

## Viability, valuation and funding of green infrastructure on new development sites



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Preparation of this document on the viability of green infrastructure (GI) has been led by Worcestershire County Council's Strategic Planning and Environmental Policy Team. The document has been endorsed by the **Worcestershire Green Infrastructure Partnership** (GI Partnership). The GI Partnership includes the DEFRA statutory agencies (Environment Agency, Natural England, Forestry Commission), Historic England, local authorities, and voluntary sector organisations including Worcestershire Wildlife Trust.

## **What is green infrastructure?**

**1.1** Green infrastructure (GI) is the planned and managed network of green spaces and natural elements (including rivers, streams, canals, woodlands, street trees, parks, rock exposures and semi-natural greenspaces) that intersperse and connect our cities, towns and villages. GI comprises many different elements including



## **Introduction**

**2.1** Green infrastructure provision can impact on the viability of developments. It can have a positive effect by adding value to the development in the long or short term through, for example, increased sales or rental receipts. However, it can also add to development costs through, for example, the planting of various species, or the lost opportunity value of land dedicated to GI.

**2.2** Assess



**2.9** It is a common perception among developers and businesses that requirements for development sites to protect and enhance biodiversity, protect local landscapes, provide for informal recreation and facilitate sustainable drainage are separate issues, each incurring additional costs. In reality, providing these functions does not mean "doubling up" the costs. By combining these issues together and using a multi-functional approach, developers can reduce their costs, whilst at the same time delivering a high-quality development with a strong sense of place. Applying a green infrastructure approach can be a real money-saving exercise for new developments; well-designed sustainable drainage ditches or ponds can, for

Particular care should be taken to avoid costing various GI assets multiple times for each individual function they fulfil. If a particular GI corridor on a single piece of open land delivers benefits to flood risk management, biodiversity enhancements, landscape, etc. this can all be delivered through the same investment.

**2.12** The following principles have been agreed by the Worcestershire GI Partnership and should be followed by those involved in masterplanning and delivering green infrastructure in the county:

## PRINCIPLES TO ENSURE GI VIABILITY ON DEVELOPMENT SITES

- 1.** Early assessment of the GI assets on the site across all GI functions (biodiversity, landscape, blue infrastructure, historic environment and access & recreation)
- 2.** Early engagement with the bodies responsible for various GI functions
- 3.** Assessment of the potential benefits/value (financial and social) of the GI to establish what types of GI are specifically required
- 4.** Consideration of the long-term management of GI
- 5.** Assessment of the multifunctionality of the GI assets

## Further reading

Worcestershire County Council (2011) Viability of Infrastructure Background Research Paper

Town & Country Planning Association and The Wildlife Trusts (2012) Planning for a healthy environment . good practice guidance for green infrastructure



## Introduction

**2.1** This section explores various approaches to calculating the value of green infrastructure and provides examples of calculation methods. This paper aims to signpost readers to important evidence on valuing green infrastructure nationally and internationally, rather than describing each methodology in detail<sup>2</sup>. The valuation methods included in this paper are a selection of various techniques across different elements of green infrastructure. There may be additional methods which are not covered by this paper.

## Context

**3.1** Valuing green infrastructure allows the quantitative and qualitative benefits of services and functions provided by different elements of green infrastructure to be understood. This applies not only to their wider impact on society, the economy, and the environment, but also

## Valuation techniques

**3.5** There is a wide range of valuation methods relating to different types of green infrastructure. In 2013, Natural England commissioned a report<sup>4</sup> which assessed various valuations available nationally and internationally and advised which techniques are the most robust. This section provides guidance on selecting the most relevant techniques.

### TOTAL ECONOMIC VALUE OF GREEN INFRASTRUCTURE

There is no single method of assessing the value of green infrastructure, but rather a number of methods which can be used, depending on its type and what we are trying to achieve. The complex nature of the GI relationships means that specialist techniques are needed. This can be done by assessing the *total economic value*\* (TEV) of the green investment. Total economic value can include:

*Use value* - relating to current or future uses of a good or service.

Direct use values such as timber (consumptive value) or recreational activities (non-consumptive)

Indirect use values such as flood protection.

*Option value* - associated with retaining the option to use a resource in the future.

*Non-use values derive from:*

Existence value - the knowledge that environmental resources continue to exist

Altruistic value . are available to others to use now

Bequest value . are available for use in the future.

Costs and benefits related to market goods and services are estimated using market prices. For wider social and environmental costs and benefits for which no market price is available, specialised non-market valuation techniques should be applied.

