does not prevent the effects, rather it involves measures to make up for residual effects that cannot be prevented. Offsetting is a form of compensation that trades losses of biodiversity in one location with measurable gains in another – biodiversity offsets have a formal requirement for measurable outcomes. Offsetting losses of biodiversity with gains elsewhere can be within or outside of the development footprint.	

CIEEM's guidelines describe the application of the mitigation hierarchy during an EcIA. There are also statutory advisory notes for specific species. But gaining project buy-in to rigorously apply the mitigation hierarchy is crucial – to help this, **Box 1.4** gives advice for ecologists. While the advice is for ecologists, it illustrates these aspects to all stakeholders.

Box 1.4
Advice on gaining project buy-in and support to rigorously apply the mitigation hierarchy

Engage the commissioning agency and senior project lead so that the importance of applying the mitigation hierarchy is on the project agenda from the start.

Make clear any relevant policy links, for example, the principles for the mitigation hierarchy have been adopted in national planning policy guidance (eg see Welsh Government, 2009, and the NPPF for England).

Align application of the mitigation hierarchy with other industry initiatives or such as ISO 140001:2015, BS 42020:2013 or BREEAM, in order to streamline activities.

Explain the business benefits of applying the mitigation hierarchy to the project team, eg easing the consent process, its application being essential for projects seeking compliance with BS 42020:2013.

Explain that not applying the mitigation hierarchy risks lengthy and costly consent processes and damages a company's reputation.

Make clear that applying the mitigation hierarchy is essential for demonstrating application of good practice principles on BNG (especially important if the commissioning agency or company has publicly signed up to the principles).

Explain the mitigation hierarchy to the project team, simplifying how people can be involved and contribute.

If working on a project's EIA, work closely with the EIA co-ordinator to integrate biodiversity into the wider environmental application of the mitigation hierarchy Ricketts *et al* (2017) provides guidance on progressive use of EIA stages to influence design).

Use technology to make the process tangible, eg overlaying digital maps of ecological hot spots and opportunities with project engineering designs, or 3D modelling used on large-scale projects.

Seek to avoid impacts on biodiversity as early as possible in the project life cycle stage, when avoidance actions are most easily incorporated.

Work collaboratively with the engineering team and project managers as early as possible, and throughout the project. For example, gathering their ideas on avoiding biodiversity loss. Incorporate constraints faced by project teams – such as engineering standards – into the BNG design, while challenging these where appropriate to establish rigour in the decision-making process.

Use data to quantify application of the mitigation hierarchy under different project options, highlighting where costs can be saved.

1.5 MEASURING BIODIVERSITY NET GAINS

Good practice is to achieve measurable net gains in biodiversity. Advice on measuring BNG is contained throughout this guide. As a summary, the key points include the following:

Key points	Summary
Justify the method used to measure BNG	For example, Defra's biodiversity metric was stipulated by the LPA (Defra, 2012c).
Use the same method, consistently	The same measurement used for a project's biodiversity baseline and impact assessment should be used to measure BNG throughout the project life cycle. It should also quantify outcomes from avoidance, minimisation and compensation measures, demonstrating the additional gains.
Make explicit the reference scenario	BNG is an outcome compared to a reference scenario, which should be defined and justified. For construction projects, this can be the biodiversity baseline established as part of an EcIA. For an estate or land under routine maintenance, the point in time when the baseline is established should be justified.
Show the full working	When presenting measurable net gains in biodiversity, the full working should be presented, not just the resulting final number. For example, users of Defra's biodiversity metric should present survey data on habitat condition assessments and 'biodiversity units' for individual features before and after the development.
Use qualitative and quantitative assessments to capture all aspects of biodiversity	Measures of biodiversity are not absolute values. They are proxies for biodiversity value before and after a development, and might not capture all the features affected. For example, Defra's biodiversity metric calculates biodiversity units but does not reflect features such as a vital wildlife corridor within an urban locality. Both qualitative and quantitative assessments should be used when designing, implementing, maintaining and monitoring BNG to capture all aspects of biodiversity, and to avoid decisions being based purely on numbers. Qualitative aspects of BNG should be communicated alongside a quantitative assessment, especially to demonstrate that the net gains are commensurable to biodiversity affected by the development (or biodiversity within or surrounding a development, if there are no negative effects). This is especially important for ensuring that biodiversity losses are not replaced with features of lower value
Measure individual features	BNG is to improve the quality or extent of individual features, those affected by a development or those within or surrounding a development if the development does not affect biodiversity. Measurable net gains in biodiversity should be presented for individual features – do not aggregate all features together into a single summed number for a project
Add contingency	A project's design stage is a prediction of the BNG outcomes over a set timeframe, as no activities have yet been undertaken. Predictions, by their nature, are based on uncertainties such as whether complex habitats can be created within the anticipated timeframe. Uncertainties should be incorporated into BNG calculations. This can be by adding contingency, according to the level and type of uncertainty, to increase the amount of biodiversity needed to achieve net gain.
Carefully consider how much is net gain	This approach to BNG is not simply outweighing losses of biodiversity with gains. It is development projects that apply all of the good practice principles in combination throughout the project life cycle. One of those principles – achieve measurable net gains in biodiversity – requires careful consideration as to how much biodiversity could be a net gain. Some LPAs, industry professional bodies and commissioning agencies have set percentage figures on BNG, for example see **Boxes 1.3 and 1.4**. **Chapter 6** gives advice on setting percentage targets for BNG – any such targets should be carefully considered, not just within the context of the specific development project but also to account for accuracy when measuring losses and gains in biodiversity. For example, if a biodiversity metric is too crude to measure change within five per cent, then increases in biodiversity of five per cent may not be actual gains. If the metric's accuracy is unknown, guidance from credible industry bodies should be followed (eg see BRE, 2016b) and/or the precautionary approach should be undertaken.
Avoid pitfalls when quantifying losses and gains in biodiversity, such as:	■ focusing on numbers to only outweigh losses of biodiversity with gains without generating any meaningful benefits ■ missing opportunities to benefit key species that are affected by a project but not directly accounted for within a biodiversity metric ■ showing a quantified net gain in biodiversity but the project causes a critical loss of, for example, ecological connectivity, a rare habitat, green space or some other key feature ■ replacing highly valuable features with features of lower ecological value, or replacing locally important features with features further away ■ causing negative social impacts, eg when people negatively affected by a project's impact on biodiversity are not the same as those benefitting from the net gains in biodiversity.

Key points	Summary
Present quantifiable evidence that demonstrates measurable net gains	Designs are predictions of BNG outcomes when no activities have been undertaken. Communications on actual achievements in BNG require quantifiable evidence that demonstrates measurable net gains in biodiversity – such evidence is usually monitoring data over a timeframe that is commensurable with the specific biodiversity features of the net gain design.

1.6 TARGET AUDIENCE AND RELEVANCE

The breadth of readership was described earlier, and a range of stakeholders can influencing or facilitate BNG. This section guides readers with specific roles or perspectives to parts of the guide that will be of particular relevance. It is followed by a number of frequently asked questions.

Stakeholder	Where to find guidance
LPAs	**Chapter 3** sets out the benefits for incorporating BNG within local plans and planning decisions, and **Chapter 4** gives advice on how to do so. All chapters within **Part D** contain summary boxes with advice for LPAs.
Statutory advisors	**Chapter 8** gives advice on quality assurance, while **Section 2.2** provides an overview of implementing BNG during each stage of a project life cycle, the details of which are within **Part D**.
Landowners and managers	**Section 11.6** provides advice on developing management and monitoring plans, which landowners and managers might be involved with, while **Chapter 13** provides advice on maintenance and monitoring of BNG activities. For landowners and managers involved with the earlier stages, **Section 2.2** provides an overview of BNG activities throughout the project life cycle.
Small-scale developers	**Technical note T2** gives practical advice on how small-scale developments with limited or no impacts on biodiversity can achieve net gain.
Ecological consultants	**Section 1.1** describes good practice to drive BNG during each stage of a project life cycle, while **Section 2.2** provides an overview of implementing BNG during the project life cycle (the details of which are within **Part D**). **Box 1.6** gives advice on embedding the mitigation hierarchy within development projects and **Section 1.5** describes the main considerations when measuring BNG. Also there are several technical notes on specific aspects of BNG.
Sustainability managers	**Chapter 5** sets out the business case for BNG and **Chapter 6** gives advice on developing corporate strategies on BNG. This includes setting KPIs and implementing phased approaches such as starting with pilot projects in order to use the learning to roll-out BNG within the organisation.
Project managers	**Section 2.2** provides an overview of implementing BNG during each stage of a project life cycle, and **Chapter 8** gives advice on quality assurance.

1.7 FREQUENTLY ASKED QUESTIONS

This section is to help readers find topics of interest by providing references to more information within the guide. It addresses some of the questions that were raised at industry consultations during the development of the BNG principles and this guidance.

Question	Where to find guidance
What is BNG?	**Chapter 1** defines BNG and **Chapter 2** gives an overview of implementing BNG during each project life cycle stage. This is supported by detailed advice in **Part D**.
What are the legislative and policy drivers of BNG?	See **Technical note T1**, but also check for the latest developments in legalisation and policy.
What is the business case for BNG?	**Chapters 3 and 5** describe the business case for LPAs and for commercial organisations respectively.
Isn't BNG just for big development projects?	No. **Technical note T2** gives pragmatic advice for small development projects with limited or no impacts on biodiversity.
Is BNG a lot more work?	No. Development projects involving ecological assessments will already be undertaking many activities in this guide. These links are highlighted throughout the guide, and summarised in **Technical note T7**. Also, **Technical notes T5 and T6** outline links between BNG and the development consent order process and EIAs.
How is BNG measured?	**Technical note T9** gives advice on choosing a biodiversity metric and **Section 1.5** presents key considerations when measuring losses and gains in biodiversity. For more detailed advice on measuring BNG, see **Section 10.2** for baselines, **Section 10.4** for impacts on biodiversity, and **Section 11.4** for the net gains.

Question	Where to find guidance
How should biodiversity metrics be used?	Section 1.5 describes how both qualitative and quantitative assessments should be used to design, implement, maintain and monitor BNG to capture all aspects of biodiversity. So, metrics are used in combination with qualitative assessments, while Chapter 10 gives detailed advice on how to bring together qualitative and quantitative assessments.
How much more biodiversity is a net gain?	Section 1.5 explains that BNG is not about simply outweighing losses of biodiversity with gains. It is about development projects that apply all of the good practice principles in combination throughout the project life cycle. This section also gives advice on carefully considering how much more biodiversity could be a net gain. To support this, Section 6.5 gives advice on setting percentage targets for BNG, and Boxes 1.2 and 1.3, and Section 11.5, show examples of LPAs, commercial organisations and professional institutes who have set percentage targets.
Who should evaluate claims of BNG?	Chapter 8 sets out good practice for auditing BNG activities, which can be by internal or external assessors.
Is BNG only about offsetting?	No. Section 1.4 describes the cornerstone of BNG: applying the mitigation hierarchy, taking each step in turn with particular focus on avoiding biodiversity loss. Compensation is the final stage of the mitigation hierarchy after all possibilities to avoid and then mitigate and remediate biodiversity loss have been considered. One form of compensation is to offset losses of biodiversity with measurable gains elsewhere, within or outside a development site. Chapter 11 gives advice on following good practice to design BNG, including full application of the mitigation hierarchy and key decisions when (as the final stage of the mitigation hierarchy) offsetting biodiversity loss with gains elsewhere. Technical note T10 gives advice on addressing potential issues regarding biodiversity offsetting.
What does ecological equivalence and 'trading up' mean?	The glossary defines all key terms in the guide, including these. Section 11.4.1 describes and gives advice on ecological equivalence and trading up when designing BNG.
How can BNG achieve Lawton's principles of 'better, bigger and more joined up' wildlife areas?	See Section 11.4.13.
How can BNG be secured for the long term?	See Section 11.7. The advice in Chapters 12 and 13 will also be useful.
How can achievements in BNG be demonstrated?	Section 1.5 describes how quantifiable evidence, through monitoring over appropriate timescales, should be used to demonstrate measurable net gains in biodiversity against a credible reference scenario, such as a project's biodiversity baseline. Chapters 12 and 13 give detailed advice on monitoring BNG activities during a project's construction and maintenance and monitoring stages. When communicating about BNG, being clear on timescales is vital. Communications should differentiate between a designed BNG project (which if implemented is predicted to achieve BNG) and actual delivery of BNG (which in some cases will be many years in the future). This clarity is important to meet the transparency good practice principle.
How does BNG link with ecosystem services and natural capital?	See Technical note T11. Also see Section 11.6 on optimising the wider socio-economic benefits from BNG and accounting for both positive and negative effects of BNG on people.
How can BNG be delivered through a broker or third party?	See Section 11.7 and Box 11.7. Also see Technical note T4 on engaging stakeholders.
What about projects that affect irreplaceable habitats or statutory designated sites?	This guide is clear that any project or development that damages irreplaceable habitats or designated sites cannot make a claim for that whole project of BNG. Technical note T3 gives advice on irreplaceable habitats.

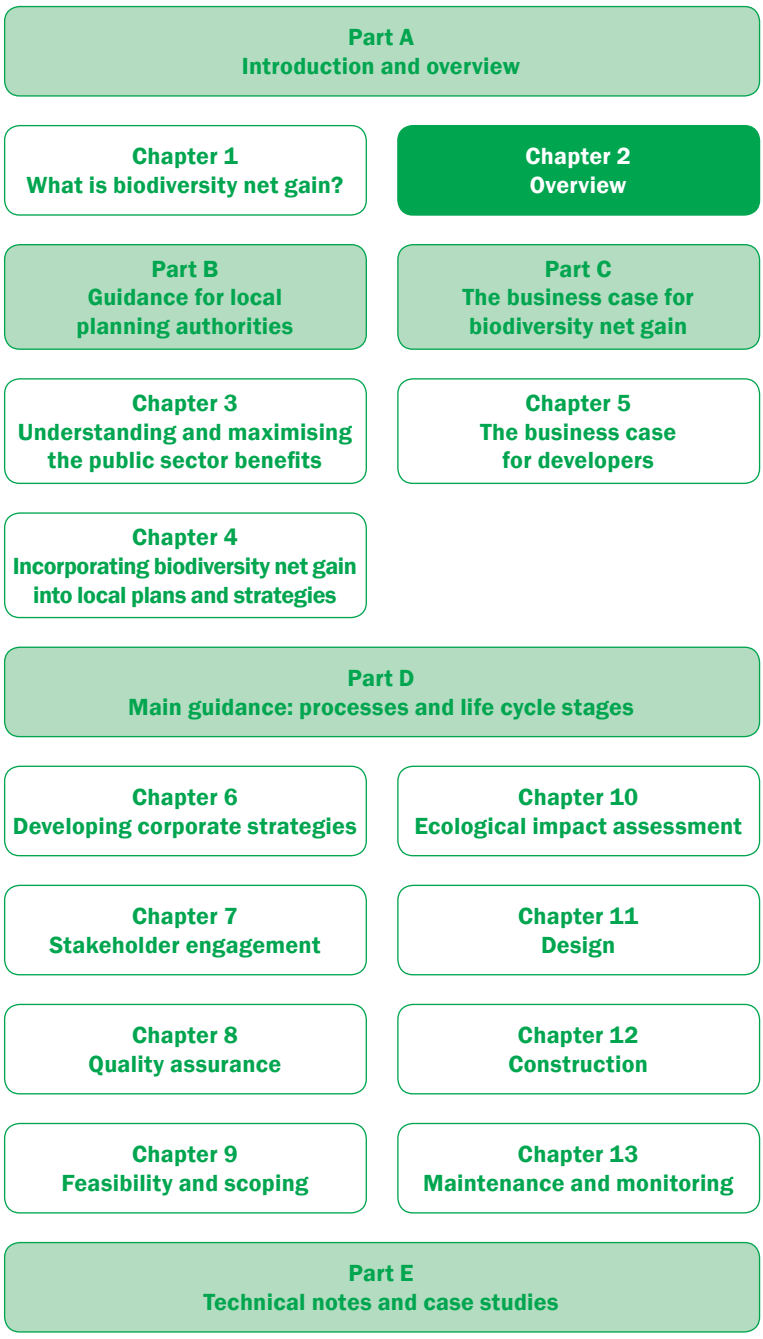
2 Overview

Summary

This chapter provides a checklist of what good looks like and the main activities to implement BNG during each project life cycle stage. It describes good practice to ensure BNG is included at each stage of a project life cycle. It also presents an overview of adopting BNG during the project life cycle.

The chapter is aimed at industry practitioners involved in delivering BNG, including ecologists, EIA co-ordinators, environment and sustainability managers, consent managers and landscape architects. It also shows other members of a project team, and external stakeholders such as statutory advisors, what is involved when designing, implementing, maintaining and monitoring BNG.

For those working on developments with limited or no impacts on biodiversity (especially small-scale projects), Technical note T2 gives advice on achieving BNG.



2.1 WHAT GOOD LOOKS LIKE

Table 2.1 summarises good practice to drive BNG at each project life cycle stage, whether the development requires an EIA, EcIA or PEA, or is under 'permitted development', or part of routine maintenance activities. It is intended as a brief high-level overview only, to be used with the detailed advice in **Part D**. Its application should be proportionate to the scale of a development and its effects on biodiversity.

Table 2.1 Driving biodiversity net gain at each project life cycle stage

What good looks like: throughout the project life cycle

- Implement all good practice principles in combination as part of the iterative process of a project's life cycle.
- Engage a range of stakeholders to gather their input, including testing the feasibility of BNG designs and identifying local and strategic biodiversity priorities to contribute towards, and also to address their concerns.
- Achieve BNG in partnership with stakeholders where possible.
- Undertake quality assurance to evaluate and demonstrate that the good practice principles for BNG were applied, and to justify communications on achieving BNG.
- Use an agreed biodiversity metric, and the same metric throughout all project stages.
- Do not apply BNG to irreplaceable habitats or designated statutory sites.

What good looks like: feasibility and scoping

- Show a clear application of the mitigation hierarchy.
- Set BNG as a goal for the project to achieve through application of the good practice principles.
- Integrate an assessment of BNG into core project documentation such as a project brief, budget and programme (rather than only being within the environmental or ecological assessment reports).
- Secure resources and budget for designing, implementing, maintaining and monitoring BNG for the long term.

What good looks like: impact assessment

- Assess and quantify a project's biodiversity baseline, being clear whether the baseline will be used to evaluate BNG outcomes after the development.
- Apply the mitigation hierarchy, seeking biodiversity gain or net gain at each stage (not just at the end).
- Integrate the use of ecological and other topic assessment approaches (such as landscape and visual assessment) in securing design improvements in line with all levels of the mitigation hierarchy.
- Assess and quantify each type of impact on ecosystems, ecological functions, habitats, species populations and individuals from the development. Assess how the development's biodiversity impact might affect people for these social impacts of BNG to be incorporated within the design.
- Describe, and where possible quantify, how and over what timescales the impacts are addressed – so that net gains for biodiversity are over/above requirements for avoidance, mitigation or compensation.

What good looks like: design

- Describe and quantify an improvement in the extent or quality of individual biodiversity features affected by a project (or biodiversity within and surrounding a development if the project does not affect biodiversity).
- Demonstrate that a project's BNG outcomes exceed existing requirements (ie would not have happened anyway) and contribute towards local and strategic biodiversity priorities.
- Where possible, optimise the wider social and economic benefits from BNG while ensuring that any negative effects on people from losses and gains in biodiversity are addressed.
- Develop BNG management and monitoring plans, and establish mechanisms to secure BNG for the long term.
- Be consistent in communications – designs are a prediction of BNG (not actual achievements) as no activities have yet been undertaken.

What good looks like: construction

- Integrate BNG requirements within core construction documentation, with training for construction teams.
- Present evidence on application of the mitigation hierarchy.
- Implement the BNG design as early as possible to avoid or reduce time-lags between losses and gains in biodiversity.
- Act on opportunities to enhance biodiversity beyond the design.
- Collect data on implementation of the BNG design to check and demonstrate that progress towards BNG is on track.

What good looks like: maintenance and monitoring

- Implement the BNG management and monitoring plan.
- Use monitoring data to employ adaptive management and to demonstrate progress towards BNG.
- Use monitoring data to present quantifiable evidence on achieving measurable net gains in biodiversity. This monitoring should be over a timeframe that is commensurable with the specific biodiversity features of the net gain design.
- Share the monitoring findings widely with industry and the project stakeholders.

2.2 IN A NUTSHELL

A project life cycle is an iterative process. The design is informed by the impact assessment, and construction and ongoing maintenance is informed by monitoring. The good practice principles for BNG are implemented in combination throughout a project life cycle, as part of this iterative process. The project life cycle adopted for this guide is:

Tables 2.2 to 2.6 present the main activities for each project life cycle stage. Detailed advice on these activities is given in **Part D**. The extent to which these activities are undertaken should be proportionate to the scale of a project and its effects on biodiversity.

Case study 2.1
A residential development that created vital ecological 'stepping stones'

A residential home development at Priest Hill, Ewell, resulted in the creation of a new nature reserve, secured through a planning S106 agreement. The reserve is a new and important 'stepping stone' between two existing reserves, which in turn supports a wildlife corridor within a biodiversity opportunity area. Reserve ownership was transferred to Surrey Wildlife Trust, and their targeted management has benefitted the recovery of various priority species including brown hairstreak butterflies, common lizard, skylark and linnet, as well as several Red-Listed vascular plants.

For further details see Case study 12 in C776b.

Figure 2.1 Priest Hill nature reserve, Ewell, Surrey

Case study 2.2
An urban expansion development enhances areas for wildlife

The urban expansion at Kingsbrook involved new residential and community facilities. From the start, it was designed to incorporate various features for wildlife including nectar-rich planting, ecological networks, conservation work for black poplars, and installation of wildlife boxes and newt ponds. The project has also involved extensive engagement with local communities to secure these opportunities for wildlife in the long term.

For further details see Case study 3 in C776b.

Figure 2.2 Housing development, Kingsbrook, Aylesbury Vale (from HM Government, 2018)

Table 2.2 Checklist on feasibility and scope (Chapter 9)

Feasibility and scoping | Impact assessment | Design | Construction | Maintenance and monitoring

Identify local and strategic priorities for biodiversity	Check whether the commissioning agency and LPA have set any biodiversity targets or specifications on BNG, such as use of a specific biodiversity metric.	
	Identify biodiversity features possibly affected by the project, and check for published targets or plans on these features, eg in BAPs.	
	Incorporate any of the above in the project's BNG feasibility assessment, and then in the design.	
Apply the mitigation hierarchy	Present evidence on actual or planned application of the mitigation hierarchy, as far as possible at this stage. This is critical as key decisions about a project (eg location) are often made during the early stages.	
Engage stakeholders	Feasibility studies and ecological scoping assessments often involve stakeholder engagement, so include BNG (or engage with stakeholders separately) to gather their input at this early stage.	
	Gathering stakeholder input can include: ■ risks to achieving BNG, eg sites prone to localised flooding ■ local priorities for biodiversity that are most important for the project's BNG to contribute towards ■ potential 'win-wins', given the social and environmental context of the project.	
Assess feasibility	Assess whether the project can achieve BNG by considering, for example: ■ achieving biodiversity gains or net gains at each stage of the mitigation hierarchy ■ estimating any residual biodiversity loss in order to estimate the gains required ■ risks, eg ecological, logistical, financial ■ resource, budget and programme requirements for securing BNG in the long term ■ effects on statutory designated sites and irreplaceable habitats (BNG does not apply to these).	
Set a goal	Where achieving BNG is feasible, set a project goal and outline the intention to follow the good practice principles.	
	The goal on BNG should be as 'SMART' as possible at this stage, but can be a high-level commitment or aspiration that is updated during later stages of the project. It should reflect the commissioning agency or local authority's biodiversity targets (if such exist), as well as local priorities for biodiversity, eg targets for a biodiversity opportunity area.	
Finalise the reports	Integrate BNG into core project documentation (eg an outline business case, a project option appraisal, a project execution plan or client's strategic brief), rather than only being within environmental or ecological assessment reports.	
	Set out resource requirements, an outline budget and a programme for BNG as far as possible, and update these as the project progresses.	

Table 2.3 Checklist for impact assessments (Chapter 10)

Feasibility and scoping | **Impact assessment** | Design | Construction | Maintenance and monitoring

Assess the project's biodiversity baseline	Clarify if the baseline will be used to evaluate BNG outcomes after the development project.	
	CIEEM's guidelines set out how to establish a project's biodiversity baseline. For BNG consider: ■ clarifying the timeframe of the baseline, ensuring that all activities for the development are included in the design ■ assessing the quality and extent of specific features, eg a site's ecological spatial context and functionality ■ identifying published targets for biodiversity features, eg in BAPs ■ assessing how people use and value biodiversity, to address a project's effects on these ■ excluding irreplaceable habitats and statutory designated sites from BNG designs.	
	This qualitative assessment will inform the BNG design, especially for features not explicitly captured when measuring biodiversity, such as vital wildlife corridors within an urban area. This enables the design to show improvements in such features alongside a quantitative assessment.	
Measure the project's biodiversity baseline	Check if the commissioning agency or LPA specifies a biodiversity metric. If not, select a robust credible metric and check that it is appropriate with relevant stakeholders, eg statutory advisors.	
	Measure a project's biodiversity baseline with consideration to: ■ recording what cannot be measured, eg ecological functionality, and highlighting such features in the qualitative assessment ■ identifying limitations, eg when using remote techniques ■ taking a precautionary approach ■ being consistent and transparent ■ validating through quality assurance.	
Assess potential negative effects	CIEEM's guidelines describe how to assess and characterise potential impacts on biodiversity from development. For BNG, consider: ■ retaining information on features scoped out of an EcIA, to include them in a BNG design ■ assess how biodiversity impacts might affect people, for these social impacts of BNG to be incorporated within the design.	
Measure potential negative effects	Quantify potential negative effects of a project on biodiversity including direct, indirect, temporary, permanent and cumulative impacts, as far as possible noting any limitations or assumptions.	
	Track each biodiversity feature from its baseline status to after the development – this clear and quantified information is needed to apply the mitigation hierarchy and to design BNG.	
	Update the assessment and quantification of predicted impacts as the mitigation hierarchy is applied and as the project design develops.	
Apply the mitigation hierarchy	Take each step of the mitigation hierarchy in turn, focusing on all possibilities before moving on to the next step and seeking biodiversity gain or net gain at each stage (not just at the end).	
	Provide evidence on applying the mitigation hierarchy to demonstrate that the good practice principles were followed. Note that losses of irreplaceable habitats and statutorily designated sites cannot be offset to achieve net gain.	

Table 2.4 Checklist for designing biodiversity net gain (Chapter 11)

Feasibility and scoping | Impact assessment | **Design** | Construction | Maintenance and monitoring

Clarify the starting point	BNG is an outcome compared to a reference scenario. Clarify the reference scenario, eg the project's biodiversity baseline established as part of the EcIA.	
	Apply the mitigation hierarchy and make clear what actions avoid, minimise and then compensate for residual losses, in order to distinguish between these and to achieve net gains in biodiversity.	
	Losses of irreplaceable habitats or statutory designated sites cannot be offset to achieve net gain.	
Set the outcomes	Describe the intended outcomes of BNG – this should be gains or net gains in specific individual features and how the gains contribute towards local and strategic priorities for biodiversity. The outcomes should be as 'SMART' as possible, but can be high-level to be refined later as the design progresses.	
Design net gains in biodiversity	Make clearly justified choices using evidence and local knowledge to achieve the best long-term outcomes for biodiversity. Considerations include: ■ the same or a different type of habitat ■ locating nearby or further away from the development site ■ enhancing existing or creating new habitat ■ creating more, bigger, better and joined-up areas for wildlife ■ optimising wider social and economic benefits ■ being additional, ie more than what would have happened anyway.	
Avoid or minimise risks	Avoid or minimise time-lags between losses of biodiversity being incurred and the net gains being attained.	
	Avoid, minimise or safeguard against risks to delivering BNG such as ecological, logistical and practical risks.	
Measure the predicted net gains	Measure the anticipated additional benefits for biodiversity after avoidance, minimisation and compensation. Considerations include: ■ use the same measurement used for the baseline and impact assessment ■ add contingency to account for risks to achieving BNG, eg the time-lag losses and gains ■ measure net gains for individual features ■ show full working ■ clarify that this is a prediction as no activities have been undertaken.	
Plan for the long term	Be specific on timescales, noting that the principles refer to sustaining BNG *"over the longest possible timeframe"* with the expectation of *'at least the lifetime of the development (eg often 25 to 30 years)'*.	
	Develop a BNG management and monitoring plan and put mechanisms in place to secure long-term outcomes, such as legal provisions and financial arrangements.	
Finalise the design outputs	Finalise outputs of the BNG design, including the intended measurable outcomes for specific features, details of BNG activities and timescales for implementing, managing and monitoring the activities.	

Table 2.5 Checklist for construction (Chapter 12)

Feasibility and scoping | Impact assessment | Design | **Construction** | Maintenance and monitoring

Update the biodiversity baseline	Undertake any surveys necessary to establish (or update) the full qualitative and quantitative aspects of the biodiversity baseline, using opportunities such as the enabling works phase. Use this information to check that the BNG design is on track.	
Include BNG within construction documents	Detail what needs to be done and when, and who is responsible for implementing the BNG design, within: ■ documents that set out ecological requirements of a project ■ documents and plans regularly used by construction teams. For example, construction environmental management plans, ecological method statements, work package plans and project programmes.	
Train key staff	Consider training environmental staff, especially if BNG is relatively new, eg on collecting specific data.	
	Consider training or updating other key individuals such as the project director, construction manager, quality manager and procurement teams. This can win their support to deliver BNG.	
Avoid or reduce the time-lag between losses and gains	Undertake BNG activities as early as possible, to avoid or reduce the time-lag between losses and gains. This is intrinsically worthwhile and can reduce the amount of contingency needed for BNG.	
Act on risks and opportunities	Include BNG within inspection programmes, ensuring that potential problems are detected early and can be acted on.	
	Include checks for opportunities to enhance biodiversity, even by small measures, since these can greatly improve the biodiversity outcomes of construction.	
Collect evidence and data	Collect evidence on actions undertaken to apply the mitigation hierarchy.	
	Develop and implement a plan for collecting data on the BNG activities undertaken and the outcomes of these. As the design sets out the predicted gains in biodiversity, data from the construction stage is part of communications on achievements in BNG (alongside long-term monitoring data).	

Case study 2.3
Construction that safeguarded valuable habitats

Beam Parklands was redesigned to increase its flood storage capacity and improving the community facility to contribute towards the regeneration of the area. Construction involved enhancing wildlife areas while undertaking works in ways that safeguarded valuable habitats and protected species, including great crested newt, water vole, reptiles and Schedule 1 breeding birds.

For further details see Case study 21 in C776b.

Figure 2.3 New wetland habitat with volunteers tending it

Table 2.6 Checklist for maintenance and monitoring (Chapter 13)

Feasibility and scoping | Impact assessment | Design | Construction | **Maintenance and monitoring**

Monitor progress and outcomes	Achievements in BNG should only be demonstrated using quantifiable evidence of actual gains in biodiversity. This will often be monitoring data, over appropriate timescales, to show measurable BNGs against a credible reference scenario, such as a project's biodiversity baseline.	
	Ecological requirements for development projects often require monitoring. Include monitoring of BNG activities to assess progress towards, and achievement of, the intended outcomes of the BNG design.	
	To implement the monitoring, consider: ■ clarifying the importance of monitoring to reduce risk and uncertainty in delivering BNG, and to be able to communicate achievements in BNG ■ setting a monitoring regime for BNG within the project's works information, programme and budget ■ establishing responsibilities for undertaking and reporting the monitoring ■ monitoring whether the BNG management plan was implemented according to the required quality standard, budget and programme as part of quality assurance.	
Employ adaptive management	Implement adaptive management to amend maintenance activities if conditions change and the amendments are necessary to keep the BNG target on track.	
	Ensure that measures are in place for when there is no reasonable possibility of successfully achieving the original outcomes for BNG, such as undertaking additional measures to make up any shortfall. Also ensure that there is a process for how these measures are agreed, for example, the commissioning agency is to grant approval.	
Report on progress and outcomes	Communicate progress in delivering BNG. If it is a statutory or planning requirement to report on progress, ensure that the monitoring gathers the data required and that the reports satisfy any specific requirements.	
	Communicate lessons learnt at this stage (and throughout the project life cycle).	

Case study 2.4
Monitoring biodiversity enhancements on solar farms

Several solar farm owners are seeking biodiversity enhancements on their estates. Many do not have a specific corporate strategy on BNG, but hold an interest in improving biodiversity. A comprehensive, yet simple monitoring regime was employed to assess change in biodiversity from the baseline. This showed, for example, how planting a wild flower meadow increase species diversity and the abundance of bumblebees.

For further details see Case study 29 in C776b.

Figure 2.4 Solar farm with recent habitat restoration (courtesy G Parker)

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Part B
Guidance for local planning authorities

Part B (Chapters 3 and 4) describes the reasons for adopting the good practice principles within local planning authorities, to achieve BNG through spatial planning and development management. It explains good practice for how BNG can be embedded within the work of a planning function.

3 Understanding and maximising the public benefits

Summary

This chapter describes the benefits from integrating BNG within local plans and planning decisions, from targeting net gain activities towards local biodiversity priorities, and from engaging stakeholders when doing so.

3.1 THE BENEFITS OF BIODIVERSITY NET GAIN FOR LOCAL PLANNING AUTHORITIES

Biodiversity is integral to the places where people live, work and enjoy themselves. It is fundamental to our health and wellbeing and it brings intrinsic benefits that span all aspects of sustainable development, from clean air and water to the increased value of a new home. Sustainable development meets the requirements for economic, social and environmental needs in an integrated way.

BNG helps local authorities to deliver high-quality sustainable development within their administrative area. By building in biodiversity gains as part of development, a local area can be improved and the LPA can demonstrate that their local plan is making a meaningful contribution to achieving biodiversity priorities established in law, policy and strategies. BNG has been relevant in national planning policy for each of the devolved governments for some time. With increasing momentum in the understanding and application of BNG, as national policy documents are revised, the focus on BNG is increasingly significant – see **Technical note T1**.

By incorporating BNG into the planning functions of a LPA, a number of benefits can be achieved, which are discussed in turn within this chapter.

Local plans are the statutory vehicle for land use decisions. It should be noted that this chapter refers to 'local plans' as being the local-level plan for setting out the direction of growth within a LPA area. These plans are commonly described as strategic plans, local plans or spatial development strategies in England, local plans in Scotland, local development plans in Wales and local area plans in Northern Ireland. As plan-making legislation and policy is updated by each devolved government, terminology will vary over time. This guide therefore uses the general term of 'local plan' to maintain continuity. Reference to spatial planning throughout this guide is a generic term covering the plan making function of a LPA, while development management refers to the planning application approval function. Again, each devolved government may use different terminology over time.

3.2 DISCHARGING LOCAL PLANNING AUTHORITY BIODIVERSITY DUTIES

The UK has national and international targets and commitments to restore and enhance biodiversity. Many of these are within national legislation and strategies and are transposed into policy duties for local authorities (see **Technical note T1**). The justifications necessary to support BNG policy are clear from the wealth of biodiversity commitments and requirements in place for the UK and at each devolved government level. By setting BNG policy within local plans, a LPA can make the requirements consistent, proportionate, fair and measurable.

Note

By including BNG within local plans, local planning authorities and their partners can demonstrate, in a measurable way, how they are meeting national and international biodiversity requirements. A plan-led approach to BNG embeds these biodiversity requirements as an integral part of the planning process.

A plan-led approach to BNG provides the following benefits.

- It demonstrates adequate incorporation of national legislation and policy in relation to biodiversity, which is increasingly being checked in detail by planning inspectors at local plan examination in public.
- It enables LPAs to target biodiversity enhancements to the habitats, species or locations where there is the greatest need for biodiversity restoration.
- It enables biodiversity gains to be maximised by targeting the location and type of biodiversity enhancement that makes the most positive difference for local biodiversity.
- It prevents piecemeal approaches at the development project level.
- It prevents biodiversity commitments being made that mean very little for local biodiversity in practice.
- It enables staff resources (such as local authority ecologists, where in place) to be focused on building a strategic approach, rather than trying to retrofit suitable biodiversity gains into submitted proposals.

- It enables linkages to other strategies and objectives for the LPA, such as health and wellbeing. BNG delivery could be linked to health targets relating to exercise or mental health, for example.
- It contributes to the discharge of wider duties relating to the environment, such as the Social Value Act 2013, which applies in England and Wales and requires public services to consider how they can secure social, economic and environmental benefits. Similar legislation applies under the Procurement Reform (Scotland) Act 2016 and is being progressed within Northern Ireland.

3.3 INTEGRATING ECONOMIC, SOCIAL AND ENVIRONMENTAL OBJECTIVES

The business case for commercial organisations to adopt BNG, set out in **Chapter 5**, illustrates how the good practice principles generate benefits for private business and the wider economy. This also supports the public sector case for BNG.

Note

The planning system functions in order to deliver sustainable development by planning for and meeting economic, social and environmental needs of a local area. Well-planned development can deliver a stronger economy, a better serviced and integrated community and a more resilient natural environment. These three aspects of sustainable development work together in a mutually dependent way.

Biodiversity is one part of the natural capital of an area. Natural capital covers the full range of natural resources that provide benefits to people, alongside resources such as soil, air and water. Natural capital is now increasingly being quantified alongside other forms of capital. Delivering BNG can dovetail into natural capital initiatives locally (see **Technical note T11**). As interest in natural capital grows, local LPAs are recognising that the natural capital of a local area is fundamental to the delivery of other public sector strategies and objectives. This includes those relating to green infrastructure (GI), air, water and soil quality and food production. BNG is also intrinsically linked to societal benefits such as health, regeneration and social care.

It is good practice for LPAs to form links with wider plans and strategies when embedding BNG into spatial planning and development management. Where possible, embedding BNG into a planning function should cross a range of workstreams and strategic objectives for the LPA.

3.4 CONTRIBUTING TO THE NATURE CONSERVATION PRIORITIES FOR A LOCAL AREA

BNGs in a local area are best achieved where there are clear, measurable objectives for developers to follow, and where the outcomes for biodiversity arising from each development project are monitored and recorded. LPAs should communicate the local biodiversity objectives in the following ways.

- Local plan policies can encourage developers to achieve BNG in accordance with established local biodiversity needs and priorities.
- Multiple developments in one location could be encouraged to focus on the same opportunities to give an accumulation of targeted gains in biodiversity for the local area.
- Working with partners can establish or confirm how best to target BNG. There may be local biodiversity action or opportunity areas, which could include work undertaken by local nature partnerships (LNPs), for example. These can helpfully be the starting point for targeting biodiversity enhancement in a LPA area. Priorities can then be updated or refined over time.
- There may be opportunities to identify sites, or parts of site allocations, for BNG delivery as part of the local plan. Where compensation is required, larger offset sites could provide the necessary compensation for any unavoidable biodiversity loss from several developments, creating larger strategic biodiversity areas as part of the local plan. This could then reduce delays for developers unable to find individual offset sites for residual biodiversity losses after first demonstrating adequate application of the mitigation hierarchy (see **Section 1.4**).

LPAs can draw on agreed area-wide objectives to establish measurable BNG outcomes for each individual project. By requiring a standardised means of reporting on BNG for each project, data can be collated for the area. Good practice is to secure the inclusion of a quality assurance and reporting process within the development life cycle for a development project (see **Chapter 8**), that can then be used to provide an administrative area-wide audit of BNG.

Quality assurance records can be used to inform a wider audit of BNG from multiple projects over a geographical area with consistency in the format and detail of data provision. The area audit of biodiversity restoration and enhancement can be added to with each new development project. LPAs, either individually or collectively, can demonstrate their contribution to halting the decline of biodiversity through setting targets, requiring developers to monitor success and then using the information to feed into the area-wide audit.

The audit across the local plan area provides:

- a demonstration of a local contribution towards national and international biodiversity commitments
- compliance with national policy requirements for the environment and sustainable development (see **Technical note T1** on devolved government and **Chapter 4** on public sector plans and strategies)
- opportunities to consider BNG at a wider landscape scale with a co-operating group of LPAs (eg across an entire county, which fits well with the spatial planning changes underway to deliver services in a more efficient and collaborative way)
- local plan monitoring of policy implementation for BNG.

The audit could be undertaken within the LPA, or in partnership with other external partners such as a local wildlife organisation or local environmental records centre (LERC) (see **Chapter 4**). These partners may already have service-level agreements in place with the authority.

3.5 REDUCING DELAYS IN THE PLANNING APPROVAL PROCESS

BNG should be proportionate to a development and the potential impact on biodiversity. Such proportionate approaches are more likely to be achieved if strategically planned for and incorporated within local plans from the outset.

By providing BNG policy in a local plan, and guidance on how to meet that policy, LPAs provide the opportunity for developers to design development proposals in alignment with the biodiversity objectives of the local plan. Planning applications are then able to be made in conformity with the local plan. Pre-application discussions are also an opportunity to check that an applicant is going to provide the right information to meet biodiversity policy.

Development proposals coming forward in conformity with biodiversity policy requirements are able to deliver meaningful benefits for biodiversity while reducing delays, conflicts and objections that can often occur when biodiversity matters are left to the determination of individual planning applications.

Clear requirements for BNG in the local plan, which is the subject of public consultation, can also help alleviate local concerns about the biodiversity value of a development site.

3.6 ESTABLISHING POSITIVE RELATIONS BETWEEN PARTIES

By embedding BNG as part of the spatial planning and development management process, LPAs can facilitate collaboration between planning officers, developers and stakeholders (see **Chapter 7 and**

Technical note T4 on engaging stakeholders). Good practice is for LPAs to encourage positive relations between developers and local communities, for example by being inclusive in the preparation of masterplans with community buy-in.

Where there are significant issues and opportunities for biodiversity, the input of stakeholders and the local community can provide:

- a positive means of resolving conflicts and seeking solutions
- a reduction in delays at the planning application stage
- community-wide support for new development
- recognition the biodiversity that is valued by local people.

In addition to better outcomes for biodiversity by targeting local biodiversity priorities, these discussions can provide a foundation for discussing other issues associated with the development in a more constructive way. By taking a plan-led approach to BNG and encouraging stakeholder involvement, LPAs can demonstrate to local communities that their environment is improving. This may engage communities in other positive environmental activities locally as a result.

3.7 IMPROVING A LOCAL AREA FOR THE BENEFIT OF LOCAL BUSINESS AND THE COMMUNITY

Developing distinctive, attractive and sustainable places is at the heart of new development. Communities and businesses thrive in places that are well-designed. Policies for local plans encourage high quality design, sustainable buildings and inclusive facilities and public spaces, and all such policies can potentially include reference to biodiversity enhancements as part of achieving sustainable places. The biodiversity of a local area contributes to the feel and ownership of a place and defines its landscape, whether urban or rural. A place with improving biodiversity value will in turn contribute to the range of values that people give to and gain from the area. Neighbourhood plans could play an important role in defining local biodiversity priorities, to link back to the BNG policy in a local plan.

4 Incorporating biodiversity net gain into local plans and strategies

Summary

This chapter complements Technical note T1 on the policy drivers for BNG. While it is aimed at local planning authorities, it can help other public bodies and nature conservation organisations in their work with local planning authorities. It gives advice on incorporating BNG within local plans and strategies. The chapter focuses on the preparation of local plans by local planning authorities, but with relevance for wider public sector plans and strategies. It highlights the many opportunities for BNG throughout the local plan-making process, and additional opportunities to promote BNG through development management. This chapter also refers to good practice in the absence of current BNG policy within an adopted local plan.

4.1 IMPLEMENTING BIODIVERSITY NET GAIN WITHIN LOCAL PLANNING AUTHORITIES

This chapter refers to 'local plans' as being the local-level plan for setting out the direction of growth within a LPA area. These plans are commonly described as strategic plans, local plans or spatial development strategies in England, local plans in Scotland, local development plans in Wales and local area plans in Northern Ireland. As plan-making legislation is updated by each devolved government, terminology will vary over time.

This chapter provides good practice for LPAs in how to implement BNG. It particularly focuses on how to incorporate BNG within local plans and other associated strategies. However, it also sets out good practice for taking forward BNG where a local-plan policy does not exist (see **Section 4.11**).

The public sector prepares and implements a wide range of plans and strategies, many of which relate to development and seek to collectively improve the economy, society and environment for a given geographical area. As described in **Chapter 3**, the UK Government promotes the 'plan-led' approach to sustainable development, of which BNG can be an integral part.

The recently published Defra 25-year plan has stated an ambition for 'environmental net gain' (see **Technical note T1**), and while this is an English strategy, it promotes the objectives of the plan as being a basis for UK-wide collaboration. Environmental net gain is not explicitly defined in the 25-year plan, but it is taken to mean gains in all aspects of the natural environment, of which biodiversity is one part.

Public sector plans, especially those produced by LPAs (individually or combined), provide an opportunity to embed BNG in order to meet national policy and strategies for each of the devolved UK governments, which are described in **Technical note T1**.

The preparation of a local plan is a critical opportunity for establishing BNG within a LPAs administrative area. Missing this opportunity can create difficulties in establishing the approach as a requirement for development. Poorly worded biodiversity policy also risks difficulties in requiring BNGs for development that is meaningful and commensurate with the potential harm.

The local plan-making process involves multiple stages and can include a range of different documents and processes that then form part of the local plan. How BNG can be included within these stages is discussed in **Sections 4.2 to 4.10**.

This chapter also provides some additional recommendations for promoting BNG through development management in **Sections 4.11 and 4.12**.

The final sections provide additional information for LPAs in getting up to speed with BNG, and what will be required, **Sections 4.13 to 4.14**.

4.2 GATHERING BIODIVERSITY EVIDENCE TO ESTABLISH A BASELINE

As explained in **Chapter 3**, BNG fits with the purposes and processes of local plan making that is founded on evidence. LPAs are used to working with supporting information to establish planning policy and to monitor its implementation. Data on various aspects of sustainable development is gathered and used to decide the type, location and level of economic growth required for an area. The data is also used to identify constraints and opportunities to make improvements for residents and visitors as part of the overarching objectives for the local plan.

Note

Good practice is for local planning authorities to gather and maintain biodiversity information as part of wider evidence gathering for a local plan. How this is done may be different for each LPA area. Establishing a BNG approach is not reliant upon having extensive biodiversity information, but the collation of all available biodiversity information is beneficial. It will enable a LPA to target gains towards the optimal locations or to focus on local biodiversity priorities.

The biodiversity data situation for LPAs may differ because:

- they may already hold some biodiversity information and could build on that data over time
- data may already be held by an external partner or service provider, such as a local environmental records centre (LERC), statutory body or wildlife organisation.

LERCs are often hosted within, or closely associated with, LPAs and/or local nature conservation organisations. Currently in England, LERCs tend to cover one or a small cluster of LPA areas, in Scotland the coverage is incomplete, in Wales there are four LERCs, and there is only one covering the whole of Northern Ireland. LERCs hold biodiversity data for an area, which is sourced from:

- the statutory nature conservation body
- ecological assessments for developments
- records submitted by local recorders
- local nature conservation project information.

The level of baseline biodiversity information available for an area may vary between LERCs, but the data held can provide a starting point, and data expansion can be planned for in the future.

LERCs normally have GIS tools to map biodiversity data and may have a range of established GIS layers of biodiversity information. This will vary, depending on the staff and resources available to the LERC. Other nature conservation organisations may also have GIS layers of biodiversity information, and in working in partnership with these, pooling of data should be encouraged.

Evidence and data on existing biodiversity is referred to as the 'baseline', as it is a snapshot of the current or recent circumstances. Caution will be needed if the data is a few years old, and specialist advice may need to be sought regarding the viability of old data.

Using a baseline dataset provides a starting point against which future BNGs can be measured, and good practice would be to start to collate a baseline, even if limited. Some priorities for BNG may already be established if the local area has the benefit of a LNP, or there are biodiversity-related plans or strategies in place. Where these are not established, working with local partners will enable data to be brought together into one place.

When a LPA is beginning to incorporate BNG, it would be beneficial to look at how existing datasets can be used to inform BNG policy and guidance. Where existing data is minimal, a LPA could choose to focus on particular aspects of local biodiversity while a BNG approach is being established as part of a planning function.

Options could include those shown in **Table 4.1**.

Table 4.1 Options for informing initial biodiversity net gain policy and guidance

Initial priorities	What to consider
Biodiversity priorities for the local area	Gather data on habitat or species hotspots, and work with stakeholders to establish where biodiversity assets should be avoided, and how habitat restoration, expansion or creation might be most effectively targeted.
Work with partners	Work with partners such as neighbouring LPAs and local nature conservation organisations to establish what existing biodiversity projects might be able to be supported or expanded with BNG. These could include, for example, the work of the Wildlife Trust as part of its Living Landscapes project. Any BNG claims need to demonstrate that they are additional to those that would have otherwise been delivered by the biodiversity project, in accordance with the good practice principles.
Limit to key habitat types	Start with one or two key habitat types where there is good data coverage and identify where BNGs could make a positive difference for biodiversity. This might include connecting fragmented habitats or restoring degraded habitats that are of local importance. Adding in biodiversity gains where there is some existing biodiversity value can be more beneficial than gains where existing biodiversity value is low. See Case study 4.1.
Explore external funding options	Explore external funding opportunities to see whether there are options to fund new datasets, or to expand on or improve existing datasets. For example, Heritage Lottery funded projects often include additional data gathering. Such data may serve a number of purposes, and inclusion in a wider project bid can enable the data to be used to inform BNG. Options to work with local universities could also be explored.
Use online resources	There is a level of biodiversity information available on internet-based open datasets, such as those held by statutory nature conservation bodies and other environmental organisations. MAGIC is an open GIS-based dataset of biodiversity information. MAGIC: **http://www.natureonthemap.naturalengland.org.uk/MagicMap.aspx**

Case study 4.1
Warwickshire County Council's GIS database

Warwickshire County Council (WCC) has developed such maps for woodlands and grasslands, enabling BNG to be targeted where there is existing woodland or grassland habitat that can be enhanced by additional habitat creation to aid countywide connectivity. The Council has established a close working relationship with its LERC so that the database is managed and updated over time.

For further details see Case study 17 in C776b.

Figure 4.1 Core area and strategic enhancement area

4.3 SECURING CONSISTENT DATA FROM DEVELOPERS

In planning for BNG as part of the local plan, it will be important to think about how baseline data can be improved over time. The most obvious source of extra data to add to a biodiversity database is that which is provided as part of a development proposal:

- EcIA and EIA with planning applications
- details required for the discharge of conditions
- monitoring information required for compliance with legal agreements

Ecological information provided by developers can be used to expand the biodiversity database for an area over time. Larger developments often have survey coverage outside the development site.

LPAs should consider whether it may be beneficial to request data in a standard format to aid data collation. A consistent requirement for submitting the right type and level of detail for biodiversity data with planning applications will enable that data to be more effectively used. It will also demonstrate to developers that there is a level playing field for biodiversity data requirements. The use of data submitted with planning applications needs to be made clear to developers, so that data can be automatically transferred, unless there are specific exceptions. CIEEM provides a range of guidelines that may assist in establishing a standard format for ecological data, including CIEEM (2016).

When establishing a BNG approach within a LPA it is good practice to give early consideration to the quality and level of detail for data that will be required from applicants and to refer to established advice, such as that provided by statutory nature conservation bodies, or to develop guidance to assist developers with data submission.

4.4 WORKING WITH LERCS OR OTHER DATA PROVIDERS

LERCs are organisations that collate and manage data on the natural environment. The data is available for use by the public and private sectors – normally for a small fee, to cover running costs. Collectively they work to promote high standards and consistency in data collection and use, and are often working in partnership on nature conservation projects (see **Table 4.2**). Many LERCs are members of the Association of Local Environmental Records Centres (ALERC).

LERCs are an important partner in establishing BNG within a LPA, and are well placed to develop and maintain the evidence base for BNG over time. Local circumstances will vary and, in some situations, there may be other partners who can support the LPA in maintaining a biodiversity database. For example, in some locations the local Wildlife Trust is commissioned by a LPA to provide specialist ecological advice to the planning function of that authority. In these cases, a database may already be in place within the Wildlife Trust.

Table 4.2 Summary of how partners can help the local planning authority set biodiversity net gain targets and to improve evidence and datasets over time

Organisation	Baseline data collation and setting biodiversity net gain targets
LERC or other organisation holding the GIS database	Providing baseline data. Co-operating with neighbouring LERCs on data gathering. Regularly updating the database with: ■ new BNG sites ■ monitoring data Creating an area-wide inventory of new BNG sites.
Partners, eg local wildlife groups, statutory nature conservation organisations	Establishing key nature conservation priorities for the local area Identifying the most beneficial locations to focus BNG by reviewing data, existing strategies such as GI strategies and exploring linkage options with existing nature conservation projects.

Many LPAs are already working in partnership with their respective LERCs to identify and map priorities for BNG, to create an audit of biodiversity gains across an area and to collate monitoring information. There is an opportunity for building more collaborative working with LERCs and other partners that provide a biodiversity mapping facility. These providers may wish to consider the level of service they can provide, and whether that can be developed across the LERC network.

4.5 ENGAGING STAKEHOLDERS

LPAs consult with the public and with statutory and local organisations when preparing a local plan. The formal stages of plan making allow for several consultations, presenting an opportunity to engage stakeholders on BNG.

There are many benefits from engaging stakeholders on BNG (see **Chapter 7 and Technical note T4**) which, for LPAs, include identifying local expertise, understanding what aspects of biodiversity are important to local people or organisations and identifying any risks or challenges early in the process.

LPAs may find the following questions useful when engaging stakeholders, particularly local biodiversity organisations, when developing BNG policy and encouraging a focus on local biodiversity priorities.

- What biodiversity is rare or vulnerable locally? What is declining most rapidly?
- Where are the most important biodiversity assets and how are they ecologically connected?
- What areas have historically been more biodiverse but have suffered declines?
- Where are corridors enabling wildlife to move within the area, and what is their conservation status?
- What is the status of natural connectivity between wildlife sites within the administrative area and in neighbouring administrative areas?
- Where are the most and least beneficial locations for delivering BNG, and is there enough evidence for these conclusions?

Answering these questions should help to determine what BNG policy and guidance for development would be most appropriate for the local area.

4.6 OPTIONS FOR BIODIVERSITY NET GAIN REQUIREMENTS WITHIN A LOCAL PLAN

A BNG policy should be included within the local plan, and early stages in the plan-making process should start to explore options (see **note**). Good practice would be to develop local plan policy and supporting text wording that is clear about the development to which it relates, the expected biodiversity gains commensurate with potential risks, the application of the mitigation hierarchy, and the information requirements.

Policy wording can also encourage developers to contribute towards the local priorities for BNG. The range and complexity of priorities initially established will be dependent on the data available.

Note

BNG policy could make reference to particular locations or habitats favoured by locally relevant species. It could target particular areas for restoration and could refer to reducing vulnerabilities, increasing resilience and reconnecting fragmented habitats. Where data is limited and priorities are not established, an initial option may be to simply require a minimum level of BNG (see Box 4.1).

There are options for establishing BNG requirements within local plans, and working with stakeholders to answer the questions set out above will assist with determining the most suitable policy approach (see **Case study 4.2**). This could include:

- **An illustrative map.** Providing an illustration of priorities within a local plan would help developers to identify how their development site fits with the local biodiversity assets. Throughout the UK there have been a number of initiatives in recent years to identify areas of biodiversity priority or opportunity, and the outputs of these projects may still be in use locally. See further detail in Case study 17 in C776b.

  LPAs have often worked together to establish biodiversity opportunity maps, green and blue infrastructure linkages and BAPs and the data may still be relevant now. Several authorities have updated this data or amalgamated it into new strategies such as that for GI. A map-based illustration of local biodiversity priorities would be beneficial to include alongside a BNG policy, to highlight where and how BNG could be targeted.

  New initiatives are coming forward all the time, such as the Wildlife Trust's Living Landscapes projects, the Nature Recovery Action Plans in Wales and the provision of priority habitat data (on GIS hazard layers) to all LPAs in Northern Ireland. There is continued opportunity for collaborative working to streamline the resources necessary to embed BNG within a LPA.

Case study 4.2
Lichfield District Council

Lichfield District Council (2015) has embedded a BNG policy within its local plan. The Council requires development that is resulting in a loss of biodiversity to provide compensation that is measurably greater than the loss, with a minimum gain of 20 per cent to be demonstrated.

- **A specific target.** A LPA may choose to set a consistent and specific minimum target for development projects to achieve. This could include a particular level of BNG. Care would need to be taken to ensure that the level is achievable, fair and proportionate. It may be appropriate to establish tentative targets or priorities for BNG and to review those over time. It may be preferable to put targets within a lower tier plan document, such as a supplementary planning document/ guidance to allow for more regular updates.
- **Using a biodiversity metric to encourage spatially specific gains.** Local plan policy should require the quantification of biodiversity losses and gains in a planning application so that a BNG can be demonstrated. It would be beneficial to encourage a consistent means of calculating biodiversity losses and gains, to provide data from individual development projects that can be combined to give an overview of a wider area. If the preferred metric to be used by developers is not stated by a LPA, there is a greater risk of challenges and difficulties. These might include:
  - a bespoke metric designed to favour the individual circumstances of the development proposal
  - greater difficulty in verifying that the calculation is correct
  - less transparency and comparison across different developments
  - reduced ability to encourage a focus on the nature conservation priorities for an area
  - lack of fairness and proportionality across developments
  - impossibility of data collation to undertake analysis of BNGs across an area.

  The biodiversity metric promoted by a LPA should help to highlight and favour local biodiversity priorities (see **Technical note T9**). For example, Defra's biodiversity metric includes the application of a 'spatial multiplier' that gives a numerical value within the calculation, to encourage locally relevant BNG. Defra's intention was to direct BNG efforts towards locations identified by LPA plans and strategies as being important for biodiversity gains. A local plan encouraging the use of the Defra biodiversity metric can make explicit how this spatial multiplier is applied.

  Good practice is to make a metric work most effectively for biodiversity locally, and a number of practitioners have used the Defra biodiversity metric and made adaptations that are justified on the basis of greater benefits for local biodiversity, including the application of the spatial multiplier.

  Examples of LPA areas that specify the use of a metric to demonstrate a measurable BNG in order to meet planning policy include Lichfield, Essex, North Devon, Dorset and a collaborative approach in Warwickshire, Coventry and Solihull.

Box 4.1
Advice on good practice for BNG policy wording

Good practice for a BNG policy wording includes:

- an explanation of why BNG is an integral part of sustainable development
- a requirement for developers to demonstrate how they followed the mitigation hierarchy
- a requirement for developers to demonstrate how they followed the BNG good practice principles
- BNG priorities that define the scale, location and objectives for biodiversity within the local area
- an explanation that BNG should be achieved regardless of whether the development project must compensate for the biodiversity losses it generates, ie net gains can be achieved even where there are no losses
- a demonstration that the requirements are consistent and are proportionate to the size of project and its impact on biodiversity (see **Technical note T2** on making provision for small scale projects with limited impacts on biodiversity)
- any thresholds that include or exclude development types, locations or sizes for BNG should be explained where they are included – it is recommended that small developments should not be excluded from BNG, but simplified options for smaller developments should be explained (see **Technical note T2** on making provision for small scale projects with limited impacts on biodiversity)
- a requirement that the gain is measurably demonstrated with explicit reference to a biodiversity metric – where appropriate this could be using a recognised calculation methodology, consistently applied across all developments
- clear criteria for the management of BNG sites, whether within the development area or off site
- linkages to complementary strategies.

4.7 DEVELOPING POLICY

Including a BNG policy within a local plan will make the specified requirements a routine part of the development management process. Once it is in place, BNG should become an accepted requirement, along with other environmental requirements such as surface water management or air pollution abatement. A lack of policy makes developer negotiations very difficult and can lead to challenge. Early consideration of policy options during plan making, as described above, should help to formulate a BNG policy.

Where a local plan includes allocations for development, it is necessary to consider whether a generic BNG policy is sufficient, or whether there are additional issues or opportunities that need to be dealt with as part of site allocation specific policy. Where possible, basic baseline data should be gathered on key site allocations. Where baseline data or other information sources indicate that potential site allocations within an emerging plan have particular issues or opportunities for biodiversity, the LPA should establish each of the following:

- whether the allocation should be included or a less damaging alternative pursued
- what specific recommendations for BNG need to be stated as part of the site allocation policy, including locations
- particular requirements for biodiversity information that needs to be submitted as part of a planning application
- restrictions to the type of development that can be pursued on certain parts of the site
- encouragement of a stakeholder-inclusive concept planning stage as part of the planning application process (see **Section 4.8**).

4.8 PLACE-MAKING THE ROLE OF DIFFERENT PLANS

Place-making is a term frequently used in relation to all of the factors that define a place and which draw people to it. There are many ways of describing what place-making is. This guide recognises that it is about designing and developing places that people can feel ownership of, and want to live and work within and enjoy. It is about giving local identity to a place and making it resilient to future challenges. Place-making most successfully happens with the valued input of a wide range of organisations, professionals and local communities, and LPAs are continually seeking new ways of engaging on place-making. Biodiversity makes an important contribution to the value that people place on their local area and the positive local identity that evolves from cohesive planning.

LPAs will often focus on particular areas or clusters of site allocations within their administrative area where more detailed planning policy is necessary or beneficial. This usually leads to the preparation of additional planning documents such as area action plans, masterplans and concept plans. Local communities may also wish to develop their own neighbourhood plans.

If the timing of a local plan review means that an opportunity to embed BNG policy has been recently missed, the lower tier planning documents may present an opportunity to develop BNG before the next local plan review, using a general biodiversity policy that is then expanded into local priorities within these types of plans:

- **Area action plans.** These are formal planning documents that form part of the local plan, with a similar policy structure and purpose, often focusing on a particular settlement. These will follow the same plan-making process as the main local plan and present an opportunity for location-specific BNG to be identified and consulted upon.
- **Master plans and concept plans.** These tend to be the result of a more bespoke process of analysing the development needs of a particular location. They can focus on an individual development allocation of a large scale with a mixture of housing, employment and community uses. The physical buildings are only one part of these detailed plans, and there is normally a focus

on the spaces between buildings and how people move within the area and access facilities. A LPA could work with developers to establish specific biodiversity targets for these types of plans.

Community engagement is often key to the preparation of a masterplan or concept plan. When being taken forward, these detailed plans present an ideal opportunity to realise particular BNG aspirations for an area and enable the good practice principles to be embedded at a very early stage, including engaging the local community, addressing risks and creating a long-term legacy that is owned by the local community. Good practice is for the LPA to make clear that BNG needs to be included in any master or concept planning taking place within a LPA area.

- **Neighbourhood plans.** Neighbourhood plans are prepared by a local community, with the support of the LPA. They should be in conformity with the local plan as once in place they are formally regarded as part of the local plan. Neighbourhood plans provide an opportunity for local residents to define their own biodiversity priorities for their local area.

4.9 SUPPLEMENTARY PLANNING DOCUMENTS AND GUIDANCE DOCUMENTS

Supplementary planning documents and supplementary planning guidance are prepared by a LPA to give additional guidance on how a local plan policy should be implemented. The development of a BNG supplementary planning document has many benefits, including:

- enabling a BNG planning policy to be consistently applied
- providing upfront advice on what is expected from a developer within a planning application
- enabling options for development to contribute to combined BNG initiatives
- allowing for some changes to the approach without waiting for the review of the local plan
- enabling requirements for different development types to be fully explained
- consultation in the development of the document, which allows for consultee input to biodiversity priorities.

The preparation of such documents does require time and resources, and an interim measure may be to develop informal guidance to accompany a policy. The preparation of guidance can often benefit from input from external partners.

4.10 MONITORING

A local plan will include a monitoring scheme that should provide a realistic and meaningful record of the plan's progress towards achieving its objectives. By including BNG indicators as part of local plan monitoring, BNG is further established and understood as an integral part of the local plan.

When a local plan is being prepared, it is important to include indicators to measure progress towards BNG targets for the local plan area. Good practice would include the following.

- Plan these indicators and targets early in the plan-making process, to enable the BNG policy and any associated guidance to be tailored, so that the right information is gathered to inform monitoring.
- Ensure that indicators and targets are relevant for monitoring the success of the policy. These should measure positive success and gains. While losses need to be quantified, they should not form the only measures of BNG success.
- Check that indicators relate to specific targets that a policy has set, for example the biodiversity units created, the number of developments achieving BNG or the achievement of habitat- or location-specific aspirations.
- Add to the biodiversity baseline over time with monitoring information. Updates to the database should allow for BNGs to be added as projects report on their progress. The baseline is kept up to date and a true picture of success can be established.

- Check whether local plan level biodiversity targets should be refined over time. As biodiversity gains are made across a local plan area, new targets may need to focus on different biodiversity priorities. A LPA should be aware of the changing needs of local biodiversity, including having a record of external factors such as climate change.

A database of sites included with an area-wide auditing system introduces further benefits by tracking when a target condition for the habitats has been achieved and where time-limited BNG agreements are ending.

While projects should ensure a biodiversity legacy in accordance with good practice principles, there will still come a time when management is no longer required as part of agreements linked to a development. Maintaining a record identifies where a new development could continue the legacy by providing new BNGs and managing the land in accordance with a new agreement term. This feedback loop can identify where the long-term continuation of previously secured gains in biodiversity could be resourced, while preventing double claiming within the same timeframe.

4.11 INTRODUCING BIODIVERSITY NET GAIN IN THE ABSENCE OF PLANNING POLICY

A LPA has the opportunity to embed BNG within the local plan when the plan is being prepared or reviewed. This is the ideal time for establishing a strategic approach to BNG. While this is optimal, LPAs that have recently adopted a local plan without specific policies or processes in place for BNG are not precluded from taking it forward at the development project level.

Development proposals are approved in accordance with a range of legislation and policy, in addition to the current local plan. Reference should be made to the key BNG drivers in national planning policy when seeking project-level BNGs (see **Technical note T1** on devolved government).

It is likely that there are existing locally developed strategies in place that focus on, or refer to, biodiversity and again these will provide additional justifications for seeking a BNG approach. It is worth checking the content of, for example, GI strategies and whether local biodiversity initiatives such as LNP, Nature Improvement Areas (NIAs) or remaining BAPs to establish whether these can support the application of BNG.

4.12 BIODIVERSITY NET GAIN WITHIN DEVELOPMENT MANAGEMENT

LPAs may find a range of opportunities to advise and work with developers to raise the profile of BNG. The following circumstances are examples of these opportunities:

- **Early consideration of site allocations.** A LPA will liaise with a number of potential developers during the plan-making process. Landowners and developers will highlight land parcels as possible development allocations, and these will be looked at by the LPA in terms of their suitability as site allocations in an emerging local plan.

  Where BNG is being newly embedded into local plan policy, liaison with developers over potential allocations is an ideal opportunity to instil the BNG concept. LPAs could advise the developer what BNG the authority may be looking for on particular site allocations when a planning application comes forward. This prepares the way for more positive and anticipated discussions at the development application stage.

  BNG is now featuring in the corporate strategies of developers. Where this is the case, the LPA could work positively with the developer to enable their corporate targets to be realised.

- **Promotional and advice opportunities.** Once a local plan is in place and BNG is embedded, there may be opportunities to add BNG guidance to the authority website. It may also be beneficial to offer advice and promotional events or training for the main developers in a local area. This work

could be undertaken in partnership with the LERC and other nature conservation organisations. It will also be important to make sure that planning officers are adequately informed of the requirements so that they are able to identify new opportunities for BNG with developers.

Planning officers should seek opportunities to encourage small scale developments to make a proportionate BNG. It will be important for any guidance that supports a BNG approach within a LPA to provide information on how BNG can still be achieved for small scale development (see **Technical note T2**).

- **Giving pre-application advice.** LPAs and other organisations such as the statutory nature conservation bodies or local Wildlife Trusts often provide advice to developers before they submit their planning application. This might be informally through discussion, or formally through a chargeable service. Providing advice on BNG during early conversations with developers is an important opportunity to embed BNG within the planning application process.

  During pre-application advice it will be important to point to any BNG policies or targets that have been established. Early advice to developers enables them to plan and budget for BNG as part of the project (see **Chapter 9**), and in turn this helps make BNG an integral part of development.

  LPAs may wish to familiarise themselves with the business benefits of delivering BNG (see **Chapter 5**) to discuss with developers.

4.13 GETTING READY FOR BIODIVERSITY NET GAIN – GOOD PRACTICE CHECKLIST

The following checklist provides a summary of the matters that need to be thought through so that BNG can be successfully implemented within a planning function.

Table 4.3 Checklist of requirements for embedding biodiversity net gain within a planning function

Requirements for embedding biodiversity net gain in a planning function	Planning function checklist
Partners and stakeholders	Have the right partners and stakeholders been identified? Are there mechanisms in place to engage with, and work collaboratively with, partners and stakeholders?
Ecological skills and support	Is there adequate staff resource or commissioned external resource to provide ecological expertise?
Evidence base	Have all data source options been explored? Are stakeholders being brought together to help collate all available data? How will the evidence base be used?
Standardised data requirements	Has the level of detail required to demonstrate BNG within planning proposals been agreed? Are developers being provided with the right guidance on the data requirements and standard formats?
Demonstration of the mitigation hierarchy	Are the requirements for demonstrating compliance with the mitigation hierarchy clear? What does an applicant need to provide? Who will check and verify?
Agreed metric	Is a standardised means of quantifying biodiversity losses and gains being required, and has this been explained? Can the metric vary or be simplified for small scale development, and has this been explained (see **Technical note T2**)?
Expected net gain for biodiversity defined	Has a minimum level of gain for biodiversity been set, or where it has not, is this justified? Who will check and verify the claim of BNG?
Collaboration with neighbouring LPAs	Has there been adequate co-operation with neighbouring LPAs to ensure that implementation of BNG is complementary and not conflicting? Have all opportunities for collaborative working and data sharing been explored?
Local biodiversity priorities defined	Has the necessary liaison with stakeholders been undertaken to determine the local biodiversity priorities? Are there opportunities for multiple development projects to deliver BNG collectively and, if so, are these being secured?

Requirements for embedding biodiversity net gain in a planning function	Planning function checklist
Adequate provision of guidance	Has guidance been provided to enable applicants to understand the BNG requirements? Does the guidance encourage early consideration of BNG and pre-application discussion?
Enforcement capacity	Is there enough capacity within the authority for monitoring and enforcement of planning conditions and Section 106 (S106) agreements?
Links to other plans and strategies made	Have all opportunities been explored for linking BNG with other LPA work areas? Have these linkages been highlighted in relevant plans and strategies?

4.14 OPTIONS FOR LOCAL PLANNING AUTHORITIES TO FACILITATE DELIVERY OF BIODIVERSITY NET GAIN

A LPA should think strategically about how best to achieve BNG in their local area and provide opportunities for all development types and sizes to make a meaningful contribution. This could include the provision of options for multiple development projects to contribute to a BNG initiative. This could be achieved through financial contributions from developers in accordance with the BNG they are seeking, which then funds the implementation of the gains through a larger scale initiative that is funded by multiple developments. The term 'habitat-banking' refers to a situation where a BNG initiative is set up to serve multiple developments, that is it provides a 'bank' of BNG that individual developers can invest in. This could be planned for strategically, to achieve the best outcomes for biodiversity locally and to secure the best long-term management options. Land could be sought by the LPA or by a third-party broker or it could be provided by a landowner, for example. Strategic provision of BNG could be managed in the long term by a nature conservation organisation, trust or charity.

The success of BNG within a LPA area will be influenced by the extent to which it is organised, administered and reviewed. Good practice would include the development of a formalised structure for checking BNG information submitted with a planning application, overseeing the use of data, establishing and continually reviewing promoted biodiversity priorities for the local area and/or any strategic BNG implementation projects previously described. The governance of BNG implementation within a LPA will be specific to local circumstances but should ideally include relevant external partners in addition to LPA staff. It is recommended that LPAs embarking on BNG should look at the increasing good practice in a range of LPAs already implementing BNG as part of their planning function.

4.15 ADVICE FOR LOCAL PLANNING AUTHORITIES THROUGHOUT THE PROJECT LIFE CYCLE

Part D of this guide relates to the project life cycle and is particularly relevant for the construction industry, but it will provide helpful context for other sectors involved in BNG. To assist LPAs with navigation through the project life cycle sections of the guide, boxes for LPAs appear within relevant chapters in **Part D**. These give specific advice for each project life cycle stage. **Technical note T4** on engaging stakeholders is also of relevance to LPAs and similarly contains boxes throughout. **Table 4.4** and in the advice boxes throughout the chapters, give details of where LPAs can find further help in this guide. All other technical notes are likely to be of direct relevance to LPAs.

Table 4.4 Where to find advice for local planning authorities

Chapter	Guidance provided
7 *Stakeholder engagement*	LPAs can help developers engage with stakeholders, especially local community or specialist groups that the developer might not be aware of. For all stakeholders, check whether they are willing to be contacted directly by the developer, or whether liaison is better undertaken through the LPA. Consider BNG as a genuine opportunity for collaboration, but one that does not preclude valid objections to the development.
8 *Quality assurance*	This chapter includes a specific section on BNG auditing for LPAs at **Section 8.6**.
9 *Feasibility and scoping*	***Section 9.1*** Developers check local plans to make sure that their project meets policy objectives, which helps to secure planning permission. Local plans that include BNG should set clear requirements for developers, such as: ■ what biodiversity information to include in planning applications, in what format, and which metric they should use ■ what information to submit to demonstrate that the project achieves BNG ■ which locations for biodiversity enhancements are priorities. This minimises delays for both planners and developers, and helps to ensure that net gains in biodiversity generate maximum benefits.
	Section 9.2 Local plans should clarify which developments are to deliver BNG and how they should demonstrate this. Ideally, BNGs should be sought on all developments, proportionate to their size and impact. Examples in **Technical note T2** provide both planners and developers with pragmatic approaches for small-scale development or developments with minimal biodiversity loss to achieve net gains.
	Section 9.5 When setting BNG in local policy, carefully consider whether specific goals for BNG can be stipulated, for example, goals relating to gains for particular habitats or species, or a minimum gain in biodiversity that development projects must achieve. See **Chapter 5** on incorporating BNG within local plans and policies.
10 *Ecological impact assessment*	***Section 10.1*** Provide advice to developers on available ecological data, recommending contact with the local environmental records centre where appropriate. Highlight any other relevant information, such as local GI strategies. Provide advice on social and cultural values of biodiversity where possible, such as from data on people's use of green spaces.
	Section 10.5 When developing biodiversity policies for a local plan, highlight the importance of applying the mitigation hierarchy, in accordance with national planning policy. Consider providing guidance clarifying how to demonstrate application of the mitigation hierarchy as part of a planning application. Evidence of application of the mitigation hierarchy is a key element in assessing and determining a planning application.
11 *Design*	***Section 11.2*** Before planning proposals are submitted, working with developers on their design for BNG can secure a high quality planning application, for example by highlighting local priorities that their BNG design can contribute towards.
	Section 11.3 The advice in this section should be used to: ■ review a project's BNG design to ensure that it delivers optimal benefits as far as possible ■ establish a plan-led approach to BNG that incorporates all key considerations ■ produce guidance for developers on BNG that is specific to the administration area. If several biodiversity projects are taking place within one area, good practice requires the BNG design to be clearly additional to the other projects, and to maximise complementary interactions with other projects. This helps avoid a piecemeal approach. However, care should be taken to avoid situations where landowners or managers choose between BNG and other biodiversity-related projects and lose a benefit that would have otherwise been provided.
	Section 11.5 When accounting for BNG across one or more districts or boroughs, only include gains over and above measures that avoid, minimise or compensate for impacts on biodiversity. Consider providing tools and guidance on how BNG should be identified in a planning application, so it is easily accounted for when auditing the administrative area.

Chapter	Guidance provided
11 Design	***Section 11.6*** Set consistent expectations on timeframes for maintaining BNG, so as to give developers a level playing field. This is especially important for requirements such as those stipulated in S106 agreements. If consistency is difficult, for example where development projects vary in size, consider a minimum timeframe, with the actual timeframes set depending on the scale of the project's impact on biodiversity. When giving planning permission, include clear and enforceable targets and timeframes for BNG. Consider if BNG management plans should be required when giving planning permission, weighing up the needs for a developer to commence work on site. If BNG activities are incorporated within existing management plans, ensure that BNG is clearly distinguished and quantified. Depending on its likely complexity, the management plan could be required under a S106 legal agreement, or it could be an additional requirement stipulated within that agreement, but developed separately. The fundamental aspects of management need to be secured as part of the planning permission documents, while details may be developed as a requirement of the permission given.
12 Construction	***Section 12.4*** When liaising with developers and checking submitted documentation, look for evidence of time-lag minimisation. Ask developers to explain the reasons for any time-lag. Consider providing developers with guidance clarifying how to demonstrate application of the mitigation hierarchy as part of a planning application, and the importance of time-lag minimisation.
13 Maintenance and monitoring	***Section 13.3*** Secure long-term management and monitoring of BNG through the planning permission, for example through the conditions of planning or legal agreements associated with the permission such as S106 agreements. Include requirements for a monitoring and adaptive management regime that provides: ■ clear, timed and measurable objectives for BNG ■ a commitment to adaptive management in response to monitoring ■ a formal review process when objectives are not fully reached to set the appropriate course of action ■ key milestones for reviewing the monitoring ■ allowance for reasonable amendments to ongoing maintenance of BNG when shortfalls occur because of unforeseen (and acceptable) circumstances ■ data in a standard format to allow for its collation into an area-wide biodiversity database. Consider establishing a panel with organisations such as Natural England, nature conservation organisations and the LERC to review monitoring from all BNG projects within the administrative area to capture lessons learnt and plan for new BNG initiatives that build on previous projects.
Technical note T4	LPAs could assist by checking the stakeholder consultation strategy to establish whether any key contacts have been missed. Stakeholders could include relevant staff within the LPA. Officers from a range of departments, including those relating to health, education, countryside management, biodiversity, air quality, planning, GI, social care and sustainable transport could be considered. Where consultation events are taking place for local plan making purposes, there may be an opportunity to include development site specific stakeholder engagement, particularly where a forthcoming development project is associated with a local plan site allocation option. LPAs should provide information on any established priorities for biodiversity (and those of its partners) to be shared at consultation events. If BNG targets have been set within the local plan or other strategies, share and explain these for inclusion. Make BNG expectations clear to developers so that they can effectively plan their stakeholder engagement through pre-application advice, as well as publishing guidance online. Early involvement with stakeholders can be effective in reducing objections to a planning application. LPAs should check that key stakeholders are being kept up to date with anticipated timetables of events. BNG is an evolving practice. Sharing lessons learnt will secure better outcomes as BNG becomes established. Encourage developers to undertake joint lessons learnt reviews so that new projects can benefit from experience.

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Part C describes the business advantages from adopting the good practice principles. It also contains advice on selling the business case to commercial organisations, and provides references to more information.

5 Business case for developers

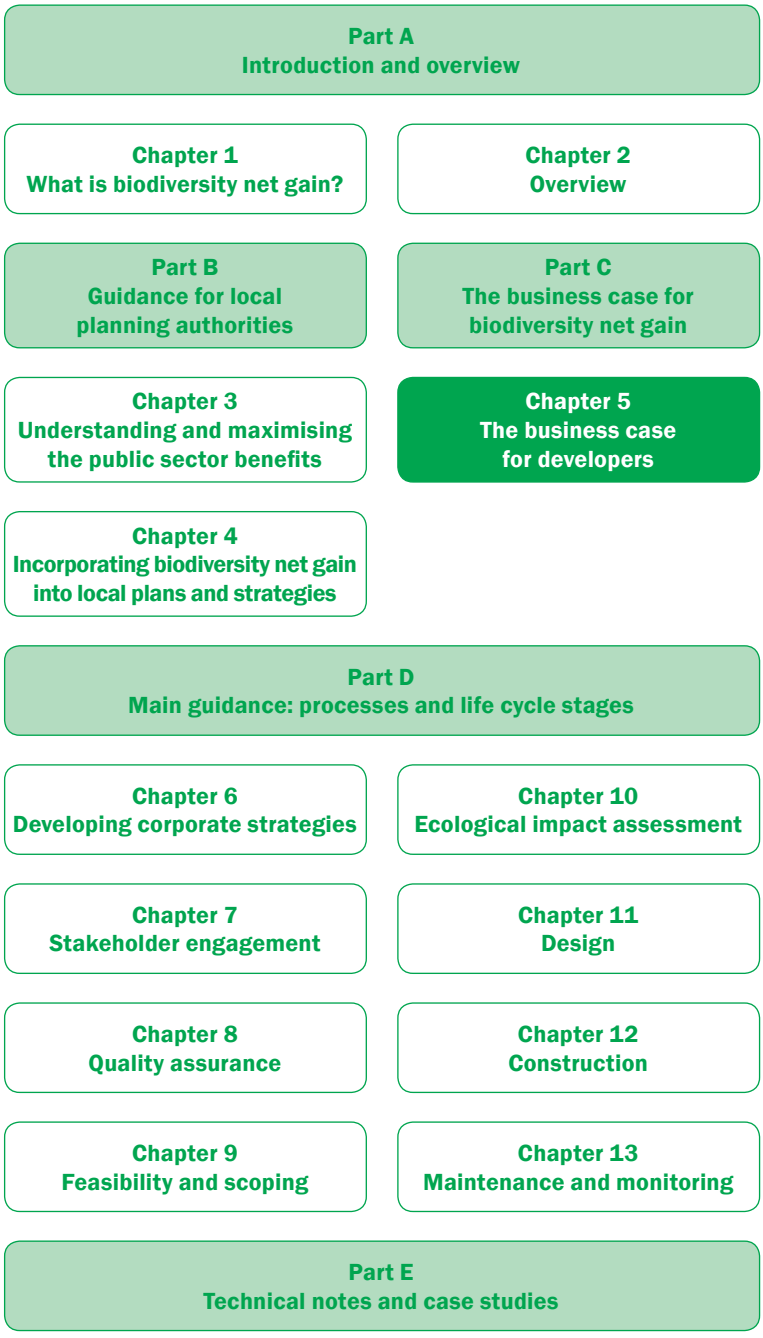
Summary

Adopting the good practice principles for BNG offers several business advantages. These are relevant for new developments and maintenance activities. They apply to developers who own or buy land to develop, and to their supply chain partners including consultants, suppliers, contractors and maintainers who support decision making throughout a project's life cycle.

The business advantages are described under the categories of:

- gaining a competitive advantage (Section 5.1)
- increasing financial value (Section 5.2)
- securing efficiencies (Section 5.3).

Section 5.4 contains advice for practitioners who need to sell the business case to commercial organisations, and Box 5.2 contains references with more information.



5.1 GAINING A COMPETITIVE ADVANTAGE

"One of our core priorities is designing and delivering great places to live in. Working to deliver net gain for biodiversity via planning conditions or voluntarily gives housebuilders the opportunity to innovate on how to deliver homes for nature, and improve places for both the existing and new communities."

David Thomas
CEO, Barratt Developments PLC

"By considering up front how construction schemes can boost biodiversity, the need to build more infrastructure to support economic growth and provide new houses and places of employment can be balanced with environmental concerns. But to make this possible, we must move away from the current 'development versus nature' scenario to infrastructure projects that help deliver government priorities for both national infrastructure and biodiversity."

Leo Quinn
Group Chief Executive, Balfour Beatty

Be ready for the future

The UK Government's 25-year plan for the environment describes its ambition to mainstream BNG (HM Government, 2018). For businesses, experience in BNG will help to anticipate implications for the organisation and ensure a smooth transition when aligning projects and operations with requirements to deliver BNG.

Improve work-winning potential

Many commissioning agencies require their projects to improve the environment. Some have specific biodiversity commitments (see **Box 1.3**) or projects where LPAs stipulate BNG (see **Box 1.2**). For companies tendering for work, adopting the good practice principles and proving expertise in applying them can be a crucial differentiation factor.

Improve site selection

The good practice principles for BNG can help companies to improve site selection by:

- avoiding costly consent processes and rectification measures by applying the mitigation hierarchy early (eg avoiding highly biodiverse features)
- gaining stakeholder input to identify areas where supporting local biodiversity priorities will be most valuable
- quantifying (and budgeting for) resources to achieve BNG by estimating the biodiversity outcomes of sites being considered.

Improve site acquisition

Companies committing to BNG can be better placed to acquire land, for example when bidding for land to develop, by demonstrating that their project will benefit local communities through enhancing biodiversity.

Secure consents

Companies can avoid costly delays to obtain consents or permits by:

- applying the mitigation hierarchy, measuring biodiversity outcomes and making evidence-based decisions to demonstrate that legal and planning conditions have been met or exceeded
- demonstrating how their project supports local biodiversity priorities
- engaging stakeholders early to address their concerns and 'smooth progression through the planning process' and minimise 'misunderstanding and controversy' as described in CIEEM (2018).

For projects requiring EIAs, an Environmental Statement (ES) that demonstrates that the project would achieve BNG can also avoid lengthy (and costly) consent processes.

Improve stakeholder relations

Communicating BNG activities transparently, supporting local priorities for biodiversity and engaging stakeholders can all improve relations with regulators, local communities and other stakeholders. While this does not sidestep issues that the stakeholders may wish to raise about a project's effect on biodiversity, it does provide a collaborative basis to work. It can also help win wider acceptance of a project, especially by local communities and interest groups.

Demonstrate sustainability leadership

Implementing the good practice principles can demonstrate leadership in sustainable management practices, for example by:

- initiating technical innovation for less invasive working methods and smaller working footprints
- gaining trust and confidence from reporting biodiversity performance
- going one step further, to drive a new visibility of industry's reporting of biodiversity losses and net gains
- demonstrating a contribution towards local, regional and national biodiversity priorities
- demonstrating how BNG efforts are supporting the UK to deliver the United Nations sustainable development goals (UN, 2015) especially halting biodiversity loss
- communicating the benefits for communities and the economy arising from BNG, especially in terms of a project's legacy
- leading advances in sustainable development within industry, eg net positive by the NextGeneration (2017) housing benchmark
- sharing lessons learnt to support wider industry uptake of BNG.

Boost reputation

Sustainability leadership will boost a company's reputation, and can also secure a competitive advantage. Winning biodiversity awards (see **Case study 5.1**), scoring highly in third-party certification schemes such as BREEAM, ranking highly in sustainability benchmark schemes and investor-based corporate responsibility indices (eg Vigeo Eiris) will also enhance reputation and provide evidence of expertise when tendering for work. Alternatively, there are reputational risks if the good practice principles are not followed.

Case study 5.1
Winning the BIG Biodiversity Award

At CIRIA's 2017 BIG Biodiversity Awards, the team of Atkins, City of London and BAM Nuttall, who worked on biodiversity initiatives of the Hampstead Heaths Ponds Project, were singled out by the judges when they won the large-scale permanent award: *"the judges noted how this project had biodiversity enhancements added throughout and at every level. The team's strong ethos of going over and beyond the original driver of flood mitigation to enhance biodiversity was very clear. Judges recognised the effective and massive amount of community engagement."*

5.2 INCREASING FINANCIAL VALUE

Create high-quality places

Implementing the good practice principles can create buildings, public parks and other spaces that enhance people's wellbeing and quality of life. They can also enhance 'place-making' to strengthen the connection between people and places. All of this can attract investment into an area and increase the financial value of assets such as housing. It can also increase footfall (eg the number of people entering a shopping area) to benefit investors (see **Box 5.1**).

Gain additional benefits

Developments that achieve BNG can secure additional environmental benefits, such as improved air quality, soil stability, flood management and adaptation to climate change. This is valuable for companies seeking to demonstrate the wider value of their projects and for landowners seeking to maximise the benefits from investing in BNG (see **Box 5.1**).

Deliver existing commitments

BNG is a way of delivering existing commitments. For example, companies with sustainability commitments, such as addressing flood risk or enhancing the wellbeing of local communities, can also achieve these commitments through BNG (but see **Technical note T10** regarding additionality).

Boost productivity

Companies with a proven record on sustainable development, including delivering BNG, can attract and retain high-quality employees. Premises with enriched natural surroundings have been shown to boost employee productivity (see **Box 5.1**).

Box 5.1
Evidence on social and economic benefits of biodiversity

Rolls and Sutherland (2014) *Microeconomic evidence for the benefits of investment in the environment 2 (MEBIE2)*

This is a guide to the benefits of investing in the natural environment. It contains evidence and case studies, with a particular focus on England, to help readers make robust arguments to the effect that investment in the environment represents a rational use of limited funds. For example, there is evidence on:

- people paying more for properties with views of nature
- the natural environment boosting employee productivity
- vegetation, particularly trees, contributing towards air quality improvements.

Defra (2013) *To what extent does green infrastructure improvement act as a catalyst for economic growth? An assessment of the international and UK evidence (previously project number*

This report presents evidence that green infrastructure (GI) increases economic growth. It defines GI as a planned approach to the delivery of nature within a city in order to provide benefits to residents. It shows that GI contributes to both local economic growth and the welfare of the local and visitor population (in terms of mental and physical health and environmental quality). It also shows that GI clearly makes a contribution to the resilience and sustainability of economic growth in a particular place, through reducing important risks such as flooding and the urban heat island effect.

Maximise new commercial opportunities

An estate or landholding can be an opportunity to provide BNG activities to other developers on a commercial basis (see **Case study 5.2**). For example, creating or enhancing habitats and maintaining these for a set time period in return for a financial fee.

Case study 5.2
Tees Estuary habitat banking system

The Tees habitat banking system provides a strategic approach to land availability to meet the biodiversity requirements of developers and it will lead to a simpler planning process. After applying the mitigation hierarchy, developers can purchase 'biodiversity credits' generated by habitat creation or enhancement to offset residual biodiversity losses caused by development. Landowners can feed land into the process, while retaining ownership of it, to gain credits from developers who wish to pay for land management as part of their biodiversity requirements. The approach will underpinned by legal agreements.

For more details see Case study 24 in C776b.

5.3 SECURING EFFICIENCIES

Improve risk management

Applying the mitigation hierarchy can minimise the risk of delay and unnecessary costs from failing to address a project's potential effects on biodiversity earlier in the process. This risk can also be addressed by measuring a project's biodiversity outcome to clarify the budget and resources needed to address biodiversity loss and achieve BNG.

Improve land management

Management of an estate can be made more efficient by securing wider environmental benefits alongside delivering BNG, for example by creating habitat for wildlife that also improves a site's flood resilience.

Ensure an efficient design process

When a company commits to BNG, the process of designing it can be streamlined. For example, projects involving EcIAs will already be undertaking many of the activities to design BNG. The process of designing BNG can add value, such as engaging local stakeholders who can help assess the suitability of sites marked for habitat creation.

For companies with an estate or a portfolio of projects, demonstrating landscape-level gains in biodiversity can simplify how BNG is achieved.

For example, a company has several projects in close proximity. After following the mitigation hierarchy, each project causes a loss of biodiversity. Rather than treating each project in isolation, BNG is designed to deliver net gain for each project individually, as well as net gains at the landscape level.

5.4 SELLING THE BUSINESS CASE AND ADDITIONAL INFORMATION

Figure 5.1 contains advice for those involved with selling the business case for BNG to commercial organisations, and **Box 5.2** contains references with more information.

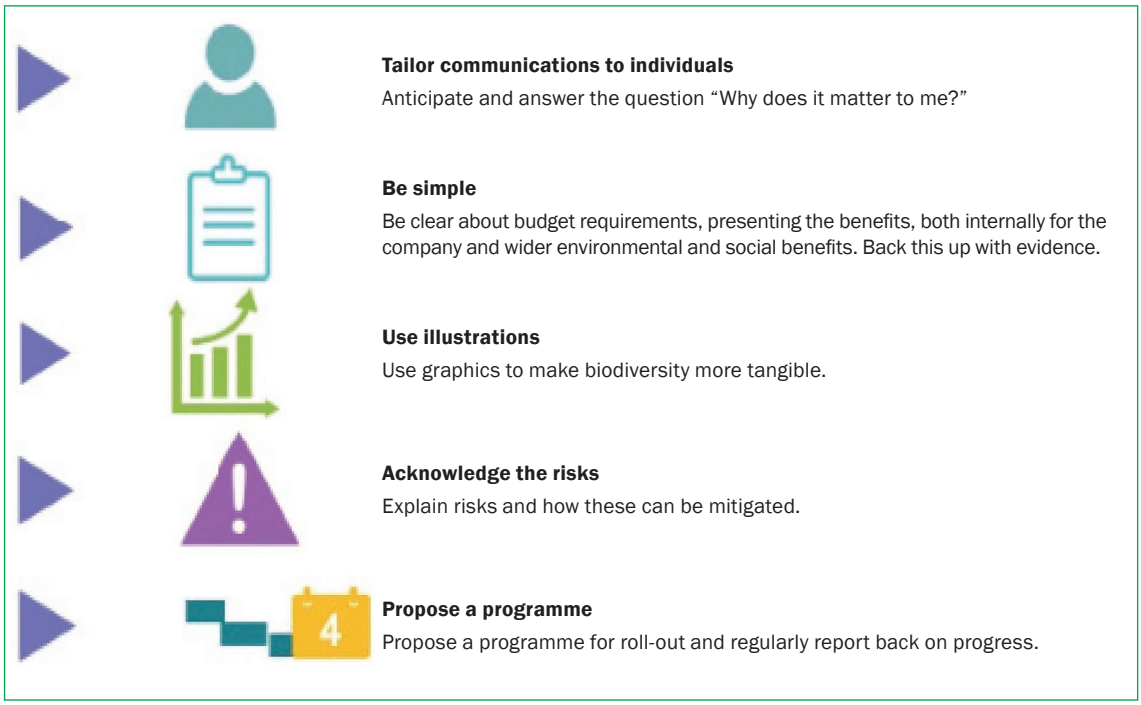


Figure 5.1 Advice on selling the business case for BNG to commercial organisations

Box 5.2
Additional literature on the business case for BNG

Dale et al (2011) Delivering biodiversity benefits through green infrastructure

This guide is a tool for construction professionals to maximise the opportunities to development projects by enhancing biodiversity through green infrastructure. It includes a chapter on the benefits of biodiversity to the economy and society.

www.ciria.org

IUCN (2015) Net positive impact on biodiversity: the business case

This report summarises the business case for private sector applications of net positive impact (NPI). It outlines the opportunities available for businesses to adopt good practice biodiversity management by applying NPI in their operations.

https://portals.iucn.org/library/node/45848

MA (2005) Ecosystems and human wellbeing. Opportunities and challenges for business and industry

This report summarises the findings of the millennium ecosystem assessment for the business community and describes how the findings affect the 'bottom line' for businesses large and small, throughout the industrial and developing world, illustrating the business case to halt biodiversity loss.

https://www.millenniumassessment.org/en/Framework.html#download

TEEB (2012) The economics of ecosystems and biodiversity in business and enterprise

This report documents the growing corporate concern about biodiversity loss, and offers examples of how leading companies are taking action to conserve biodiversity and restore ecosystems. It shows how businesses can align their actions in relation to biodiversity and ecosystem services with other corporate responsibility initiatives, including community engagement and poverty reduction.

http://www.teebweb.org/publication/the-economics-of-ecosystems-and-biodiversity-teeb-in-business-and-enterprise

Sustainable Development Goals

The 17 Sustainable Development Goals are an urgent call for action by all countries (both developed and developing) in a global partnership. They recognise that ending poverty and other deprivations go hand-in-hand with strategies that improve health and education, reduce inequality, and spur economic growth, while tackling climate change and working to preserve the world's oceans and forests.

https://sustainabledevelopment.un.org/?menu=1300

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Part D contains detailed advice on implementing the good practice principles for BNG throughout a project life cycle. The chapters are aimed at industry practitioners involved with delivering BNG for a project, including ecologists, EIA co-ordinators, environment and sustainability managers, consent managers and landscape architects. For local planning authorities, the chapters contain pointers on what to expect at each life cycle stage and how to support BNG initiatives.