### Green Infrastructure Valuation Toolkit (GIVT)

**3.6** The Green Infrastructure Valuation Toolkit (GIVT) was developed by a consortium of organisations with remits for economic development, place-making and protection of the natural environment, led by *Natural Economy Northwest*. The toolkit provides step-by-step guidance to valuation which includes preparation, assessment and reporting. The guidance is supported with an Excel calculator guiding the user through the process of valuation. The spreadsheet can be accessed on the Natural Economy Northwest website [www.bit.ly/givaluationtoolkit](http://www.bit.ly/givaluationtoolkit).

**3.7** The principle of this valuation technique is '*an ecosystem services approach*'. The ecosystem approach means recognising that regardless of its current main use, any open area of land has the potential to deliver a very wide range of ecosystem services (such as flood management, biodiversity, or recreation) and it is important that the diversity of these services is recognised in policy and decision making.

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<sup>4</sup> Natural England (2013) Green Infrastructure Valuation Tools Assessment, NECR126  
<http://publications.naturalengland.org.uk/publication/6264318517575680>

There may, however, be a limit to the extent to which multifunctionality can be pursued without impairing the delivery of one or more of the services involved. For

### **3. Reporting: Articulating a strong return on investment case**

The scheme was calculated to provide multiple benefits. The total value of the benefits generated by the improvements was estimated to be £53.1 million - £55.8 million (PV). Just over half of this (56%) of this uplift was attributable to the green infrastructure. The



achieving national targets to increase cycling or walking, or to illustrate potential cost consequences of a decline in current levels of cycling or walking.

**3.17** The HEAT calculator can be accessed here <http://www.heatwalkingcycling.org/>.

### **i-Tree Eco**

**3.18** i-Tree is a software suite from the United States Department of Agriculture's Forest Service that provides urban forestry analysis and benefits assessment tools. i-Tree Tools are intended to help communities of all sizes to strengthen their urban forest management and advocacy efforts by quantifying the species, age and size of trees in the community and the ecosystem services that trees provide.

**3.19** i-Tree Eco is one of these tools which provides a broad picture of the entire urban forest. It is designed to identify air pollution and meteorological data to quantify urban forest structure, environmental effects and values to communities.

**3.20** Using this project tool requires installation of the i-Tree Eco software. A series of inventories would need to be undertaken on trees across the project area. The data then would need to be imported into the programme to populate the results. The i-Tree Eco User's Manual contains a step by step guide on the use of the i-Tree software.

**3.21** The i-Tree Eco tool can be found here <http://www.itreetools.org/eco/index.php>.

**2.2** Whilst the i-Tree Eco tool has been presented in this paper as the most comprehensive tool in terms of its green infrastructure focus, flexibility and wide range of benefits covered, it is only one of various tree and woodland valuation tools.