Developments and maintenance activities involving PEA, EcIA and EIAs will already be undertaking many of these activities. Links with these assessments are identified throughout, with reference to CIEEM (2018) and are summarised in **Technical notes T6 and T7**.

For developments with low-level impacts on biodiversity or without specialist ecological input especially small-scale projects, **Technical note T2** contains advice on achieving BNG.

6 Developing corporate strategies

Summary

Developing corporate strategies on BNG can involve the following activities:

- assess risks and opportunities (Section 6.1)
- identify gaps (Section 6.2)
- phase implementation (Section 6.3)
- commit to good practice (Section 6.4)
- establish key performance indicators (KPIs) (Section 6.5)
- monitor progress and performance (Section 6.6)
- review (Section 6.7)
- plan external communications (Section 6.8)

Which activities to implement, and to what extent, depends on the organisation. For example, a small housing contractor could simply commit to adopting the good practice principles when a LPA requires BNG (see Technical note T2 for advice for small developments), whereas a large mineral extraction company could develop a phased five-year plan to implement all activities.

Case study 6.1
Transport for London's biodiversity commitment

Transport for London (TfL) committed to protecting and enhancing its natural assets and has a target of delivering 'net gain biodiversity' – the principle of leaving biodiversity in a better state than that in which it is found.

TfL (2014) aims to *"protect, manage and enhance the natural environment within our landholding"* and *"measure and report on the percentage of our landholding with improved habitat and biodiversity quality"*. This aligns with Policy 5.2.1 of the draft Mayor of London's (2017) environment strategy that states that the Mayor will *"protect a core network of nature conservation sites and ensure a net gain in biodiversity"*. It also aligns with the Mayor of London's (2018) transport strategy, of which Policy 7 states that the *"Mayor will ensure that transport schemes in London protect existing and provide new GI wherever practicable to deliver a net positive impact on biodiversity"*.

6.1 ASSESS RISKS AND OPPORTUNITIES

A useful starting point is to determine why BNG is relevant to the organisation, by assessing what the risks and opportunities are. This provides clarity for senior managers and gives the information needed to develop the corporate strategy. Risks include requiring additional budget to achieve BNG or inappropriate communication that attracts criticism. Opportunities include gaining a competitive advantage and the other business benefits described in **Chapter 5**.

BBOP (2018) describes how to undertake a risk and opportunity assessment when commercial organisations plan for BNG. It also gives examples of risks and opportunities when pursuing a BNG agenda.

6.2 IDENTIFY GAPS

A gap analysis of differences between 'business as usual' projects and those achieving BNG will identify the requirements for BNG, such as resources, skills, budget, management tools (eg databases) and programme (see **Case study 6.2**). Addressing these gaps can be part of phasing implementation of BNG.

A gap analysis can also identify an organisation's maturity with BNG, from which to plan a phased implementation. For example, BS 8900-1:2013 enables organisations to assess their current maturity with sustainable development using a maturity matrix. The results inform decisions on implementing principles of sustainable development.

Case study 6.2
A gap analysis on BNG for Redrow Homes

Atkins was appointed by house developer, Redrow Homes, to analyse the biodiversity gains of three housing sites in England. Protecting and enhancing biodiversity is a key part of Redrow Homes' sustainability strategy. The Atkins team used the Defra biodiversity metric to analyse three sites, along with a literature review to help inform a wider biodiversity strategy. The study gave Redrow an in-depth insight into how it could encourage biodiversity gains on future developments. The company is now progressing their biodiversity agenda based on the findings of the study and developing measurable targets to enhance biodiversity on all their developments.

For details see: **http://www.atkinsglobal.com/en-GB/projects/working-towards-biodiversity-gain**

6.3 PHASE IMPLEMENTATION

A corporate strategy that phases implementation of BNG can be most efficient and successful. When using information from the risk and opportunity assessment and gap analysis, phased implementation can include the following:

- **Scope**. Setting the scope of BNG is essential, for example phasing over time the business units, projects and activities that will achieve BNG (see **Table 6.1**). An organisation should clearly communicate its scope and reasons why, for example not including its supply chain until implementing BNG on its projects is successful.

Table 6.1 Phasing the scope of biodiversity net gain over time

Scope	Starting with:	Progressing to:
Operational unit	Selected operational units	All units
Projects	Projects above a certain budget or size	All projects
Activities	Certain activities, eg construction	All activities, eg construction and routine maintenance
Footprint	Project footprint	Project footprint and supply chain

- **Pilot testing.** This can generate invaluable learning that improves the roll-out of BNG across an organisation, for example, pilot testing a metric to measure losses and gains in biodiversity on a few projects before rolling out the metric to all projects. Such learning is worth sharing, especially to help other private and public sector organisations who are considering adopting the good practice principles for BNG.

  A programme to show how pilots fit within an anticipated timeframe for achieving BNG should be developed, and this can help to secure resources and monitor progress of the corporate strategy (see **Section 6.7**).

  BBOP (2018) provides guidance for an organisation to review the implications of delivering BNG in the context of its direct footprint or through its value chain, and to implement BNG following iterative stages of 'Plan Do Check Act'.

- **Addressing gaps.** To identify gaps in analysis that can be phased over time, starting with the priorities. Gaps might include:
  - ☐ securing budgets, eg for long-term monitoring of BNG activities
  - ☐ establishing reporting lines, eg reporting progress to senior managers
  - ☐ allocating staff resources
  - ☐ assigning responsibilities
  - ☐ building internal competencies
  - ☐ developing management tools such as databases, reporting systems and dashboards (see **Case study 6.2**).

Case study 6.3
Setting organisational goals for biodiversity

Berkeley Group committed to *"develop and apply an approach to ensure that all new developments create a net biodiversity gain"*. It worked with Waterman Infrastructure & Environment Limited to develop a biodiversity toolkit. The toolkit helps internal teams, together with their ecologists and landscape architects, to calculate, enhance and manage biodiversity on site. The toolkit enables reporting against the net biodiversity gain target at both project and organisational level. It stores data on sites' biodiversity baselines, and highlights the amount and types of habitats needed to deliver net biodiversity gain. The toolkit is used to monitor the biodiversity requirements during the development process and to identify maintenance regimes.

For examples of projects led by the Berkeley Group as a result of its BNG target, see Case studies 18 and 19 in C776b.

6.4 COMMIT TO GOOD PRACTICE

Committing to implement the good practice principles for BNG (and then demonstrating this) is invaluable. Such statements in a corporate strategy set a clear direction for an organisation. It also sends a clear message to its clients and suppliers.

For projects requiring consents or planning permission, committing to the principles can facilitate discussions with LPAs and statutory advisors, especially those who have endorsed the principles.

This commitment should be linked with the organisation's implementation of BNG. For example, organisations piloting BNG could commit to a phased implementation whereas those with experience could pledge that all new projects will achieve BNG (see **Box 6.1**).

Box 6.1
Examples of corporate commitments to biodiversity net gain

- The organisation should commit to a phased implementation of the BNG principles (Baker, 2016) over five years. This includes quantifying the biodiversity outcomes from existing practices, pilot testing BNG on large-scale projects and using lessons from the pilots to roll out BNG within the organisation.
- All new projects will adopt the principles to achieve BNG (Baker, 2016). This includes applying the mitigation hierarchy, seeking BNG in partnership with stakeholders and generating long-term benefits for both biodiversity and people.

See BBOP (2018) for more examples on commitments to BNG.

6.5 ESTABLISH KPIs

BS 8900-1:2013 offers advice for organisations to develop an approach to sustainable development. Its recommendations include setting objectives for sustainable development and identifying KPIs to assess progress and performance in achieving these.

Activity-based KPIs

For BNG, a practical starting point is to set KPIs on undertaking activities that help an organisation achieve BNG. Examples of activity-based KPIs are shown in **Table 6.1**.

Table 6.1 Examples of activity-based KPIs and how they can support progress towards biodiversity net gain

Activity-based	Supporting progress towards biodiversity net gain
Staff are trained on the good practice principles for BNG	Building skills and capabilities
	Informing staff about the business advantages of BNG and motivating them to embed the principles within their work
Each project submits evidence on applying the mitigation hierarchy as part of performance reporting	Embedding this critical stage of BNG within business operations
Each project measures its biodiversity baseline	Piloting this aspect of BNG to learn what is involved and the associated resource, time and budget requirements
	A first step towards integrating measurements of biodiversity within business operations
Each project measures its biodiversity baseline and outcome	Fully integrating measurements of biodiversity within business operations
	Understanding the resources, time and budgets needed to achieve BNG on future projects, eg from the amount of biodiversity that existing projects need to achieve net gain
	Commencing annual biodiversity performance reporting (eg for a business unit or portfolio of projects), which increases visibility of BNG to senior management
Tools for reporting progress towards BNG (eg biodiversity dashboards, toolkits, calculators) are developed and applied	Engaging staff
	Putting BNG into operation
	Streamlining implementation of BNG, eg minimising risk of human error or inconsistency in data entry and reporting
Pilot implementation of the good practice principles for BNG	Gathering learning to improve wider application and roll-out within the organisation
Opportunities for site compounds and offices to achieve BNG are reviewed	Engaging all levels of staff in BNG activities
	Raising awareness that achieving BNG is not just for projects or operational activities, but also for places of work
Feedback is gathered on what went well and what can be improved	Engaging all levels of staff and improving the roll-out of BNG
Case studies on projects that achieve BNG are produced	Raising the profile of BNG within the organisation, especially with senior management

Outcome-based KPIs

As experience with BNG develops, an organisation should progress to KPIs on outcomes regarding achievements in BNG. **Table 6.2** gives examples of measures that can be used for such KPIs.

KPIs on achieving BNG can be for individual projects, at the corporate level or for operational units, especially to include places of work (ie not just projects or activities). They should include the good practice principles, for example by linking BNG activities with targets in the local GI strategy to 'make a measurable net gain contribution'.

Setting outcome-based KPIs has several advantages, including capitalising on the business advantages of BNG described in **Chapter 5**. However, there are potential pitfalls to avoid, for example when setting percentage targets. These are illustrated in **Table 6.2**.

Table 6.2 Examples of outcome-based KPIs, the activities to achieve them, business advantages and how to avoid potential pitfalls

Outcome-based KPIs	Example activities to achieve KPI	Business advantages	How to avoid pitfalls
Individual projects			
Achieve net gains in biodiversity affected by a development in a way that contributes towards local priorities for biodiversity.	Project X results in permanent loss of woodland after following the mitigation hierarchy. It achieves BNG by creating new areas of native-species-rich woodland in areas identified for woodland creation in the local biodiversity plan.	Quantifying a project's contribution towards local biodiversity plans is a powerful message for an organisation to demonstrate the wider value, and legacy, of its project.	Link to published biodiversity plans (eg those by LPAs) to avoid a numbers-focused approach where BNG is achieved on paper but means little in practice, eg woodland is created but in areas inaccessible to the target species. Ensure that the contribution towards local biodiversity priorities is measurable and proportionate with the biodiversity affected by a project.
Achieve net gains in habitats affected by a development by creating habitats, or enhancing their condition, to secure long-term benefits.	Project X results in permanent loss of woodland after following the mitigation hierarchy. It enhances a nearby woodland reserve into a quality sufficient for designation as a County Wildlife Site, and creates a buffer around the reserve to help protect it from harmful activities.	Demonstrates leadership by sending a strong message that BNG is not only about creating new biodiversity features, but addressing drivers of biodiversity decline such as (in this example) enhancing the quality of, and increasing protection for, valuable features. Other examples include facilitating wildlife to adapt to climate change and enhancing natural connectivity.	Establish long-term safeguards to avoid future failure. For example, ensure that there is sufficient funding and resources to maintain BNG for the long term. Ensure that the contribution towards local biodiversity priorities is commensurate with the biodiversity affected by a project.
Achieve net gains in habitats used by species in decline.	Project X will install 10 nesting sites for house sparrows (on the UK's 'red list' of Birds of Conservation Concern) and increase their food supply by creating features to provide seed and to attract insects.	Ensures BNG is not just about outweighing losses with gains but generates meaningful benefits by supporting the UK's biodiversity priorities. Delivers meaningful benefits by targeting BNG towards key species not directly accounted for within some biodiversity metrics.	Establish long-term safeguards to avoid future failure. For example, ensure that there is sufficient funding and resources to maintain BNG for the long term. Ensure the contribution towards local biodiversity priorities is measurable and proportionate with the biodiversity affected by a project.
Corporate level			
All projects increase biodiversity by a set minimum percentage that contributes towards local and strategic priorities for biodiversity.	All projects will achieve a minimum (for example) 15% increase in biodiversity (higher for projects affecting sensitive biodiversity features) that contribute towards targets in local biodiversity plans.	Enables early planning and budgeting by providing clarity on what is to be achieved. Avoids lengthy discussions on BNG for individual projects. Encourages competition between project teams to achieve the highest percentage. Focuses attention on transparency regarding a project's biodiversity baseline. Ensures that claims of BNG are not just above 'NNL'.	Check for any existing percentage targets on BNG (eg by the LPA) to avoid conflicts. Assess whether a blanket percentage increase for all projects will always be appropriate. For example, the increase is not possible in a particular location because of ecological constraints. Avoid situations where projects with complex biodiversity features dismiss the voluntary percentage increase because it is too onerous (and the opportunity to achieve any biodiversity benefit is lost). Ensure transparency when establishing a project's biodiversity baseline (ie the reference scenario to compare the net gains outcomes) to avoid accusations of false reporting.

Outcome-based KPIs	Example activities to achieve KPI	Business advantages	How to avoid pitfalls
			Link the target to published biodiversity plans to avoid penalising projects that make important contributions to these plans but do not meet the target, eg a project increases an extremely rare habitat by 5% to make a substantial contribution towards local biodiversity plans, compared with a project that increases a commonly occurring habitat by 20% that only makes a limited contribution. Set the target through a collaborative process with stakeholders to avoid allegations that the target is greenwashing. Ensure that contributions towards local biodiversity priorities are commensurate with the biodiversity affected by a project. Ensure sufficient accuracy in the measurement of losses and gains in biodiversity, eg if the metric is too crude to distinguish change within 15% then targets within this range are meaningless.
Projects increase biodiversity by a percentage that is set on a project-by-project basis, ensuring that it is proportionate to a project's impact on biodiversity.	Project X will increase coverage of calcareous fen within the district borough by 10%, contributing to the district's biodiversity action plan target for this habitat.	Demonstrates leadership by a considered and proportionate approach based on the project's specific context and its surrounding landscape. Enable flexibility to set targets based on a site and its surrounding landscape. Enables the company to achieve a set increase in biodiversity while enabling flexibility at the project level.	Avoid projects with low biodiversity baselines doing the minimum to claim net gains in biodiversity. Ensure sufficient accuracy in the measurement of losses and gains in biodiversity to distinguish change (as above). Requires safeguards to avoid projects setting easy targets to deliver BNG that are disproportionate to a project's effects on biodiversity.
Projects contribute towards local, regional and/or national targets for biodiversity.	BNG activities by each project are a quantifiable net gain contribution to the UK's biodiversity.	Demonstrates leadership by seeking to underpin and support delivery of government targets for improving biodiversity.	Define a 'quantifiable net gain contribution to the UK's biodiversity' through a collaborative process with stakeholders, to avoid allegations of greenwashing. Ensure that the net gains are commensurate with a project's effects on biodiversity. Update regularly to ensure alignment as priorities for biodiversity change over time.
The business unit achieves an overall (for example) 15% increase in biodiversity.	All projects, site compounds and offices seek BNGs that contribute towards local and strategic biodiversity priorities.	Enables flexibility as some projects, compounds or offices might not be able to achieve BNG, whereas others can.	Ensure sufficient accuracy in the measurement of losses and gains in biodiversity to distinguish change (as above). Requires safeguards to avoid projects with low biodiversity baselines doing the minimum to achieve BNG and to avoid penalising projects that achieve a smaller percentage increase in biodiversity but make important contributions to strategic priorities.

6.6 MONITOR PROGRESS AND REVIEW PERFORMANCE

Organisations should establish a programme and assign responsibilities to monitor progress and review performance in implementing a corporate strategy on BNG. This is also an opportunity to identify improvements or updates, for example when progressing from activity-based to outcome-based KPIs, or expanding the scope from projects to also include supply chains.

Incorporating monitoring within existing procedures, especially to link with mechanisms for continuous improvement, can streamline uptake of BNG. Monitoring individual projects can also support audits of BNG (see **Chapter 8**) and an organisation's communications on BNG (see **Technical note T10**).

6.7 PLAN EXTERNAL COMMUNICATIONS

The good practice principles on BNG include engaging stakeholders early and communicating BNG activities in a transparent and timely manner, sharing the learning with all stakeholders. Transparent communications is not only good practice but helps to establish credibility.

Companies benefit from combining communications on BNG with existing stakeholder engagement activities. This especially regards corporate strategies, for example if piloting BNG:

- Announcing the pilots can engender stakeholder input to improve roll-out of BNG, but care should be taken not to raise expectations on what the company aims to achieve.
- Alternatively, communicating after completing the pilots avoids unrealistic expectations but misses the opportunity to collaborate at a key learning stage. It could also result in mistrust because of the lack of transparency and stakeholder engagement.

Planning communications should involve securing the necessary resources and expertise for communications to withstand scrutiny.

When communicating achievements in BNG, organisations should clarify whether communicating predicted or actual achievements.

This often depends on the life cycle stage of a project (see **Table 6.3**). For example, within the housing industry, a builder will often buy land to build residential homes and will then sell the land when building is complete. If the builder designs and implements net gains in biodiversity that will be achieved in 30 years' time, the builder can report actual losses and gains in biodiversity from the construction stage and the predicted BNG outcomes in 30 years.

Table 6.3 Communicating biodiversity net gain achievements during the project life cycle

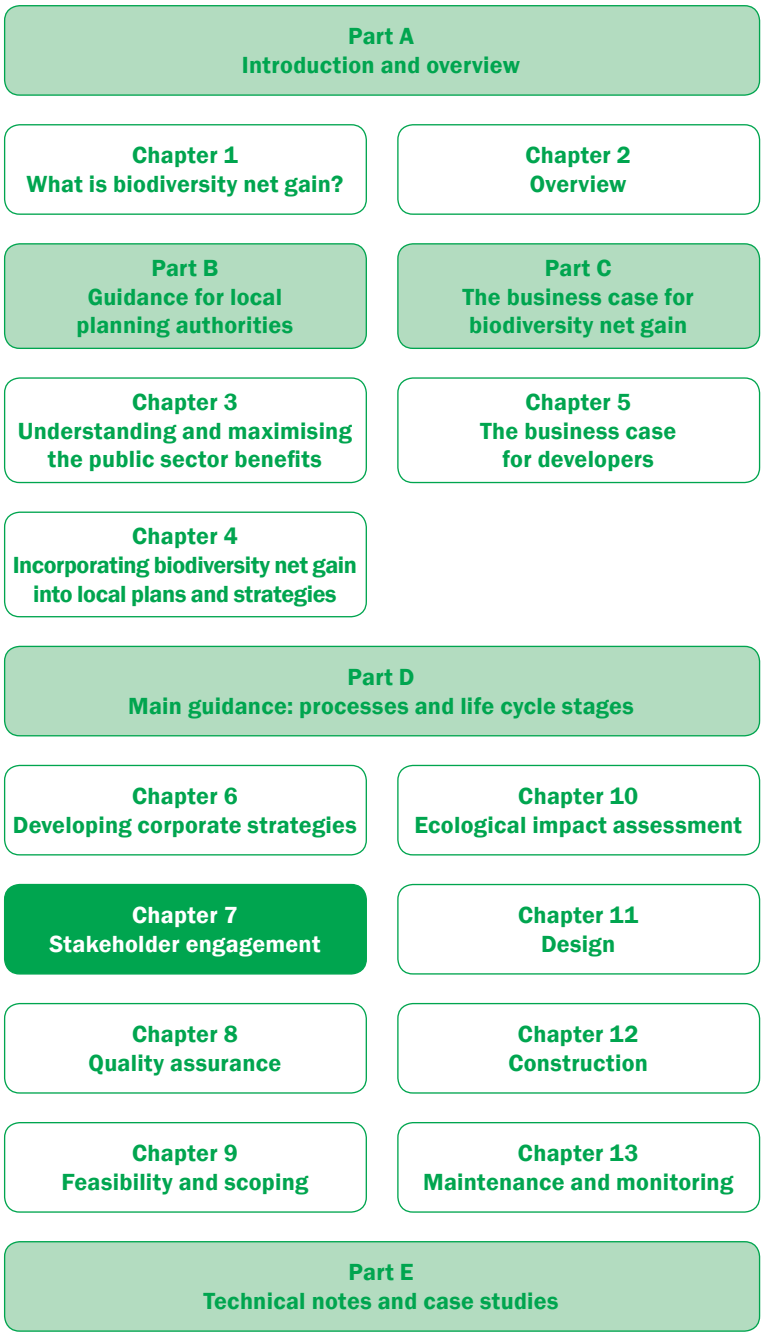
Project life cycle stage	Predicted or actual	What to communicate
Design	Predicted	Predicted BNG outcomes from a project over a set timeframe if no activities have yet been undertaken.
Project construction	Actual	The actual project footprint and actual losses and gains in biodiversity during construction.
	Predicted	An updated prediction of the project's BNG outcomes, eg if there were changes from the design stage.
Maintenance and monitoring of BNG	Actual	Maintenance activities undertaken for BNG (eg following the BNG management and monitoring plan).
	Predicted	Updated predictions on the project's BNG outcomes.
	Actual	Achievements in BNG, eg monitoring shows incremental achievements in BNG over a 30-year period.

Technical note T10 provides advice on communicating achievements in BNG.

7 Engaging stakeholders throughout a project life cycle

Summary

This chapter highlights the importance of collaborating with stakeholders throughout a project to achieve BNG, while giving an insight into Technical Note D, which provides a more detailed look at the topic.



What good looks like

Engage a range of stakeholders to gather their input including testing the feasibility of BNG designs and identifying local and strategic biodiversity priorities to contribute towards, and also to address their concerns.

Achieve BNG in partnership with stakeholders where possible.

The process of development often involves stakeholder engagement. This can be a housebuilder liaising with the local authority during the planning application process or a large infrastructure project holding consultations as part of the development consent order (DCO) process.

Good practice for both an EcIA and BNG is to engage stakeholders early. CIEEM (2018) advise that early and regular engagement with consultees offers *"smooth progression through the planning process"*. They also highlight how statutory and non-statutory consultees can provide site-specific contextual information and expertise for an EcIA. Similarly, Rickett's *et al* (2016) advises that *"engagement can help build confidence that [stakeholder] concerns will be addressed and mitigation will be delivered"*.

The good practice principles for BNG build on this, emphasising inclusivity and involving stakeholders in designing, implementing, monitoring and evaluating the approach to BNG. Not only is this good practice, but it can significantly improve the biodiversity outcomes. Several design factors can be identified that would significantly improve the biodiversity offset outcomes, as Pilgrim and Ekstrom (2014) noted *"greater attention to feasibility testing and stakeholder engagement during the offset design process is likely to result in offset designs that are more practical to implement."*

The scale of stakeholder engagement should be proportionate. For example, a large business might seek input from a wildlife organisation when setting its corporate strategy on BNG or for a particular project, such as **Case study 7.1**, whereas small developers can work with LPAs to integrate BNG during statutory consultations. (**Technical note T2** provides advice for small-scale developments engaging stakeholders.)

Technical note T4 provides advice for other development projects on engaging stakeholders, including:

- identifying stakeholders and developing a stakeholder consultation strategy
- preparing for consultations
- incorporating BNG when setting terms of reference for an EcIA
- involving stakeholders in the design of BNG
- maintaining two-way communications
- sharing lessons learnt.

These activities might already be planned, for example consultations as part of a project's EIA. If so, BNG can be easily incorporated.

Advice for local planning authorities

Local planning authorities can help developers engage with stakeholders, especially local community or specialist groups that the developer might not be aware of. First check whether stakeholders are willing to be contacted directly by the developer, or whether liaison is better undertaken through the LPA. Consider BNG as a genuine opportunity for collaboration, but one that does not preclude valid objections to the development.

Case study 7.1
A collaboration for BNG at the Kingsbrook development

Kingsbrook comprises 2450 homes, a neighbourhood centre, two primary schools, link roads, community facilities and support infrastructure including electricity substation and flood defences.

Barratt Developments PLC, the RSPB and Southern Ecological Solutions are working with Aylesbury Vale District Council to set a new benchmark for a commercially viable housing development that delivers real biodiversity gains. This has been achieved through an ecology-led master planning process in partnership with key stakeholders.

Figure 7.1 Landscape masterplan of Village 2, Oakfield Village

The master plan was shaped by a suite of ecological surveys, which provided a baseline upon which the mitigation hierarchy was applied. Key green infrastructure was retained and enhanced with complementary habitats that provide ecological networks through the site. Habitat works included the restoration of arable fields to species-rich lowland meadows and the creation of a 100 ha nature reserve.

Biodiversity measures have been incorporated within the built environment through wildlife sensitive lighting, sustainable urban drainage systems (SUDS), gardens, orchards and allotments, road verges and green corridors.

For more details see Case study 3 in C776b.

Case study 7.2
Enhancing wildlife areas through a residential development

Development of the former St Leonard's Hospital site, Dorset, into residential housing has been highlighted as an example of good practice where public and private organisations collaborated to enhance biodiversity by incorporating various wildlife features into the design, including restoring 18 ha of priority habitat over seven years, establishing a new 25 ha site for wildlife, securing and funding management for 50 years and securing the Dorset Wildlife Trust's ownership of the new reserve.

For more details see Case study 5 in C776b.

8 Quality assurance

Summary

This chapter provides advice for preparing and undertaking quality assurance as part of BNG, and highlights good practice for auditing BNG across a geographical area.

What good looks like

Undertake quality assurance to evaluate and demonstrate that the good practice principles for BNG were applied, and to justify communications on achieving BNG.

8.1 EMBEDDING BIODIVERSITY NET GAIN WITHIN QUALITY ASSURANCE

Quality assurance is a process used to check and confirm that agreed project targets are being delivered in the right way, in the right place and at the right time. It is an integral part of development, and this section explains how quality assurance for BNG can be incorporated.

Building in and undertaking quality assurance for BNG is good practice throughout the project life cycle. It can help to ensure that the project design is following the good practice principles and that BNG claims are valid and justified when monitoring the long-term management plan, for example.

The level of detail for quality assurance for BNG will depend on the nature of the project. It should:

- be proportionate to the scale of the development and scale of biodiversity impact
- fit with the project's lifespan
- have the appropriate level of detail for the complexity of the BNG target.

For small-scale projects with a low biodiversity impact a simplified approach and brief documentation can be adopted that still provides a step-by-step check, using the themes and actions described here (see **Technical note T2** on small-scale and low-impact developments with a limited impact on biodiversity).

A range of options for BNG quality assurance are available, with examples described in **Box 8.1**.

Box 8.1
Examples of quality assurance protocols and benchmarks that can be used for biodiversity net gain

Many businesses and organisations will follow ISO 9001:2015, which defines quality assurance as the action necessary to give confidence that requirements for quality have been satisfied.

ISO 140001:2015 is another standard commonly used by businesses to demonstrate that environmental impacts are being measured and improved, which can include aspects relating to biodiversity.

CIEEM (2018) guidelines include quality assurance as a chapter within the EcIA template and suggest the use of a quality assurance protocol for checking the quality of the EcIA report. Some of the principles could be used as a basis for putting in place quality assurance for the project. Ricketts *et al* (2016) provides an overview of the use of EMPS for EIA developments, which can aid quality assurance.

The Wildlife Trust (2014) biodiversity benchmark is a standard for assessing and certifying an organisation's systems for achieving continuous biodiversity protection and enhancement on its landholdings. The local Wildlife Trust and other organisations can also offer to assist with the quality assurance process.

Quality assurance for BNG should be initiated early in the project life cycle, for example by beginning to think about key requirements or setting out an initial draft of a protocol during the scoping or option selection stage. Businesses or organisations may choose to create a standardised quality assurance protocol to meet their specific project requirements, which can be used for each project. The quality assurance documentation should identify when, how and by whom quality assurance checks will be made, and what will be done with the information gathered.

8.2 STRATEGIC AUDITS AND PROJECT-LEVEL QUALITY ASSURANCE

Individual project quality assurance can feed into wider auditing of BNG achievements, whether across a business, a landholding or a LPA area at a 'strategic level'. The terminology used to describe a checking process can differ and be interchangeable. The following definitions are adopted here to help

distinguish between project level quality assurance and wider BNG auditing. Other definitions already established within a business or organisation could still be used.

- Quality assurance is the mechanism by which the progress and achievement of BNG targets are checked, confirming conformity in terms of quantity, quality and timeliness for both implementation of a project and achievement of outcomes. Quality assurance checks may result in modified activities in order to achieve a BNG target. Quality assurance is undertaken during the project life cycle and can influence the project.
- An audit is an inspection of records. An audit of BNG across a geographical area (such as a LPA area, landholding or portfolio of projects) can be the checking and analysis of records of biodiversity losses and gains achieved, their nature and location and any lessons learnt. Long-term management information may form part of the audit. It does not influence the individual project, but the purpose is to provide a record for beneficial future purposes such as influencing where future BNG projects are targeted. The good practice principles advise that lessons learnt should be shared. They can influence the way in which future BNG projects are implemented. Auditing across a local area can feed into local and national targets for biodiversity.

8.3 OVERARCHING THEMES FOR QUALITY ASSURANCE

This guide provides advice on good practice for designing a project-specific approach to quality assurance. The following are beneficial to incorporate into a quality assurance protocol for BNG.

Consistency

A consistent quality assurance process for individual projects can better enable gains to be cumulatively audited over space and time for a number of projects being promoted by an organisation or developer or within a given geographical area.

It will be useful to standardise checklists to enable comparison and to maximise the benefits of lessons learnt. Exploring lessons learnt may be undertaken by the consultant, contractor, LPA or a third party in different circumstances. Where possible, the quality assurance process should be apparent to all parties as early as possible, for example by including it in contract specifications. Where other verification mechanisms will be applied, such as BREEAM, linkages should be identified to avoid duplication (see **Technical note T8** on alignment with BREEAM).

Independence

Independent evaluation adds credibility and removes bias. There are three options:

- **A first-party** (the project promoter self-certifies) quality assurance can be undertaken with a degree of independence. The evaluator should be suitably qualified, trained and experienced to undertake the quality assurance checks, and could be the suitably-qualified ecologist, for example.
- **A second party** (a partner organisation) may be involved in the delivery of BNG delivery, such as the Wildlife Trust. This may be advantageous, as the project will be known and understood, removing the need for additional briefing.
- **A third party** (fully independent verification) is a fully independent body that is typically a professional organisation, or it could be a panel of representatives from several organisations (see **Chapter 3** on local plans and strategies). Where a broker has been used for the BNG project, the quality assurance process can be undertaken and reported by the broker, following standard criteria that they have established and/or agreed with the developer.

Each option can incorporate measures to demonstrate independence.

Proportionality

Quality assurance should not be onerous or overly costly in relation to the development. The quality assurance protocol needs to be flexible to accommodate different development types. A traffic light system of red–amber–green reporting rather than detailed descriptions may be appropriate for small scale development.

Transparency

Quality assurance protocols (or non-technical summaries of protocols) should be communicated with relevant stakeholders, including the local community where appropriate. Quality assurance should enable lessons learnt to be gathered and communicated. This enables future projects to benefit from the experiences of other projects. As explained in **Chapter 5** on the business case for BNG, delivering BNG can generate a wide range of benefits for businesses and local communities. By sharing good practice, the benefits will be better realised.

Accuracy

Quality assurance should enable a true picture of progress towards achievement of the BNG target throughout the project life cycle. It should identify whether the delivery of key milestones is on track during construction. During the maintenance and monitoring stage, quality assurance should focus on whether the management plan has been followed, and if there are risks to the achievement of defined targets.

8.4 QUALITY ASSURANCE THROUGHOUT THE PROJECT LIFE CYCLE

The quality assurance protocol should be a living document throughout the project life cycle. **Figure 8.1** at the end of this section summarises actions for quality assurance at each stage, which are described in more detail in **Chapters 9 to 13**. As previously noted, the application of these should be proportionate to the development and its biodiversity impact.

Feasibility and scoping

The quality assurance protocol should initially be prepared during the feasibility and scoping stage for the project, described in **Chapter 9**. This could be an outline of checks in accordance with the anticipated project. The 'in a nutshell' section of this guide (see **Chapter 2**) can be used as a checklist for project life cycle stages to help develop how quality assurance of BNG may fit into that life cycle. It is likely to be further refined at the project design and subsequent stages when more detail is known. At the feasibility and scoping stage, the quality assurance protocol can start to identify the key points during the project life cycle that checks will be made. The quality assurance protocol should describe:

- the risks to achieving required quality for each option (eg issues that might impede timely delivery of BNG)
- when the quality checks will be made
- who will be appointed to undertake the checks
- what methodologies will be used
- the acceptance criteria for recording compliance at each check
- how the quality assurance information will be recorded
- how the quality assurance information will be used (eg how it will inform progress reviews).

The party or parties responsible for quality assurance should be involved at the earliest opportunity, and so it would be good practice for these to contribute or lead on the preparation of the quality assurance protocol.

EcIA

The quality assurance protocol should build in a verification of the information gathered to inform the BNG calculation of losses and gains. **Chapter 10** explains the information that will be gathered and quantified in tandem with the EcIA in relation to the biodiversity baseline, the negative impacts and the positive gains. Quality assurance of the BNG calculation could be undertaken by a first, second or third party, as described above. This could include, for example, a check by an independent professional, review by a steering group or verification by the LPA ecologist. The quality assurance protocol should include checks that the necessary evidence to support and inform the achievement of the BNG target has been gathered.

Design

The quality assurance protocol should be refined at the design stage, which is described in **Chapter 11**. At this stage, the design of the BNG, as part of the project, is developed. At this stage the predicted BNG claim is established, and the protocol can include quality controls, benchmarks and milestones for the achievement of BNG for the project in terms of the following:

- Is the BNG design appropriately based on the EcIA?
- Are the project timeframes for BNG appropriate?
- Has the stakeholder engagement been effectively used?
- Are the predicted BNGs based on evidence?
- Does the BNG design follow good practice (for example, the good practice principles and the BBOP (2012a) standard) or benchmarks set by other good practice projects?

BBOP (2012a) can be used for undertaking quality assurance reviews, as it contains criteria and indicators within a framework.

One of the most important aspects of BNG through development is doing everything possible to prevent a delay between biodiversity loss and BNG. The quality assurance protocol should include a programme of checks that focus on the alignment of the habitat creation, enhancement or restoration that achieves a BNG. This is an important part of the design stage, and the quality assurance checks need to be timetabled to make sure that the agreed timescales for biodiversity gains are on target.

Where it is not possible to prevent a time-lag (and this has been demonstrated and justified), the quality assurance protocol should put checks in place to make sure that the agreed time-lag is a maximum and does not overrun. This is important because the time taken to achieve the BNG outputs has a bearing on the quantity of BNG that is required (see **Technical note T9** on biodiversity metrics).

Construction

Quality checks should be undertaken at a frequency that allows for changes to be made where criteria are not being met, but they should not be disproportionate to the development project. The checks should align with other activities, where possible, in order to minimise repetition. The quality assurance checks should fit with the work programme, to maximise efficiency. Site visits are a good opportunity to gather photographic evidence of BNG progress.

The quality assurance protocol should include enough checks for the nature and duration of the project construction. The success of the BNG will be dependent on the commitment and understanding of all involved in the project.

Where individuals are reporting on particular aspects of the project, at agreed milestones, they need to be given the right tools and information to complete their tasks. Starting the development project with a team that is informed about the quality assurance protocol and the checks being made should prevent delays during construction and should reduce errors.

A continuous check that the project is consistently applying the mitigation hierarchy will also be important.

Maintenance and monitoring

The continued reporting of quality assurance after the development project is complete will need to be secured with whichever body is taking on the long-term responsibility of the BNG. This may be the landowner, a management company or a public body. At a defined point in time, identified within the quality assurance protocol, the progress towards the actual BNG claim and the implementation of the management plan should be checked and reported.

Adaptive management is described in the guide in **Chapter 13**. It is a type of management that has a level of flexibility to allow for modifications. Ideally, the quality assurance protocol should build in checks that are early enough in the overall project life cycle to enable adaptations to be made where BNG targets are at risk.

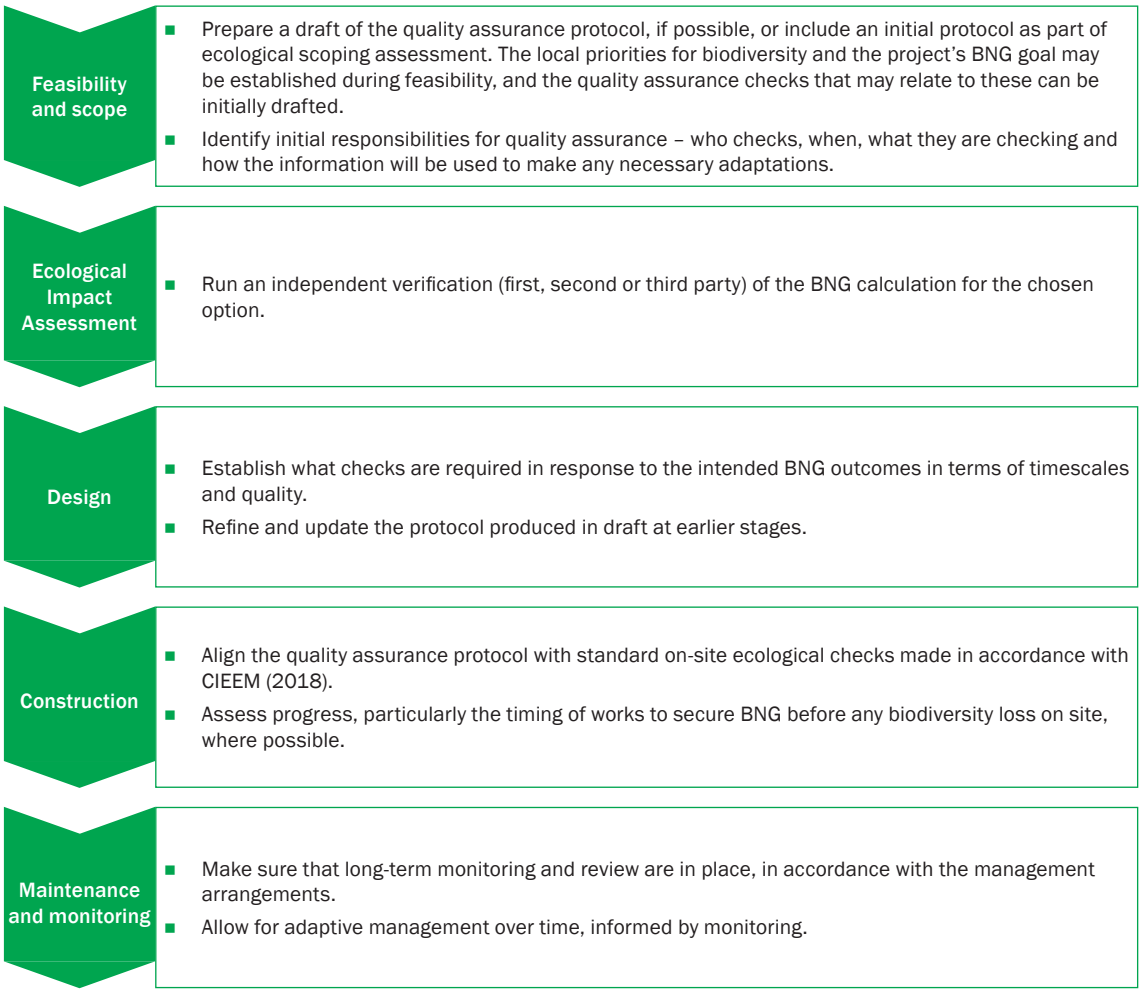


Figure 8.1 Key actions for quality assurance of the implementation of biodiversity net gain through the project life cycle

8.5 STRATEGIC-LEVEL AUDITING OF BIODIVERSITY NET GAIN

BNGs from individual projects can be collated to provide an overview of BNGs over multiple projects. This is beneficial for:

- gaining an organisational view of BNG achievements – this can provide information for reporting on corporate targets or for business promotion and staff motivation
- auditing several BNG projects within the same landholding
- auditing BNG across a LPA area or wider administrative area, where authorities are working together on BNG.

A business or landholder may design a bespoke auditing methodology for their own reporting purposes. However, they should liaise with the relevant LPAs and associated LERCs to share their data, because this can contribute towards LPA audits. Good practice for LPAs and LERCs is described in **Section 8.6**. Businesses and landowners may also find this information useful for working in partnership with these public bodies.

8.6 GOOD PRACTICE FOR AUDITING BY LOCAL PLANNING AUTHORITIES

Where a LPA is promoting BNG through their local plan (see **Chapter 4**), the authority should consider:

- guidance on consistent quality assurance for BNG at the individual project level
- a set of standards for BNG quality assurance and/or template forms for submitting quality assurance information and demonstrating that BNG targets are on track/have been achieved
- a form of accreditation to encourage BNG and promote adopted local plan policy – it is possible that, in time, there will be a national level accreditation system for BNG
- the most suitable means of auditing BNG projects across the administrative area of the authority
- the tools and guidance necessary for developers to ensure that the right data is submitted to inform an area wide audit.

Pre-application discussion should encourage development projects to submit biodiversity information relating to the site baseline, and then report on quality assurance as the project progresses and completes. Requirements can then be confirmed within the planning permission given through planning conditions and/or legal agreements.

For BNG claims relating to projects requiring planning permission, the developer will be seeking to meet BNG policy and demonstrate adequate provision for a BNG claim in order to secure planning permission. The LPA will need to have enough information to give certainty that the predicted BNG claim will be delivered, which will only be confirmed over time and through monitoring. Securing a robust quality assurance system as part of a permission given will enable monitoring over time to be effective in its demonstration of BNG over time, which in turn enables effective auditing of BNG across a LPA area.

Auditing BNG across a LPA area – or across a group of neighbouring LPAs if working collaboratively on BNG – can be part of monitoring a local plan. The audit can help to evaluate whether a local plan policy on BNG is on track, and to give a picture of biodiversity change during the lifetime of the local plan. If this cannot be included within the local plan monitoring process, a process for auditing BNG can be developed outside of the local plan reporting.

To support effective auditing of BNG, the following good practice should be followed:

- Have a database for BNG project records. This could include ecological baselines for the development site (and BNG receptor site, if different), intended BNG outcomes, the monitoring programme and the quality assurance protocol). This could be held by the LERC, within a database held by the LPA or a partner (which could be the subject of a service level agreement).
- Map BNG projects and features within the administrative area – this should ideally linked to the BNG database.
- Secure ongoing resources to update the database and mapping.
- Use the database and mapping resource to inform future BNG priorities for the area.
- Update the database and mapping resource with information from project monitoring reports.

The LERC and/or other local data holding partners should be included in the establishment of the BNG auditing process for a local area. Auditing BNG across an administrative area then enables the collated data to demonstrate the local contribution towards national biodiversity objectives.

Advice for local planning authorities

Quality assurance and reporting of BNG could be supported by specific guidance as part of a local plan BNG policy. Requirements should be consistent to ensure that developers have a 'level playing field', while recognising the range of size and complexity of development projects (see **Technical note T2** for good practice for small development with a limited impact on biodiversity

Discussions with the statutory nature conservation body and wildlife organisations will inform how the data can best be used at a national level. The establishment of a panel with representatives from relevant partners to look at individual project reporting and inform strategic planning for BNG would be beneficial. This will help set priorities for geographical areas or habitat types that bring the most benefit (such as ecological connectivity).

9 Feasibility and scoping

Summary

Incorporating BNG during a project's early stages can involve these activities:

- identify local and strategic priorities for biodiversity (Section 9.1)
- apply the mitigation hierarchy (Section 9.2)
- engage stakeholders (Section 9.3)
- assess feasibility (Section 9.4)
- set a goal (Section 9.5)
- finalise reports (Section 9.6).

What good looks like

To drive BNG at the feasibility and scoping stage:

- show a clear application of the mitigation hierarchy
- set BNG as a goal for the project to achieve through application of the good practice principles
- integrate an assessment of BNG into core project documentation such as a project brief, budget and programme (rather than only being within the environmental or ecological assessment reports)
- secure resources and budget for designing, implementing, maintaining and monitoring BNG for the long term.

9.1 PLANNING FOR BIODIVERSITY NET GAIN EARLY

Planning and budgeting for BNG during a project's early stages is essential. It minimises risks and secures efficiencies in designing and implementing BNG. It is also the most efficient way to realise opportunities, especially the business benefits of BNG described in **Chapter 5**. A project's early stages include the following:

- **Feasibility**. Large or complex projects tend to have feasibility studies. These determine a project's legal and technical feasibility and its economic justification, and provide information for a project's technical development.
- **Scoping assessments**. Ecological scoping assessments and preliminary ecological assessments (PEAs) are often used to determine whether an EcIA is required. They can be part of a project's feasibility study or its initial design stage or become what is often an iterative process to complete an EcIA. Similarly, the EIA scoping process is a critical stage when issues are scoped in or out of the full EIA.
- Incorporating BNG during a project's early stages can involve these activities:
  - ☐ identify local and strategic priorities for biodiversity (**Section 9.2**)
  - ☐ apply the mitigation hierarchy (**Section 9.3**)
  - ☐ engage stakeholders (**Section 9.4**)
  - ☐ assess feasibility (**Section 9.5**)
  - ☐ set a goal (**Section 9.6**)
  - ☐ finalise reports (**Section 9.7**).

The extent to which these activities are undertaken depends on a project's potential effects on biodiversity and the aspirations for net gain. It also depends on any ecological assessments being undertaken. For example, ecological scoping assessments might include consultations with stakeholders, whereas PEAs might not.

When undertaking these activities, the findings should be documented in the relevant report such as a project's feasibility study report, ecological scoping assessment report or PEA report.

According to CIEEM (2018): *"The timing of scoping [assessments] is very important. It should begin at the earliest opportunity to ensure sufficient time is allowed to adequately inform the EcIA process. Early scoping will also allow for effective consultation and… early identification of potential impacts and the opportunity to refine the proposal."*

9.2 IDENTIFY LOCAL AND STRATEGIC PRIORITIES FOR BIODIVERSITY

Contributing towards local and strategic priorities for biodiversity is fundamental to BNG. In practice, this means a project's BNG helps to deliver targets in, for example, GI strategies and biodiversity action plans (BAPs). Identifying biodiversity priorities during a project's early stages can result in a simpler design process. *"National, regional and local policies expect projects to achieve biodiversity benefits, not simply no net loss through avoiding or mitigating negative effects. Scoping provides an early opportunity for ecologists to work*

with others to achieve national and local policy objectives and lays the foundation for the whole consultation and assessment process." (CIEEM, 2018).

First any requirements for BNG should be identified. For example, some commissioning agencies have targets for biodiversity (see **Box 1.4**) or related sustainability commitments such as 'enhancing the environment'. Many LPAs have biodiversity policies (see **Box 1.3 and Technical note T1**), and some have specific priorities for BNG, such as **Case study 9.1**. Any of these will be part of the project's BNG design.

Case study 9.1
Targeting action to help deliver local conservation priorities

The cirl bunting, a bird species of principal importance under S41 of the Natural Environment and Rural Communities Act 2016, was once widespread and common across southern England but has now become rare and mostly confined to South Devon. The local plan explicitly supports mitigation and compensation measures for cirl buntings, and the South Devon's biodiversity offsetting guidance (Miller and Jennings, 2014) identified cirl buntings as a key beneficiary of offsets. The RSPB developed a compensation mechanism for Teignbridge District Council (which was extended to other local planning authorities) to secure financial contributions from development affecting breeding territories of this species. These contributions were used to purchase land, identified by RSPB as priority locations, and undertake habitat restoration and creation for cirl buntings.

For more details see Case study 14 in C776b.

Figure 9.1 Land west of higher Exeter road, Teignmouth, Devon

Then priorities for biodiversity at local, regional and national levels should be identified that match the biodiversity affected by a project (or the biodiversity surrounding a project if there are no negative impacts), for example:

- Local priorities include those set by LPAs, eg targets in local plans, BAPs and GI strategies.
- Regional priorities include those developed by organisations working together across local authority boundaries, eg LNPs and biodiversity partnerships, including biodiversity opportunity areas and green corridors.
- National priorities include those published by statutory advisors, as well as threatened species lists and action plans for specific species, and nationally significant conservation networks. See also the list of key sites, habitats and species for nature conservation in the UK and Ireland in CIEEM (2018).

A desk study is a useful starting point because much of this information is available online (see **Table 9.1**). Biodiversity strategies are likely to vary between administrative areas, so checking with LPAs and statutory advisors on which ones are appropriate can be helpful, especially as some will cross administrative boundaries. Sometimes buying data from local environmental record centres will be necessary.

The appropriate search area will depend on the project's potential effects on biodiversity, and can be informed by the 'zone of influence' used within the project's ecological assessment. Further guidance is provided in CIEEM (2016 and 2018).

The assessment should be a broad overview that is refined during the design stage – especially to ensure that these wider priorities match the type of biodiversity affected by, or surrounding, a project.

The results should be presented in the report (see **Example 9.1**). They should be used for developing the project's BNG goal (see **Section 9.6**) and for designing BNG (see **Chapter 11**).

Box 9.1
Example of an assessment of local biodiversity priorities in a project's feasibility study report

At the feasibility stage, after following the mitigation hierarchy, the project might negatively affect woodland and grassland habitats. It lies within biodiversity opportunity area X (BOA). Relevant targets for this BOA, that the project could contribute towards by delivering net gains in woodland and grassland habitats, include:

- enhancing at least 20 ha of grassland to UK BAP priority habitat chalk grassland quality
- reconnecting fragmented woodland
- buffering woodland nature reserves from damaging activities.

Defining the project's contribution towards these targets through delivery of BNG will be part of the design stage.

Advice for local planning authorities

Developers check local plans to make sure that their project meets policy objectives, thus helping secure planning permission. Local plans that include BNG should set clear requirements for developers, such as:

- what biodiversity information to include in planning applications, in what format, and which metric they should use
- what information to submit to demonstrate that the project achieves BNG
- which locations for biodiversity enhancements are priorities.

This minimises delays for both planners and developers, and helps to ensure that net gains in biodiversity generate maximum benefits.

Table 9.1 Examples of local and strategic priorities for biodiversity and where to find them

Biodiversity priorities[1]	Where to find them	Examples
Local biodiversity strategies, eg BAPs, where these exist	Dedicated website	Kent BAP: **www.kentbap.org.uk/about**
	Website of an organisation involved with developing the BAP	Warwickshire Wildlife Trust, species and habitat action plans: **www.warwickshirewildlifetrust.org.uk/LBAP%20Action%20Plans**
	LPA website	Cardiff BAP: **https://www.outdoorcardiff.com/wp-content/uploads/Cardiff-LBAP-2008.pdf**
		Belfast City Council BAP: **http://biodiversityni.com/publication/view/belfast-local-biodiversity-action-plan**
		Edinburgh BAP 2016–2018: **http://www.edinburgh.gov.uk/downloads/file/7669/edinburgh_biodiversity_action_plan_2016-18**
		Dudley Metropolitan Borough Council BAP: **http://www.dudley.gov.uk/resident/environment/conservation/birmingham-black-country**
GI (GI) strategies	RTPI briefing on GI: **https://www.rtpi.org.uk/media/499964/rtpi_gi_task_group_briefing_final.pdf**	
	Dedicated website	Liverpool City GI strategy: **http://www.greeninfrastructurenw.co.uk/liverpool**
		TCPA GI library: **https://www.tcpa.org.uk/green-infrastructure-research-database**
		GLA all London green grid: **https://www.london.gov.uk/what-we-do/environment/parks-green-spaces-and-biodiversity/all-london-green-grid**
Regional strategies	Partnership organisation websites	Welsh Government conservation and biodiversity: **http://gov.wales/topics/environmentcountryside/consmanagement/conservationbiodiversity/?lang=en**
		WENP maps: **http://www.wenp.org.uk/maps**
		LNPs: **https://www.gov.uk/government/publications/map-of-local-nature-partnerships**
		Catchment Based Approach: **https://www.catchmentbasedapproach.org**
	Websites of wildlife conservation organisations	TWT living landscapes: **http://www.wildlifetrusts.org/living-landscape/schemes**
		RSPB landscape scale conservation: **https://www.rspb.org.uk/our-work/conservation/landscape-scale-conservation**
	Nature improvement areas in England	UK Gov NIAs: improved ecological networks: **https://www.gov.uk/government/publications/nature-improvement-areas-improved-ecological-networks**
Regional strategies	Biodiversity opportunity areas (BOAs) developed for English regions (eg on the LPAs website)	Kirklees Council map: **http://www.kirklees.gov.uk/beta/delivering-services/pdf/biodiversity-opportunity-zones-map.pdf** Kirklees Council opportunity zones: background: **http://www.kirklees.gov.uk/beta/delivering-services/pdf/biodiversity-opportunityZones-background.pdf**
	Conservation target areas in Oxfordshire	Wild Oxfordshire conservation target areas: **https://www.wildoxfordshire.org.uk/biodiversity/conservation-target-areas**

Biodiversity priorities[1]	Where to find them	Examples
National level biodiversity strategies	Government websites	Welsh Government action plan for pollinators: **http://gov.wales/topics/environmentcountryside/consmanagement/conservationbiodiversity/action-plan-for-pollinators/?lang=en**
		NBDA all-Ireland pollinator plan: **http://www.biodiversityireland.ie/projects/irish-pollinator-initiative/all-ireland-pollinator-plan**
		SNH pollinator strategy 2017–2027: **https://www.nature.scot/pollinator-strategy-2017-2027**
		UK Gov national pollinator strategy for bees and other pollinators in England: **https://www.gov.uk/government/publications/national-pollinator-strategy-for-bees-and-other-pollinators-in-england**
		Joint Nature Conservation Committee (JNCC) UK post-2010 biodiversity framework: **http://jncc.defra.gov.uk/page-6189**
	Regional or local websites dedicated to sustainability goals including biodiversity	Central Scotland Green Network (CSGN): **http://www.centralscotlandgreennetwork.org**
Species action plans	Organisations dedicated to conserving the species	Butterfly Conservation BAP: **https://butterfly-conservation.org/88/biodiversity-action-plans.html**
		Amphibian and Reptile Conservation SAPs: **https://www.arc-trust.org/species-action-plans-saps**
	Within the BAP where these exist	Westminster Council BAP (eg house sparrow): **https://www.westminster.gov.uk/sites/default/files/uploads/workspace/assets/publications/Biodiversity_web_house-sparrow-1244122075.pdf**

Note

1 The glossary contains definitions of these priorities.

9.3 APPLY THE MITIGATION HIERARCHY

Key decisions about a project – such as location – are often made during its early stages. So applying the mitigation hierarchy (see **Section 1.4**) is essential, as decisions such as avoiding biodiversity loss can be more easily incorporated.

Avoiding biodiversity loss during a project's early stages can secure cost efficiencies that would otherwise be unattainable. For example, designing out losses of highly protected biodiversity will avoid complex and costly ecological consent processes and expensive rectification measures. Avoidance measures are also less risky than minimisation and compensation measures, which incur the risk of failing to deliver the intended outcomes that might be required under legal or planning obligations.

Evidence on actual or planned application of the mitigation hierarchy, as far as possible, should be presented in the report. This is important to demonstrate good practice because applying the mitigation hierarchy is the cornerstone of achieving BNG.

Advice for local planning authorities

Local plans should clarify which developments are to deliver BNG and how they should demonstrate this. Ideally BNGs should be sought on all developments, while being proportionate to their size and impact.

Examples in **Technical note T2** provide both planners and developers with pragmatic approaches for small-scale development or developments with minimal biodiversity loss to achieve net gains.

9.4 ENGAGE STAKEHOLDERS

Technical note T4 gives detailed advice on engaging stakeholders to achieve BNG throughout a project life cycle. Feasibility studies and ecological scoping assessments often include stakeholder engagement. BNG can be easily incorporated to gather stakeholder views on, for example:

- **What they see as the risks to both biodiversity and the BNG target**

  An early understanding of stakeholder concerns can enable planning to address the concerns, which minimises objections to a project or delays to consent.

- **What works locally regarding BNG, and what does not**

  Tapping into local knowledge can set an invaluable foundation for the design stage (and increase efficiencies in the design process).

- **Which local biodiversity priorities are important for the project to contribute towards**

  Gaining stakeholder input can identify the key local biodiversity priorities for the project to support and any local 'win-wins', given the social and environmental context.

CIEEM (2018) state that *"The benefits of [ecological] scoping are… early stakeholder engagement and input, identifying issues of concern."*

Similarly, the EIA scoping opinion process is an opportunity to consult and engage planning authority and statutory nature conservation advisers in setting a project level BNG objective.

Engaging stakeholders on BNG is also an opportunity to set realistic expectations on a project's remit for BNG, for example whether it is a commitment or an aspiration. When the stakeholder consultation is completed the activities and outcomes should be documented in the report (see **Box 9.2**).

Box 9.2
Examples of stakeholder views on biodiversity net gain at the project's feasibility stage

The project feasibility meeting with statutory conservation advisors and local planning authorities included seeking their views on risks and opportunities regarding BNG. Their views and the project team's proposals are as follows:

Stakeholder views: risks to biodiversity net gain*	Project team's proposals: risk mitigation
Loss of habitat before the BNG design is implemented.	Implement opportunities for early habitat creation or enhancement before vegetation clearance starts.
Loss of ecological connectivity despite the project's biodiversity metric showing net gains in biodiversity.	Provide evidence that the project's BNG design enhances local ecological networks.
Replacement of highly valuable ecological features with features of lower ecological value while the project's biodiversity metric shows net gains in biodiversity.	Demonstrate that the project achieves net gains in features of the same or higher biodiversity value compared to those features lost after following the mitigation hierarchy.
Biodiversity offsets used when losses of biodiversity could have been avoided or minimised.	Provide evidence of sequential application of the mitigation hierarchy and fully justify any compensation measures including offsets.
The project achieves BNG but makes no contribution towards local biodiversity priorities.	Demonstrate how the project achieves net gains in the type of biodiversity affected by the project, in a way that contributes towards appropriate and matching local biodiversity priorities.
Opportunities from biodiversity net gain	***Opportunity measures***
Enhancing landscape-scale ecological networks.	Identify gaps within local ecological networks to identify possible BNG measures.
Increasing access to high quality green spaces in deprived neighbourhoods.	Use the MHCLG (2015) statistics to identify target neighbourhood.
Contributing towards strategic environmental and social priorities, eg flood risk.	Identify appropriate regional priorities and plan for them. For example, use the 'flood map for planning' portal to identify risks to sites marked for BNG and opportunities to incorporate flood resilience in BNG designs.

* See Chapter 11 for advice on managing risks to BNG.

Case study 9.2
Engaging stakeholders on biodiversity net positive pilot for the Midland Mainline programme

The Midland Mainline Programme (MMP) involves permanent clearance of vegetation to enable the delivery of its electrification, building and civils projects (see Figure 9.2). Carillion, representing the MMP, recognised the need to address this loss by achieving biodiversity net positive (BNP). It ran the first engagement workshop with key stakeholders including Natural England, RSPB, the Environment Agency, Wildlife Trusts and representatives from the farming community (see Figure 9.3). The workshop included discussions on critical aspects of BNP, including local wildlife priorities that MMP could contribute towards. By holding the workshop at an early stage of MMP, the programme benefitted from being able to target its BNP activities and from establishing good working relations with key stakeholders.

Fore more details see Case study 9 in C776b.

Figure 9.2 Vegetation clearance

Figure 9.3 Stakeholder engagement workshop

9.5 ASSESS FEASIBILITY

An ecological scoping assessment, stakeholder consultations and PEA can inform an assessment of whether delivering BNG for the project is feasible. This can be an iterative assessment that is updated during the design stage when more information about the project becomes available. It can include the following:

- **Identifying statutory designated sites or irreplaceable habitats.** Projects negatively affecting statutory designated sites or irreplaceable habitats cannot, as a project, achieve BNG. Technical note T3 gives advice on irreplaceable habitats.
- **Assessing risks**. Chapter 11 lists risks to achieving BNG. Considering these at an early stage can help to plan (and demonstrate) application of the mitigation hierarchy. This is important because committing to BNG does not negate the need to first avoid and then minimise a project's loss of biodiversity. It also enables planning for a more efficient and less risky design stage.

  Highlighting risks to achieving BNG can inform a feasibility assessment of the project itself, especially when different options are being considered. For example, this could be identifying locations where a project will affect highly biodiverse features that, to address the effects, will add substantially more time and cost to the project.
- **Assessing wider benefits**. BNG can generate benefits for society, the environment and the economy, in addition to the goal of BNG. A high-level assessment of these wider benefits might be possible at an early stage, and can position BNG as part of the project's legacy. It can also identify additional benefits for the commissioning agency or landowner, for example making an estate more resilient to climate change.
- **Estimating biodiversity losses and gains**. The method for measuring a project's biodiversity losses and gains should be specified, with justification. For example, some commissioning agencies and LPAs specify a method, or if no method is specified, projects might use a commonly applied metric such as Defra's biodiversity metric (see Technical note T9 for advice).

  Chapter 11 gives advice on measuring a project's biodiversity losses and gains. At an early stage, findings of an ecological scoping assessment or PEA might enable a calculation of estimated biodiversity losses to:

  - ☐ focus attention on measures to avoid and then minimise biodiversity loss

- highlight possibilities for on-site gains, eg estimating gains from enhancing habitats within the site footprint to compare with the time and cost implications of removing them, and the missed opportunity for achieving the gains
- produce a ballpark figure of the area and types of habitat to create or enhance to achieve BNG, which will in turn support planning for the budgets, resources and timescales (eg budgeting to create 10 ha of species-rich meadow, and maintaining this over a 25-year period).

When estimating biodiversity loss (see **Box 9.3**), milestones for updating this calculation should be set within the project programme. This aligns with the CIEEM guidelines, which describe how to analyse information gaps during a scoping assessment in order to plan and prioritise information gathering for the full EcIA.

- **Assessing resource, budget and programme requirements**

This assessment can help inform budgets for designing, implementing, maintaining and monitoring BNG. It can include:

- **data collection**, especially any new data required for a biodiversity metric during both the design and construction stages. Data on habitat condition for Defra's biodiversity metric is not typically collected for EcIA surveys, but can be collected during EcIA or other similar surveys
- **specific expertise**, eg surveyors with the right botanical skills, ecologists with experience in designing BNG, local knowledge of the ecological suitability of sites marked for habitat creation, and expertise for implementing the BNG design
- **timescales**, eg implementing a BNG design and its long-term maintenance
- **seasonal constraints**, eg affecting when data should be collected and when BNG activities can be implemented (although these could be similar to seasonal constraints affecting protected species surveys and mitigation measures, and landscaping schemes)
- **cost estimates to implement the BNG design**, eg habitat planting or enhancement (see **Section 9.5**, point 3), and management plans.

Box 9.3
Examples of options for delivering biodiversity net gain using Defra's biodiversity metric

In the worst case, the project could result in permanent loss of 38 biodiversity units of a scrub and grassland mosaic. For budgeting purposes only, this indicative calculation at the project's feasibility stage shows that the project could achieve BNG by Options A or B:

Option	Hectares	Habitat	Work required	Biodiversity net gain	Assumptions
A	6.5	Amenity grassland	Converting to scrub/grassland mosaic in moderate condition	49 biodiversity units	No spatial risk, a low difficulty risk and 10 years to reach target condition
B	7	Scrub/ grassland mosaic	Enhancing from poor to moderate condition	46 biodiversity units	No spatial risk, a low difficulty risk and 5 years to reach target condition

This indicative calculation is only to illustrate possible options for BNG. It is intended to support budgeting and programming, as part of the project's feasibility assessment. It will be updated during the design and EcIA stage, when the mitigation hierarchy will be properly applied.

9.6 SET A GOAL

Where achieving BNG is feasible, a statement on the project's BNG goal should be included in the report.

The goal can be a commitment or an aspiration if uncertainty exists, for example on resources. It can be high-level, reflecting any targets set by the commissioning agency and LPA, as well as local biodiversity priorities. It can also outline the intention to follow the good practice principles (see **Box 9.4**).

A goal shows the project team what is to be achieved, helping to get BNG budgeted and in the project programme.

Chapter 6 advises on setting BNG goals and targets that contribute towards biodiversity strategies.

Box 9.4
Examples of a biodiversity net gain goal for a project's feasibility stage

The project aims to achieve BNG by following the principles in Baker (2016).

At the feasibility stage, it is envisaged that, after following the mitigation hierarchy, the project will result in permanent losses of woodland and grassland habitats. The project will create new areas of woodland and grassland to deliver net gains in these habitats. By doing so, the project will support targets of the biodiversity opportunity area that it lies within. These targets include reconnecting fragmented woodland, enhancing species rich grassland and addressing local population declines of invertebrates.

The project's BNG activities will support client X to deliver its target to enhance the environment, as set in its sustainability strategy. This initial BNG goal will be revised during the design stage, taking account of all biodiversity features affected by the project.

Advice for local planning authorities

When setting BNG in local policy, carefully consider whether specific goals for BNG can be stipulated, for example, goals related to particular habitats or species, or a minimum net gain in biodiversity that development projects must achieve. See Chapter 4 on incorporating BNG within local plans and policies.

9.7 FINALISE REPORTS

Findings from the assessments described in **Sections 9.2 to 9.6** should be included within core project documentation where possible, for example setting out BNG requirements in a project's execution plan rather than a standalone report. Core project documents include an outline business case, a project option appraisal, a project execution plan and a client's strategic brief.

All findings should be reported, including:

- best case and worst case scenarios for achieving BNG
- resource requirements for stakeholder engagement and for designing, implementing, maintaining and monitoring BNG in the long term
- an outline budget for the resource requirements
- a programme for designing, implementing, maintaining and monitoring BNG, especially to highlight the timescales involved
- risks and mitigation measures
- opportunities and how to achieve these.

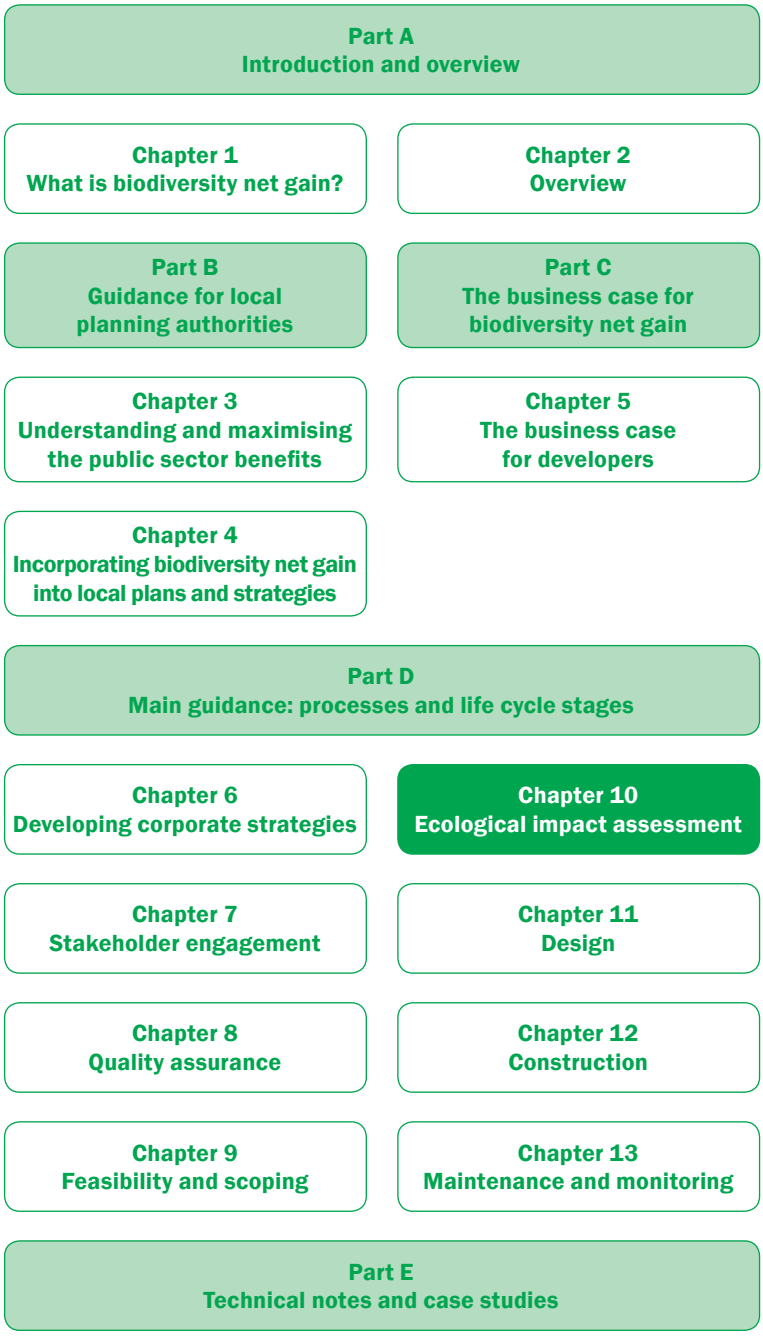
10 Impact assessment

Summary

CIEEM (2017 and 2018) advises on assessing ecological impacts of development. When following these guidelines, incorporating the good practice principles on BNG can involve these activities:

- assess the project's biodiversity baseline (Section 10.1)
- measure the project's biodiversity baseline (Section 10.2)
- assess negative effects (Section 10.3)
- measure negative effects (Section 10.4)
- apply the mitigation hierarchy (Section 10.5)

The extent to which these activities are undertaken should be proportionate to the scale of a project and its potential effects on biodiversity.



What good looks like

- Assess and quantify a project's biodiversity baseline, being clear whether the baseline will be used to evaluate BNG outcomes after the development.
- Apply the mitigation hierarchy, seeking biodiversity gain or net gain at each stage (not just at the end).
- Integrate the use of ecological and other topic assessment approaches (such as landscape and visual assessment) in securing design improvements in line with all levels of the mitigation hierarchy.
- Assess and quantify each type of impact on ecosystems, ecological functions, habitats, species populations and individuals from the development. Assess how the development's biodiversity impact might affect people for these social impacts of BNG to be incorporated within the design.
- Describe, and where possible quantify, how and over what timescales the impacts are addressed – so that net gains for biodiversity are over/above requirements for avoidance, mitigation or compensation.

10.1 ASSESS THE PROJECT'S BIODIVERSITY BASELINE

CIEEM (2018) describes a project's ecological baseline as conditions *"existing in the absence of proposed activities"*.

The qualitative assessment of a project's biodiversity baseline is critical. It captures features not explicitly captured when measuring biodiversity, such as ecological connectivity or position within an ecological network. This enables the design to demonstrate improvements in these features when clarifying how the project achieves BNG (using qualitative assessments) and by how much (using a measure of losses and gains in biodiversity).

CIEEM (2018) also sets out how and when to establish and assess a project's baseline. At the early design stage, there is usually no additional land allocated for BNG activities. Assuming this is the situation, **Table 10.1** lists considerations.

Table 10.1 Considerations when assessing a project's biodiversity baseline

Identify irreplaceable habitats and statutory designated sites	To exclude them from the project's BNG calculation see **Technical note T3**.
Clarifying the baseline's point in time	To identify what site activities are included in the BNG design, ensuring that all activities for the development are included. For example, a line of trees needs to be cleared for the development. It is cleared by routine maintenance teams before construction starts, but is correctly included in the project's baseline, and addressing the tree clearance as part of the project's BNG design.
Assess the extent and quality of features	For the BNG design to describe how the extent or quality of such features will be improved (ie no 'trading down' as described in **Chapter 11**).
Assess natural connectivity within and through sites (noting patchiness and fragmentation)	
Assess the spatial context of features within an ecological network	
Assess ecological functionality[1]	
Identify biodiversity priorities[2]	For the BNG design to describe the project's contribution towards local and strategic priorities for biodiversity. If the priorities were assessed at a project's feasibility or ecological scoping stage, they should be checked to see if they need updating or refining.
Assess how people use and value biodiversity[3]	For the BNG design to clarify how, and over what timescales, impacts on people's social and cultural values of biodiversity are addressed.

Notes

1 Assess ecological functionality

CIEEM (2018) provides advice on assessing ecological functions. Examples of ecological functions are:

a permanent breeding sites, ie those used throughout the year and/or regularly over several years

b permanent hibernation sites (as above)

c temporary sheltering or resting sites

d sites providing foraging resources which may be year-round or seasonal, have high or low quantities and high or low quality

e features facilitating wildlife movement, eg between shelter/resting sites and foraging sites, for migration, for navigation.

2 Identify biodiversity priorities

Section 9.1 describes how to identify local, regional and national priorities for biodiversity that are relevant to a project.

3 Assess how people use and value biodiversity

CIEEM (2018) list assessments of people's social and cultural values of biodiversity, and how a project might affect these. To support these assessments, the guidelines give examples of the benefits people derive from biodiversity including:

a wildlife experiences, eg bluebells in a woodland or watching birds at a nature reserve

b recreation, eg countryside walks

c green space in urban areas.

Assessing people's social and cultural values of biodiversity can mean listing such benefits. It can involve consultations, as CIEEM (2018) notes *"where there are potentially significant effects on ecological features of particular value to local communities, it is important to consult with those communities or local groups"*. Or it can be more detailed, such as an ecosystem service assessment. CIEEM (2018) give the following advice on undertaking ecosystem service assessments *"it is important to recognise where a project's ecological effects might affect ecosystem services, and ecological information from the EcIA can help assess this. However, assessing ecosystem services relies on separate specialist assessments of social and economic value. Ecologists can work together with other specialists to ensure that the EcIA collects data for these separate assessments. This lets the social and economic implications of ecological changes be taken into account."*

See **Technical note T11** on aligning natural capital and ecosystem assessments with BNG.

10.2 MEASURE THE PROJECT'S BIODIVERSITY BASELINE

The method for measuring a project's biodiversity baseline should be clarified, with justification. This is especially important if the baseline is used to measure change in biodiversity after a project, ie the baseline is the reference scenario used to demonstrate net gains in biodiversity from before to after the development.

Some commissioning agencies and LPAs specify biodiversity metrics. Some projects select Defra's biodiversity metric because it is commonly applied within industry. **Technical note T9** contains advice on selecting methods to measure biodiversity for individual projects, for a portfolio of projects and for estates, which include ecological calculators, national-level indicators and biodiversity metrics. It is vital to use a credible, robust biodiversity metric, and to use the same metric throughout all project stages.

When the method is confirmed, **Table 10.2** lists considerations for measuring a project's biodiversity baseline.

Table 10.2 Considerations for measuring a project's biodiversity baseline

Advice for local planning authorities
Provide advice to developers on available ecological data, recommending contact with the local environmental records centre where appropriate. Highlight any other relevant information, such as local GI strategies. Provide advice on social and cultural values of biodiversity where possible, such as from data on people's use of green spaces.

Measure area accurately	If measuring area (eg hectares of habitat), check that the measurement is as accurate as possible, given the circumstances (eg using field surveys or remote data collection techniques).
Clarify exclusions	BNG does not apply to irreplaceable habitats and statutory designated sites. See **Technical note T3** on irreplaceable habitats.
Record what cannot be measured	Methods measuring biodiversity provide a proxy and will not represent all features. For example, methods based on habitats might exclude roof tiles providing roosting opportunities for bats, or not account for the site being a vital green corridor for wildlife within a heavily urbanised locality. Highlight such features as part of the qualitative baseline assessment and include them in the BNG design, especially if the project affects them (see **Table 10.1**).
Identify limitations, eg when using remote techniques or desk-based studies	If surveying a large area, consider emerging techniques to gather data, such as habitat mapping using remote sensing or drones. Some LPAs and record centres have maps of habitat or land cover for purchase. Check whether the information generated is detailed enough to measure a baseline and change over time. If not, consider surveying a representative percentage of the area, eg 20 per cent. Such surveys can also help to overcome information gaps.

Take a precautionary approach, eg when information is limited (such as restricted site access or when using remote techniques)	For example, if using Defra's biodiversity metric to measure a project's baseline: ■ Woodland is identified from aerial photography, but the specific type of woodland is unknown. It could be either high or medium distinctiveness, so high distinctiveness is assumed. The project then seeks to achieve net gains in high distinctiveness woodland. ■ From limited site access, some habitats appear in poor condition and some in moderate condition, but all habitats are assumed to be in moderate condition. The project then seeks to achieve net gains in habitats in moderate condition as a minimum, and habitat in good condition where possible. ■ Another example is when project constraints mean that initial habitat surveys are undertaken outside of the recommended survey timescales: a precautionary approach is applied until the habitat surveys are undertaken during the recommended survey timescales.
Justify assumptions with evidence	Make informed assumptions when these can be justified with evidence. For example, records from the landowner of invasive species or fly-tipping might indicate a lower habitat condition. Other examples include Natural England's condition assessment reports and site improvement TT plans for SSSIs that could provide useful information on neighbouring features.
Identify implications of assumptions	If making assumptions, describe how these could affect the baseline measurement, eg over- or under-estimations. Then if updating the baseline when more accurate information becomes available, clarify whether change in the biodiversity number is actual change or generated from improved information.
Be consistent	Being consistent ensures that any level of inaccuracy is consistent from project to project, or for the same project (or estate) over time. This enables comparisons. Be consistent in use of the same metric throughout a project's life cycle, and use the same method of collecting data. This especially relates to using the same metric to measure a project's biodiversity status from before to after the development.
Be transparent	Show full workings of the baseline measurement with evidence, eg date-stamped photographs. State the competencies and experience of those measuring the baseline. Make data (including GIS layers with habitats and species) available to the local environmental record centre.
Validate	Undertake quality assurance reviews (see **Chapter 8**).

A BNG design is based on both a qualitative and quantitative assessment of a project's biodiversity baseline. The assessments should be reported in combination, such as **Box 10.1**.

Box 10.1
Example of a site's biodiversity baseline assessment

The site is a 2.8 hectare contiguous linear strip of dense scrub, unimproved neutral grassland and species-poor semi-natural woodland. These habitats are largely undisturbed and unmanaged, with only small pockets of invasive species and with small areas near the boundary that have been subject to fly-tipping. The site provides an important regularly used corridor for bats and reptiles within a heavily urbanised locality, and the woodland is used by birds for breeding. It is also valuable for local residents as visual greenery within an otherwise 'grey' urban location, although not accessible to the public. The BAP describes the site's importance for facilitating wildlife movement. It also contains targets on increasing habitats for bats, birds and reptiles within the locality.

Habitats on site generate a total of 15.5 biodiversity units. This comprises 5.5 biodiversity units of scrub, eight biodiversity units of grassland and two biodiversity units of woodland.

This baseline assessment is based on site conditions on 12 July 2017. Full details of the baseline assessment and the biodiversity unit calculation are in the appendix of the site's EcIA report.

Case study 10.1
TfL's biodiversity baseline

TfL worked with WSP to create a biodiversity baseline of all habitats within its highway, rail and underground estates in 2017. The biodiversity baseline enables TfL to monitor changes to biodiversity that result from specific projects, but also from general management practices. The comparison between the baseline and these changes allows TfL to demonstrate the effect it could have on biodiversity at a project and network level across its estate.

TfL are working with Greenspace Information for Greater London (GiGL), who will host the biodiversity baseline dataset and update it as TfL and its contractors share ecological survey and reinstatement data with them. GiGL will update the baseline with new information as it becomes available, independently tracking progress against TfLs net gain commitments.

Fore more details see Case study 15 in C776b.

Figure 10.1 Data used to identify habitats

10.3 ASSESS NEGATIVE EFFECTS

CIEEM (2018) states that: *"One of the key challenges in EcIA is to decide which ecological features (habitats, species, ecosystems and their functions/processes) are important and should be subject to detailed assessment.*

"This does not mean that efforts should not be made to safeguard biodiversity in its entirety… national policy documents emphasise the need to achieve no net loss of biodiversity and enhancement of biodiversity."

Also, CIEEM (2018) advises on assessing negative effects on ecological features (habitats, species and ecosystems) and on identifying ecological constraints to a development. Incorporating the good practice principles for BNG into these assessments can involve the following.

Include all ecological features

The EcIA process can involve scoping out ecological features from a detailed assessment that are *"sufficiently widespread, unthreatened and resilient to project impacts and will remain viable and sustainable."* (CIEEM, 2018). It does emphasise safeguarding biodiversity in its entirety, so in practice this means retaining sufficient information on features scoped out of a detailed assessment to include them in a BNG design.

Make effects explicit

An EcIA includes a project's potentially negative effects on ecosystems, ecological functions, habitats, species populations and individuals. Making all such effects explicit is vital for designing BNG, as the design should describe and, where possible quantify, how and over what timescales effects on all of these features are addressed.

The design should also describe and quantify its improvement in the extent or quality of all such features affected by the development (ie no 'trading down' as described in **Chapter 11**). This includes indirect effects (eg the effects of displaced individuals on other populations) and temporary land use, especially if construction will occur over a number of years. This is especially important to capture features not explicitly captured when measuring biodiversity, such as ecological connectivity or position within an ecological network.

Assess landscape level effects

Describing how a project affects biodiversity within a landscape can be appropriate for large-scale projects, for a portfolio of projects within one geographical area or for one project that is part of a wider development within a region. Landscape level impact assessments provide information that:

- helps to apply the mitigation hierarchy, eg when considering many projects affecting the same habitat within one region
- achieves net gains in biodiversity affected by a project that contributes towards regional biodiversity priorities, eg addressing issues of fragmentation that threaten the long-term viability of populations.

10.4 MEASURE NEGATIVE EFFECTS

All potential negative effects of a project on biodiversity should be quantified where possible, including direct and indirect effects, temporary and permanent and cumulative. Particular considerations include the following:

- **Temporary losses of habitat.** Areas cleared of habitat to be used temporarily for construction are often restored after works. Temporary losses of habitat and the timescales over which the losses occur should be quantified and included in the project's BNG design. This is especially important when the construction phase lasts for several years, and when factors such as soil compaction and contamination may result in a longer time period for the habitat to re-establish.

  For example, if using Defra's biodiversity metric, a 'time to target condition' multiplier will account for the time-lag between losses of habitat for construction and when, after construction, planted habitat becomes established. As an example, two hectares of grassland are cleared for a construction compound, construction lasts five years, the two hectares are then restored to grass, which takes five years to reach its original condition. The 'time to target condition' multiplier is 10 years to account for the five years of construction and the five years for the grassland to reach its original condition.

  Time-lags from temporary losses of habitat should be minimised where possible. For example, if habitats are being created to achieve BNG, this habitat creation is started before any losses occur.
- **Indirect effects**. For those using Defra's biodiversity metric, guidance for Warwickshire, Coventry and Solihull includes a method to calculate indirect negative effects of development on biodiversity (WCC, 2018). This is a locally applied adaptation of Defra's biodiversity metric, which is regarded as good practice, and the approach can be adopted if using other metrics or ways to measure biodiversity.
- **Legally protected species.** Habitat losses and gains relating to legally protected species can be included, but should be clearly identified.
- **Cumulative effects.** CIEEM (2018) describes cumulative effects as *"additional changes caused by a proposed development in conjunction with other developments or the combined effect of a set of developments taken together."*

  Cumulative effects can mean that a project's effect on biodiversity is greater than initially predicted when the project was considered in isolation. For example, several road improvement projects are constructed close to a lowland meadow nature reserve. Individually their effects on air quality are negligible, but their combined effect on air quality significantly degrades the nature reserve.

  Cumulative effects (as with any effects on biodiversity) require application of the mitigation hierarchy. Then any residual unavoidable effects must be accounted for when seeking to achieve BNG.
- **Tracking individual features.** Tracking individual ecological features can help to measure all negative effects. It gives a clear and quantified picture of how the project affects each feature. It also provides the information needed to apply the mitigation hierarchy and to design BNG. **Table 10.3** contains an example using Defra's biodiversity metric. This approach is applicable if using other metrics or ways to measure biodiversity. It should be updated as the designs for both the project and the BNG develop.

Table 10.3 An example of calculating biodiversity units for a project's negative effects on habitat using Defra's biodiversity metric

Baseline (before works)	Effect	Post development (after works)	Loss
1 ha of woodland generating 12 biodiversity units	Permanent loss of woodland	0 biodiversity units generated by woodland	−12 biodiversity units of woodland
0.5 ha of scrub generating 4 biodiversity units	Temporary loss of scrub: the scrub is cleared for construction activities, which last two years, then the area is replanted with scrub which is considered to take three years to reach its original status of moderate condition. That results in a total of five years' time-lag between losses and gains.	3.3 biodiversity units generated by scrub accounting for a five-year time-lag	−0.7 biodiversity units of scrub
1.5 ha of woodland-scrub generating 18 biodiversity units	Indirect impact of degradation, which reduces condition from good to moderate	1.5 ha of woodland-scrub generating 12 biodiversity units	−6 biodiversity units of woodland scrub

Note

The project results in the loss of:

- 12 biodiversity units of woodland
- 0.7 biodiversity units of scrub
- 6 biodiversity units of woodland-scrub

These habitats are a green corridor for wildlife within a heavily urbanised location. Mitigation on site retains the wildlife corridor. The project's design will seek to achieve net gains in each of these habitats in a way that enhances wildlife corridors within the locality and contributes towards targets for these habitats in the local biodiversity plan.

10.5 APPLY THE MITIGATION HIERARCHY

Section 1.4 advises on applying the mitigation hierarchy. Taking each step of the mitigation hierarchy in turn, considering all possibilities before moving on to the next step is essential to demonstrate that the good practice principles were followed.

Advice for local planning authorities

When developing biodiversity policies for a local plan, highlight the importance of applying the mitigation hierarchy, in accordance with national planning policy. Consider providing guidance clarifying how to demonstrate application of the mitigation hierarchy as part of a planning application. Evidence of application of the mitigation hierarchy is a key element in assessing and determining a planning application.

11 Designing biodiversity net gain

Summary

Designing BNG can be an iterative process that builds on application of the mitigation hierarchy (see Section 1.4) and individual features within a project's EcIA (see Chapter 10). It uses contextual information established during the project's early stages (see Chapter 9) and when engaging stakeholders (see Chapter 7). It can involve these activities:

- clarify the starting point (Section 11.1)
- set the outcomes (Section 11.2)
- design net gains in biodiversity (Section 11.3)
- avoid or minimise risks (Section 11.4)
- measure the predicted net gains (Section 11.5)
- plan for the long-term (Section 11.6)
- finalise the design outputs (Section 11.7)

Box 11.1 provides a checklist of these activities for a quick reference list.

The chapter then provides detailed advice on designing BNG. The extent to which this advice is applied should be proportionate to the scale of a project and its potential effects on biodiversity.

This chapter does not cover enhancements for individual species, and should be read in conjunction with such technical references as those in Box 11.9.

Technical note T2 gives advice on designing BNG for small developments.

What good looks like

- Describe and quantify an improvement in the extent or quality of individual biodiversity features affected by a project (or biodiversity within and surrounding a development if the project does not affect biodiversity).
- Demonstrate that a project's BNG outcomes exceed existing requirements (ie would not have happened anyway) and contribute towards local and strategic biodiversity priorities.
- Where possible, optimise the wider social and economic benefits from BNG while ensuring that any negative effects on people from losses and gains in biodiversity are addressed.
- Develop BNG management and monitoring plans, and establish mechanisms to secure BNG for the long term.
- Be consistent in communications – designs are a prediction of BNG (not actual achievements) as no activities have yet been undertaken.

Table 11.1 Biodiversity net gain design checklist

Apply the mitigation hierarchy	Apply the mitigation hierarchy as far as possible, especially to avoid losses of irreplaceable habitat and statutory designated sites that cannot be offset to achieve BNG.
Set the starting point	Clarify measures that avoid, mitigate or compensate for negative effects on biodiversity, and the intended outcomes of those, both qualitatively and quantitatively
Define the reference scenario	Make explicit, and justify, the reference scenario used to compare the design's predicted BNG outcomes (eg the project's biodiversity baseline)
Set the outcomes	Clarify the predicted biodiversity outcomes both qualitatively and quantitatively
	Describe the outcomes: net gains in specific features affected by the project, and how these net gains contribute towards local and strategic biodiversity priorities
Design for net gain	
Ecological equivalence	Demonstrate net gains in features of the same or higher biodiversity value as those affected by the development
	Demonstrate at least equivalent or better levels of ecological functionality and, overall, improve the extent or condition of biodiversity
	Ensure that lost or damaged features are not replaced by features of lower biodiversity value
Location	Optimise locations to keep the net gains local to the development while contributing to strategic biodiversity priorities
Enhancing existing or creating new habitat	Consider the local context and strategic priorities for biodiversity, as well as coverage of habitats, especially to avoid projects achieving BNG numerically but reducing cover of highly valuable habitat
Creating new, bigger, better and joined-up areas for wildlife	Use the 'Lawton principles' for designing BNG, demonstrating sound ecological rationale
Optimise wider benefits	Ensure that the people experiencing negative effects from a project's impact on biodiversity (after application of the mitigation hierarchy) are the same as those who gain commensurable benefits
Additionality	Demonstrate that the BNG outcomes deliver more than legal requirements
	Demonstrate that the BNG outcomes are additional when several activities are undertaken on the same site
Avoid or minimise risks	Minimise time-lags between losses and gains in biodiversity
	Avoid, minimise or safeguard against risks to achieving BNG, ensuring that any residual risks are accounted for when measuring the predicted net gains.
Measure predicted net gains in biodiversity	Clarify whether it is a prediction
	Use the same method to measure biodiversity as used for the baseline and impact assessment
	Add contingency to account for uncertainties by increasing the amount of biodiversity needed to achieve net gains
	Measure predicted net gains in biodiversity for individual features
	Show the full work of the measurement of BNG, with evidence
Plan for the long term	Clarify the timescales, eg a milestone approach with phased outcomes or measuring the final net gains at one point in time
	Develop a costed management and monitoring plan on the methods, responsibilities and timescales for delivering BNG
	Identify who is accountable for delivering the BNG design, and how this accountability is enforced
	Ensure that mechanisms such as legal and financial arrangements are in place to secure BNG over the long term
Finalise outputs	Ensure that outputs are useable for the construction, management and monitoring stages

11.1 APPLY THE MITIGATION HIERARCHY

Apply the mitigation hierarchy as far as possible (see **Section 1.4**), especially to avoid losses of irreplaceable habitats and statutory designated sites that cannot be offset to achieve BNG (see **Technical note T3**).

There might be situations where, locally, net gains in biodiversity cannot be achieved when losses of a specific feature are incurred, for example when local populations of a species depend on a particular habitat and are at risk of extinction if the habitat is removed. In these situations, the mitigation hierarchy and legislative and policy requirements should be applied in discussion with the LPA and statutory nature conservation advisor.

11.2 CLARIFY THE STARTING POINT

A starting point when designing BNG is to clarify measures that avoid, mitigate or compensate for negative effects on biodiversity, and the intended outcomes of those. This clarification should be for individual features in qualitative and quantitative terms, and is necessary to communicate achievements in BNG (see **Technical note T10**).

11.2.1 Describe measures

The design should then describe measures to achieve BNG, ie benefits that are more than mitigation or compensation. This should be for individual features and is especially important when using the same site to compensate for residual losses of biodiversity and also to generate net gains. Compensatory measures can complement net gain activities when the net gains are clearly additional.

Note that CIEEM (2018) describes enhancements as *"net benefits for biodiversity over and above requirements for avoidance, mitigation or compensation."* The guidelines give an example for bats – planting to increase foraging resources within a wood as well as installing bat boxes that compensate for lost roosting features.

11.2.2 Define the reference scenario

BNG is an outcome compared to a reference scenario. A BNG design should make explicit, and justify, the reference scenario used to compare the design's predicted outcomes. For individual projects, the reference scenario is usually the baseline established as part of the EcIA (see **Chapter 10**). For land under routine maintenance, the point in time when the baseline was established should be justified.

11.3 SET THE OUTCOMES

CIEEM (2018) states that *"enhancement measures should be designed to deliver biodiversity objectives that are specified in relevant policy documents."* In practice this means linking outcomes of a BNG design to local and strategic priorities, such as those in BAPs. As well as adhering to CIEEM's guidelines, this is fundamental to apply the good practice principles.

A BNG design should clarify the predicted outcomes both qualitatively and quantitatively. Setting outcomes early is beneficial. It focuses ongoing design decisions, especially to avoid net gains on paper that in reality bring no benefit. It gives clarity to the project team and commissioning agency and can enable constructive discussions with regulators overseeing the project's requirements to avoid, minimise and compensate for biodiversity loss.

The outcomes can be high-level to be refined as the BNG design progresses, and should contain these two aspects:

1 Net gains in specific features affected by the project after requirements for avoidance, mitigation or compensation (or in features within or surrounding the project footprint if no negative effects)

(based on specific, individual features building on the project's ecological impact assessment, while refining any previous goals set for BNG, eg during a project's feasibility stage).

2 How these net gains contribute towards local and strategic priorities for biodiversity (building on the assessment of biodiversity priorities and including any targets set by the commissioning agency and LPAs).

See **Box 11.1**.

Box 11.1
Example of setting high-level biodiversity net gain outcomes during the initial design

Net gains in specific features affected by the project

The project will create new wetland habitat that provides more and better shelter and foraging resources for the wetland birds affected by the project after following the mitigation hierarchy. The project will achieve a minimum of 20% increase in biodiversity (measured in biodiversity units) through its wetland habitat creation, compared against the project's baseline.

Contributing towards biodiversity priorities

The project's wetland habitat creation will contribute towards recovery plans for wetland birds of conservation concern. The project will also create patches of marshy grassland to connect to other wetlands within the local biodiversity opportunity area, thereby increasing ecological connectivity within the locality.

For projects involving EIAs, the EIA co-ordinator can engage the engineering design team to integrate BNG outcomes throughout the design, as part of an iterative process whereby design is informed by impact assessment.

Advice for local planning authorities

Before planning proposals are submitted, working with developers on their design for BNG can secure a high quality planning application, for example by highlighting local priorities that their BNG design can contribute towards.

11.4 DESIGN FOR NET GAINS IN BIODIVERSITY

Designs for BNG are based on individual features in both qualitative and quantitative terms. Key considerations include the following:

- Should the net gains be in the same or a different type of habitat?
- Where should BNG activities be located?
- Should BNG enhance existing or create new habitat?
- How can BNG create more, bigger, better and joined-up areas for wildlife?
- How can BNG optimise wider benefits?
- Are the BNGs more than what would have happened anyway?

The following sections describe these considerations. While each is listed individually, in practice they will be complementary and influenced by practicalities such as the availability of suitable sites.

In all instances, designs should be to generate the best long-term outcomes for biodiversity taking into account all considerations in this guide.

The good practice principles call for decisions that are based on evidence, application of the mitigation hierarchy and that involve stakeholders. CIEEM (2018) says that *"evidence should be provided to support the likelihood of delivering the predicted [biodiversity] benefit"*. Accordingly, designs that adhere to the principles and these guidelines should contain justification of decisions made, with evidence where possible.

Advice for local planning authorities

The advice in this section should be used to:

- review a project's BNG design to ensure that it delivers optimal benefits as far as possible
- establish a plan-led approach to BNG that incorporates all key considerations
- produce guidance for developers on BNG that is specific to the administration area.

11.4.1 Should the net gains be in the same or a different type of habitat?

When compensating for biodiversity loss, CIEEM (2018) refers to compensating for the same type of features as those affected, and seeking to achieve at least equivalent levels of ecological functionality.

When designing BNG, good practice is achieving net gains in features of the same or higher biodiversity value as those affected by the development. It is also to achieve at least equivalent or better levels of ecological functionality and, overall, to improve the extent or condition of biodiversity affected by a project (or the biodiversity within or surrounding a project footprint if no negative impacts are incurred). See **Table 11.2**.

Table 11.2 Design aim/description

Design consideration	Biodiversity net gains
Habitats of high biodiversity value	In the same type of high-value habitat. Net gains in habitats of high biodiversity value should be in the same type of habitat. Habitats of high biodiversity value include those identified as being of principal importance for biodiversity in accordance with the Natural Environment and Rural Communities Act (2006). These are often referred to as 'priority habitats' and can be identified using data from the MAGIC website or JNCC (2011). Arable field margins specifically managed for wildlife should be considered as priority habitats. For those using Defra's biodiversity metric, habitats of 'high' distinctiveness should be considered as priority habitats.
Ecologically equivalent or better	In the same habitat as that affected by development, or a habitat of a higher biodiversity value that supports the same species affected. Generate the same or better levels of ecological functionality. **Box 11.2** describes the concept of 'ecological equivalence'. Net gains should be in the same habitat as that affected by development, or a habitat of a higher biodiversity value that supports the same species affected, for example where a project results in the loss of semi-improved grassland and achieves net gains by creating unimproved grassland. For those using Defra's biodiversity metric, net gains for losses of medium distinctiveness habitats should be achieved in habitats of medium or high distinctiveness. Whereas net gains for losses of low distinctiveness habitats should be achieved in habitats of medium or high distinctiveness. A BNG design should generate the same or better levels of ecological functionality. Ecological functionality is often not captured within biodiversity metrics but should be captured within qualitative assessments and can be essential to achieve BNG (see **Box 11.3**).
No trading down	Improve the extent or condition of biodiversity and do not result in lost or damaged features being replaced by features of lower biodiversity value A BNG design should improve the extent or condition of biodiversity affected by a project. It should not result in lost or damaged features being replaced by features of lower biodiversity value. This is regardless of whether a metric shows an increased amount of biodiversity after a project compared with the baseline. A BNG design should demonstrate the improvement in the extent or condition of specific features in qualitative terms. This should be accompanied by a quantitative assessment that shows that the numerical outcome for individual features is a net gain compared with the baseline.

Box 11.2
The principle of ecological equivalence within biodiversity offsetting

Equivalence is the principle that biodiversity offsets should provide habitat, functions, values and other attributes that are similar in type and proportionate to those affected by the project. These are referred to as 'in-kind' offsets where the offset is the same kind of biodiversity components in a similar ecosystem to that affected by the project.

There may be instances where 'out-of-kind' offsets are appropriate, ie offsets are in a different habitat from the habitat affected, but one of a higher biodiversity value. Out-of-kind offsets should demonstrably provide a greater contribution to landscape-level conservation goals (eg should better address the past disproportionate losses to specific habitat types). Maron *et al*, 2016.

Table 11.3 Examples of creating biodiversity net gain in either the same or a different type of habitat after applying the mitigation hierarchy

Example	Outcome
Creating gains in a different type of habitat so that greater benefits are achieved	A development results in losses of species-poor, semi-improved grassland that is locally common. The grassland did not support notable wildlife populations nor did it provide any key local ecological function. There is no option to achieve BNG within the development footprint.
Using Defra's biodiversity metric to achieve gains in a different type of habitat that has a higher distinctiveness than the habitat lost	The project borders a wetland reserve that is in decline, so addressing this decline and enhancing the wetland are priorities in the BAP. In agreement with the statutory conservation advisor and LPA, the project achieves BNG by enhancing the wetland and supporting ongoing management of the reserve. This contributes towards wetland targets in the BAP, and improves access to higher quality nature for neighbouring communities. Using Defra's biodiversity metric, the species-poor, semi-improved grassland scored low distinctiveness. The aquatic habitats within the wetland scored high distinctiveness.
Using Defra's biodiversity metric to achieve gains in the same type of habitat with a higher distinctiveness band	A project results in the loss of semi-improved acid grassland with a low cover of wildflowers. This habitat scored medium distinctiveness using Defra's biodiversity metric. The project achieves BNG by establishing new areas of species rich grassland with a high cover of wildflowers within the development footprint. This habitat scores high distinctiveness.
Creating gains in the same ecological function as that lost, through a different habitat type with higher biodiversity value	A transport project in an urban environment is seeking to achieve BNG. It required the removal of buddleia, which scored low distinctiveness using Defra's biodiversity metric but provided vital resources for local butterfly populations. BNG is achieved by planting linear swards of native, nectar-rich plants along the site boundaries that increase habitat for the butterflies and contribute towards targets on increasing resources for butterflies in the BAP.
Creating gains in the same ecological function as that lost from a project through the same type of habitat but of higher conservation value	A development is converting derelict land covered by species-poor grassland into housing. Common lizards occupy the site and their numbers are significant locally. Increasing cover and quality of acid grassland is a target in the BAP – for the habitat itself and to boost local populations of common lizard. The project enhances the condition of acid grassland nearby the development and creates new areas of acid grassland in locations identified in the BAP. The project commits funding to implement a 30 year management plan for all areas. This plan includes monitoring for the project to claim BNG when the newly created habitats have reached their target condition and when lizards have colonised the areas.
Designing BNG based on habitats and ecological function	A project is seeking net gains for the unavoidable loss of a hedgerow. The ecologist assesses the ecological connectivity of the hedgerow and uses the assessment to create new hedgerows that increase ecological connectivity within the landscape.

11.4.2 Where should biodiversity net gain be located?

CIEEM (2018) directs compensation of biodiversity loss to be *"as close as possible to the location where effects have occurred and benefit the same habitats and species as those affected."*

When designing BNG, keeping the net gains local to the development while contributing to local and strategic biodiversity priorities can be important. Key considerations can be:

- home ranges and/or ecological networks of species affected by the project
- areas identified of local and strategic priority for biodiversity, eg within local biodiversity plans and GI strategies.

Table 11.4 helps to decide where to locate BNG activities to generate the best outcomes for biodiversity. When conflicts exist between delivering local net gains and supporting wider priorities, the aim should be to generate the best outcomes for biodiversity that are commensurate with and proportionate to a project's effect on biodiversity.

Table 11.4 Considerations for keeping biodiversity net gain local while contributing towards strategic biodiversity priorities

Any combination of these factors might apply	
Is achieving BNG locally to the development a priority?	■ Green space is extremely limited and any loss of habitat is critical, eg in urban areas. ■ Achieving BNG within the project footprint adds the greatest value to both biodiversity and the project. ■ The project affects biodiversity that is important to local ecosystems, eg rare species and species of conservation concern. ■ The project affects species with limited home ranges. ■ Local communities highly value the biodiversity. ■ Local areas coincide with 'wider priority' areas, eg within a biodiversity opportunity area.
Do spatial constraints influence the location of BNG?	■ BNG activities are to be within the home ranges of species affected by the project. ■ BNG activities are to complement and build on compensatory activities. ■ The commissioning agency or regulator stipulates that BNG is to be achieved within the project footprint. ■ The LPA has target areas for the affected species and/or for BNG within its local plan. ■ Constraints within the project footprint (eg safety, operational) mean that BNG cannot be achieved on site. ■ BNG activities within or adjacent to the project have a high failure risk because they are surrounded by conflicting land use, or on areas likely to be developed in the near future. ■ BNG activities not in the same landscape or ecosystem type of the project cannot deliver ecologically equivalent values and functions to those lost. ■ BNG activities located far from the project creates unacceptable 'winners and losers' where the region and people benefitting from the activities are not the same as those experiencing the losses. ■ BNG activities are to be within defined target areas, eg biodiversity opportunity areas.
Is BNG best delivered on several sites rather than a single site?	■ The project seeks local biodiversity gains for neighbouring communities, as well as gains further away for important species or places. ■ The project compensates for its biodiversity impacts on site or nearby, and provides the gains elsewhere to support targets within local biodiversity plans. ■ The project affects biodiversity across different landscape or habitat types or local authority areas.
Is BNG best delivered on a single site?	■ BNG activities are small in scale. ■ Delivering all BNG activities on the same site (or on the same site as compensation activities) boosts the site's value for wildlife. ■ BNG activities are delivered through habitat banking (eg The Environment Bank, 2015). ■ A project's greatest loss of biodiversity occurs in one place. ■ Areas available for BNG activities are limited.

For users of Defra's biodiversity metric, the location of BNG activities will determine application of the 'spatial risk multiplier'. This multiplier is to encourage BNG activities to be within strategically important areas for biodiversity (see **Section 11.5**).

11.4.3 Should biodiversity net gain enhance existing or create new habitat?

Habitat creation is the removal or loss of an existing habitat to create a new, different habitat. It can also involve creating habitat where none was previously present (including from bare earth). Habitat enhancement is increasing the biodiversity value of an existing habitat, for example by improving its biodiversity capacity or removing factors that degrade its value.

When designing BNG, a mixture of habitat creation and enhancement can be appropriate. Key considerations include:

- the conservation status of the target habitat (and the species that use it), for example, after strict application of the mitigation hierarchy, when a project affects rare habitats, creating new areas of the habitat is often required to ensure no reduction in cover
- the intended conservation outcomes of the BNG design in the context of surrounding priorities for biodiversity, such as contributing towards targets in local biodiversity plans on restoring degraded habitat
- coverage of a habitat to avoid projects achieving BNG numerically but reducing cover of highly valuable habitat

- protecting valuable habitat from continued decline, which is often termed 'averted loss' (see ICMM, IUCN, 2013) and its use for a project to achieve BNG should first be discussed with the LPA and statutory advisor.

In all cases, the design should make explicit the areas of creation and of enhancement for individual habitats and the intended conservation outcomes of these activities. **Table 11.5** contains prompts when considering whether to enhance existing or create new habitat to achieve BNG.

Table 11.5 Should biodiversity net gain enhance existing or creating new habitat?

Any combination of these factors might apply	
Does the habitat affected have high biodiversity value?	When a project affects rare habitats, creating new areas of the habitat is often required to ensure no reduction in cover. This only applies after strict application of the mitigation hierarchy, and does not apply to irreplaceable habitat or statutory designated sites.
	Enhancing existing habitats that should have high biodiversity value, but that are currently degraded, could generate valuable benefits for biodiversity.
Does the habitat affected provide a critical ecological function?	When a project affects critical ecological functions, creating new habitat that provides equivalent or better ecological functions is often required to ensure no reduction in provision of the function.
Do stakeholders or local policies prioritise enhancements in the habitat over increasing its coverage?	Enhancing existing habitats could contribute to this priority.
Alternatively, do stakeholders or local policies prioritise increases in habitat cover?	Creating new habitat could be most appropriate.
Is provision of green space a priority issue locally?	Projects that achieve BNG by enhancing habitats elsewhere, although resulting in a loss of green space, can cause significant negative consequences locally.
Are existing habitats at risk from future threats and/or under continued decline?	Enhance habitat to secure its long-term future, eg by making habitat more resilient to other pressures, such as the effects of climate change. Also protect habitats in decline from declining further (also known as averted loss).

11.4.4 How can biodiversity net gain create more bigger, better and joined-up areas for wildlife?

Principles for enhancing England's wildlife sites were developed as part of the Lawton Review (Lawton, 2010). Across the UK, these principles can be used to design BNG activities to boost wildlife sites. They are:

- improving the quality of wildlife sites
- increasing the size of wildlife sites
- enhancing connections between, or joining up, wildlife sites
- creating new wildlife sites
- reducing pressures on wildlife sites.

When designing BNG, demonstrating delivery of the 'Lawton principles' is a vital consideration but there can be pitfalls to avoid, as illustrated in **Table 11.6**.

Table 11.6 Possible issues to avoid when designing biodiversity net gain

Biodiversity net gain designs	Possible issues
A project involves the unavoidable loss of woodland that was used by local communities. It seeks BNG by enhancing degraded woodland within a nearby local nature reserve that is also used by local communities.	Despite the enhancements being in a nature reserve used by local people, local people have still lost a valuable green space because BNG is achieved by enhancing (not creating new) woodland.
A project requires the clearance of a linear tree strip that connects two woodland reserves. It creates new woodland at each reserve to increase their size.	Although the project increases local woodland cover and the sizes of each reserve, it disconnects the two woodland reserves, causing the loss of a critical ecological function.

Biodiversity net gain designs	Possible issues
A project results in the unavoidable loss of a woodland scrub mosaic. It achieves BNG by enhancing woodland scrub within a nearby wildlife reserve. While this boosts the reserve, the enhancement option achieves BNG faster than creating new habitat. This shorter timeframe means less area of habitat is required, so less investment is needed.	BNGs designs should be justified by a sound ecological rationale. This is crucial to demonstrate that the good practice principles were followed. There are instances where enhancing existing habitat, rather than creating new habitat, is appropriate (eg when there is greater reassurance that BNG will be achieved). However, the ecological rationale underpinning the BNG design should be clear.
A project achieves BNG by investing in a nature reserve that is well used by local communities and the wider public.	Although the project's BNG offers social benefits, care must be taken to ensure that visitors do not compromise the biodiversity features, and that no other external factors, whether related to the development or not, could affect the BNG activities in the reserve.

11.4.5 How can a biodiversity net gain design optimise wider benefits?

The good practice principles state *"prioritise biodiversity net gain and, where possible, optimise the wider environmental benefits for a sustainable society and economy."* This aligns with CIEEM (2018), which describes how biodiversity enhancements *"could be linked to the delivery of wider socio-economic benefits"*, giving the example of wetland restoration that supports flood risk management.

Key considerations when designing BNG and seeking to optimise the wider benefits include the following:

- **Prioritising BNG.** The UK Government (2018) plan for the environment set the principle that *"new development should result in net environmental gain."* For this specific context of BNG, the good practice principle makes clear that the priority is BNG. Clarifying this priority from the start is important to manage trade-offs and maximise the synergies between BNG and wider socio-economic benefits. **Technical note T11** describes links between BNG, ecosystem services and natural capital.
- **Collaboration between specialists.** CIEEM (2018) states that *"EcIA is a process that is most effective if all contributing ecologists and other specialists work in collaboration."* This is equally vital when seeking to optimise the wider benefits from BNG.

  In addition, there are several technical references such as:

  - those on the susdrain website
  - advice for local planners that provides useful information, eg TCPA and TWT (2012)
  - Porter *et al* (2014)
- **Ensuring that people are no worse off, and preferably better off.** International guidelines, such as those produced by BBOP (2012) and Bull *et al* (2018), advocate that biodiversity offsets should achieve NNL and preferably a net gain of biodiversity without making local people worse off, and preferably ensuring that they are better off.

  BNG designs should demonstrate, by application of the mitigation hierarchy, that the 'no worse off, preferably better off' principle has been achieved with regard to people's use and values for biodiversity. This should build on, and be proportionate to, social considerations of a project's EcIA (see **Chapter 10 and Box 11.3**). It is especially important where biodiversity affected by a project is valued by communities, ensuring that people experiencing negative effects from a project's impact on biodiversity (after applying the mitigation hierarchy) are the same as those who gain commensurable benefits. For example, locating BNG activities far from the project may create unacceptable 'winners and losers' where the region and people benefitting from the activities are different from those experiencing the losses.

Box 11.3
Social considerations for 'no net loss' of biodiversity

Despite international good practice guidelines calling for biodiversity no net loss (NNL) to ensure that people are no worse off, and preferably better off, comprehensive guidance on including social considerations within the design and implementation of biodiversity NNL is limited at both the policy and project level. To address this gap, new international principles have been published on incorporating social considerations into NNL objectives of biodiversity (Bull *et al*, 2018).

- **Are the BNGs more than those that would have happened anyway?** The good practice principles state BNG should *"achieve nature conservation outcomes that demonstrably exceed existing obligations (ie do not deliver something that would occur anyway)"*. This is termed the 'additionality' principle, which has been defined in a UK context as: *"The need for a compensation measure to provide a new contribution to conservation additional to any existing values, ie the conservation outcomes it delivers would not have occurred without it."* (Natural England, 2016).

  In practice, this means that BNG cannot be claimed for meeting existing legal requirements or commitments.

  For example, the UK Government and landowners are responsible for keeping SSSIs in 'favourable condition', however doing this does not qualify for BNG. Also, landowners who are delivering an agri-environment scheme such as Countryside Stewardship are responsible for managing land to benefit biodiversity. Any gains resulting from this scheme do not count towards the delivery of BNG.

  Countryside Stewardship: https://www.gov.uk/government/collections/countryside-stewardship-get-paid-for-environmental-land-management

  Addressing effects on statutory designated sites should follow legislative and policy requirements and are excluded from BNG designs. When not compensating for such effects, BNG designs can involve statutory designated sites when the gains are clearly additional to the reasons for designation (and any associated management requirements). In these situations, advice and verification from the statutory conservation advisor and LPA should be obtained.

  Where several activities are underway on the same site, how the BNGs are additional to other activities should be demonstrated. For example, when using the same site to compensate for residual losses of biodiversity and achieve net gains in biodiversity, the compensation and then the actual net gains should be clearly distinguished and quantified.

  One way to demonstrate additionality is to describe and measure the predicted outcomes from two scenarios:

  - with BNG activities and the predicted gains for a specified period
  - without BNG, predicting the status of biodiversity over the same time period

  The 'without BNG' scenario should be established using information that can be independently verified. This is often best done by working with stakeholders, ensuring that stakeholders agree that the project generates biodiversity outcomes that would not have otherwise occurred.

Advice for local planning authorities

If several biodiversity projects are taking place within one area, good practice requires the BNG design to be clearly additional to the other projects, and to maximise complementary interactions with other projects. This helps avoid a piecemeal approach. However, care should be taken to avoid situations where landowners or managers choose between BNG projects and lose a benefit that would have otherwise been provided.

11.5 AVOID OR MINIMISE RISKS

11.5.1 Avoid or minimise time-lags

A BNG design should, as far as possible, reduce or eliminate time-lags between losses of biodiversity and the gains being attained. There should especially be no net reduction in resources for endangered species during a project life cycle, even if there is a gain at some point in the future.

To avoid or minimise time-lags, BNG designs should be implemented as early as possible, ideally before habitat clearance starts, even if it is only some of the activities (see **Case study 11.1**). Reducing time-lags will reduce contingency added to the amount of biodiversity needed to achieve net gain (see **Section 11.5**).

The measurement of BNG should account for any time-lags, for example the 'time to target condition' multiplier for Defra's biodiversity metric. Accounting for time-lags should apply to areas where habitat is cleared temporarily and then reinstated (see also **Section 11.6.3**).

Case study 11.1
Early mitigation activities by East West Rail

The railway enhancement project, East West Rail (EWR) Phase Two, implemented early ecological mitigation activities before habitat clearance started. A number of advanced ecology mitigation sites along the line were negotiated with local landowners and planning applications granted. Works involved three sites, enabling the sites to mature before construction of the railway line starts, providing new habitat for both the legally protected species such as GNCs and common lizards, as well as other locally important species such as the black and brown hairstreak butterfly.

11.5.2 Avoid, minimise or safeguard against risks

The good practice principles advise avoiding or mitigating *"difficulty, uncertainty and other risks to achieving net gain"* such as the examples in **Table 11.7**. Avoiding or mitigating risks early can ensure an efficient design process. It should build on risks discussed with stakeholders during the project's early stages (see **Chapter 9**), as well as application of the mitigation hierarchy (see **Section 1.4**). Using tools such as a risk register can keep track of the likelihood of risks occurring and their significance if they do, especially for large projects. Any residual risks should be accounted for when measuring BNG, as described in **Section 11.5**.

Table 11.7 Examples of risks and mitigating actions for achieving biodiversity net gain

Ecological risks	Examples of mitigation actions
Difficult BNG activities fail, eg failure to successfully create a habitat	■ Apply the mitigation hierarchy to avoid or minimise biodiversity loss. ■ If using Defra's biodiversity metric, Defra (2012b) describes levels of difficulty for recreating or restoring certain habitats to use. ■ Secure legal, financial and practical arrangements to meet long timeframes. ■ Ensure that the period for a habitat to achieve its target condition matches the time period that the management will cover, as a minimum. ■ Avoid designing for 'less difficult' or 'less time consuming' activities where these do not generate sufficient or proportionate net gain outcomes relative to a project's effect on biodiversity. Designing only for the least cost option can risk failure and attract criticism.
Lengthy timeframes to achieve BNG for particular habitat types	
External factors pose risks to BNG, eg climate change	■ Assess risks (eg flood risk), initially through desk studies. ■ Design for resilience, ensuring that the net gains in biodiversity can withstand potential environmental change or threats. ■ If a full EIA involves working with relevant specialists (eg climate change experts), work together to design BNG.
Allocated sites prove unsuitable	■ Undertake desk-based studies to assess environmental conditions (eg soils types). ■ Check local knowledge on site suitability, eg is the site prone to flooding? How was the land used or managed in the past? ■ Check pre-works site access if undertaking environmental surveys. ■ Regarding soil conditions, if working on major projects, extensive landscape schemes or large-scale BNG activities, consider: □ undertaking a soil resources survey (statutory advisers often recommend that LPAs ask for this survey as part of a planning application) □ developing a soil management plan in accordance with the Defra (2009) code of practice □ securing the expertise and funding needed to implement a soil management plan.
Other risks	
Land acquisition is not possible	■ Land purchase can be the best option to secure BNG for the long term. Identify the need for land acquisition as early as possible to secure funding and identify potential sites. ■ Programme the acquisition process to clarify timescales and when BNG activities could start (eg when seeking to minimise time-lags between losses and gains).
Late land acquisition	■ Budget for and programme any necessary BNG surveys and assessments as early as possible. ■ Clarify implications for time-constrained surveys and BNG activities (eg what happens if wildflower seed cannot be sown at the right time of year?). ■ Include BNG in the project's risk register so that risks such as late land acquisition are formally captured.
Limited or no land is available for BNG	■ Consider BNG within the project's early stages to prioritise delivering net gains within the project footprint. ■ Seek advice from the LPA on approaching landowners or suitability of their sites. ■ Consider undertaking BNG activities further away, but only where these link with published priorities for biodiversity, eg with BAPs.

Ecological risks	Examples of mitigation actions
Sites are at risk from future development	■ Check planning proposals. ■ Ask advice from the LPA. ■ Submit data to the local environmental record centre so that they can update a register of sites with BNG activities.
Landowners have insufficient flexibility to deliver BNG	■ Secure the expertise and funding needed for long-term management of BNG sites. ■ Employ adaptive management. ■ Address concerns by landowners early, eg creating habitats that are later designated as SSSIs and prevent management of the land after the BNG funding expires (in these situations, landowners can be supported to acquire other funding for biodiversity-related practices).
Landownership changes	■ Secure legal and/or financially binding agreements that protect against this, eg agreements that stipulate any new owner will continue to deliver the BNG such as S106.
Potential disturbance, eg siting sensitive activities within the development footprint where neighbouring land uses are incompatible, or within well-used nature reserves	■ Undertake desk studies to identify such risks as soon as sites for BNG are identified (including areas within the development footprint). ■ Undertake surveys to fully investigate potential disturbance. ■ Carefully locate BNG activities to minimise potential disturbance. ■ Ask advice, eg from reserve managers.
Reliance on individuals for continuity within project teams.	■ If project teams will change (eg projects lasting for several years) plan in advance for people leaving, eg handover meetings over appropriate timescales.
Concerns that the biodiversity metric does not represent all features affected by the development or count all enhancements	■ Demonstrate the BNG outcomes in both qualitative and quantitative terms. ■ Focus on net gains in features not explicitly measured, such as the ecological functionality of a site. ■ Describe how the project achieves net gains in individual features and contributes towards local and/or strategic priorities for biodiversity. ■ Continue to engage stakeholders to minimise risk of being labelled as 'licence to trash' (see **Technical note T10**).
Opposition from local communities or interest groups, eg being accused of using offsetting as a 'licence to trash' nature	■ Engage local communities and interest groups as early as possible (see **Chapter 8**). ■ Listen to, understand and act on people's concerns about biodiversity offsetting (see **Technical note T10**). ■ Provide evidence on application of the mitigation hierarchy. ■ Fully adopt and implement the good practice principles.

11.6 MEASURE THE PREDICTED NET GAINS

11.6.1 Clarify whether information is a prediction or actual

Technical note T10 gives advice on communicating achievements in BNG, including clarifying whether these are predicted or actual achievements. If no activities have been undertaken, the design should clarify that this is a prediction of a project's BNG outcomes over a set timeframe. The construction and maintenance stages are often when actual achievements in BNG are recorded.

11.6.2 Use the same measurement

Chapter 10 provides advice on measuring biodiversity baselines and a development's impact on biodiversity. The same method for measuring biodiversity used for the baseline and impact assessment should be used to measure the predicted net gains after avoidance, minimisation and compensation. It should also clarify outcomes from avoidance, minimisation and compensation, and then the net gains. For example, a project includes on-site landscaping to compensate for the project's biodiversity losses but also to achieve net gains. The outcomes from both aspects are quantified, making clear what is compensation and what is additional gain.

11.6.3 Add contingency

When measuring the predicted outcomes, the good practice principles require application of 'well-accepted ways to add contingency'. Such 'well-accepted ways' include those recognised across sectors, for example the approach taken in Defra's biodiversity metric. The approach adopted should be justified.

Adding contingency is to account for uncertainties by increasing the amount of biodiversity needed to achieve net gains, according to the level and type of uncertainty. As a minimum, contingency should account for:

- the risks to delivering BNG, eg through creating or enhancing habitat
- the time-lag between losses occurring and the gains being realised
- whether the BNG activities are in a biodiversity priority area (desired) or not, including how close these activities are to the area of biodiversity loss.

The time-lag between losses and gains in biodiversity should be avoided where possible. Where this is not possible, the time-lag should be justified and considered as part of the contingency. The time-lag is from the point in time when losses occurred to the time when desired gains are expected to be realised (this is also called the time-to-target condition). For example, a grassland meadow is cleared for a construction compound of a housing development. After five years, the compound is removed and the area is sown with a grassland mix, which takes five years to reach a better condition than the original. The time-lag is 10 years.

Evidence should be presented to justify the contingency added, eg why that number of years was assigned to a newly created habitat reaching its target condition. If using Defra's biodiversity metric, Defra (2012b) explains how to apply these contingency factors.

11.6.4 Measure individual features

Measuring predicted net gains in biodiversity should be for individual features, such as the example in **Table 11.8**. It should build on an EcIA and demonstrate that net gain outcomes are commensurate and proportionate to a project's effect on individual features. Habitat losses and gains relating to legally protected species can be included but should be clearly identified.

Table 11.8 An example of calculating biodiversity units for losses and gains in habitat using the Defra metric

Baseline (before works)	Effect	Post development (after works)	Loss	Gain
1 ha of woodland generating 12 biodiversity units	Permanent loss of woodland	0 biodiversity units generated by woodland	−12 biodiversity units of woodland	+20 biodiversity units from woodland creation
0.5 ha of scrub generating 4 biodiversity units	Temporary loss of scrub: the scrub is cleared for construction activities which last two years, then the area is replanted with scrub, which is considered to take three years to reach its original status of moderate condition. That results in a total of five years' time-lag between losses and gains.	3.3 biodiversity units generated by scrub accounting for a five-year time-lag	−0.7 biodiversity units of scrub	+5 biodiversity units from scrub creation
1.5 ha of woodland-scrub generating 18 biodiversity units	Indirect impact of degradation, which reduces condition from good to moderate	1.5 hectares of woodland-scrub generating 12 biodiversity units	−6 biodiversity units of woodland-scrub	+10 biodiversity units from enhancing woodland-scrub
Note The project results in the loss of habitats that provided a green corridor for wildlife within a heavily urbanised location. Mitigation on site retains the wildlife corridor. The project's design seeks to achieve net gains in each of these habitats, in a way that enhances wildlife corridors within the locality and contributes towards targets for these habitats in the local biodiversity plan.				

11.6.5 Reporting

Full working of the measurement of BNG, with evidence, should be presented. There should also be evidence that the net gains contribute toward local and/or strategic priorities, such as those in local biodiversity or GI plans.

Chapter 5 gives advice on setting numerical targets for BNG. This includes achieving a set percentage increase in biodiversity above the baseline to help decisions such as 'what is a net gain for biodiversity?' These decisions should account for published industry schemes (see Table 11.9) and the relative accuracy of the measurement, for example if the measurement is too crude to distinguish change within 15 per cent, then targets within this range are meaningless.

Table 11.9 Ecological calculator for BREEAM schemes

Biodiversity outcomes	Compared with the baseline, post-development biodiversity units
Minimising loss	75–94%
NNL for the habitats assessment	95–104%
Net gain for the habitats assessed	105–109%
Significant net gain	110% or above

Note

The new ecological calculator (BREEAM, CEEQUAL, HQM, 2018) is based on the Defra biodiversity metric, which quantifies a project's biodiversity outcomes as shown in the table.

Advice for local planning authorities

When accounting for BNG across one or more districts or boroughs, only include gains over and above measures that avoid, minimise or compensate for impacts on biodiversity.

Consider providing tools and guidance on how BNG should be identified in a planning application, so that it is easily accounted for when auditing the administrative area.

11.7 PLAN FOR THE LONG TERM

11.7.1 Be specific on timescales

The good practice principles require BNG to be sustained *"over the longest possible timeframe"* with the expectation that it covers *"at least the lifetime of the development (eg often 25 to 30 years) with the objective of net gain management continuing in the future"*.

Timescales for achieving BNG should be proportionate to a project's effect on biodiversity. The design should clarify the timescales, such as a milestone approach with phased outcomes measured at specific points in time, or whether the final net gains will be measured at one point in time.

Phasing timescales to deliver BNG over the short, medium and long terms can clarify what resources are needed and when, to help budgets and planning. If third parties are delivering BNG on behalf of the developer, this can form the basis for legal and commercial agreements as well as monitoring BNG.

Advice for local planning authorities

Set consistent expectations on timeframes for maintaining BNG, so as to give developers a level playing field. This is especially important for requirements such as those stipulated in S106 agreements. If consistency is difficult, eg where development projects vary in size, consider a minimum timeframe, with the actual timeframes set depending on the scale of the project's impact on biodiversity. When giving planning permission, include clear and enforceable targets and timelines for BNG.

11.7.2 Develop a management and monitoring plan

CIEEM (2018) describes how environmental management plans (EMP) should clarify methods, responsibilities and timescales for delivering the project's ecological requirements, as well as key criteria for judging success.

The design process for BNG should include developing a costed management and monitoring plan on the methods, responsibilities and timescales for delivering and monitoring BNG. Timescales for BNG might be longer than those within an EMP, which only covers the construction phase.

Box 11.4
CIEEM's guidelines on ecological monitoring plans

CIEEM (2018) describes how the EcIA should set out the monitoring methods to be used, the criteria for determining success or failure, the frequency and duration of monitoring and the frequency of reporting.

The guidelines also describe that monitoring can be used to determine:

- whether the measures have been implemented as agreed
- the success/effectiveness of the measures
- when early warning needs to be given of proposed measures that are not proving effective
- how to remedy the situation should any of the implemented measures fail, eg due to lack of management.

Monitoring is fundamental to demonstrating that BNG was achieved. **Chapter 13** provides advice on using monitoring to employ adaptive management. At the design stage, when developing a management and monitoring plan, the plan should set out a monitoring regime that feeds into ongoing management, ensuring that action can be taken if monitoring shows that changes are needed to secure the intended biodiversity outcomes. The plan should also clarify the extent to which adaptive management can be employed, such as if management activities are not meeting the biodiversity outcomes because of unforeseen site suitability issues, whether the outcomes can be amended to deliver the required amount of BNG in a way that is suitable for the site and that generates long-lasting biodiversity benefits.

The monitoring regime should include indicators to monitor whether and when BNG is achieved and maintained, such as indicators outlined in **Chapter 6**, for example recording the presence of a species or reaching a target condition for a habitat. The regime should also use the same measurement of BNG that was used for the design.

The plan should describe the contents of monitoring reports and who these reports are issued to, such as a statutory advisor or LPA (eg where BNG is a planning obligation under S106), or the developer's organisation where third parties are delivering BNG on its behalf (receipt of these reports can be a contractual requirement or trigger for payment). Monitoring data should be issued to the local environmental records centre. Some of these centres can review monitoring data to provide an independent review of progress towards BNG.

There are several options and guides to develop management and monitoring plans, including:

- **EMPs.** If the development project already has management plans for its biodiversity requirements, BNG requirements should be included within those (such as collecting evidence on applying the mitigation hierarchy and quantifying BNG outcomes).

  CIEEM (2018) states that *"details of mitigation, compensation and enhancement measures will be incorporated into an ecological design strategy or EMP"*. More details on EMPs can be found in IEMA (2008).
- **Biodiversity offset management plan (BOMP).** Defra's guidelines for offset providers describe key aspects of a biodiversity offset management plan (BOMP). BBOP (2012a) also describes a table of contents for these plans.
- **Specific guides.** For complex BNG projects, guides on management plans for national nature reserves by statutory advisors are based on good practice, and provide a template (Natural England, 2013a). Similarly, the RSPBs generic site management planning format and guidance notes can apply to a range wildlife sites.
- **Including BNG within the site's main management plan.** If BNG activities are within an existing site, including the activities within the site's main management plan can be appropriate, if BNG is clearly distinguishable and quantifiable from other activities.
- **Existing templates.** Brokers or BNG providers may have their own management plan template and can be responsible for producing the management plan for BNG. Early discussions on the format, scope and content of a BNG management plan, and timescales for producing it, can avoid later delays.

Advice for local planning authorities

Consider if BNG management plans should be required when giving planning permission, weighing up the needs for a developer to start work on site.

If BNG activities are incorporated within existing management plans, ensure that BNG is clearly distinguished and quantified.

Depending on its likely complexity, the management plan could be required under a S106 agreement, or it could be an additional requirement stipulated within that agreement, but developed separately.

The fundamental aspects of management need to be secured as part of the planning permission documents, while details may be developed as a requirement of the permission given.

11.7.3 Define responsibilities

The good practice principles require BNG to be sustained *"over the longest possible timeframe"* with the expectation that timescale covers *"at least the lifetime of the development"*. Who has responsibility for delivering the BNG design should be clarified as early as possible. This might involve different organisations at different life cycle stages of a project, for example:

- **During construction:**
  - the main contractor where the BNG design is delivered fully or partly on site
  - a broker who secures delivery through a third party on behalf of a commissioning agency
  - a third party contracted directly by a commissioning agency, either on the agency's land or as a biodiversity offset provider (see **Box 11.5**)
- **After construction:**
  - the main contractor responsible for the landscape aftercare programme, for example for three years, who then hands over to a commissioning agency, the maintainer of the asset or another organisation
  - a commissioning agency when BNG is delivered on their land, such as agencies with large estates
  - a management company who manages the open spaces areas of a housing development after construction
  - a broker who secures delivery through a third party on behalf of a commissioning agency
  - a third party contracted directly by a commissioning agency.

Identifying responsibilities early allows time to secure any necessary financial and contractual requirements. It also establishes accountability.

Box 11.5
Biodiversity offset providers

A biodiversity offset provider is an individual or organisation who is responsible for implementing and/or managing a biodiversity offset (ie responsible for the long-term management after implementation). They can be landowners or organisations who lease land, for example a Wildlife Trust managing a nature reserve on land leased from the LPA, or organisations who manage land on behalf of the landowner.

Biodiversity offset providers can provide a single biodiversity offset, such as creating new habitat for a specific development, or many offsets on one site where each biodiversity offset is clearly distinguishable and quantifiable, and collectively provides the many benefits of a larger scale biodiversity gain.

There can be situations where the developer buy lands for BNG activities and commissions a biodiversity offset provider to create and then maintain the BNG in the long term, for example where local wildlife groups do not own land of low biodiversity value but are extremely well placed to provide BNG schemes.

Defra described that biodiversity offset providers will deliver a quantifiable amount of biodiversity benefit. This quantified benefit is what the developer buys, not the biodiversity itself or the land that it stands on (Defra, 2012).

11.7.4 Determine accountability

Accountability is to ensure that the BNG design is delivered to the required quality and programme. It is especially critical for development projects where staff will move to other projects after the construction phrase, yet delivering the BNG design involves a longer period.

Who is accountable for delivering the BNG design, and how this accountability is enforced, should be clarified, especially when accountability changes at different life cycle stages. This can range from securing services of a third party to monitor implementation for complex projects (see **Box 11.6 and**

Chapter 8) to submitting monitoring data to the local environmental record centre in order to update a publicly available register of sites where BNG is delivered. Accountability should align with a project's quality assurance reviews, as described in Chapter 8.

Box 11.6
Examples of assurance roles undertaken by third parties

A broker can provide an assurance role, for example by receiving monitoring reports from a biodiversity offset provider and validating progress. Alternatively, an independent third party can assess progress. For example, CIEEM encourages practitioners to share EcIA survey and ecological monitoring data through local environmental record centres. These centres might be able to receive and audit monitoring reports from the organisation delivering the BNG design. Alternatively, the LPA or statutory advisor might be able to do so.

11.7.5 Put mechanisms in place

Mechanisms for securing BNG over the long term may include legal and financial arrangements, as well as various practical actions.

Legal

CIEEM's guidelines direct that biodiversity enhancements should *"be guaranteed through a legal obligation, such as, in England and Wales, a planning obligation under S106 of the Town and Country Planning Act 1990, or its equivalent provision elsewhere, as well as other permits and consents"*. Another example is the licence system for the GCN, which has options for management plans ranging up to in perpetuity.

As well as legal agreements between the developer and LPA, legal or contractual agreements with a third party may be necessary if the third party is responsible for the BNG activities, for example when a wildlife organisation is delivering BNG on behalf of the developer within their land ownership, or the developer has signed over land to an organisation undertaking suitable land management.

The BNG design will specify timescales for implementing, maintaining and monitoring activities, and whether these will deliver objectives over the short, medium or long term. Contractual arrangements should reflect deliverables in the BNG design, especially when these are legal or planning requirements, for example a S106 agreement.

Contractual arrangements should require accountability to ensure that the required quality and programme is delivered, for example the biodiversity offset provider submits monitoring reports that are subject to quality assurance reviews by the local environmental record centre. They can include performance incentives, for example withholding payment until delivering of objectives against a specified timeframe.

Case study 11.2
High Exeter Road, Teignmouth

A residential development was allocated in the emerging local plan, and granted planning permission. The development resulted in the loss of grassland, although it included enhancing woodland and hedgerows. Application of Defra's metric showed that the development caused a net loss in biodiversity. The S106 agreement included a financial contribution by the developer for the LPA to deliver compensation for losses of biodiversity. The costs were modelled on a local compensation scheme for cirl buntings (a bird species of principal importance under S41 of the Natural Environment and Rural Communities Act 2016), and provided clarity to the developer of the requirements.

For more details see Case study 13 in C776b.

Figure 11.1 Land west of higher Exeter road, Teignmouth, Devon

Delivering the BNG design might be part of the main contract between a commissioning agency and its primary contractor for the development project. Where a commissioning agency employs the services of a broker or biodiversity offset provider, the broker or provider might be required to adopt the agency's contractual terms. Alternatively, they might have their own contractual arrangements. In either situation, the contractual arrangements should be clarified as early as possible, to allow time for any negotiations and to avoid delays.

The contractual arrangements should clarify arrangements regarding land tenure, such as when a developer buys a quantifiable amount of biodiversity benefit from a biodiversity offset provider, not the biodiversity itself or the land that it stands on. They should also clarify the extent of liability and how risk of delivering BNG will be managed. For example, in the event that the BNG outcomes are not achieved, the requirements for adaptive management should be stated.

Financial

Financial arrangements can depend on the development project or those responsible for delivering the BNG design. For example, a project with a completion date may need to issue the funding by that time, whereas farmers or wildlife groups might prefer staggered payments rather than one lump sum.

Whichever option is selected, good practice is for payment to be set against a schedule of performance, for example delivering of objectives in the BNG design. Options for payment include:

- a one-off payment, eg on completion of BNG for small projects
- on delivery of milestones, eg milestones on habitats reaching a certain condition or quality, or the delivery of specific activities (such as those set out in the management plan)
- a regular, staggered payment, eg through an endowment fund or a conservation trust fund releasing annual payments after submission of annual management reporting.

Financial arrangements should refer to the BNG design and to the management and monitoring plan, as well as any associated documents such as a S106 agreement. They can be simple or extensive and include direct costs and overheads. Most important is clarity on what is being paid for (eg work undertaken or biodiversity outcomes achieved) and when evidence is required to enable payment.

The agreements should clarify acceptable practices. For example, a management plan that covers 30 years and allows activities to change, if change is necessary to secure the intended biodiversity outcomes. They can also enable additional financial support to be secured in the future, especially to build on the initial BNG activities. This can be especially important for landowners taking on responsibilities to deliver BNG for a developer.

Options for securing funding include making endowments – a donation of money or property to a not-for-profit organisation with stipulations regarding its use. These can be structured to maintain the principal amount and use investment income for management, or it could release part of the principal amount each year. Other options include paying into existing mechanisms such as residential funding schemes (where residents of the new build pay into a fund for activities on site). This avoids the need for a new fund, but stipulations on how money is used are still needed.

Practical actions

Practical action that supports BNG legacies include:

- registering the sites with the local environmental records centre
- adding the data to the landowner's asset register or landscape database (or developing new databases), ensuring that this is updated and maintained, and links with land management practices
- including requirements for BNG within handover management documents, eg from the construction team to the maintainers.

11.8 FINALISE THE DESIGN OUTPUTS

When outputs of the BNG design are finalised, they should be useable for the construction, management and monitoring stages, to check whether the anticipated additional benefits for biodiversity were delivered.

The outputs should include the intended avoidance, mitigation and compensation activities. They should also include measurable outcomes and the nature, scale and location of BNG activities, together with timescales for implementing, managing and monitoring the activities (eg whether phased to deliver specific biodiversity objectives over the short, medium and long terms).

Box 11.7
Examples of references on species-specific enhancements

- Bright *et al (2006) The dormouse conservation handbook, second edition*
- Day and Symes (2003) *A practical guide to restoration and management of lowland heathlands*
- Dean *et al (2016) The Water Vole mitigation handbook*
- Gunnell, K (2012) *Landscape and urban design for bats and biodiversity*
- Langton *et al (2001) Great Crested Newt conservation handbook*
- Murphy *et al* (2013) *Designing for biodiversity: a technical guide for new and existing buildings*
- Natural England *(2013b) The Mosaic Approach: managing habitats for species*
- The Barn Owl Trust (2012) *Barn Owl conservation handbook*
- Publications by statutory conservation agencies, for example the various advice notes by SNH including woodland management. Also Natural England's variety of habitat management and restoration guides, species management and nature reserves and long-term management of nature reserves
- Publications by Buglife including management sheets for species and habitats
- Publications by the RSPB such as *The future of reedbed management* published in 2009
- Publications by Butterfly Conservation including advice notes on various habitat types
- Articles in the journal *Conservation Evidence* on research, monitoring results and case studies on the effects of conservation interventions

12 Construction

Summary

There are several publications on environmental good practice during construction, eg Charles and Edwards (2015). Box 12.1 contains advice on general good practice regarding biodiversity including toolbox talks and nominating biodiversity champions.

For BNG, good practice during the construction stage can involve these activities:

- updating the biodiversity baseline (Section 12.1)
- including BNG within construction documents (Section 12.2)
- training key staff (Section 12.3)
- avoiding or reducing the time-lag between losses and gains (Section 12.4)
- acting on risks and opportunities (Section 12.5)
- collecting data (Section 12.6)

What good looks like

- Integrate BNG requirements within core construction documentation, with training for construction teams.
- Present evidence on application of the mitigation hierarchy.
- Implement the BNG design as early as possible to avoid or reduce time-lags between losses and gains in biodiversity.
- Act on opportunities to enhance biodiversity beyond the design.
- Collect data on implementation of the BNG design to check and demonstrate that progress towards BNG is on track.

12.1 UPDATE THE BIODIVERSITY BASELINE

The project's biodiversity baseline should be updated if more than a year has passed between surveys for the original baseline and project construction, and if the BNG design was based on limited information, for example where full site access was not possible.

Surveys to establish the full baseline (or to update it) should involve both qualitative and quantitative aspects, as described in **Chapter 10**. These surveys can be undertaken as rapid assessments, depending on the extent of the original baseline surveys, and during periods of enabling works or investigations before the main construction starts. They should account for all baseline features, even if some activities required for the development are undertaken before construction starts, for example tree clearance by routine maintenance teams.

The updated biodiversity baseline should be used to check that the project's design is on track to achieve BNG. Any necessary updates to the design should be completed as early as possible.

Case study 12.1
Scottish and Southern Electricity Networks Spittal substation

Scottish and Southern Electricity Networks (SSEN) is committed to protecting and enhancing the environment by minimising the potential impacts from their construction and operational activities. As part of this approach SSEN is proactively working towards no net loss biodiversity, and ultimately net gain. Recently SSEN appointed WSP to undertake a BNG assessment of their Spittal Substation development in northern Scotland. The aim was to determine whether a typical substation site could achieve a net gain in biodiversity within the development boundaries.

The Defra metric was used to calculate the baseline biodiversity value of the development site and to determine how much of the biodiversity would remain on the site post development. SSEN developed an updated and enhanced landscape plan, with a range of on-site habitat enhancements, which would not only achieve an overall net gain of 34 per cent but also provide much needed habitat for the great yellow bumblebee, one of the UK's rarest bumblebees.

12.2 INCLUDE BIODIVERSITY NET GAIN WITHIN CONSTRUCTION DOCUMENTS

Documents that set out ecological requirements for the construction phase should include measures for achieving BNG. These documents include environmental management plans as described in **Chapter 11**, as well as ecological design strategies, ecological method statements, construction environmental management plans and sustainability action plans.

What needs to be done and when, and who is responsible, should be clear. Stating responsibilities establishes accountability, which is especially important for measures to avoid and minimise impacts on biodiversity. Linking these responsibilities to a project's quality management plan, and its audit of BNG (see **Chapter 8**), can further embed BNG within construction activities.

Measures to achieve BNG should also be included within core construction documents, discussed in the following sections.

Work package plans, work method statements and work risk assessments

These are documents that construction teams follow. They should contain straightforward instructions on implementing measures to achieve BNG, illustrated by maps and plans. They should also clarify responsibilities and timescales.

Building information modelling and GIS databases

Models of engineering designs, and GIS databases of construction sites, should contain BNG designs. This can identify additional opportunities to enhance biodiversity, as well as clashes such as areas required for material storage that will not be available within the required timeframe for BNG activities. Modelling and GIS databases can also help apply the mitigation hierarchy.

Construction phase plans

Plans that construction teams regularly use should include BNG activities, for example, areas where construction works are prohibited and where BNG activities will be undertaken.

Project programmes

The main project programme should include all BNG activities, such as preparation works (eg soil treatment for landscaping), any linked activities (eg archaeological mitigation for the soil treatment) and aftercare activities (eg for landscaping). The programme should clarify constraints for the project team (eg time-limited biodiversity activities) and should include statutory reporting (eg discharging planning conditions).

Risk registers

Some projects maintain a register of risks to delivery. This should detail the type and level of risks to achieving BNG (eg more land or activities are needed if the construction footprint expands) and to implementing the BNG design (eg activities that can only be undertaken at certain times of the year). It should also detail measures to mitigate the risks, and implications to the project if the risks occur (eg delays and additional cost).

Stakeholder plans

Stakeholder engagement on BNG usually continues during construction, particularly for larger projects (eg issuing project newsletters or hosting site tours for those involved with the design). These activities should be included in the project's construction stakeholder plan.

Project dashboards

Large-scale projects often have dashboards or trackers on key aspects of construction, such as safety incidents and sustainability targets. Including BNG can raise its profile to the project team. It is also an opportunity to engage senior managers, for example, projects using Defra's metric can include a 'live' tracker of biodiversity units as vegetation clearance and landscaping progresses.

12.3 TRAIN KEY STAFF

Site ecologists and environment/sustainability managers often work on construction projects. Training these staff should be considered if BNG is relatively new and involves different activities from the standard ecological requirements, such as collecting data to measure biodiversity losses and gains from the actual extent of habitat clearance and landscaping undertaken (see **Section 12.6**).

Training provides them with support to deliver BNG to the quality standard and timescales required, and to budget. It is also an opportunity to discuss additional biodiversity activities, such as arranging tree planting days with local wildlife groups or schools. If they are interested, professional training courses on BNG should be considered as part of their continuing professional development.

Other key staff that could need briefings or training include:

- construction manager, eg on programming and implementing BNG activities

- project director, eg if he/she reports progress on all aspects of a project to the client
- communication or stakeholder liaison lead
- quality manager, eg on auditing BNG implementation
- individuals collecting data related to BNG
- financial estimators and commercial teams, eg so that overly high cost predictions are avoided, which is often critical when BNG is a voluntary commitment
- procurement teams, eg when they secure third-party services not typical in construction supply chains, such as activities by local wildlife groups.

Training can be informal, such as meeting individuals to discuss the requirements for BNG, or more formal induction or training sessions. Whichever is appropriate, training can engage key team members so that BNG becomes a core part of the project's construction.

Box 12.1 at the end of this chapter contains advice on training construction teams.

12.4 AVOID OR REDUCE THE TIME-LAG BETWEEN LOSSES AND GAINS

BNG activities should be undertaken as early as possible, even if in part. This can avoid or reduce the time-lag between biodiversity losses from the development and the net gain activities. Doing so is intrinsically worthwhile. It can also reduce the amount of contingency needed for BNG, which in turn reduces the amount of biodiversity required for achieving net gain.

In practice this means planning early for implementing BNG designs so that these activities start (ideally) before losses of biodiversity occur. Where this is not possible, the time-lag should be minimised and justified.

Advice for local planning authorities

When liaising with developers and checking submitted documentation, look for evidence of time-lag minimisation. Ask developers to explain the reasons for any time-lag. Consider providing developers with guidance clarifying how to demonstrate application of the mitigation hierarchy as part of a planning application, and the importance of time-lag minimisation.

12.5 ACT ON RISKS AND OPPORTUNITIES

Many construction projects involve regular on-site inspections to detect potential problems early, and react quickly. Some inspections involve specific ecological requirements, such as projects with protected species licences. BNG should be included within inspection programmes, ensuring that risks are identified and acted on, so that BNG remains on track.

Inspections can include seeking opportunities to enhance biodiversity, even by small measures, since these can greatly improve the biodiversity outcomes of construction. **Technical note T2** lists examples of enhancing biodiversity for small developments, many of which apply to construction sites.

12.6 COLLECT DATA

A plan for collecting data on the BNG activities undertaken should be developed as early as possible. The plan should detail who is responsible for collecting the data, in what format, where will it be stored and how/when it will be reported.

The design sets out the predicted gains in biodiversity. Data on activities undertaken, and their outcomes, is part of demonstrating that BNG was achieved. This data is often called as-built data and should be used to quantify the implementation of BNG designs, using the same measurement of BNG as used for the design.

As-built data on BNG can also inform a qualitative assessment of the implementation of BNG designs, for example by data on the area and types of habitat:

- retained
- habitat enhanced
- permanently cleared
- temporarily cleared
- habitat planted

and also installations of features for wildlife, eg built features such as swift towers or bricks, hibernacula and wildlife boxes.

Evidence of applying the mitigation hierarchy during construction should also be collected, and is essential for demonstrating that good practice was followed. This is evidence of actions, not advice or recommendations. For example, changing an access route in order to avoid habitat clearance is evidence of avoiding harm to biodiversity. However, an ecologist's report with recommendations to change the access route is not evidence that the mitigation hierarchy was applied (although if the recommendations cannot be adopted, eg for operational reasons, this should be documented).

Both as-built data on BNG and evidence on applying the mitigation hierarchy can support audits of BNG (see **Chapter 8**).

Box 12.1
Advice on general good biodiversity practice during construction

Training the construction team and the supply chain:

Ecological toolbox talks and inductions are often part of construction. Including a summary of BNG is an efficient way of training the wider construction team and supply chain. Training can build interest in BNG, which encourages site operatives to identify additional ways to avoid and minimise biodiversity loss and to enhance biodiversity.

Practical, site-based training that explains why the project is delivering BNG (eg required by the commissioning agency) can be effective. Seeking feedback on what worked well, and what could be improved when implementing BNG, can be invaluable because site teams often know how best to undertake an activity on site. Refresher training should be considered, especially when the construction phase extends over several years.

Seeking champions and initiating awards:

Many construction projects nominate individuals to be 'champions' of a particular issue, such as health and safety. They also have award schemes recognising individuals who go 'above and beyond' their duties. Instigating champions and awards for BNG can lead to site operatives identifying opportunities that would have otherwise been missed (see **Case study 12.2**). Champions and awards can also raise the profile of the project, especially when the commissioning agency has set BNG as a deliverable, such as nominating construction managers for the National Housing Building Council award.

Case study 12.2
Network Rail Greater West Programme's biodiversity awards

The Network Rail Greater West Programme launched a biodiversity award scheme. Its aim was to encourage initiatives that significantly contributed towards biodiversity on a site or on a project. The judging panel included Network Rail's advisor on biodiversity offsetting and a representative from Kew Gardens, which is an internationally important botanical research and education institution. Several award entries were received, which included building wildlife ponds in local schools, collaborating with a local wildlife group to enhance their nature reserve, and creating additional wildlife areas that are secure from disturbance on railway land. The awards clearly demonstrated the enthusiasm and commitment of Network Rail's supply chain to undertake innovative biodiversity initiatives, and they successfully raised the profile of biodiversity and its importance to Greater West Programme.

13 Maintenance and monitoring

Summary

Chapter 11 gives advice on preparing management and monitoring plans for BNG. This includes using the same methods to measure losses and gains as those used in the design, which ensures that actual change is measured (rather than changes resulting from a change in method).

This chapter gives advice on good practice for maintenance and monitoring of BNG activities, which can involve:

- monitor progress and outcomes (Section 13.1)
- employ adaptive management (Section 13.2)
- report on progress and outcomes (Section 13.3)

What good looks like

- Implement the BNG management and monitoring plan.
- Use monitoring data to employ adaptive management and to demonstrate progress towards BNG.
- Use monitoring data to present quantifiable evidence on achieving measurable net gains in biodiversity. Such monitoring should be over a timeframe that is commensurable with the specific biodiversity features of the net gain design.
- Share the monitoring findings widely with industry and the project stakeholders.

13.1 MONITOR PROGRESS AND OUTCOMES

Ecological mitigation and compensation measures for development projects often require monitoring. BNG can be incorporated within these monitoring regimes, which include monitoring requirements of a protected species licence, a planning condition or planning legal agreement or under the Town and Country Planning (Environmental Impact Assessment) Regulations 2017.

Monitoring BNG activities should be undertaken to assess progress towards, and achievement of the intended outcomes of the BNG design. This can secure success of an individual BNG project as part of an adaptive management regime (see **Section 13.2**). It is also necessary to demonstrate that BNG has been achieved.

However, ecological monitoring of development projects post construction is sometimes limited or not undertaken at all. Practical steps to overcome this situation depend on the scope of the development and its BNG design, and can involve the following:

- **Part of the works information package.** A project's works information package includes a monitoring regime of BNG during construction and post construction, and any linked actions (eg monitoring that informs an adaptive management regime). In this way monitoring is a core part of project delivery and of the commissioning process.
- **Set within programmes and budgets.** The project's programme and budget both include monitoring of BNG (see **Chapter 8** on setting budgets for BNG during the feasibility and scoping stages).
- **Procure the required resources.** Resources for the monitoring, including any specialist skills required, are identified early and commissioned.
- **Establish responsibility.** Those responsible for undertaking and reporting the monitoring are commissioned early. For example, the monitoring is undertaken by the organisation implementing the BNG management and monitoring plan, or by a third party.
- **Reduce risk and uncertainty.** Monitoring is (and is seen as being) essential to deliver BNG. Its purpose is to inform decisions about ongoing management of BNG activities, because monitoring whether progress towards BNG is on track (against indicators and a programme) will identify whether management needs changing to secure the planned outcomes. If changes are necessary, monitoring identifies what, when and how these changes should be undertaken. All of this reduces uncertainty and risk for those responsible for delivering BNG, and is made explicit in the BNG management and monitoring plan.
- **Demonstrate outcomes.** The project uses monitoring data to demonstrate achievement of BNG, for example monitoring specific outcomes such as reaching a target condition for a habitat or recording the presence of a species, or measures of effectiveness, such as that the diversity of invertebrate assemblages is higher than the project's baseline.
- **Undertake assurance reviews.** The commissioning agency uses monitoring to determine whether the BNG management and monitoring plan was implemented according to the required quality standard, budget and programme. This gives assurance that what was agreed in the plan (and commissioned) has been undertaken. This links to quality assurance reviews of BNG (see **Chapter 8**).

13.2 EMPLOY ADAPTIVE MANAGEMENT

The BNG management and monitoring plan should clarify how monitoring feeds into an adaptive management regime. It should also clarify the process for agreeing any changes to management in light of the monitoring results, for example, approval must be granted by the commissioning agency or an independent third party.

Adaptive management is the adaptation of a management programme in light of monitoring or new information that shows change is necessary to achieve the original objectives. It is appropriate where ongoing management activities cannot be developed in detail during the design stage and where unforeseen problems could arise.

BNG activities can be affected by many factors, such as extreme weather, pollution or the influx of unwanted species (invasive or predatory species, for example). Adaptive management should be adopted because it enables ongoing management to be amended when conditions change, which is especially important for projects with long timeframes, eg over 25 years.

It can also enable measures for when there is no reasonable possibility of successfully achieving the original outcomes for BNG, such as undertaking additional activities to make up any shortfall, or targeting other species or areas, to achieve the required measurable net gains in biodiversity. All such activities should follow the process in the BNG management and monitoring plan.

13.3 REPORT ON PROGRESS AND OUTCOMES

The good practice principles includes *"communicate all net gain activities in a transparent and timely manner, sharing the learning with all stakeholders"*. This refers to all stages of a project life cycle. At this stage of ongoing maintenance, communicating actual progress in delivering BNG, and lessons learnt, is fundamental to demonstrating both good practice and achievement of BNG.

The BNG management and monitoring plan should include a detailed specification for reporting (see **Chapter 11 and Box 13.1**).

At the maintenance stage, preparations for reporting should be made as early as possible, including:

- the full contents of the report such as raw monitoring data, date-stamped photos and plans illustrating recommended management activities
- a programme of when and to whom the monitoring reports are submitted, eg to the commissioning agency of the development project or to a broker or local environmental record centre
- technical checks making sure that the monitoring gathers the data required (and in the correct format) for reporting requirements, especially if reporting on the delivery of BNG is a statutory or planning requirement
- quality assurance reviews ensuring that the report structure satisfies any requirement by, for example, the commissioning agency.

Advice for local planning authorities

Secure long-term management and monitoring of BNG through the planning permission, for example through the conditions of planning or legal agreements associated with the permission such as S106 agreements.

Include requirements for a monitoring and adaptive management regime that provides:

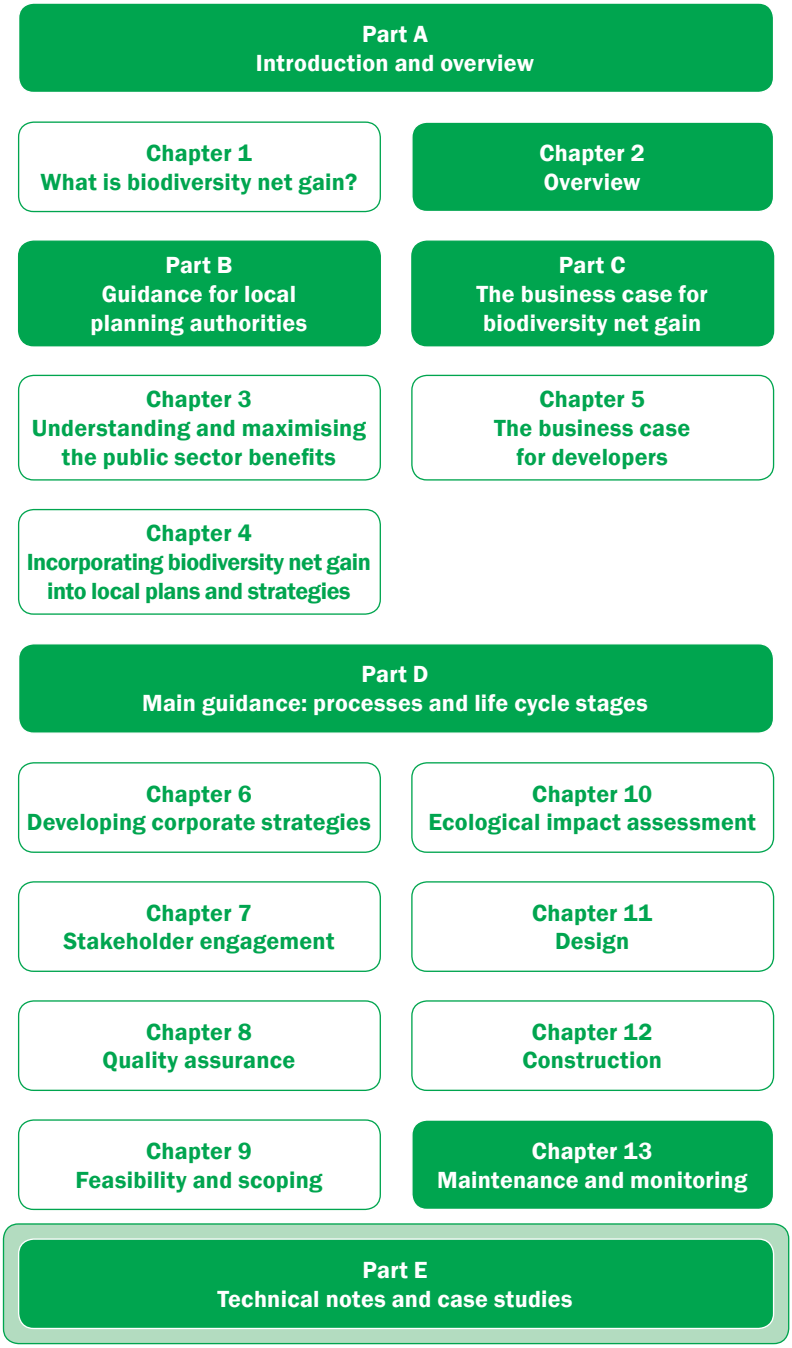
- clear, timed and measurable objectives for BNG
- a commitment to adaptive management in response to monitoring
- a formal review process when objectives are not fully reached to set the appropriate course of action
- key milestones for reviewing the monitoring
- allowance for reasonable amendments to ongoing maintenance of BNG when shortfalls occur because of unforeseen (and acceptable) circumstances
- data in a standard format to allow for its collation into an area-wide biodiversity database.

Consider establishing a panel with organisations such as Natural England, nature conservation organisations and the local ecological records centre to review monitoring from all BNG projects within the administrative area to capture lessons learnt and plan for new BNG initiatives that build on previous projects.

Box 13.1
Specification for a monitoring report on BNG

The monitoring report shall include the following for the target habitat species of the BNG management plan:

- Any presence recorded of the target species.
- If present, date-stamped photographs accompanied by detailed site notes on the extent of growth and condition, using indicators in the management plan with any additional notes of interest.
- If the target species is or is not present, detailed site notes on factors that are/could hinder growth and factors that are/could promote growth.
- Detailed specific recommendations (if appropriate) on management actions to promote growth of the target species including timescales for undertaking the actions and marked-up site plans with photographs to show the actions.
- From a minimum of five fixed points, photographs to record the current status of the site, accompanied by a site plan that shows the fixed photographic monitoring point (with its reference number and direction of the photograph). All photographic monitoring shall be undertaken using high quality images suitable for publication (the raw images shall be submitted when the report is submitted).
- The monitoring report shall be submitted to the local environmental record centre.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Part E
Technical notes

This part contains technical notes on key aspects of BNG. These are aimed at practitioners who require detailed advice on implementing BNG, including practitioners within industry, local planning authorities and statutory agencies. The notes also show other stakeholders what is involved with implementing BNG.

Technical note T1
Devolved government planning and biodiversity policy

Summary

This technical note provides information and links on devolved powers in relation to the natural environment for the four countries of the UK. It highlights relevant devolved government legislation, policy strategies and research of relevance for biodiversity, including any current developments in the progression of BNG.

This note should assist those wanting to promote BNG within each of the four countries, providing references to support the inclusion of BNG in both public sector plans and private sector corporate strategies. It also includes nation-specific documents to be referred to.

Further information and links are also provided by the JNCC: **http://jncc.defra.gov.uk/page-5701**

T1.1 WHAT IS A 'DEVOLVED POWER'?

The UK Government is responsible for matters of primary importance for the UK as a whole, such as foreign affairs, defence and security. Following the creation of the Scottish Parliament, the National Assembly for Wales and the Northern Ireland Assembly, there has been a transfer of power for various matters from the UK Government to the individual nations, ie the power to legislate and make national policy on these matters has been 'devolved'. The natural environment, along with agriculture, forestry and fishing, is a devolved power. Each of the devolved governments prepares its own legislation and policy on devolved matters. The UK Government remains responsible for all devolved powers in England.

T1.2 WHY IS THIS RELEVANT FOR BIODIVERSITY NET GAIN?

This guide emphasises the importance and benefits of embedding BNG within plans and strategies. These include plans prepared by a LPA (see **Chapters 3 and 4**), or by a business (see **Chapters 5 and 6**). Highlighting national policy, legislation and strategy drivers within plans and strategies will strengthen the local promotion of BNG.

Biodiversity restoration and enhancement is an integral part of sustainable development, but the policy drivers and underpinning reasons why are still not widely understood. By making reference to these key national documents, BNG can achieve greater recognition within the development sector.

The HM Government (2018) plan (known as the Defra 25-year environment plan) is the most recent development in BNG strategy of UK-wide relevance. While this has been prepared by the English government department responsible for the environment, its content makes clear that the plan has objectives of UK-wide application, and achievement of those objectives requires UK-wide collaborative working. The plan includes 'environmental net gain' as a key theme.

Within the plan 'environmental net gain' has key prominence. This refers to the need for net gains for the natural environment as a whole, and highlights the work to date on BNG, which should be expanded.

T1.3 ENGLAND: KEY STRATEGY, POLICY AND LEGISLATION DOCUMENTS

The following national strategy documents, government-commissioned research, national policy and legislation should be referred to when making the case for BNG as part of sustainable development in England.

T1.3.1 English strategy and research

Defra (2011) sets out how England is driving its international commitments to biodiversity through a number of key targets for biodiversity restoration and enhancement, recognising the role of sustainable development in halting biodiversity decline. This can be used to explain why BNG through development has a fundamental role to play in achieving international commitments.

A government-commissioned review of England's wildlife sites and what needs to be done to protect and reconnect them was led by Professor John Lawton (2010). It is often referred to as the 'Lawton Review' and places emphasis on the importance of biodiversity linkages outside designated wildlife sites.

T1.3.2 English policy

The NPPF (MCLG, 2018) sets out the government's planning policies for England. It was originally published in 2012 and includes support for BNG within both spatial planning and development management. The NPPF has been revised in 2018, with an increased focus on BNG as part of wider 'environmental net gain'. Helpful references in relation to local plan making are paragraphs 32, 170, 171 and 174, planning decisions at paragraphs 118, 170 and 175, along with transport infrastructure at paragraph 102 and large housing developments at paragraph 72. There are also references to biodiversity throughout the supporting national planning practice guidance (NPPG), which can give weight to the justifications for local plan policy. Relevant extracts are provided in **Box T1.1**.

NPPF: https://www.gov.uk/government/publications/national-planning-policy-framework--2

NPPG: https://www.gov.uk/government/collections/planning-practice-guidance

Box T1.1
National Planning Policy Framework extracts

Some text has been emphasised in **bold** for the purpose of this guide to show where BNG is referenced within the NPPF.

118 Planning policies and decisions should:

a encourage multiple benefits from both urban and rural land, including through mixed use schemes and taking opportunities to **achieve net environmental gains – such as developments that would enable new habitat creation** or improve public access to the countryside;

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

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;

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.

171 Plans should … 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.

174 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 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

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.**

175 When determining planning applications, local planning authorities should apply the following principles…

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.

T1.3.3 English legislation

The Natural Environment and Rural Communities Act 2006 includes a duty to conserve biodiversity at Section 40, which LPAs should be aware of and should be able to demonstrate compliance with. The Act states that: *"The public authority must in exercising its functions have regard as far as is consistent with the proper exercise of those functions… to the purpose of conserving biodiversity. … "Conserving biodiversity includes in relation to a living organism or type of habitat restoring or enhancing a population or habitat."*

T1.4 NORTHERN IRELAND: KEY STRATEGY, POLICY AND LEGISLATION DOCUMENTS

The following national strategy documents, government-commissioned research, national policy and legislation should be referred to when making the case for BNG as part of sustainable development in Northern Ireland.

The planning system in Northern Ireland has undergone significant recent changes, with the delegation of planning powers from the Northern Ireland Assembly to the 11 LPAs. The statutory nature conservation body, the Environment Agency, provides nature conservation advice to the 11 LPAs, and takes the legislative requirements described here to further the conservation of biodiversity to be a requirement for development to achieve net gains for biodiversity.

T1.4.1 Northern Irish strategy and research

DOENI (2015a) is an important strategy document for linking with BNG policy at the local level. Key points from this guide includes from Paragraph 19 which advises *"Good developments incorporate biodiversity considerations in their design but can result in some biodiversity loss when there are impacts that cannot be avoided. Current planning policy requires mitigation for this loss."* Paragraph 54 sets a goal to *"reduce direct pressures to help safeguard biodiversity"*. While Action 29 is to *"Consider the outcome of the consultation on Biodiversity Offsetting carried out by Defra and decide on the way forward in Northern Ireland."*

T1.4.2 Northern Irish policy

DOENI (2015b) identifies working towards the restoration of, and halting the loss of, biodiversity as an integral part of sustainable development. The statement has positive wording on biodiversity benefits including *"by planning for nature and green space in our neighbourhoods we can improve our health and quality of life. Including biodiversity features into schemes adds to the attractiveness and appeal of regenerated areas."*

DOENI (2013) sets out the planning policies for the conservation, protection and enhancement of Northern Ireland's natural heritage. The main reference to use to support BNG is from Section 5, Paragraph 11, which states that *"The planning policies of this statement must therefore be read… in conjunction with relevant contents of development plans… other planning policy publications… and must have regard to any strategy designated for the conservation of biodiversity."*

Northern Ireland has specific national policies in relation to active peatland, an irreplaceable habitat. Policy was firstly introduced in DOENI (2009), which is now repeated in DOENI (2015b).

T1.4.3 Northern Irish legislation

The Wildlife and Natural Environment (Northern Ireland) Act 2011 includes a statutory biodiversity duty for all government departments and public sector bodies. This is the key piece of legislation to support the implementation of BNG in spatial planning. Section 1 (1) states that *"It is the duty of every public body in exercising any functions to further the conservation of biodiversity so far as is consistent with the proper exercise of those functions."*

T1.4.4 Recent planning reforms

The planning system in Northern Ireland has recently been reformed and restructured from a unitary system where all planning powers rested with the government, to a delegation of local planning responsibility to LPAs. The 11 LPAs of Northern Ireland are required to produce local area plans. As described for Wales, the recent and significant planning changes present an opportunity for BNG to be embedded within these new local plans as they are prepared.

The Northern Ireland statutory nature conservation body, the Northern Ireland Environment Agency (NIEA), is anticipating that the 11 LPAs will incorporate policies relating to ecosystem services, BNGs, to protect irreplaceable habitats (with active peatland being of particular concern in Northern Ireland) and to bring BNG into local place-making work (Defra, pers. comm.).

T1.5 SCOTLAND: KEY STRATEGY, POLICY AND LEGISLATION DOCUMENTS

The following national strategy documents, government commissioned research, national policy and legislation should be referred to when making the case for BNG as part of sustainable development in Scotland.

T1.5.1 Scottish strategy and research

The Scottish Government (2013) report is a strategy for the conservation and enhancement of biodiversity in Scotland. It sets out Scotland's commitments to international biodiversity targets. The strategy is a supplement to The Scottish Government (2004), which is a 25-year strategy for the conservation and enhancement of biodiversity in Scotland. The two documents together comprise the Scottish Biodiversity Strategy and should be referred to when developing local planning policy on BNG.

Chapter 4 of the Scottish Government (2013) states that *"Much still needs to be done to conserve, manage and reintroduce species to ensure the greatest gains for nature and us."* The Scottish Government (2004) suggests an Agenda for action 11 *"Use the strategy itself as a management tool to ensure effective delivery of biodiversity gains."* The Scottish Government (2012) also consulted on the report, Section 2.5.3 states that *"The Scottish Government is keen to consider the scope for the use of biodiversity offsetting. We would welcome comments on biodiversity offsetting in consultation responses."*

The Scottish Government is currently funding research that includes consideration of BNG, covering topics such as public attitudes, use of metrics and biodiversity offsetting. These activities may lead to further national policy updates when complete. Further information can be found in Scottish Government (2015). The Hutton Institute, which is one of the academic institutions involved in the research programme, also provides guidance on their website.

T1.5.2 Scottish policy

Planning policy in Scotland is covered by two documents. The National Planning Framework (NPF3) is in its the third iteration and published by the Scottish Government (2014a). It sets out the national development strategy for Scotland for economic development, regeneration, energy, environment, climate change, transport and digital infrastructure.

This document does not currently make a specific reference to the duty of planning authorities to account for impacts to biodiversity during development. The fourth NPF will include updated Scottish planning policy. Preparation should begin in 2019 and offers an opportunity to integrate BNG more formally.

The Scottish Planning Policy (SPP) is a set of national policies reflecting the Scottish Government's priorities for implementing the Scottish planning system. It should be used by planning authorities to

assist with the preparation of local development plans and determination of planning applications, and in the design of development by developers.

The SPP includes a section on 'valuing the natural environment', where it is stated that the Scottish planning system should take account of the need to maintain healthy ecosystems and seek benefits for biodiversity from new development where possible, including the restoration of degraded habitats and the avoidance of further fragmentation or isolation of habitats.

T1.5.3 Scottish legislation

The Nature Conservation (Scotland) Act 2004 placed a biodiversity duty on all public sector bodies in Scotland. Section 1(1) states that *"It is the duty of every public body and office-holder, in exercising any functions, to further the conservation of biodiversity so far as is consistent with the proper exercise of those functions."*

The Wildlife and Natural Environment (Scotland) Act 2011 introduced a requirement for all public bodies to publish a report on their compliance with the biodiversity duty.

T1.6 WALES: KEY STRATEGY, POLICY AND LEGISLATION DOCUMENTS

The following national strategy documents, government-commissioned research, national policy and legislation should be referred to when making the case for BNG as part of sustainable development in Wales.

T1.6.1 Welsh strategy and research

The Welsh Government's (2013) environment strategy sets targets up to 2026. It is currently under review, and will be updated to reflect current environmental policy, legislation and initiatives deriving from the three new pieces of relevant legislation explained below.

The Wales Biodiversity Partnership (2015) sets out how Wales will address the 2011–2016 convention on biodiversity (UNEP, 2011). Key sections to use to support BNG are:

- **Part 1:** sets out the position with regard to biodiversity in Wales, the issues that need to addressed and guiding policies.
- **Part 2:** sets out actions that have been specifically identified to support biodiversity, over and above but contributing to the delivery of the sustainable management of natural resources in Wales.
- **Part 3:** the Wales Biodiversity Partnership (2015) is under development and will show the roles and responsibilities of the key players for delivery of action for biodiversity in Wales, as well as how they will fit into the delivery framework for the Well-being of Future Generations (Wales) Act 2015 and the Environment (Wales) Act (2016.

T1.6.2 Welsh policy

The Welsh Government (2016) does not explicitly refer to net gains for biodiversity. It does advise that losses where damage is unavoidable need to be compensated for. The main information in relation to the mitigation hierarchy and seeking opportunities to enhance biodiversity, which can be used to underpin local planning policy on BNG are from Section 5.2.8, which states that *"The planning system has an important part to play in meeting biodiversity objectives by promoting approaches to development which create new opportunities to enhance biodiversity, prevent biodiversity losses, or compensate for losses where damage is unavoidable."*

The document is being revised, which will include the main issues from three key pieces of new legislation, discussed in **Sections T1.6.3**, with particular emphasis on biodiversity enhancement and ecosystem resilience.

T1.6.3 Welsh legislation

- **The Environment (Wales) Act 2016** is a new piece of legislation that provides positive wording for planning and managing natural resources in a proactive, sustainable and joined-up way. The Act includes a requirement for public authorities to publish a plan setting out how it proposes to comply with the biodiversity duty to maintain and enhance biodiversity and promote resilience of ecosystems.

  The resilience of ecosystems is the main driver for BNG in Wales. The statutory nature conservation body, Natural Resources Wales (NRW), advises LPAs on achieving ecosystem resilience, providing assistance to the 25 LPAs across Wales. NRW is currently working with CIEEM and ALGE to produce guidance on the application of the ecosystems resilience duty, including setting out the main attributes of ecosystem resilience.

- **The Well-being and Future Generations (Wales) Act 2015** requires public bodies to carry out sustainable development and to set wellbeing objectives and goals, along with indicators to measure progress towards those goals. This presents opportunities for BNG to be included within these requirements.

- **The Planning Act 2015** has introduced the requirement for a national spatial plan to function above the local plans prepared by the 25 LPAs. The new National Development Framework (NDP) is currently in its final stages of preparation by the Welsh Government. The Act provides the requirements for local plans, known as local development plans (LDPs), and joint strategic development plans (SPDs) in areas with a particular growth focus. Annual monitoring reports (AMRs) need to be submitted to the Welsh Government.

There is a significant opportunity to put in place strong BNG and ecosystem resilience policies within these new planning documents, as each LPA prepares their new LDP. Welsh local panning authorities should use the guidance provided in **Chapters 3 and 4** to assist with embedding BNG within their new local plans. **Chapter 7** on stakeholder engagement may also be beneficial. Targets for BNG should then be reflected in the AMRs.

Technical note T2
Achieving BNG on sites with limited or no impact on biodiversity

Summary

This technical note provides guidance for those involved in developments where there is little or no impact on biodiversity. Information is provided on how collaboration and engagement with local planning authorities can support BNG.

Appropriate thresholds for adopting a small scale / low impact approach, together with measurement approaches are described.

Key considerations and opportunities for introducing BNG at each stage of the project life cycle are then outlined.

T2.1 WHAT TYPES OF SITE ARE COVERED BY THIS TECHNICAL NOTE?

This technical note is primarily aimed at LPAs and those involved in commissioning, planning, designing, constructing and operating development projects where the effects on biodiversity are typically at a low level or negligible. It is directly relevant to those considering projects:

- of a small scale with low or negligible biodiversity impact
- that do not pose a risk to biodiversity, but can still make proportionate biodiversity gains
- of a larger scale, but where the biodiversity impacts are predicted to be low.

Small-scale development proposals form a significant proportion of the planning applications received by many planning authorities. Collectively these applications could make a notable contribution to BNG, even where the effects on existing biodiversity are low.

In some instances, small-scale projects can pose a significant risk to biodiversity, and these projects should follow the advice on good practice within the main guide.

T2.2 WHAT DOES THIS TECHNICAL NOTE PROVIDE?

LPAs should encourage small-scale development to contribute towards BNG by:

- **proportionate net gains** – through the provision of advice and guidance on proportionate approaches to measuring losses and gains, and by identifying options for biodiversity enhancement that are suitable for a small-scale development site and that can still contribute towards local biodiversity priorities
- **making a contribution to biodiversity elsewhere** – establishing or joining up with local biodiversity initiatives to enable small-scale developments to contribute financially towards larger-scale BNG within the local authority's administrative area.

This technical note provides advice on applying good practice for BNG by setting out guidance on:

- LPA support for BNG within small-scale and low-impact or no-impact development
- establishing a threshold for where a suitably-qualified ecologist is required
- defining small-scale and low-impact development
- small-scale and low-impact criteria
- a basic measurements option for measuring losses and gains for development with no or negligible biodiversity interest
- a simplified metric option for measuring losses and gains for small-scale and low-impact development

- the key considerations for small-scale development at each stage of the project life cycle
- opportunities for delivering BNG on a small development site
- opportunities for development to deliver BNG through contributions to biodiversity initiatives elsewhere
- links to where LPAs and small-scale developers can find additional ideas for BNG.

T2.3 LOCAL PLANNING AUTHORITY SUPPORT FOR BIODIVERSITY NET GAIN

Local plans that include BNG policy should:

- explain how small-scale and low-biodiversity-impact development can deliver BNG in a way that is proportionate to the development and its effect on biodiversity
- be supported by additional guidance, such as on the LPA website. These should include small-scale and low-impact development.

LPAs may need to engage with small-scale developers to suggest proportionate ideas for incorporating biodiversity benefits. Providing pragmatic and locally relevant guidance for developers is fundamental. This then encourages proportionate gains and should prevent small-scale developers assuming that BNG does not apply to them. Any development has the potential to provide BNG.

Provision of advice could be through pre-application advice, in the form of guidance notes that can be printed off or through a more formally established planning document such as a SPD or supplementary planning guidance (SPG). A formal document could be progressed towards over time, to underpin a BNG policy within the local plan.

T2.4 OPTIONS FOR PROVIDING BIODIVERSITY NET GAIN

Table T2.1 should help in considering the options for different development scales and biodiversity impact. This technical note then explains both the indicators and measuring options highlighted in bold in the table.

Table T2.1 Thresholds for measuring biodiversity net gain at different development scales and biodiversity impacts

Threshold of biodiversity impact	Development scale	Indicators	Measuring biodiversity net gain
No biodiversity on site and/or no biodiversity affected by the project	Typically small scale Could exceptionally include medium or large scale development	Below a LPAs set **validation checklist thresholds** for whether a **suitably-qualified ecologist is required** for the project	The '**basic measurements**' option
Low level of biodiversity on site, low level of impact	Typically small scale Could exceptionally include medium or large-scale development	Definition of **small scale and low impact** described within this technical note (or locally established adaptation) is met	The '**simplified metric**' option
Medium or high level of impact	Typically medium or large scale Could exceptionally include small-scale development	Above locally set **validation checklist thresholds** for whether a suitably-qualified ecologist is required for the project, and above the definition of **small scale and low impact** described within this technical note (or locally established adaptation) has not been met	Follow the good practice throughout the main guide

T2.5 ESTABLISHING A THRESHOLD WHERE A SUITABLY-QUALIFIED ECOLOGIST IS REQUIRED

A LPA should identify where a more proportionate approach to BNG is applicable to small-scale and low-impact development. This could be in circumstances where:

- a suitably-qualified ecologist is required to assess potential risks to biodiversity, even though the development is of small scale and impacts are likely to be relatively low. An EcIA will form part of the planning application
- the site does not pose any biodiversity risk. A suitably-qualified ecologist is not required, but meaningful gains for biodiversity could still be achieved.

Guidance can be found in BS 42020:2013 which defines the term suitably-qualified ecologist.

LPAs should already have mechanisms in place to establish at an early stage whether a development could pose a risk to biodiversity to the extent that ecological assessment by a suitably-qualified ecologist is required. This is normally through the planning application process where a validation checklist is used. Typically, the thresholds set are defined by:

- whether features of potential biodiversity interest are present (such as buildings with bat roost potential, trees, hedgerows, scrub, ponds) – a planning validation checklist normally asks the applicant to identify the presence of these features
- a threshold of size or development type – guidance is normally provided on the LPA website (see **Box T2.1**).

Box T2.1
Examples of checklists and thresholds

Peterborough City Council

https://ask.peterborough.gov.uk/help/council/planning/planning-biodiversity-checklist/

https://www.peterborough.gov.uk/pdf/biodiversityfinal.pdf

Staffordshire County Council

https://www.staffordshire.gov.uk/environment/eLand/planners-developers/biodiversity/biodiversitysurvey/0030703233Planningapplicationvalidationbiodiversit.pdf

BREEAM

The BREEAM accreditation system provides an ecological risk evaluation checklist to determine whether a suitably-qualified ecologist is required when applying the BREEAM accreditation schemes.

https://tools.breeam.com/filelibrary/Guidance%20Notes/97330-BREEAM-UK-Ecology-Consultation-Document-2017.pdf

Dorset County Council

Developments of 0.1 ha or more are all required to undertake a biodiversity impact assessment.

https://www.dorsetforyou.gov.uk/article/401489/Biodiversity-Appraisal-in-Dorset

T2.6 DEFINING SMALL-SCALE AND LOW-IMPACT DEVELOPMENT

LPAs should give specific guidance on when a development is considered to be small scale for the purposes of BNG assessment, to enable a simplified route to be followed. Where necessary, the threshold should have regard for local circumstances and should make clear that exceptions on a case-by-case basis may apply. Where a development does not meet the definition here, it should follow the good practice set out within the main guide rather than this technical note (see **Chapters 9 to 13**).

Town and Country Planning (Environmental Impact Assessment) Regulations 2017 defines minor development as a residential development of nine units or less, or a commercial development of less than 1000 m^2 of floor space or on a site of less than 1 ha. Development at the upper limits of these thresholds could easily have a medium or high impact on biodiversity and should therefore follow the good practice guidance set out in the main parts of this guide.

For the purposes of BNG assessment, it is recommended that LPAs set lower thresholds to define small-scale development with a low impact on biodiversity, that can follow a simplified BNG approach.

It is important to note that ecological survey and assessment may lead to a change in the level of impact predicted for a development project. Where this happens, it may be no longer appropriate to follow a simplified route, and the main guide should be used.

T2.7 SMALL-SCALE AND LOW-IMPACT DEVELOPMENT CRITERIA

The following criteria should help LPAs setting thresholds. A small-scale and low-impact development for the purposes of BNG may be where all of the following apply:

- The development site does not include or adjoin a local wildlife site or nationally designated wildlife site, irreplaceable habitat or habitat supporting legally protected species (see Note).
- A total of 500 m2 or less of habitat is present within the development site boundary.
- The habitat present on site does not include any of the following, irrespective of size:
  - habitats listed as being of principal importance for biodiversity and/or listed as a habitat of high distinctiveness within the Defra metric
  - habitat likely to host one or more species of principal importance for biodiversity.
- **Species of principal importance for biodiversity**. These are explained, and links provided to each UK country list on the JNCC website: http://jncc.defra.gov.uk/page-5705
- **Legally protected bat species.** Where a development meets the above criteria but could affect structures with potential to support roosting bats, a suitably-qualified ecologist will need to assess this risk, following established practice to meet legal requirements, usually set by the statutory nature conservation bodies. The simplified means of assessing and delivering BNG set out in this technical note could still be followed having regard for the additionality principle by clearly defining what is required for legal compliance and what is being undertaken for BNG.

Note that these thresholds align with the thresholds in the BREEAM ecology assessment criteria (BREEAM, CEEQUAL, HQM, 2018). It is important to note that the recommendations provided here may not be applicable in all circumstances and exceptions will occur.

T2.8 OPTIONS FOR MEASURING BIODIVERSITY LOSSES AND GAINS

The good practice principles include making 'a measurable net gain contribution'. This enables a development project to demonstrate that a BNG has been achieved.

This technical note provides two recommendations for measuring biodiversity losses and gains:

- A basic measurements option (Section T2.8.1). This approach would typically be used where it has been determined that a suitably-qualified ecologist is not required. This option does not include any form of metric. Instead the development can produce a simple list of biodiversity features before and after the development, using basic measurements to demonstrate a net gain. This option may limit the ability of a LPA to use the outputs when accounting for biodiversity gains across the borough or district, as the measures will likely vary each time
- **A simplified biodiversity unit metric option (Section T2.8.2).** This approach would typically be used where it has been determined that a suitably-qualified ecologist is required, and the development meets the small-scale/low-impact definition. This route follows the same metric calculation process as that set out within the Defra biodiversity metric guidance but simplifies the calculation by making assumptions in relation to the attributes used. LPAs should note that by

encouraging developers to follow a simplified version of the Defra metric, the calculation outputs can still be used to inform an aggregated account of biodiversity gains across the borough or district (see **Chapter 4**).

T2.8.1 Basic measurement option

There are several ways to quantify change in biodiversity before and after development. The following basic measurements could be made by a non-ecologist. For example:

- an area or linear measure of habitat lost, retained and created
- a list of key plant species (particularly native species) present before and after the development
- a list of structures and functions provided to wildlife, before and after the development (eg nesting or roosting boxes, habitats generating food such as berries, perches, places for species to overwinter or hibernate such as log piles) and the species for which these structures and functions are beneficial
- a demonstrable positive change in site management for biodiversity secured as a result of the development, for example the loss of close mown amenity grassland has been replaced with wildflower verges that will be managed to allow flowering and seeding prior to cutting
- the positive benefits of the development in terms of local biodiversity targets, for example contributing a percentage of habitat creation towards a target or new habitat features for target species, so any loss of habitat as a result of the development will need to be factored in.

This basic means of measuring biodiversity losses and gains may be particularly applicable to developments where the biodiversity present is too small to apply a metric.

T2.8.2 Simplified biodiversity metric option

This method for following a simplified approach to using the Defra biodiversity unit metric is taken from the ecology assessment within BREEAM. See BREEAM, CEEQUAL, HQM (2018).

The simplified biodiversity metric option should be undertaken by a suitably-qualified ecologist. This option uses the Defra biodiversity unit metric but allows some assumptions to be made when assigning numerical values to the attributes within the metric calculation. The guidance on using the Defra biodiversity unit metric should be referred to and followed. This simplified route allows the suitably-qualified ecologist to make some assumptions in a small-scale and low-biodiversity impact situation.

- **Simplification and assumptions for area-based habitats.** The typical calculation in the Defra metric for area-based habitats is:

  Habitat distinctiveness score × Habitat condition score × Habitat area (ha) = biodiversity units

  - The habitat area should be identified from existing data (eg aerial photography) and/or a site walkover.
  - The habitat type should be identified from existing data (eg aerial photography) and/or a site walkover. A habitat distinctiveness score should be given by checking the distinctiveness scores for different habitat types in the Defra metric guidance or the BREEAM methodology (which has additional scores for some habitat types not covered by the Defra metric).
  - The condition of all habitats should be assumed to be of moderate, giving a condition score of 2, unless there is existing evidence that habitats are in good condition, then a score of 3 should be assigned.
- Simplification and assumptions for linear habitats. The typical calculation in the Defra metric for linear habitats is:

  Length (m) × Condition = biodiversity linear units

  - The length of linear features such as hedges and water courses should be identified from existing data (eg aerial photography) and/or a site walkover.
  - The length of the linear features should be identified from existing data (eg aerial photography) and/or a site walkover.

- The condition of all linear features should be assumed to be moderate, giving them a condition score of 2, unless there is evidence that they are in good condition, then a score of 3 will be assigned.

The calculations should be made for the pre- and post-development scenarios, to give an overall account of biodiversity losses and gains for area-based habitats and linear habitat features. The Defra metric guidance allows for some additional factors to be taken into account when considering the biodiversity gains. These are known as risk factors and have regard for some aspects of risk in achieving the desired habitat creation or enhancement. Where possible, these risk factors should be included, following the guidance by Defra (2012a, b, c), or the more up-to-date consideration of risk factors given in BREEAM (2018).

T2.9 KEY CONSIDERATIONS AT EACH STAGE OF THE PROJECT LIFE CYCLE

The stages of the project life cycle described within the main guide (see **Chapters 7 to 13**) are applicable to development of medium or large scale. The stages of the project life cycle will be the same for small-scale development, but the timescales, level of detail and complexity of each stage is likely to be less for small-scale development. Each stage of the project life cycle is described below, highlighting the key considerations for BNG in small-scale and low-impact development.

- **Feasibility and scoping**
  - Establish and quantify existing biodiversity features on site.
  - Look at options for the development that avoid harm to biodiversity by choosing the footprint, layout and access that prevents as much as possible.
  - Start to establish opportunities for BNG. Look at opportunities for enhancing existing assets and creating new features, and set budgets and programmes accordingly.
- **Design**
  - Undertake an EcIA in accordance CIEEM (2018).
  - Design the development with measures to avoid and then minimise harm to biodiversity, for example timescales for construction that minimise disturbance to biodiversity.
  - Quantify the biodiversity features where harm cannot be avoided or minimised.
  - Finalise the most suitable ways of providing BNGs that can compensate for unavoidable loss. Quantify the compensation to make sure it is greater than the loss.
  - Look at the potential additional benefits for biodiversity that can be achieved as part of the development.
  - Set a timetable for the project that minimises, and where possible removes, the time-lag between biodiversity losses and gains. Putting in place the biodiversity gains as early as possible in the project timeline gives new or enhanced biodiversity features time to establish (see **Chapter 13**).
  - Provide the quantification of losses and gains to the LPA as part of a planning application. Demonstrate how the mitigation hierarchy has been followed.
- **Construction**
  - Make sure that all personnel to be involved on site are fully briefed prior to the site clearance and commencement of construction. They should understand the biodiversity aspects of the development project in terms of the features on site, the measures in the development proposal to avoid and minimise impacts and to deliver BNGs, the timescales and who is responsible for those measures. Share the project timetable and highlight key milestones for establishing or enhancing biodiversity features. Ideally incorporate key milestones in the construction timetable.
  - Undertake on-site checks for assurance that the biodiversity aspects of the development project are being implemented correctly.

- Identify and record any remedial action that may be required if there are unforeseen changes such as timescales or construction methodologies.

- **Maintenance and monitoring**
  - Establish the management necessary for the BNGs to be maintained as part of the development.
  - Provide occupants of development, once built, with information on the biodiversity features of the development.
  - Provide the LPA with confirmation that the biodiversity gains are in place and accord with the original specification. Identify any changes that have been necessary.

T2.10 OPPORTUNITIES FOR DELIVERING BIODIVERSITY NET GAIN

The following provides guidance for delivering BNG on small development sites with limited impacts on biodiversity. These options apply to projects following either the basic measurements route or the simplified biodiversity metric route.

Traditionally, small-scale development has sought to enhance biodiversity by simply installing bird nesting boxes or bat boxes. While these can be beneficial in the right location, they are often included in a project without adequate consideration of the types of boxes that would most benefit local biodiversity, whether the site is close to wider habitat needs, such as foraging habitat, and whether there are the necessary habitat connections to enable species to commute to and from the nesting or roosting boxes. This technical note provides a range of alternatives that could replace or complement bat and bird box provision, to make a more meaningful contribution to local biodiversity.

If bat and bird boxes are to be included, the following questions help determine whether installing them is a positive enhancement:

- Which species are local nature conservation priorities, and are the boxes the right specification for these species?
- Has the correct height and orientation for the box been specified, and is there a clear flight path to the box?
- Are there records for the target species locally? Check with local environmental records centres or biodiversity databases online such as MAGIC
- Does the wider area have the right habitat – and habitat that is connected – for the species?
- Is there a shortage of nesting or roosting locations for the species?
- Will the operation of the site create disturbance or detractors that will deter the target species (light, noise, odour, people movement, pets etc)?

The Bat Conservation Trust and RSPB can provide guidance on the appropriate use of bat and bird boxes.

Small-scale low-impact developments, and those seeking a BNG with no impact, have a range of options for enhancing biodiversity. Some examples of measures to incorporate biodiversity features are given here, and also in **Case studies T2.1 and T2.2**:

- Green roofs with a diversity of plant species (these can be a small section of the development if not all of the roof area).
- Rough or natural stone walls with holes for invertebrates and small birds to use.
- Species-rich native hedgerows as boundary features.
- Brown roofs with a range of substrates (these can be a small section of the development if not all of the roof area).
- Habitat creation for locally relevant wildlife habitat types (this can be beneficial on a small scale if it adds to the habitat resource locally).

- Ponds (not fish stocked) with an irregular and shallow, sloping edge (these should be combined with stone and log piles close by to provide refuge for amphibians).
- Green walls created with planting locations built in, or a planting framework added externally.
- Nectar-rich native planting and native species with berries in the autumn within formal landscaping.
- Native wildflower mixes as an alternative to amenity grassland or verges – see **Case study T2.1**.
- Garden boundaries with gaps to allow small animals to move between them.
- Early flowering plants that provide a nectar source for early invertebrates such as bees.
- South-facing banks with some bare ground (particularly beneficial for reptiles and invertebrates).
- Habitat corridors across a site to make a connection with wider habitats.
- Architectural features that provide nesting or roosting habitat (such as ornamental slit holes, stone ledges, wood cladding).
- Provide a range of 'bug hotels' with dead wood and stone piles, or purpose-made bug boxes with tubes and drill holes – see **Case study T2.2**.
- Information packs and interpretation material for the development end users.
- Habitat creation that targets locally important species with isolated habitat patches.
- Biodiversity focused design of sustainable urban drainage, for example with open and naturally vegetated swales.

Case study T2.1
Ecotricity Eco Park

The Ecotricity Eco Park in Stroud, Gloucestershire, is a new development for green businesses and technology companies and provides a centre for sports and sports science. The development includes planting neutral grassland using a wild flower meadow mix around the business park and football pitches as part of the landscaping scheme. Areas of nature reserve within the development site were retained and enhanced. This achieved an on-site BNG without the need for off-site habitat creation.

Case study T2.2
Bee bricks and bee foraging habitat at Nansledan

The Duchy of Cornwall is building an extension to the town of Newquay in Cornwall to create a new settlement called Nansledan. This development is now underway, incorporating a range of environmental features, at both the large and small scale.

Bee bricks designed to provide nesting spaces for solitary bees are being incorporated within buildings at Nansledan. This is being complemented by landscape planting that is focused on providing a range of food sources for bees. This simple combination of both nesting and foraging habitat close to each other greatly increases the value of the habitat being provided.

T2.11 OPTIONS TO DELIVER BIODIVERSITY NET GAIN VIA CONTRIBUTIONS TO OTHER INITIATIVES

A LPA may choose to establish biodiversity schemes that can draw financial contributions from multiple development projects. Provided that these are additional to biodiversity initiatives occurring irrespective of development, there is the opportunity for small-scale development to make a BNG through a financial contribution to a biodiversity scheme. This can be established in the form of 'in lieu fees', where a LPA implements a biodiversity enhancement scheme for the local area based on an agreed set of actions and priorities, determined where possible through discussion with external partners (see **Chapter 4** for good practice for LPAs when working with external partners to establish BNG).

Another option is 'habitat banking' where a LPA may wish to work with partners or specialised habitat banking brokers to establish or add to biodiversity projects to provide a local habitat banking initiative. See The Environment Bank (2015) for guidance.

Land purchased for combined BNG delivery could then be managed by a local nature conservation organisation, trust or charity.

T2.12 SOURCES OF ADDITIONAL IDEAS

Further information and ideas for incorporating BNG at the small scale with a low impact on biodiversity is given here. These sources can be used by small-scale developers to identify suitable options and can inform LPA guidance. There are many other resources available and internet searches can yield helpful guides and examples.

- Islington Council (2012) *Biodiversity and the built environment, good practice guide 4*
- Biodiversity planning toolkit – an interactive toolkit for assessing and incorporating biodiversity in development (note that this also has a list of references): www.biodiversityplanningtoolkit.com/
- CIEEM Best Practice Awards often include small-scale development with innovative biodiversity design: **https://www.cieem.net/best-practice-awards**
- Forest of Dean District Council (2007) *Landscape and biodiversity considerations for small scale planning applications*
- TCPA and TWT (2012) *Planning for a healthy environment – good practice guidelines for green infrastructure and biodiversity*
- Aberdeenshire Council (2015) *Planning advice 5: Opportunities for biodiversity enhancement in new development*
- Wild West End – a partnership between The Crown Estate, Grosvenor Britain and Ireland, The Portman Estate, Howard de Walden and Shaftesbury. These landowners are working together to encourage birds, bees and bats back into this iconic area of London: **www.wildwestend.london**
- The BIG Biodiversity Challenge – a CIRIA initiative that shares and awards good practice in biodiversity in the construction industry: **http://www.bigchallenge.info/award-categories-c5su**
- The Wildlife Trusts have a national section within each local Wildlife Trust magazine, and often provide an update on biodiversity initiatives within development.
- LWT (2017) *How to plant a native hedgerow planting*: **http://www.wildlondon.org.uk/sites/default/files/files/How%20to%20plant%20a%20mixed%20hedgerow.pdf**

Technical note T3 Irreplaceable habitats

Summary

This technical note provides information to help identify an irreplaceable habitat and to explain the good practice principle that losses of irreplaceable habitats (or statutory designated sites) cannot be offset to achieve biodiversity net gain. Impacts on irreplaceable habitats and statutory designated sites should be avoided. The application of the mitigation hierarchy should be undertaken with full regard to irreplaceable habitats and statutory designated sites, and in accordance with the relevant legislation and planning policy. This technical note is for those seeking to incorporate biodiversity net gain into a project design, and who need to avoid losses to irreplaceable habitat. It is also for decision makers who need a good understanding of what might constitute an irreplaceable habitat, so that these features can be dealt with appropriately, separate from any biodivesity metric calculations or contributions towards any biodiversity net gain policies or targets. This technical note is about irreplaceable habitats. Some of the good practice it contains might be useful for those considering species, but it does not specifically cover species populations that may be considered irreplaceable in a particular locality.

T3.1 WHAT IS AN IRREPLACEABLE HABITAT?

Irreplaceable habitat is habitat that, once lost, cannot be recreated elsewhere, within a reasonable timeframe. Ancient woodland, active peatland and limestone pavements are widely accepted as examples of irreplaceable habitats. These habitats are mapped on the MAGIC website, which provides geographical information on the natural environment.

There is less agreement or understanding of what other irreplaceable habitats are present within the UK.

The BBOP website provides some international research material and resources such as topical webinars, including a BBOP resource paper on the limits to what can be offset (BBOP, 2012b).

BBOP: http://www.forest-trends.org/documents/files/doc_3128.pdf

T3.2 HOW CAN AN IRREPLACEABLE HABITAT BE IDENTIFIED?

Irreplaceable habitats are often within statutory designated sites, but it cannot be assumed that all have been designated or included in any local mapping exercise or inventory. Evidence, expert opinion and local knowledge are all needed to identify irreplaceable habitats. Developers and decision makers should be aware that while habitats such as ancient woodland are defined as irreplaceable in any context, for some habitats irreplaceability at one location does not necessarily mean that the habitat is irreplaceable in all locations. Where there is uncertainty, the following should be applied:

- The factors that influence irreplaceability should be agreed with relevant decision makers, statutory consultees and stakeholders.
- The habitat in question should then be systematically assessed against the agreed factors, to gain consensus on whether the habitat is irreplaceable.
- Evidence should be collated to support the decisions made, and records of expert opinions given should also be included.

The following examples of factors determining whether a habitat is irreplaceable are provided as good practice. Other factors may also be relevant:

- **Age**. The habitat is only considered to be a particular habitat type after an extensive period of time, which is necessary for the habitat to mature in terms of species diversity and supporting environmental processes such as particular hydrological conditions. The maturity of these features and processes then helps to define the habitat type.
- **Environmental context**. The habitat exists because of an exceptional or very rare combination of physical, ecological and/or historical circumstances that cannot be replicated elsewhere.

- **Evidence on achievability of re-creation**. Scientific research and case study evidence demonstrates that full re-creation has not been successfully achieved within a realistic timescale. Or there is a lack of scientific research and case study evidence to demonstrate that full re-creation has been successfully achieved within a realistic timescale.

Box T3.1 summarises examples of where these factors may be applied.

Box T3.1
Examples of applying factors to differing habitat scenarios

A species-rich lowland meadow habitat could potentially be re-created, because there is good evidence of successful re-creation. A species-rich and traditionally managed ancient hay meadow may have localised historic, biotic and abiotic aspects that could lead to a conclusion that it is not re-creatable.

A range of coastal habitats such as saltmarsh have a good degree of evidence of re-creation through managed retreat, and the timescales for recreation are not extensive. In some specific circumstances, such as for particular sand dune systems, the specific coastal location may provide the unique dynamics necessary to create and maintain the habitat and lead to a conclusion of irreplaceability.

T3.3 CHECKING FOR ANCIENT WOODLAND

Ancient woodland is often used as an example of irreplaceable habitat because of the availability of information to establish the age of woodland. An Ancient Woodland Inventory is published by the nature conservation body for each devolved government (and by the Woodland Trust for Northern Ireland).

- England: **http://naturalengland-defra.opendata.arcgis.com/datasets/ancient-woodlands-england**
- Scotland: **https://gateway.snh.gov.uk/natural-spaces/dataset.jsp?dsid=AWI**
- Wales: **https://naturalresources.wales/guidance-and-advice/environmental-topics/woodland-management/woodlands-and-the-environment/ancient-woodland-inventory/?lang=en**
- Northern Ireland: **http://www.backonthemap.org.uk**

The Ancient Woodland Inventory is a tool for checking for ancient woodland sites but it should not be taken to be exhaustive. Some sites or parts of sites may be included in error due to mapping issues and some have been missed. Checking the mapped information at a site is recommended.

There are publications with references to habitats that could be deemed to be irreplaceable. The technical paper supporting the Defra biodiversity metric (Defra, 2012c) includes information to assist with the assessment of biodiversity losses and gains, including the timing and difficulty of recreation. This gives an indication of which habitat types are either of a very high technical difficulty to recreate, or impossible to recreate (see Appendix 1 of Defra, 2012c).

T3.4 WHAT DOES PLANNING POLICY SAY?

Each of the devolved countries within the UK has national planning policy in place that makes reference to irreplaceable habitat considerations in planning decisions.

For England, Section 118 of MHCLG (2018) states that: *"planning permission should be refused for development resulting in the loss or deterioration of irreplaceable habitats, including ancient woodland and the loss of aged or veteran trees found outside ancient woodland, unless the need for, and benefits of, the development in that location clearly outweigh the loss."*

For Northern Ireland, DOENI (2013) advises that: *"Planning permission will only be granted for a development proposal which is not likely to result in the unacceptable adverse impact on, or damage to known… active peatland (and)… ancient and long-established woodland. A development proposal which is likely to result in an unacceptable adverse impact may only be permitted where the benefits of the proposed development outweigh the value of the habitat, species or feature."*

For Scotland, Section 216 of Scottish Government (2010) states that: *"Ancient semi-natural woodland is an irreplaceable resource and, along with other woodlands, hedgerows and individual trees, especially veteran trees of high nature conservation and landscape value, should be protected from adverse impacts resulting from development."*

Chapter 5 of Welsh Government (2016) states that: *"Ancient and semi-natural woodlands are irreplaceable habitats of high biodiversity value which should be protected from development that would result in significant damage."*

While there are some variations, the policy across the devolved governments is broadly similar, with a focus on ancient woodland, particularly ancient semi-natural woodland, as the most well-known irreplaceable habitat.

The Forestry Commission and Natural England (2018) provide standing advice on ancient woodland and veteran trees. Standing advice is that which is published as formal advice on the organisation's website, to reduce the need for direct checking with the organisation on frequently asked questions. While this is English advice, it may be beneficial for all UK administrations to be aware of. The advice defines veteran trees as *"Trees which, because of their age, size or condition are of cultural, historical, landscape and nature conservation value. They can be found as individuals or groups within ancient wood pastures, historic parkland, hedgerows, orchards, parks or other areas."*

T3.5 IRREPLACEABLE HABITATS IN FORWARD PLANNING AND DEVELOPMENT MANAGEMENT

Where irreplaceable habitat is at risk of loss or deterioration after applying the mitigation hierarchy, any losses of this habitat cannot be offset to achieve BNG. The development can only proceed if it complies with national and local planning policy. It is good practice for LPAs to establish an approach to identifying irreplaceable habitats, applying national policy and stating the need for separation from local BNG policy and targets. This improves clarity for developers and consistency across development projects. Local plans or guidance documents supporting planning policy that specify the requirements for EcIAs or any type of biodiversity appraisal should refer to the need to check for potential irreplaceable habitats.

In exceptional cases, national planning policy allows for the development need and benefits in its specific location to demonstrably outweigh the loss of irreplaceable habitat. These considerations and the decisions made are the responsibility of the body giving planning permission. It is good practice to provide clarity at the plan level, so that developers are better informed and prepared. The mitigation hierarchy and relevant planning policy need to be rigorously applied, but biodiversity metrics should not be used.

There are a relatively small number of cases where a decision maker has determined that the loss of irreplaceable habitat is outweighed by the overriding need of a development. In many cases, the decision maker has found that the loss is not outweighed by the development need. See **Case studies T3.1 and T3.2**.

Case study T3.1
A21 Tonbridge to Pembury road improvement scheme

The A21 road improvement scheme was approved after being considered at a public inquiry in 2013. The planning inspector's report included the following conclusions:

"In my overall conclusion, there is an overriding need for the Published Scheme and the ES has identified that there are no alternative viable approaches. So while I consider the loss of 9.0 ha of AW (ancient woodland) to be an enormous loss of irreplaceable habitat, I am satisfied that in this case the need for and benefits of the Scheme outweigh that loss."

Case study T3.2
Change of use of woodland to golf course extension at Forest Pines Hotel Golf and Country Club, Broughton, Lincolnshire

The appeal for this development was dismissed by the Inspector in his decision issues in 2010, which stated:

"I have found that the key policy test is set out in PPS9 and seeks to balance the irreplaceable ecological and historical nature of 'ancient woodland' against the need for, and benefits of, the proposed development. That test applies to both 'semi-natural ancient woodland' and 'plantations on an ancient woodland site... The protection afforded to 'ancient woodland' would appear to be independent of its 'quality' or species richness.

"The value of ancient woodland is that it is ancient. The complex interrelationships between plants, animals, soils, climate and people have developed over centuries and, for that reason, the habitat is practically irreplaceable... I find that the loss and damage to this 'ancient woodland' is not outweighed by any need for, or benefits of, the proposed development. Hence, and having considered all the other matters raised, I find nothing sufficiently compelling to alter my conclusion that this appeal should be dismissed."

T3.6 CONSIDERING IRREPLACEABLE HABITATS POTENTIALLY AFFECTED BY DEVELOPMENT

Early identification of potential impacts on irreplaceable biodiversity better enables them to be designed out of a project. EcIAs should identify any potential irreplaceable habitats on or near to the project site, using agreed factors to identify their presence, and seek to avoid any impacts through project design, separately from any use of a biodiversity metric.

In exceptional cases, where the mitigation hierarchy has been applied and there are still residual impacts on irreplaceable habitat, a planning decision maker will decide whether there is enough evidence to demonstrate with good evidence that the loss is outweighed by the development need, in the particular location. In such circumstances, losses of the irreplaceable habitat cannot be offset to achieve BNG.

Clarity on the impacts will assist decision makers in applying the required planning policy to the decision. A lack of clarity could lead to a lengthy decision-making process as further information is sought.

Compensation for irreplaceable habitats cannot be provided for on a 'like for like' basis that reduces the impact on those habitats to neutral. The compensation will need to be designed in recognition of the nature and extent of the loss or damage, to make a contribution to biodiversity that is considered proportionate. A biodiversity contribution in recognition of the irreplaceable loss is designed on a case-by-case basis, usually in consultation with the statutory nature conservation body and should not be informed by a biodiversity metric. Bespoke compensation may include options for habitat creation, enhancement or restoration, potentially on a large scale in recognition of the irreplaceability of the habitat loss or damage.

Translocation of ancient woodland soils, seedbank and vegetative fragments has been undertaken for some developments. This does not replace the habitat lost but can retain some of the local genetic stock of ancient plants, soil biota and other attributes. It is a salvage process that can help improve the biodiversity value of newly created habitat.

The Defra biodiversity metrics have not been designed to identify compensation requirements for losses of irreplaceable habitat. The exclusion of irreplaceable habitats is specifically stated within Defra (2012c) Compensation for irreplaceable habitats cannot be determined by metrics. Checking a bespoke compensation design with some form of quantification that is agreed with the statutory nature conservation body may be beneficial in some circumstances.

T3.7 DIFFERENTIATING BIODIVERSITY LOSSES/GAINS FROM IMPACTS ON IRREPLACEABLE HABITATS

A project affecting irreplaceable habitat, while not achieving BNG at the project level, can and should generate meaningful gains or net gains for other biodiversity features. These gains or net gains should be based on advice in this guide, while being clear that the development project overall cannot

achieve BNG because of impacts on irreplaceable habitats. In these circumstances, the following recommendations apply:

- After applying the mitigation hierarchy, record impacts on irreplaceable habitats so as to distinguish these from the losses and gains of other biodiversity features. The irreplaceable habitat impacts and any measures in response to those impacts should not involve use of a biodiversity metric and are reported separately. All steps taken to secure a bespoke contribution to biodiversity in recognition of the loss should be explained with input from the statutory nature conservation body where appropriate.
- Apply the mitigation hierarchy to all other potential biodiversity impacts. Account for losses and gains for other biodiversity features using a biodiversity metric, and then report achievement of gains or net gains specifically for all other biodiversity features.
- Be open and transparent about the loss of irreplaceable habitat and the agreed bespoke measures for such impacts. Report clearly and separately on measures relating to gains and net gains in other specific biodiversity features.

Having regard for good practice principles 2 and 10 and this technical note, decision makers should make sure that BNG is appropriately and transparently recorded, preventing any project-wide claims of BNG where there are impacts on irreplaceable habitats. Note that development projects that avoid impacts on irreplaceable habitats and achieve gains or net gains in other biodiversity features can make a project-wide claim of BNG.

Technical note T4
Engaging stakeholders on biodiversity net gain throughout a project life cycle

Summary

This technical note provides advice on engaging stakeholders to achieve BNG. It is primarily for practitioners within industry, but it illustrates to other stakeholders what good engagement practice involves. It also contains pointers for local planning authorities and a list of references with more information.

The technical note does not prescribe exactly how to engage stakeholders. Rather its advice can be adopted as appropriate for the development. The advice covers:

- identifying stakeholders
- developing a stakeholder consultation strategy
- preparing for consultations
- incorporating BNG when setting terms of reference for an EcIA
- involving stakeholders in the BNG design
- maintaining two-way communications
- sharing lessons learnt.

T4.1 IDENTIFY STAKEHOLDERS

The project's stakeholders for BNG should be identified as early as possible. Stakeholders include those affected by, who can influence or who have an interest in the project's biodiversity activities. **Box T4.1** gives examples.

Stakeholders can be identified from desk-based research and from the project itself if consultations have already occurred. During early engagement, asking stakeholders who else to contact can save time and can lead to introductions, especially with local interest groups. This can also help to identify potential partners in delivering and maintaining BNG.

Box T4.1
Possible stakeholders for a project's biodiversity net gain

- local planning authorities
- statutory nature conservation organisations (SNCOs)
- environmental protection agencies
- non-governmental organisations (NGOs) covering national, regional and local levels of interest (including LNPs and catchment partnerships)
- local communities, eg resident associations, parish councils
- interest groups, eg 'friends of' group for a local nature reserve
- people directly affected by the project's effect on biodiversity
- adjacent and nearby landowners and land managers including farmers (or a suitable representative, eg the local national farmer union group officer)
- conservation interests, including academics
- groups working on complementary initiatives, eg local authority sustainable drainage officers organisation (LASOO) and the UK Water Industry Research Group
- other developers working in the locality

The good practice principles include 'be inclusive' when engaging stakeholders. BS 8900-1:2013 describes stakeholder engagement as *"a core requirement for any truly sustainable organisation"*. It also describes how inclusive stakeholder engagement means an *"intention or policy of including key stakeholders… in particular… engagement with people who might otherwise be excluded or marginalised"*. In practice, this means engagement and dialogue with stakeholders without excluding any either on bias (eg sexual or racial grounds) or because the individual or sector is perceived as difficult or obstructive.

T4.2 DEVELOP A STAKEHOLDER STRATEGY

A stakeholder consultation strategy for BNG design can be a single page or longer, depending on the scope of the project and its BNG design. The strategy should summarise the project's stakeholders and their interest in the project and/or its BNG activities. It should also describe who will be engaged, when, how and why. **Table T4.1** contains an example.

CIEEM (2018) refers to establishing a stakeholder consultation strategy during a project's scoping stage.

Advice for local planning authorities

Local planning authorities could assist by checking the stakeholder consultation strategy to establish whether any key contacts have been missed. Stakeholders could include relevant staff within the LPA. Officers from a range of departments, including those relating to health, education, countryside management, biodiversity, air quality, planning, GI, social care and sustainable transport could be considered.

When doing so, BNG can be easily incorporated by the following measures:

- **Tailoring communications**

  Communications should be tailored to each stakeholder, depending on their interests and possible involvement with BNG (see **Box T4.2**).

  Communications should also be tailored to the project's life cycle stage, for example managing expectations during the early stages when the project will be built in several years' time, and when reasons of client confidentiality limit the information that can be issued.

  Having regard for the language used with different stakeholders is important, as the way in which information is communicated can affect how the recipients interpret and feel about the project. The PIRC (2018) toolkit provides helpful advice on communicating effectively in relation to nature conservation.

Box T4.2
Preparing for a first stakeholder meeting on BNG

A project team is collaborating with neighbouring farmers to deliver BNG. The project team prepares for the first meeting by setting out initial proposals for discussion, including potential financial, contractual and logistical arrangements. They seek to hear the farmers' views, to listen and respond, and to ensure that farmers have time to think about the proposals.

Another project team is collaborating with wildlife conservation groups to deliver BNG. At the first meeting, the project team initiates discussions on local and regional biodiversity strategies that the development could contribute towards, as well as wider benefits from BNG, eg improving communities' access for nature. Again they seek to listen to views and ensure that the groups have time to respond.

- **Tailoring engagement methods**

  Engagement methods should be tailored for each stakeholder group. The most effective method depends on stakeholders' interests, possible involvement and the extent of engagement already undertaken (eg just beginning versus a well-established working relationship). Methods can include newsletters, leaflet drops, posters and social media, meetings or workshop-style events, site walkovers and joint ecological surveys, for example of a local nature reserve proposed for the project's BNG activities.

- **Minimising conflicts**

  Communicating BNG can conflict with other aspects of the project, such as when a project causes the loss of biodiversity that is highly valued by local communities, or involves compulsory purchase of land that requires residents to move home. Measures to address conflicts should be in place, such as the advice in **Box T4.3** about engaging stakeholders on sensitive issues.

  "Consideration should be given to the best methods of engaging stakeholders. Where there are potentially significant effects on ecological features of particular value to local communities, it is important to consult with those communities or local groups." (CIEEM, 2018)

- **Establishing a programme**

  A programme of engagement activities on BNG for each project life cycle stage should be developed. The programme should prioritise interactions and seek to avoid over-consulting. It

should also include periodic reviews of the strategy, to keep track of progress, time and logistical requirements and to update the strategy when appropriate.

- **Developing a budget**

  A programme can provide information to develop a budget. Stakeholder engagement can be time-consuming or complex, especially when stakeholders oppose a development. However, an initial investment can balance costs saved later in the project, for example from smoother progression through the consenting process.

  "Time spent on transparency, stakeholder engagement and consensus-building in the short-term may often save significantly greater time later on [project related biodiversity] issues such as permitting delays, additional permitting conditions, protests and complaints and lawsuits." (Pilgrim and Ekstrom, 2014)

- **Using checklists**

  Checklists or similar mechanisms can demonstrate good engagement practice when auditing BNG (see **Chapter 13**).

  Table T4.1 provides an example of a stakeholder consultation strategy. It contains various engagement activities to select or exclude depending on what is appropriate for the project.

Advice for local planning authorities

Where consultation events are taking place for local plan making purposes, there may be an opportunity to include development site specific stakeholder engagement, particularly where a forthcoming development project is associated with a local plan site allocation option.

Table T4.1 An example of a stakeholder consultation strategy on biodiversity net gain

Project life cycle stage	Who?	Why?	How?
Feasibility or scoping	LPAs, environmental protection agencies, statutory nature conservation organisations, wildlife conservation NGOs, eg LNPs, catchment partnerships.	Risk mitigation: gather stakeholder concerns in order to plan, budget and implement actions to address these.	Meeting: present the project outline and the commitment or aspiration to achieve BNG. Highlight the intention to collaborate, including timescales as known at this stage. Discuss stakeholders' views on risks and opportunities to deliver BNG.
		Early sight of win-wins: gather stakeholder feedback on BNG opportunities to streamline the BNG design.	
		Setting terms of reference: gain stakeholder agreement on the context of BNG to help streamline the design.	
Design	As above, plus (if different) local interest groups and potential BNG partners.	Involve stakeholders in the BNG design to streamline the design process by reducing risks and uncertainty and testing the feasibility of the design.	Meeting: present the current status of the project's EcIA and its planned timeline for completion. Present initial or assessed predicted effects on biodiversity. Hold discussions on ideas for delivering BNG or on a draft BNG design. Also discuss practical solutions for securing BNG over the long term.
			Liaise with individuals or small groups to progress their ideas/proposals for BNG or gather their feedback on the BNG design.
Design	As above, plus (if different) local interest groups and potential BNG partners.	Maintain relations	Regularly update stakeholders with progress, eg through newsletters, social media updates.
Implementing, monitoring and managing BNG	The public affected by the project and its BNG activities (both negatively and positively), the public within the locality of the project.	Raise public awareness of the project's BNG activities.	Public consultation events, leaflet drops, project newsletters including via social media, presentations for local groups, schools etc.
	Local interest groups	Keeping interest groups informed of progress to minimise risks and conflicts. Listen to concerns and address these.	Consultation events, posters, newsletters, on-site walkovers.

Project life cycle stage	Who?	Why?	How?
Implementing, monitoring and managing BNG	LPAs, EPAs, SNCOs	Keeping regulators and statutory advisors informed of progress to meet consent requirements.	Issue progress reports including results of quality assurance audits. Host update meetings and on-site walkovers.
Throughout	Everyone involved, and subgroups as appropriate	Listen and respond, and share lessons learnt.	Gather lessons learnt, eg as part of a company's audit procedure. Share these, eg issuing data to local environmental record centres, reports on BNG, articles, webinars, conferences etc).

T4.3 PREPARE FOR CONSULTATIONS

Box T4.3 contains advice on establishing and sustaining good stakeholder relations.

Care should be undertaken when planning consultations with those who may wish to discuss issues other than BNG. For example, some stakeholders distrust developers, and some might be dealing with contentious or distressing issues regarding the project, for example losing vegetation that screens unsightly infrastructure or losing land to compulsory purchase orders.

Box T4.3
Practical advice on engaging stakeholders

Find the right people. The first person contacted might not be the right one, so explain the intentions to collaborate on BNG and ask who else to engage with.

Start early. Do not wait for detailed information about a project or its effect on biodiversity. Outlining the project and stating intentions to collaborate on BNG will set a foundation for good working relations, even if challenges are foreseen.

Start with the key messages. These can include involving stakeholders with the BNG design and a commitment to implement the good practice principles.

Deal with difficult issues and reservations. Be upfront, listen to concerns and respond. Ensure that people have time to respond to communications and proposals.

Nurture trust and respect. Early on, ask how collaboration can work best, then implement suggestions where possible. Ensure that stakeholders know how to contact the project, and respond promptly when they do.

Listen and respond. Listen to what people have to say and respond, explaining what can and cannot be undertaken, with reasons why. Ensure that stakeholders know how their input is being used positively by, for example, keeping a tracker (eg a 'you said, we did' tracker).

Be clear and relevant. Spend time ensuring that communications are clear, consistent and relevant. For example, local communities might have recreational or amenity concerns about vegetation clearance, whereas a local wildlife group (which might include the same people) will be primarily interested in implications for nature. Explain BNG so that everyone is able to understand, avoiding jargon.

Be specific. Local knowledge is invaluable to EcIAs and BNG designs. Being specific about the target biodiversity for net gain ensures the most relevant and helpful input from stakeholders.

Set the facts straight. Set out the facts clearly to avoid misunderstanding and not raise expectations about BNG (eg whether the project has committed to achieving BNG or has an aspiration to do so). Do so early before any misconstrued gossip spreads. Draft answers to anticipated questions to be prepared and deliver a consistent message.

Reach consensus. State the need to reach consensus, especially when collaborating with interest groups that have different views. Listen, then facilitate discussions. If consensus is not possible, seek clarity on what the vast majority agree with (and explain this approach at the start).

Be transparent. Hosting meetings that any stakeholder can attend builds trust and ensures consistency in communications. If meeting a specific group, be transparent about the reasons.

Be inclusive. Engage equally, for example with local groups concerned about a particular issue and with national organisations running campaigns against the project. Meet campaigners to openly hear their views and build a platform for ongoing discussion.

Be interactive. Host brainstorming sessions, group discussions and other activities rather than simply giving presentations followed by a question and answer session.

Be structured. Set an agenda and keep to it, but be flexible if issues arise that require discussion. Take a register, issue feedback forms and afterwards produce a meeting summary if resources allow. Having a structure keeps events on track, and that helps keep stakeholders focused and on board.

Keep up the momentum. A 'little and often' approach maintains stakeholder interest and commitment. Give people timescales for expected interactions and the project's BNG, even if approximate, and update them if things change. Tell people if there will not be contact for some time (eg undertaking surveys for the EcIA).

T4.4 INCLUDING BIODIVERSITY NET GAIN IN ECIA TERMS OF REFERENCE

The CIEEM (2018) guidelines refer to gaining stakeholder agreement on terms of reference for an EcIA. Terms of reference are typically agreed at the scoping stage and include criteria for evaluating the significance of an EcIA's findings.

"The results of scoping can be presented as a formal report and/or letter to the competent authority. This is strongly recommended for any project that requires detailed ecological survey, and particularly where it is important to get stakeholder agreement on the terms of reference for the EcIA." (CIEEM, 2018)

Key aspects of BNG should be included when setting terms of reference for an EcIA. Examples of key aspects are given in **Table T4.2**.

The advantages include streamlining the design process for BNG, for example when stakeholders agree on how far from the project biodiversity offsets can be located (this can also streamline the consent process). Another advantage is being able to demonstrate good practice, such as providing evidence for the NSIP DCO process that stakeholders have been engaged and responded to (see **Technical note T5**).

There are many pragmatic ways to include BNG when setting terms of reference for an EcIA, for example during meetings that have already been planned with LPAs and the statutory nature conservation advisor. Alternatively some LPAs and groups such as LNPs and catchment partnerships have developed plans for BNG that can identify priorities and highlight any additional opportunities to expand existing initiatives over and above that which is already being adopted.

Table T4.2 Examples of stakeholder agreement on key aspects of biodiversity net gain

Aspect of biodiversity net gain	Stakeholder agreement	How incorporated within the biodiversity net gain design
Irreplaceable habitat	The approach to identifying irreplaceable habitat and the local sites containing them (see Technical note T3)	Exclude from biodiversity unit calculations and the BNG design, and demonstrate application of the mitigation hierarchy
Achieving BNG locally to the development	Within the home ranges of species affected by the project, and within ecological networks that the project affects	Include BNG activities that deliver local gains focusing on species affected by the project Also include delivering more distant landscape-level gains that support targets of the BOA that are commensurable biodiversity affected by the project
Directly contributing towards regional biodiversity priorities	Targets within the biodiversity opportunity area (BOA) that the project lies within	
Achieving BNGs that exceed existing obligations	Exclude legal obligations, eg maintaining SSSIs in favourable conservation status	Exclude from biodiversity unit calculations and the BNG design
Delivering a long-term legacy	25–30 years as stated in the good practice principles for BNG	Design BNG to be resilient to future environmental change, eg climate change Develop a 25-year management plan for the BNG activities

T4.5 INVOLVE STAKEHOLDERS IN THE BIODIVERSITY NET GAIN DESIGN

Feasibility testing and stakeholder engagement during the design process is likely to result in BNG designs that are more practical to implement and more likely to succeed (Pilgrim and Ekstrom, 2014).

This call to engage stakeholders when designing BNG mirrors the approach in CIEEM (2018), which advocate early stakeholder discussions on avoiding or minimising negative effects on biodiversity, as well as on enhancement measures. The guidelines also describe the important role played by statutory and non-statutory consultees in the EcIA process in *"providing site-specific data, contextual information and expertise"*.

When designing BNG (see **Chapter 11**), the extent of stakeholder involvement should be proportionate to

the project's scope and effect on biodiversity. For example, small developers might address BNG during statutory consultations (see **Technical note T2**). Whereas a large housing development could work in partnership with local wildlife organisations and LPAs.

Involving stakeholders can include:

- explaining any constraints at the start, such as a project's operational and safety requirements that limit planting of certain habitat types
- identifying ecologically suitable locations for BNG activities
- visiting these locations to discuss practical implementation of BNG
- discussing and helping refine outline designs for BNG
- feasibility testing to reduce risks of design failure
- proposing projects when delivering BNG either on site or through offsetting
- identifying synergies and win-wins, eg improving community access to high quality green spaces or decreasing flood risk.

Technical conditions to improve outcomes from biodiversity offsets (Pilgrim and Ekstrom, 2014) described that: *"In regulatory systems for biodiversity offsets, offset failure appear to be partly because of overly theoretical offset designs that lack feasibility testing and stakeholder engagement. One of the main conditions necessary for offsets to be successful are engaging stakeholders during the identification of scope, scale and location of biodiversity offsets."*

Advice for local planning authorities

Local planning authorities should provide information on any established priorities for biodiversity (and those of its partners) to be shared at consultation events. If BNG targets have been set within the local plan or other strategies, share and explain these for inclusion. Make BNG expectations clear to developers so that they can effectively plan their stakeholder engagement through pre-application advice, as well as publishing guidance online.

Early involvement with stakeholders can be effective in reducing objections to a planning application. Local planning authorities should check that key stakeholders are being kept up to date with anticipated timetables of events.

T4.6 MAINTAIN TWO-WAY COMMUNICATIONS

After the design stage, stakeholders should be updated on progress and given opportunities to respond during the construction, maintenance and monitoring stages of BNG. This maintains transparency. It is also an opportunity to gather local information that supports successful management of BNG activities in the long term (see **Box T4.4**).

Box T4.4
Example of maintaining two-way communications with stakeholders

A project's BNG design involved creating woodland. The 25 year management and monitoring plan involved yearly invertebrate monitoring surveys, as part of a series of ecological surveys, to evaluate the success of the woodland creation against targets on the diversity and abundance of invertebrate populations.

The project team submitted all ecological survey data to the local environmental record centre. They met with local invertebrate groups every year to share their survey findings and discuss them in the context of the group's invertebrate monitoring across the district. This enabled the team to determine whether trends in their invertebrate monitoring were replicated across the district. For example, one year they recorded a decline in invertebrate abundance, and the local group suggested that this was because of seasonal variations as invertebrate abundance across the distract had declined. The meetings also enabled the project team to improve their woodland management techniques for invertebrates by hearing about the local group's experiences in what works and what does not.

The purpose of the project's communication should first be determined. For example, progress reports required for statutory obligations such as discharging planning conditions, a commitment to keep local interest groups up to date or an aim to raise awareness about a project's BNG activities.

Then the most appropriate methods can be identified, such as:

- small projects issuing a short report documenting BNG implementation to the LPA
- larger projects hosting site tours for statutory advisors or consultation events with stakeholders who were involved in the project feasibility and design stages.

If a third party is responsible for BNG activities, it can be responsible for ongoing stakeholder engagement, as well as updates such as posting monitoring reports online or submitting them to the local environmental records centre.

T4.7 SHARE LESSONS LEARNT

The good practice principles for BNG include 'sharing the learning with all stakeholders'. Lessons learnt should be shared throughout the life cycle of the project, not just at the end. These activities should be included in the programme and in the budget for stakeholder engagement and be appropriate for the project, such as:

- using company procedures on capturing and disseminating lessons learnt
- small projects issuing reports that are required by local planners that include a paragraph on lessons learnt
- larger projects hosting events to gather lessons learnt by the project team, commissioning agency and stakeholders, or sharing experiences through webinars, conferences, articles, workshops and social media
- including lessons learnt when auditing BNG.

Advice for local planning authorities

BNG is an evolving practice. Sharing lessons learnt will secure better outcomes as BNG becomes established. Encourage developers to undertake joint lessons learnt reviews so that new projects can benefit from experience.

Further information on the topic can be found at the following websites:

AccountAbility 1000 stakeholder engagement standard: **www.accountability.org/standards**

Business and Biodiversity Resource Centre: **www.businessandbiodiversity.org/action_stakeholder.html**

Project Management Institute (PMI): **https://www.pmi.org/learning/library/project-stakeholder-management-5216**

https://www.pmi.org/learning/library/stakeholder-analysis-pivotal-practice-projects-8905

Sustainability Exchange communicating biodiversity: **www.sustainabilityexchange.ac.uk/communicating_biodiversity**

Technical note T5
Aligning biodiversity net gain with the development consent order process

Summary

This technical note relates to the development consent order (DCO) process in place in England and Wales. The target audience for this technical note is those involved in nationally significant infrastructure projects (NSIPs) in England and Wales, who are following the DCO process. Similar large-scale projects in Scotland and Northern Ireland are dealt with by the relevant LPA.

T5.1 WHAT IS THE DCO PROCESS?

Development proposals requiring planning permission are normally dealt with at the local level by the relevant LPA. Recognising the complexity of large-scale infrastructure projects, the Planning Act 2008 put a new decision-making process in place for NSIPs in England and Wales.

A DCO for NSIPs is a legally binding permission for the project given by the relevant Secretary of State. A transport project, for example, would be determined by the Secretary of State for transport. Once given, a DCO defines the scope and extent of the scheme to be constructed, contains all powers necessary to construct the scheme and sets out requirements that have to be complied with.

The DCO process is led by a planning inspectorate and includes pre-application requirements, examination of the proposal by the planning inspectorate and a recommendation made to the Secretary of State for their final determination. As with locally determined development projects, there is a set period and process to challenge any decision made.

The types of infrastructure projects that are determined by the DCO process include waste and water infrastructure, pipelines, electricity infrastructure and large-scale road and rail projects.

T5.2 CAN BIODIVERSITY NET GAIN BE APPLIED TO NSIPS?

Yes. NSIPs typically affect large geographical areas. While potential effects on biodiversity must be addressed, NSIPs are unique opportunities for biodiversity gains over a large area. Projects of national significance should underpin and support the delivery of UK and devolved government biodiversity commitments and should focus on landscape-scale gains and a contribution to national biodiversity targets.

BNG for NSIPs should be discussed with those involved in early consultations, such as LPAs, statutory consultees and local wildlife organisations. LPAs with policies on BNG should highlight these to the developer and the planning inspectorate.

The business case for BNG (see **Chapter 5**) is amplified for NSIPs. The length of the project life cycle and large-scale nature of NSIP can result in a complex project with a considerable number of developers, contractors, consultants and landowners involved over time. By establishing BNG targets as an objective of the project as a whole, each party can promote their own contribution to the overall achievement of BNG.

T5.3 WHICH STAGE OF THE DCO PROCESS IS MOST RELEVANT FOR BIODIVERSITY NET GAIN?

The pre-application stage. This is the first stage in the DCO process. Unlike local planning applications, the applicant must undertake all the necessary consultation before submitting the DCO application. The application must demonstrate that consultee responses have been given appropriate regard. Undertaking and responding to consultations during the pre-application stage is the ideal opportunity to identify, promote and build in BNG. The six stages of a DCO application are shown in **Figure T5.1**.

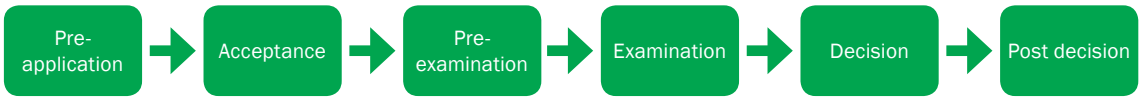

Figure T5.1 The six stages of a DCO application

T5.4 MAXIMISING OPPORTUNITIES AND BENEFITS AT THE PRE-APPLICATION STAGE

The DCO applicant must demonstrate that a comprehensive programme of consultation has been undertaken. The advice on stakeholder engagement within this guide will help ensure that the consultations are effective, in terms of exploring aspirations and options for BNG (see **Chapter 7 and Technical note T4**). Promoting the project as a BNG project and making a public commitment may help generate initial interest. Then including stakeholders in the development of BNG options can generate support for the project. A dedicated register of commitments will help to make sure that everyone understands what is being proposed for BNG.

At the pre-application stage, a DCO applicant should advertise the consultation and engage with stakeholders. BNG can be introduced as part of the project proposal at consultation events, including those focused on the local communities that may be interested in the proposal. The applicant may wish to consider using the guidance on corporate biodiversity targets and commitments within **Chapter 5**.

The applicant should consult with all relevant LPAs, statutory consultees and any people affected by the project. This gives an opportunity to engage with those who will have a specific interest in BNG. This could include wildlife organisations able to assist with locally relevant information and ideas.

During the pre-application stage, the applicant should build in the good practice for BNG as set out in this guide. **Chapter 8** on undertaking quality assurance, **Chapter 9** on feasibility and scoping, and **Chapter 11** on design will be particularly relevant.

Once a DCO application is in the pre-examination and examination phases, the benefits of early engagement will be realised, as these are the stages where consultees can make representations to the planning inspectorate. The DCO applicant can demonstrate that local biodiversity strategies have been taken into account, the mitigation hierarchy has been followed and BNG targets committed to within budgets and the project programme.

NSIPs are planned for over long time periods and there is an opportunity to build in BNG early so that time-lag between losses and gains is prevented where possible.

T5.5 HOW DOES THE LENGTH OF THE PROJECT LIFE CYCLE FOR NSIPS AFFECT BIODIVERSITY NET GAIN?

NSIPs are often in each stage of the project life cycle for several years. The construction phase alone can be extensive. The following good practice will help to keep the BNG target on track:

- Provide a dedicated resource for delivering BNG. This role should include co-ordinating, quality assurance checking and communicating (internally and externally), with full handover where there are staff changes.
- Start BNG activities early to avoid a time-lag between vegetation clearance for the project and biodiversity gains (and to minimise the penalties from time-lags when measuring the biodiversity gains).
- Apply a BNG quality assurance protocol at each life cycle stage.
- Ensure that all involved with each life cycle stage are fully aware of the BNG target and understand their roles and responsibilities.
- Set a clear BNG goal at feasibility and scoping. Given the length of time taken to establish a project design and submit a DCO proposal to the planning inspectorate, be flexible in the way that the goal is achieved. Allow the goal to benefit from any changing environmental conditions and new unforeseen opportunities that may arise during the pre-examination stages, such as creating habitat linkages as part of a newly published habitat restoration plan in the local area.
- Establish a BNG technical group to oversee the project life cycle. Include local biodiversity organisations to benefit from local expertise as well as new ideas and opportunities over time that may be relevant to any adaptive management (see **Chapter 13**).
- Given the lengthy timeframes, maximise the opportunities to create a legacy by, for example, long-term collaborations with local landowners and local wildlife organisations.

Technical note T6
Aligning biodiversity net gain with application of the EIA Regulations

Summary

This technical note provides information and links concerning the Town and Country Planning (Environmental Impact Assessment Regulations 2017 (EIA Regulations) and it highlights how BNG can be factored into the EIA process.

T6.1 WHAT ARE THE EIA REGULATIONS?

The EIA Regulations offers the opportunity to take into account the full range of significant environmental effects in development, and also covers projects outside the planning system such as agricultural improvements. Environmental topics covered include human beings, flora and fauna, soils, water, air, climate, landscape, cultural heritage and material assets. Biodiversity can interrelate with a number of these topic areas, and interrelationships are an important part of EIA.

The legislation covering EIA is specific to the devolved governments of the UK. The legislation applies the requirements of Council Directive 85/337/EEC (often known as EIA Directive) on the assessment of the effects of certain public and private projects on the environment. This Directive was reviewed in 2014 by the European Commission, which has strengthened the focus on biodiversity within the EIA Directive, and the review has triggered updates to the domestic legislation within the nations of the UK.

EIA Regulations require certain development projects to go through a process of assessment to consider their potential impacts on the environment. The thresholds for requiring an EIA relate to whether the project is within a sensitive area or whether the project exceeds a certain development size or is of a particular type. Annexes to the legislation provide these thresholds, known as schedules.

An applicant and the planning authority (along with other statutory consultees) will first go through a screening stage to determine whether an EIA is required. This is followed by a process of scoping out the required assessment in terms of the issues that need to be considered. EIA covers all aspects of the natural and historic environment, of which biodiversity is one aspect. The assessment is reported in an ES. It should be noted that there are also EIA Regulations in relation to non-development projects such as agricultural practices and forestry.

EcIA, as described in **Technical note T7**, is an assessment process specifically relating to biodiversity (CIEEM, 2018). This can be integrated into EIA, or undertaken alone where EIA is not legally required. The EIA Regulations have been transposed into a number of UK regulations, including:

- **England:** The Town and Country Planning (Environmental Impact Regulations) 2017. That these Regulations also cover projects serving national defence purposes across the UK, in all of the devolved nations.
- **Scotland:** The Town and Country Planning (Environmental Impact Assessment) (Scotland) Regulations 2017.
- **Wales:** The Town and Country Planning (Environmental Impact Assessment) (Wales) Regulations 2017.
- **Northern Ireland:** The Planning (Environmental Impact Assessment) Regulations (Northern Ireland) 2017

The changes within the 2017 Regulations include:

- describing fauna and flora as biodiversity, and referring to biodiversity protection as an important element of assessment and decision making

- clarification that EIAs need to be produced by competent experts with relevant expertise, for example in key roles such as ecology and EIA co-ordination.
- the requirement for a more co-ordinated approach to EIA and Habitats Regulations Assessment (HRA), which is the assessment of impacts on internationally designated wildlife sites
- changes made to improve the EIA process at particular stages.

T6.2 HOW SHOULD BIODIVERSITY NET GAIN BE FACTORED INTO THE EIA PROCESS?

The EIA process is iterative alongside an emerging development design. It can significantly influence the project from the outset and is a positive tool for supporting decision making. The EIA will identify:

- where any potential impacts are predicted to have a significant effect on biodiversity
- where potential impacts are not likely to lead to significant effects on biodiversity.

Both options can incorporate biodiversity gains into the project design, and the BNG principle should be a positive and visionary theme within the assessment. The mitigation hierarchy will need to be followed for any significant effects, and any measures relating to impacts on statutory designated sites, irreplaceable habitats and legally protected species need to be dealt with separately to measuring biodiversity losses and gains, in accordance with good practice in this guide.

The EIA process encourages the identification of avoidance or mitigation measures early in the project life cycle, so that these can be presented as part of the scoping stage. This fits with the recommendations in this guide, to embed BNG at the start of the project life cycle (see **Chapters 9 to 11**), and the EIA scoping stage is a key stage for BNG considerations. The EIA scoping opinion process is also an opportunity to consult and engage planning authority and statutory nature conservation advisers in setting a project level BNG objective.

An EIA will also need to include the exploration of alternatives to the project, and again the consideration of BNG is key here, as it is an opportunity to highlight where the greatest gains can potentially be achieved. The mitigation hierarchy can be used within EIA to facilitate early discussions on options that reduce biodiversity loss and maximise gains.

Co-ordination between specialists is vital for designing BNG in an EIA development project. A range of specialists are often involved in EIA, such as the landscape architect and a social scientist. These specialists will be gathering data that may be relevant for both designing BNG and also seeking any opportunities for maximising BNG outcomes. The EIA co-ordinator will play an important role in ensuring that EcIA and BNG are fully integrated into the EIA, including within an environmental management plan to help support implementation and monitoring. The EIA co-ordinator can also engage the engineering design team to integrate BNG throughout the design process, which is an iterative process whereby design is informed by impact assessment.

Rather than constraining BNG to the ecology chapter of the ES, it would be beneficial to demonstrate within the EIA how BNG crosses the range of EIA topics, such as ecosystem services, landscape, soils and water quality. The design of flood management presents a BNG opportunity, for example. EIA considers in-combination, cumulative and synergistic impacts, and again it will be important to include biodiversity gains and losses here.

The EIA Regulations require both public and statutory body consultation. These topic linkages also feed into EIA stakeholder engagement where there is the opportunity to engage on people's use and value of biodiversity, and liaise with the LPA on local biodiversity priorities.

It is recognised good practice to follow the range of guidance provided by IEMA, such as the IEMA guidelines on delivering proportionate EIA (Fothergill, 2017), and CIEEM (2018) when assessing

biodiversity impacts as part of an EIA. It should be noted that CIEEM (2018) covers any scale of development, whether above or below the EIA thresholds. The guidelines set out an assessment and reporting process that is appropriate for incorporation into an ES where required. Fothergill (2017) provides good practice for enhancing EIA practice to better influence development design in order to benefit the environmental assets that it is assessing.

The good practice in this guide regarding establishing the biodiversity baseline, assessing impacts, applying the mitigation hierarchy and designing BNGs are applicable to EIA development. Ricketts *et al* (2016) and CIEEM (2018) make reference to the importance of specialists working together, and this is particularly pertinent for EIA development where there is likely to be a range of topic chapters developed as part of the ES.

Helpful guidance on integrating biodiversity into EIA has also been produced by the EU (McGuinn *et al*, 2018), which includes useful advice on integrating climate change and biodiversity into EIA, setting out analysing baseline trends through to monitoring and management, emphasising building in ecological biodiversity measures into a project from the very beginning.

In addition, **Figure T6.1** sets out the interactions between the EIA and design process and the different mechanisms available at each stage of the project life cycle that can be used to capture and deliver environmental mitigation in general, and BNG.

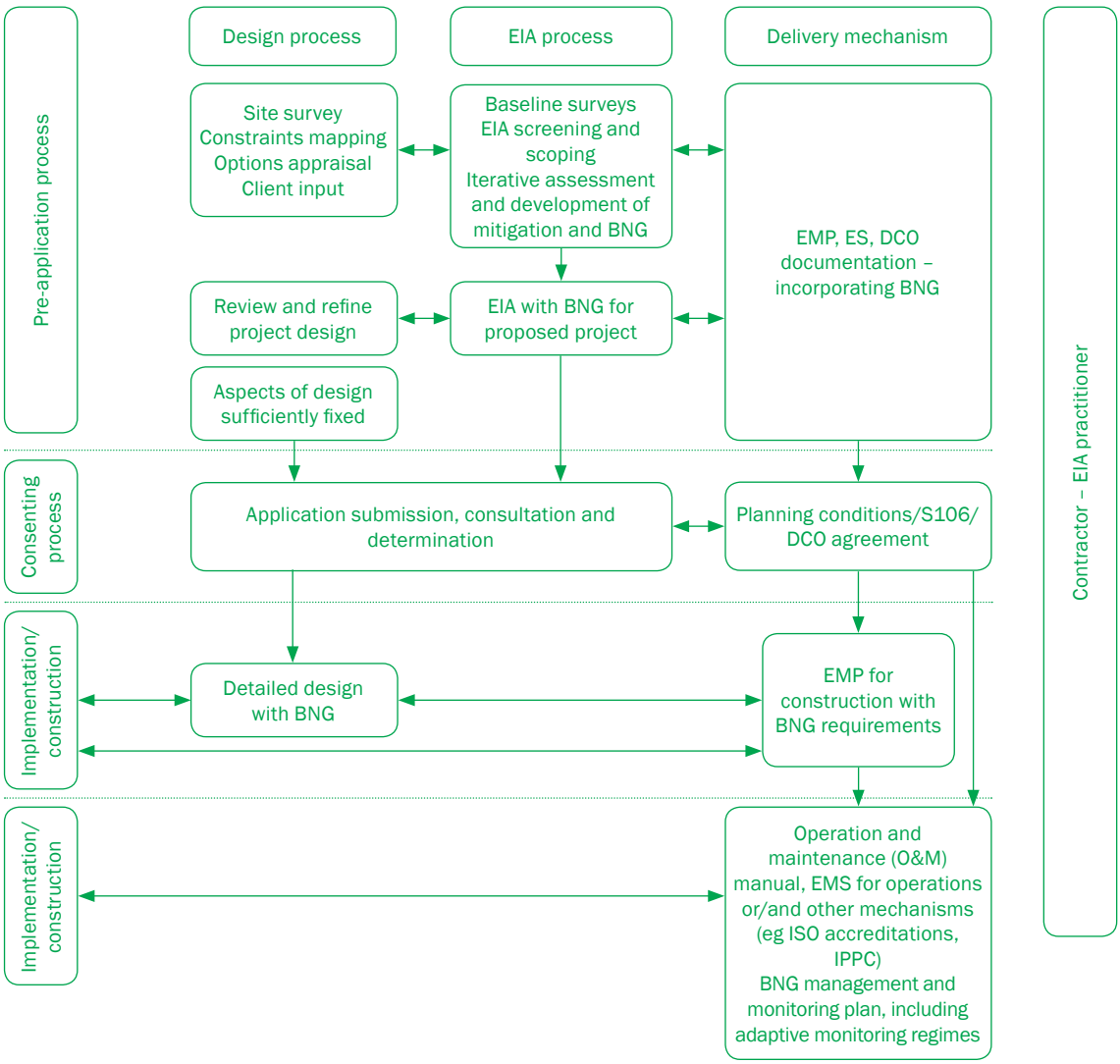

Figure T6.1 The link between design and EIA processes and mechanisms to deliver mitigation and BNG (after Ricketts et al, 2016)

Technical note T7
Aligning biodiversity net gain with EcIAs

Summary

Developments involving ecological impact assessments (EcIAs) or preliminary ecological assessments (PEAs) will already be undertaking activities in this guide. The process of undertaking these ecological assessments underpins the planning, designing, implementing and maintaining of BNG. These synergies are identified throughout the guide and summarised in this technical note with reference to CIEEM's guidelines.

T7.1 THE MITIGATION HIERARCHY

Principles of the mitigation hierarchy underpin an EcIA and are the cornerstone of BNG. **Chapter 1** describes the mitigation hierarchy, which is referenced throughout the guide.

T7.2 TRANSPARENCY

CIEEM (2018) aims to *"promote a scientifically rigorous and transparent approach to Ecological Impact Assessment (EcIA)"*. Transparency throughout the project life cycle, and sharing lessons with stakeholders, is fundamental to applying the good practice principles of BNG.

T7.3 STAKEHOLDER ENGAGEMENT

CIEEM (2018) describes how statutory and non-statutory consultees can provide site-specific, contextual information and expertise to EcIAs. They also state that *"there should also be discussions as early as possible with key stakeholders regarding… objectives for enhancement, including, where appropriate, net gain for biodiversity"*.

This complements BNG, which emphasises inclusivity when designing, implementing, monitoring and maintaining BNG activities.

T7.4 FEASIBILITY AND SCOPING ASSESSMENTS

Ecological scoping assessments, including those undertaken for a project's feasibility study, determine the issues to be covered by the EcIA. They also set out actions for avoiding and minimising impacts on biodiversity, and might involve consultations with stakeholders.

CIEEM (2018) describes how, at the outset of the project, the ecologist *"should explore opportunities for ecological enhancements and net gain of biodiversity as early as possible"*. The guidelines also state that scoping assessments need to confirm potential opportunities for *"ecological enhancement and net gain of biodiversity"* and to *"ensure biodiversity data collected is suitable for potential use in biodiversity metrics for assessment of 'net gain' of biodiversity"*.

This guide builds on this by emphasising, at a project's early stage:

- assessments of how the project's BNG can contribute toward strategic biodiversity priorities to set the direction for the design
- quantitative estimates of biodiversity losses and gains (depending on the information available)
- setting outline resource requirements, programmes and budgets for delivering BNG within core project documents, eg a client's strategic brief or project execution plan
- undertaking (or establishing a plan for) interactions and partnerships with stakeholders
- include BNG when setting terms of reference for EcIA (see **Technical note T4**).

T7.5 IMPACT ASSESSMENTS

CIEEM (2018) describes how to establish a site's baseline, assess impacts and apply the mitigation hierarchy. These activities underpin designs for BNG, especially:

- **Qualitative baseline assessments**

  These are to clarify how BNG improves the quality or extent of biodiversity features affected by a project, and how these improvements contribute towards strategic priorities for biodiversity.

- **Quantitative baseline assessments**

  These are to measure BNG in comparison with the baseline, while taking a precautionary approach when information is limited and excluding irreplaceable biodiversity and statutory protected sites (while documenting the approach to record these features).

- **All ecological features**

  The EcIA process can involve scoping out ecological features, from a detailed assessment, that are *"sufficiently widespread, unthreatened and resilient to project impacts and will remain viable and sustainable."* (CIEEM, 2018). But it does emphasise safeguarding biodiversity in its entirety. For BNG, this means retaining sufficient information on features scoped out of a detailed assessment to include them in a BNG design.

- **Assessing negative effects**

  An EcIA includes a project's negative effects on ecosystems, ecological functions, habitats, species populations and individuals. A BNG design should describe and, where possible quantify, how and over what timescales these effects are addressed.

- **Measuring negative effects**

  All potential negative effects of a project on ecological features should be quantified, including direct and indirect effects, temporary, permanent and cumulative.

T7.6 DESIGN

CIEEM (2018) states *"it is important that… projects produce a net gain for biodiversity and nature conservation… enhancement of biodiversity should be an objective of all projects."* It also states *"enhancement measures should be designed to deliver biodiversity objectives that are specified in relevant policy documents, and evidence should be provided to support the likelihood of delivering the predicted benefit."*

This guide builds on all of this. It highlights how net gains improve the quality or extent of biodiversity affected by a project (ie no 'trading down') in ways that contribute towards strategic priorities. It clarifies that designs are predictions, whereas data from the construction and maintenance stages is needed to claim achievements in BNG, and emphasises that outcomes should be measurable and should be those that would otherwise not occur.

T7.7 CONSTRUCTION

CIEEM (2018) describes how to meet a project's ecological requirements during the construction stage. This guide illustrates the importance of implementing BNG designs early, to remove or minimise time-lags between losses and gains, to seek additional opportunities to avoid and minimise losses of biodiversity and enhance biodiversity and to collect data on implementation to be able to demonstrate BNG achievements.

T7.8 MAINTENANCE AND MONITORING

CIEEM (2018) describes how details of a project's ecological requirements should be incorporated into an ecological management plan. They also set out the monitoring required for mitigation, compensation and enhancement measures. Such ecological requirements can also be documented within an EIA environmental management plan, as outlined in Ricketts *et al* (2017).

BNG highlights the importance of employing adaptive management given the long timeframes of maintaining and monitoring the BNG activities and of sharing the monitoring results and learning about adopting the good practice principles for development that achieves net gains in biodiversity.

Technical note T8
Aligning biodiversity net gain with BREEAM assessments

Summary

This technical note provides information on how BNG can be considered within the BREEAM schemes. It highlights how both BNG and a BREEAM accreditation could be pursued in a co-ordinated way to prevent unnecessary duplication. This technical note will help developers and consultants who are seeking a BREEAM accreditation, as well as designing the project to achieve BNGs. As BREEAM and CEEQUAL are part of the same accreditation system, reference here to BREEAM is inclusive of both methods.

Note that the new BREEAM guidance on its ecological calculator refers to the BNG good practice principles (Baker, 2016), which should be the first reference point for projects seeking BNG.

This technical note applies to both the current and earlier BREEAM schemes.

T8.1 WHAT IS BREEAM?

The Building Research Establishment (BRE) developed the Building Research Establishment Environmental Assessment Method (BREEAM) in 1990 to enable the sustainability value of development to be recognised and rewarded. A number of schemes are in place for different development types.

T8.2 WHAT IS THE BREEAM SCHEME?

BREEAM schemes assess, promote and then reward projects with accreditation for environmental, social and economic sustainability through the built environment. BREEAM is a recognised and independent accreditation. It is a voluntary process with continuous performance improvement that goes beyond current regulation. Good practice is rewarded by applying methodologies for achieving set requirements.

T8.3 DOES BREEAM INCLUDE BIODIVERSITY NET GAIN?

BREEAM schemes include accreditation for biodiversity enhancement. The current approach for assessing biodiversity across the BREEAM schemes is referred to as the BREEAM strategic ecology framework (SEF) (BRE, 2016a). This includes specific consideration of BNG. It has been designed with input from an advisory group of external experts to reflect current good practice.

T8.4 WHAT DOES THE BREEAM SEF SAY?

The SEF sets out how to evaluate ecological impacts and enhancements throughout the various BREEAM schemes. This is based on four assessment issues, which are:

- understanding and identifying the ecological risks and opportunities for the site
- managing negative impacts on ecology for the site
- enhancing ecological value
- long-term management and maintenance of biodiversity.

The SEF explains how suitably-qualified ecologists should gather evidence to demonstrate compliance. Where small-scale, low-risk development criteria can be met, the assessment can be undertaken without an ecologist.

The SEF promotes the use of the BREEAM ecological calculator (BREEAM, CEEQUAL, HQM, 2018) to measure change in ecological value for the development site, before and after the development. This biodiversity metric has been developed specifically for BREEAM application. Credits are gained by demonstrating the use of the calculator and showing an increase in ecological value. Achieving these credits requires a suitably-qualified ecologist.

Note that the BREEAM assessment structure is based on providing evidence to demonstrate compliance with the criteria for which credits are being sought. The BREEAM methodology for using its ecological calculator explains how designing and demonstrating BNG and securing the long-term management of biodiversity features through development can lead to the acquisition of BREEAM credits.

T8.5 SECURING BREEAM AND DEMONSTRATE BIODIVERSITY NET GAIN WITH MINIMUM DUPLICATION

First, use a biodiversity metric. Quantifying losses and gains is fundamental to BNG. Projects seeking BREEAM accreditation will be likely to use the BREEAM ecological calculator (BREEAM, CEEQUAL, HQM, 2018) as part of a submission to demonstrate BNG – duplication can be avoided by using the same metric.

Second, any submission for BNG using the BREEAM ecological calculator should use this guide to demonstrate conformity with meeting the good practice principles.

There are many other synergies between the BREEAM assessment within the ecology category and this guide. Reviewing the information and evidence gathering for both the BREEAM assessment requirements and BNG good practice principles can help to avoid duplication of work.

In addition, the following can help to align BREEAM and BNG:

- Establish and quantify the ecological baseline of the site and its associated areas.
- Follow the mitigation hierarchy, seeking to avoid impacts first.
- Establish the biodiversity opportunities for the project, identifying the risks that may impede the achievement of BNGs.
- Set appropriate biodiversity aims and outcomes.
- Use a biodiversity metric/calculator, informed by data collected on site in relation to habitat type, condition and area (or linear metres).
- Secure achievement of targets with ongoing management that delivers the intended outcomes.
- Establish a project-wide BNG claim only where any impacts on statutory designated sites or irreplaceable habitats are avoided. Where such impacts cannot be avoided, record biodiversity gains specifically for habitats that are not deemed to be irreplaceable or form part of a designated site (see **Technical note T3**).

T8.6 WHAT DOES BREEAM DEFINE AS BIODIVERSITY NET GAIN?

The new ecological calculator for BREEAM schemes (BREEAM, CEEQUAL, HQM, 2018) is based on the Defra biodiversity metric. It quantifies a project's biodiversity outcomes as:

Biodiversity outcomes	Compared with the baseline, post-development biodiversity units
Minimising loss	75–94%
NNL for the habitats assessment	95–104%
Net gain for the habitats assessed	105–109%
Significant net gain	110% or above

Technical note T9
Choosing biodiversity metrics

Summary

This technical note provides points and questions that should be considered when selecting methods to measure biodiversity. Questions are raised regarding the scope and targets of the project, how the method will be used and to what extent data is needed.

Advice for local planning authorities

Local planning authorities who specify a biodiversity metric should ensure that the metric is used consistently and to the same standards for all relevant development proposals.

Several methods of measuring biodiversity are available. These include ecological calculators, national-level indicators and biodiversity metrics. Good practice is to select a method that is widely regarded as credible and robust, and to be transparent when using it. When selecting a method, consider the following:

- Does the LPA or commissioning agency already specify a method to measure biodiversity?
- Which method is best suited to the target feature(s) of BNG? For example, does the metric account for urban GI features such as green roofs?
- Which method is best suited to the scope of the development project and its potential effect on biodiversity (see **Table T9.1**)?
- How is the method to be used, for example:
  - as an accounting tool to measure all losses and gains of biodiversity on a single project for the whole mitigation hierarchy
  - strategically to plan BNG across an estate or an administrative area, or for a portfolio of projects within one region
  - to determine biodiversity offset requirements and the delivery of these.
- What data does the method require? Particularly as the method should be used to measure a project's biodiversity baseline, predicted losses and gains at the design stage, and actual losses and gains during project construction and during the maintenance stage of BNG.
- Has the data already been collected, or are additional surveys required at each project life cycle stage?
- Can data from remote-sensing techniques or desk-based studies be used, for example for large-scale sites?
- If additional surveys are required, can these easily be included as part of existing surveys? What are the time and budget implications for each project life cycle stage?
- What skills and expertise are needed to collect the data and to use the tool?
- Are those skills and expertise available at each project life cycle stage?
- Are there seasonal constraints affecting data collection?
- Can the metric account for all impacts on biodiversity such as indirect impacts?

The statutory nature conservation advisor and LPA should be consulted to check that the selected method is suitable for measuring the baseline and also any ongoing change, for example before and after the construction of a new build as well as during the monitoring stage.

It can be beneficial to select the method as early as possible, to plan and budget for its data collection, especially for any new data required. For example, Defra's metric requires surveyors to assess habitat condition, which is not typically undertaken for EcIA surveys. There might also be specific resource requirements or any seasonal constraints affecting when information should be collected.

When using a biodiversity metric, remember that achieving BNG is not simply about demonstrating more biodiversity 'numbers' after a project than before. This approach to BNG is not an accounting tool whereby development has more biodiversity 'numbers' at the end of a project than it started with.

BNG is development that implements all of the good practice principles in combination throughout a project life cycle.

Also a BNG design is based on a qualitative assessment of the biodiversity affected by a project so that the net gains are commensurable, proportionate and make a contribution towards strategic priorities. This qualitative assessment is accompanied by a quantitative assessment (eg using Defra's metric).

Table T9.1 Factors to consider when selecting a method to measure biodiversity

Sites with limited potential impact on biodiversity and/or no involvement by an ecological expert	Sites with moderate to high biodiversity value including potential for wildlife use now or in the future and/or involving an ecological expert	Estates or assets with ongoing biodiversity monitoring
Check whether there are any requirements for developments of a certain size to deliver BNG (and there is an associated method to measure biodiversity?). See Technical note T2.	Consider tools that use data already collected by the ecologist (eg can Phase One habitat surveys or the UK Habitat Classification[1] be used with Defra's biodiversity metric?). If additional data is required, include this as part of planned surveys (eg assessing the condition of habitats when undertaking a Phase One survey or using the UK Habitat Classification survey in order to apply Defra's metric).	Consider using data already collected (eg by a landscape manager). Or published indicators (eg Defra's biodiversity indicators) or land cover maps (eg from the Centre of Hydrology and Ecology) where these provide sufficient details to detect change. Or tools that use data already collected or require minimal additional surveys.

Note

1 UK Habitat Classification: **http://ecountability.co.uk/ukhabworkinggroup-ukhab/**

Technical note T10 Communicating biodiversity net gain

Summary

In this technical note, the key steps of communicating BNG are reviewed, these include:

- approach
- scope
- quantifiable evidence demonstrating net gains
- irreplaceable habitats and statutory designated sites
- mitigation hierarchy
- reference scenario
- measuring BNG
- describing biosdiversity
- additionality
- timescales
- prediction/achievement transparency.

This technical note also suggests what should be communicated throughout each stage of a project life cycle, and discusses the role of biodiversity offsets as part of the mitigation hierarchy.

The good practice principles include *"be transparent: communicate all net gain activities in a timely and transparent manner, sharing the learning with all stakeholders"*.

This technical note gives outline advice on communicating BNG activities. It is for any organisation implementing BNG activities including LPAs, statutory advisors, NGOs and commercial organisations.

This is only outline advice, as communicating BNG activities, especially claiming achievements in BNG, is a complex topic. As practice emerges in the UK, detailed advice on communication and claims is anticipated to be developed.

Box T10.1 contains references with advice on making 'green' claims. As well as these, key aspects when communicating BNG include the following:

- **Approach.** The approach to BNG in this guide is not simply outweighing losses of biodiversity with gains. It is development projects that implement all of the good practice principles on BNG in combination throughout a project life cycle. When following this guide, organisations should clarify (and demonstrate) their approach to BNG, especially to avoid being mistaken as a project that only uses biodiversity metrics to measure losses and gains (which is not BNG).
- **Scope.** **Chapter 6** gives advice on setting the scope of BNG, for example adopting a phased approach that starts with direct impacts on biodiversity from a project's construction stage, to progress to a more comprehensive approach that includes indirect impacts, a project's operational stage and its supply chain. Clarifying the scope of BNG is essential when communicating BNG activities, especially to be transparent and avoid reputational risks.
- **Quantifiable evidence demonstrating of measurable net gains.** Designs are usually predictions of BNG outcomes, as no activities have yet been undertaken. Communications on actual achievements in BNG require quantifiable evidence that demonstrates measurable net gains in biodiversity – such evidence is usually monitoring data over a timeframe that is commensurable with the specific biodiversity features of the net gain design.
- **Irreplaceable habitats and statutory designated sites.** This guide is clear that losses of irreplaceable habitats or statutory designated sites cannot be offset to achieve BNG. See **Technical note T3**.
- **Mitigation hierarchy.** Evidence should be presented on application of each stage of the mitigation hierarchy and on measures to achieve biodiversity gains or net gain throughout the mitigation hierarchy, not just at the end.

- **Reference scenario.** BNG is an outcome compared to a reference scenario. Defining and justifying the reference scenario is critical because it influences whether BNG can be achieved. For construction projects, the reference scenario is often the biodiversity baseline that was established as part of an ecological impact assessment. For land under routine maintenance or management regimes, the point in time at which the baseline is established should be justified, especially when works are planned to develop the land for operational purposes.
- **Measuring BNG.** Transparency on the measurement of BNG is fundamental, for example:
  - justifying the selected measurement (eg Defra's biodiversity metric was stipulated by the LPA)
  - applying the same measurement consistently throughout the project life cycle
  - showing the full working, not just giving the resulting final number (eg users of Defra's biodiversity metric should present raw data on habitat condition assessments)
  - measuring losses and gains in individual features, not aggregating all features together for a single summed number
  - accounting for accuracy when measuring losses and gains in biodiversity, for example if a biodiversity metric is too crude to measure change within five per cent, then increases of fiver per cent are not actual gains in biodiversity.
- **Describe all of biodiversity, not just a number.** Technical note T11 explains that, when measuring change in biodiversity, the measures are not absolute values. They are proxies for biodiversity value before and after a development, and might not capture all features affected, such as a vital wildlife corridor within an urban locality. Chapter 11 describes and gives examples of how both qualitative and quantitative assessments should be used when designing BNG. The qualitative aspects of BNG should be clearly communicated alongside a quantitative assessment, especially to demonstrate that the net gains are commensurable with biodiversity affected by the development (or biodiversity within or surrounding a development if there are no negative effects).
- **Additionality.** Good practice is that net gains in biodiversity are additional outcomes to those that would happen anyway. Demonstrating this additionality principle is fundamental to communicating BNG activities.
- **Timescales.** The good practice principles include a "*sustained net gain over the longest possible timeframe… at least for the lifetime of the development (eg often 25 to 30 years) with the objective of net gain management continuing in the future*". Organisations should clarify the timescales over which BNG has been designed for, and is being implemented, maintained and funded. They should also clarify efforts made for BNG activities to continue in the future.
- **Transparency on predictions or actual achievements.** When communicating about BNG, it is vital to be clear and transparent on the difference between a designed BNG project (which, if implemented, is predicted to achieve BNG) and actual delivery of BNG (which in some cases will be many years in the future). This clarity is important to meet the transparency principle in Baker (2016).

  When a project affects irreplaceable habitats or statutory designated sites, being transparent in communications about net gains in other habitats is required to follow good practice. A transparent approach is to always include reference to the fact that a project wide BNG claim is not possible. For example "Although the development overall cannot achieve biodiversity net gain (BNG) due to impacts upon irreplaceable habitats, remaining habitats and species (list as appropriate…) have separately been assessed and a net gain assessment approach is being followed for those specific features"

Chapter 6 gives advice on planning communications on BNG. This includes being clear whether you are communicating predicted or actual achievements, which often depends on the life cycle stage of a project (see Table T10.1).

Table T10.1 Communicating biodiversity net gain achievements during the project life cycle

Project life cycle stage	Predicted or actual biodiversity net gain	What to communicate
Design	Predicted	Predicted BNG outcomes from a project over a set timeframe.
Project construction	Actual	Confirmation of the actual project footprint and of the BNG activities undertaken.
	Predicted	An updated prediction of the project's BNG outcomes, eg if there were changes from the design stage.
Maintenance and monitoring of BNG	Actual	Confirmation on maintenance activities undertaken.
	Predicted	Updated predictions of the project's BNG outcomes.
	Actual	Confirmation of the BNG outcomes, eg monitoring shows incremental achievements in BNG over a 30-year period.

- **Monitoring.** Chapter 13 provides advice on undertaking monitoring that feeds into adaptive management regimes and assesses progress towards (and demonstrates achievement in) BNG. Data from monitoring surveys is essential for communicating BNG activities and actual achievements.
- **Contribution.** Good practice is for BNG activities to contribute towards local and strategic priorities for biodiversity. Communications of BNG should demonstrate this contribution.
- **Quality assurance.** Good practice is to audit BNG activities, especially to check whether the good practice principles have been followed and validate communications on both predictions and actual achievements in BNG. Audits can be undertaken by internal or external assessors, Chapter 8 gives advice on this.
- **Act on concerns if offsetting losses of biodiversity with gains elsewhere (as the last stage of the mitigation hierarchy).** CIEEM (2018) describes biodiversity offsets as *"a form of compensation which may be considered when a development is expected to have significant residual impacts on biodiversity despite planned mitigation measures. Biodiversity offsets have a formal requirement for measurable outcomes. The main requirement is to quantify losses (through effects) and gains (through offsets) using the same metric."*

  Biodiversity offsets potentially offer better outcomes for biodiversity than 'business as usual'. For example, the IUCN (2015) report on technical conditions for positive outcomes from biodiversity offsets shows that offsetting outcomes would be most improved through *"integration of societal biodiversity conservation goals, greater adherence to the mitigation hierarchy and better implementation"*.

  However, biodiversity offsets have been criticised for allowing damaging development that would have otherwise been prevented, becoming a 'licence to trash'. The Lawton report described how biodiversity offsetting, if poorly implemented, could streamline destruction of native habitats (Lawton, 2010). Also, Defra (2016) provides guidance on how to make a green claim:

  The good practice principles were developed to safeguard against this important risk. They provide a framework for development projects to improve the UK's biodiversity. In addition to applying the good practice principles and following this guidance, understanding and acting on people's distrust of biodiversity offsetting is essential, and Box T10.1 contains advice on how to do so.

Box T10.1
Addressing concerns about biodiversity offsets

Selling nature is damaging: putting a market price on habitat invites developers to destroy it, using the 'excuse' that they are creating new habitat elsewhere.

Action: apply the mitigation hierarchy rigorously without shortcutting to offsets.

Offsetting fails to recognise the complexity of biodiversity: often biodiversity cannot simply be re-created, and irreplaceable habitats will be lost.

Action: apply the mitigation hierarchy, design BNG for individual features (do not sum all features into a single number) and do not apply BNG to irreplaceable habitats or statutory designated sites.

Biodiversity is lost before the offset becomes fully established.

Action: implement BNG activities as early as possible, even if only some of the activities, to avoid then minimise the time-lag between losses and net gains.

Offsets result in less, and less-connected, habitat overall despite metrics showing BNG (it is not enough to confine biodiversity to 'hotspots').

Action: design offsets that deliver Lawton's principles of making wildlife sites bigger, better and better joined.

The replacement habitat is far away, so does not compensate the local loss.

Action: check whether delivering net gains in biodiversity locally is the priority.

A newly-planted habitat cannot replace a mature ecosystem.

Action: safeguard against affecting such habitat by applying the mitigation hierarchy. Then if, despite applying the mitigation hierarchy, mature habitats are affected, design the offsets to generate long-term and meaningful benefits for biodiversity, eg delivering Lawton's principles.

Without long-term funding or management, offsets will fail (and the developer will be long gone).

Action: include and explain plans and resources to maintain the BNG in the long term. Provide for certainty in long-term delivery through planning legal agreements and legal agreements with offset providers. Provide transparency over management plans for the offset.

Developers will skip to offsets, and shortcut the mitigation hierarchy.

Action: be rigorous and transparent in applying the mitigation hierarchy, and engage with stakeholders early.

Developers will use metrics to make offsetting less onerous.

Action: engage stakeholders early, be transparent, and demonstrably follow good practice.

Technical note T11 Biodiversity net gain, natural capital and ecosystem services

Summary

This technical note defines ecosystem services and natural capital, sets out the relationship between them and BNG. It highlights key issues when undertaking a BNG assessment alongside an assessment of natural capital or ecosystem services.

T11.1 WHAT ARE NATURAL CAPITAL AND ECOSYSTEM SERVICES?

Natural capital is the earth's stock of renewable and non-renewable natural resources (eg plants, animals, air, water, soils and minerals). Natural capital is one of several forms of capital that contribute to the quality of people's lives. Others include manufactured, social and human capital. Natural capital underpins the other capitals by providing essential resources and ecological functions, which enable societies to thrive and prosper. Successful sustainable development depends on maintaining the balance between all forms of capital.

Ecosystem services flow from natural capital. These are often split into four categories:

- Provisioning services include products such as food, fibre, fuel, genetic resources, bio-chemicals, natural medicines, pharmaceuticals, water and building materials.
- Regulating services include air quality maintenance, climate regulation, water regulation and purification, erosion control, waste treatment, regulation diseases, pollination and protection from extreme weather and climatic events.
- Cultural services are the non-material benefits obtained from ecosystems, including spiritual enrichment, cognitive development, reflection, recreation and aesthetic experiences. Biodiversity also provides a cultural service directly through people's enjoyment of watching wildlife.
- Supporting services are necessary for all other ecosystem services. Their impacts on people are indirect, or occur over a long time period. Supporting services include soil formation and the cycling of water and nutrients. Some services, such as erosion control, are both a supporting and regulating service (depending on the timescale and immediacy of their impact).

One way to think about the services and benefits provided by natural capital is set out in **Figure T11.1**. This describes natural capital as the stocks, the ecosystem services flowing from these stocks and the benefits to society as the outputs.

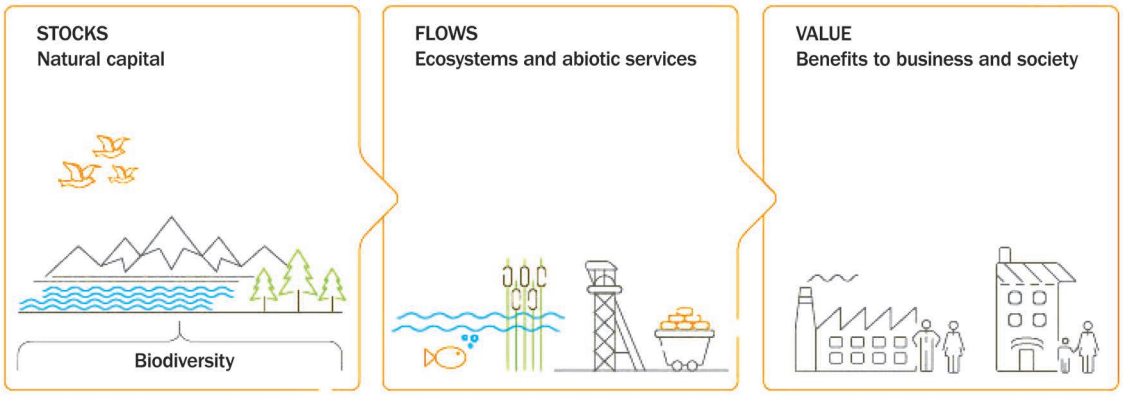

Figure T11.1 Benefits to business and society derived from natural capital as described in the natural capital protocol (from NCC, 2016)

Natural capital assessments can be used to better understand the relationship between the environment and human wellbeing. Applying a value to the environment allows it to be incorporated into decision making. This value can be represented in various ways, for example a reduction in flood risk or an increase in pollination levels. These values can also be understood in terms of effects on human health and wellbeing. Sometimes, but not always, they can be converted into monetary values. Maintaining and investing in natural capital stocks (or assets) is essential in order to continue to receive the benefits from our environment now and into the future. Hence, it is important that assessments take account of the stocks of natural capital as well as the flows.

Note that EIA practice identifies issues that are covered within some ecosystem services (eg effects on habitats, landscape and cultural heritage). However, it does not regularly cover all relevant services and normally focuses on the potential impacts rather than opportunities. Including ecosystem services will help EIA practice provide greater integration and understanding of the value of the environment (IEMA, 2012).

T11.2 WHAT IS THE RELATIONSHIP BETWEEN ECOSYSTEM SERVICES AND BIODIVERSITY?

Biodiversity constitutes the living component of natural capital. It underpins and generates ecosystem services as well as having value in and of itself. Maintaining biodiversity is important for maintaining the scale and resilience of ecosystem service delivery.

As a result there are synergies in managing for, and investing in, biodiversity and natural capital and the related ecosystem services as follows:

- Biodiversity is an essential part of what makes up the ecosystems that provide 'supporting' services. For example, living organisms enable soil formation, water and nutrient cycling.
- Biodiversity contributes to 'regulating' services, such as air and water purification, and to 'provisioning' services through, for example, pollination of our food crops.
- In addition, biodiversity is a 'cultural' service and provides, for example, recreation. Areas with higher levels of biodiversity have been shown to provide more services for people.

T11.3 NATURAL CAPITAL AND ECOSYSTEM SERVICES ASSESSMENTS, AND BIODIVERSITY NET GAIN

The way that natural capital and ecosystem services are assessed, and how these concepts are applied, is developing rapidly. Assessments of natural capital and ecosystem services often do not value biodiversity in monetary terms, as this can be complex and controversial.

Synergies between these assessments include the following:

- BNG and ecosystem services assessments often use similar data, such as habitat types and extent.
- The good practice principles for BNG include *"prioritise BNG and, where possible, optimise the wider environmental benefits for a sustainable society and economy."* Assessing benefits from natural capital will help meet this principle.
- Assessments of ecosystem services and natural capital are often used to value change in response to a specific action (or inaction). BNG assessments also measure change – in biodiversity.
- Biodiversity is a component of natural capital, so a biodiversity assessment could form part of a natural capital assessment and valuation.

T11.4 WHAT ISSUES ARE IMPORTANT TO BE AWARE OF?

When assessing natural capital or ecosystem services and BNG, issues to be aware of and how to overcome them include the following:

- **Double counting and partial valuation.** Because biodiversity underpins ecosystem services, some of the contribution that biodiversity makes to these services will be captured by a natural capital or an ecosystem service assessment. If an additional assessment to capture the value of biodiversity is undertaken and the two assessments are combined, it will result in double counting of the value of the biodiversity and the benefits provided by it. Care needs to be taken when deciding what to measure and value.

  Equally, natural capital or ecosystem service assessments only cover part of the value provided by the biodiversity. The values ascribed are specific to situations and markets and should not be the only input into long-term planning. As a result, it is important to be explicit about the extent to which biodiversity is covered in any natural capital or ecosystem service assessment and to focus any additional assessments on complementary components of biodiversity. One way to address this risk is to engage an environmental economist.
- **Missed values.** Many biodiversity values can be missed in natural capital and ecosystem service assessments, such as the health and wellbeing benefits gained from green space. This can be avoided by focusing on biodiversity as the asset that generates benefits, rather than the flows of benefits themselves. Approaches to incorporating biodiversity values into a natural capital assessment are emerging. In the meantime, being explicit about the extent to which biodiversity is covered, or not, in valuations is critical, as well as engaging relevant experts in the assessment.
- **Value of biodiversity.** The value of biodiversity that can be measured and monetised through economic valuation techniques is often a small subset of the total value. For example, when adopting BNG as a goal, the monetary cost of delivering BNG does not represent the value of the biodiversity to society.
- **Additionality and attribution.** Good practice for BNG includes achieving nature conservation outcomes that demonstrably exceed existing obligations (ie do not deliver something that would occur anyway). This equally applies when delivering wider benefits from natural capital or ecosystem services alongside BNG.

  Multiple benefits can be gained from one area of land. For example, when planting a tree, there are many benefits that this tree will provide such as carbon storage, cooling and shade as well as gains in biodiversity. Selling these benefits as a single group is sometimes called 'bundling'. Selling them separately is also possible as long as they are split. This is sometimes called 'true stacking'.

  Unintentional biodiversity benefits from previous actions should not count towards BNG. For example, if tree planting was undertaken to provide carbon sequestration, any biodiversity benefits from the delivery of carbon sequestration cannot be counted towards BNG. When additional actions are undertaken specifically to enhance biodiversity, these activities can be counted towards BNG. This is sometimes called 'stacking'. See von Hase and Cassin (2018) Mace *et al* (2012) and Robertson *et al* (2014).
- **Beneficiaries.** For natural capital, ecosystem service and BNG assessments it is important to consider who the beneficiaries might be. For example, the beneficiaries of carbon storage could be the international community, but the beneficiaries of flood relief may be downstream or upstream of the intervention.
- **Trade-offs.** It is not always the case that improvements to natural capital or ecosystem service flows will result in an increase in biodiversity and vice versa. If ecosystem service flows are unsustainable, natural capital stocks, including biodiversity, will be depleted. A local increase in natural capital could result in a decline in biodiversity which could compromise long-term delivery of ecosystem services at a larger scale. Additionally, management for one particular ecosystem service (such as crop production) can have negative implications for other ecosystem services (such as soil erosion, water regulation etc) and for different groups of beneficiaries. This might result in unacceptable

'winners and losers' when a development results in biodiversity loss and neighbouring communities lose benefits that the biodiversity provided, but the net gains in biodiversity are delivered elsewhere meaning that a different group of people get the benefits. An approach to assessing biodiversity alongside multiple ecosystem services can reveal any trade-offs and support management decisions to minimise negative outcomes and understand who the beneficiaries will be.

- **Valuing change.** When measuring change in biodiversity, the measures used are not absolute values, but are proxies for the relative biodiversity value for the state both before and after the development. The purpose of measuring biodiversity is to consistently identify the relative change to inform considerations about biodiversity net loss, NNL/net gain in the context of a development or other intervention. The output is only a proxy measure of biodiversity comparing two states.

T11.5 CASE STUDIES SUMMARIES

Case studies T11.1 and T11.2 illustrate ecosystem services valuation and natural capital accounting. The full case studies can be found in CIRIA C776b.

Case study T11.1
Medmerry ecosystem services valuation

The wider benefits of flood schemes are often poorly valued within economic appraisals. Valuation in this context refers to an assessment of the importance or significance of a particular service or good. Without an attempt to value such services in monetary terms, the value can be taken as zero. In the context of economic appraisals for Flood and Coastal Erosion Risk Management (FCERM) projects, this means that the impacts on natural capital and the associated flows of services can typically be under-represented, resulting in benefit–cost ratios that do not include the full range of impacts.

The aim of this study was to value the ecosystem service impacts (both positive and negative) of the scheme, in order to support the 'mainstreaming' of ecosystem services and natural capital assessments within FCERM.

The original business case identified the economic benefits of flood protection, estimated as £78.2m in present value (PV) terms over 100 years. The original business case for the scheme also estimated a PV of £13.5m over 100 years for other environmental benefits. In the new study, Atkins undertook an in-depth value transfer study of the scheme. This approach estimated the value of ecosystem service impacts of the scheme other than flood protection to be £2.95m per year, with a PV of £89.7m over 100 years. The study demonstrated that the standard business case had significantly underestimated the wider environmental benefits.

Innovative approaches were developed to value the key ecosystem costs and benefits of the scheme. The majority of the benefits relate to existence or non-use values from the provision of new, varied coastal habitats, now managed as an RSPB reserve, which represented a significant net biodiversity gain compared to the low-lying farmland that previously characterised the site. The scheme also provided new opportunities for nature-based recreation and tourism. These findings are in line with other ecosystem service valuation studies, which have indicated that cultural services often provide the largest proportion of benefits.

For further information, see Case study 2, C776b.

Case study T11.2
No net loss of biodiversity in corporate natural capital accounting

Forest Trends, working with the Economics For the Environment Consultancy (eftec) developed and piloted a method for integrating best practice in no net loss or net gain for biodiversity (including offsetting in line with the BBOP handbook), into the corporate natural capital accounting (CNCA) framework. This approach aims to enable a biodiversity metric to be displayed alongside monetary values on a natural capital balance sheet, helping companies to demonstrate credible natural capital accounts with respect to biodiversity.

A Balfour Beatty info graphic covering this approach can be found at:
https://www.balfourbeatty.com/media/317050/natural-capital-benefits-of-biodiversity-net-gain-infographic.pdf

Further information on the topic can be found at the following websites:

Ecosystems Knowledge Network: **https://ecosystemsknowledge.net**

Joint Nature Conservation Committee: **http://jncc.defra.gov.uk/default.aspx?page=6382**

Natural Capital Coalition: **http://naturalcapitalcoalition.org/**

Natural Capital Coalition toolkit: **https://www.naturalcapitaltoolkit.org/**

Natural Capital Committee: **https://www.gov.uk/government/groups/natural-capital-committee**

UK National Ecosystem Assessment: **http://uknea.unep-wcmc.org/Resources/tabid/82/Default.aspx**

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Biodiversity is vital to sustain the UK's society and economy. Improving biodiversity is integral to sustainable development, and biodiversity net gain (BNG) is an approach to embed and demonstrate this.

This guide offers practical advice to achieve BNG in the UK's land and freshwater environment. It is based on the UK's good practice principles for BNG and applies to all types and scales of development, at all stages in the life cycle of development. It is relevant to developers and all other stakeholders wishing to promote, facilitate and deliver BNG.

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