**2.3** Other tools include<sup>6</sup>:

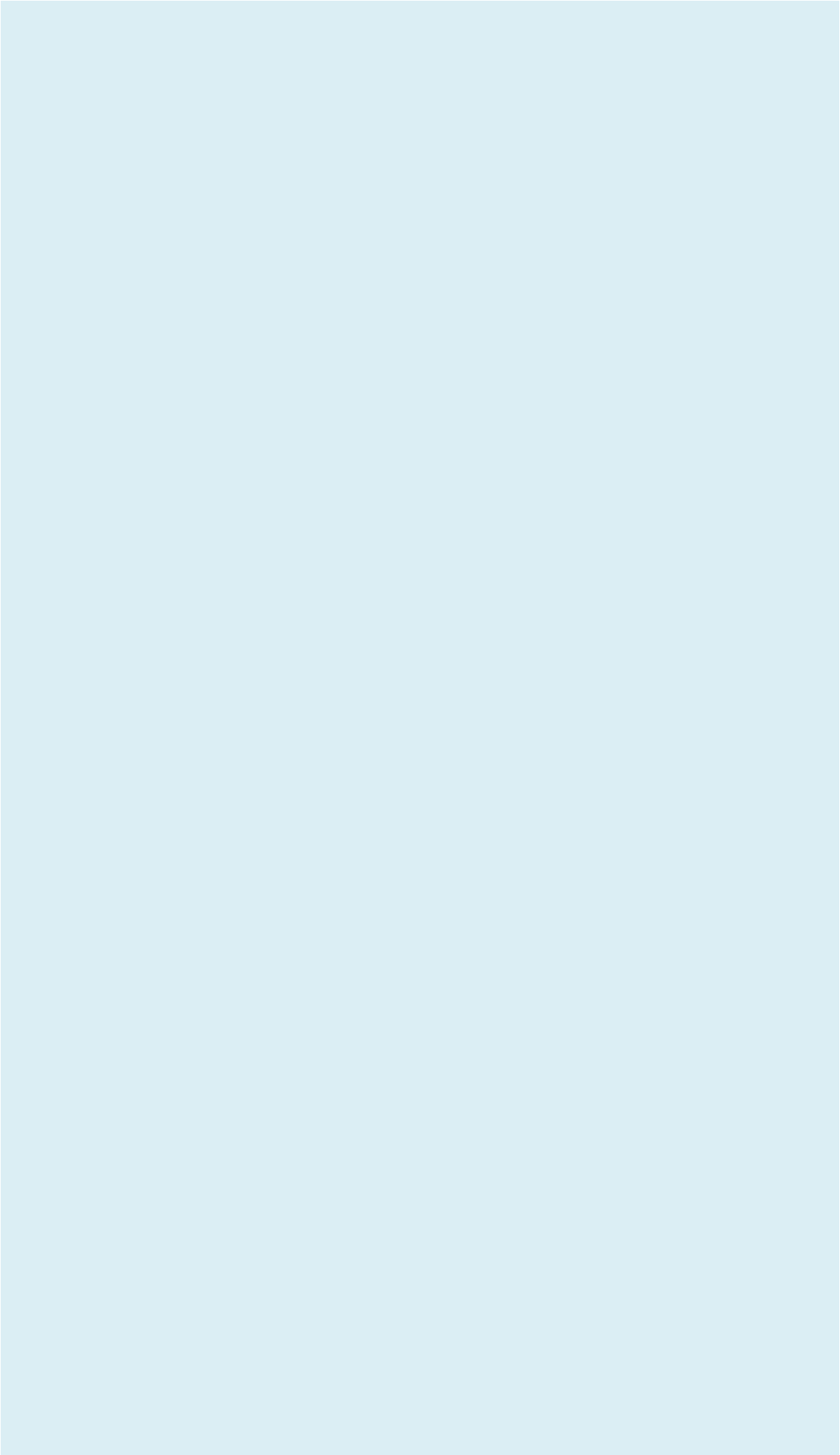
The Helliwell System focuses on visual amenity value. It is based on expert judgment as opposed to high field data collection and entry. It is the most effective for a single tree and small-scale community evaluations. [http://www.forestry.gov.uk/pdf/SERG\\_Street\\_tree\\_valuation\\_systems.pdf/\\$FILE/SERG\\_Street\\_tree\\_valuation\\_systems.pdf](http://www.forestry.gov.uk/pdf/SERG_Street_tree_valuation_systems.pdf/$FILE/SERG_Street_tree_valuation_systems.pdf)

CAVAT (Capital Asset Value for Amenity Trees) . focusing on wider benefits of trees to communities. This tool is simpler to use when only limited data is available. [www.ltoa.org.uk/docs/CAVAT-rev-May2008.pdf](http://www.ltoa.org.uk/docs/CAVAT-rev-May2008.pdf)

The CTLA system uses valuation methods from the Council of Tree and Landscape Appraisers in the United States. <https://www.asca-consultants.org/membersSection/archive/appraisal/pdfokWz8eJI1K.pdf>

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<sup>6</sup> Forest Research (nd) Street tree valuation methods. [http://www.forestry.gov.uk/pdf/SERG\\_Street\\_tree\\_valuation\\_systems.pdf/\\$FILE/SERG\\_Street\\_tree\\_valuation\\_systems.pdf](http://www.forestry.gov.uk/pdf/SERG_Street_tree_valuation_systems.pdf/$FILE/SERG_Street_tree_valuation_systems.pdf)



## Further reading

Natural England (2013) Green Infrastructure . Valuation Tools Assessment,  
NECR126

<http://publications.naturalengland.org.uk/publication/6264318517575680>



# 4. Funding green infrastructure

## Introduction

**4.1** A multitude of green infrastructure proposals will require a range of different funding mechanisms. Green infrastructure needs not only capital investment to successfully deliver schemes, but also long-lasting funding streams to finance long-term management and maintenance of assets. Both capital and revenue funding opportunities are explored in this section.

## Green Infrastructure provision

**4.2** This section covers funding regimes to secure capital investment in GI. On new development sites green infrastructure can be delivered and funded through both:

**Delivery through planning conditions:** In this type of delivery mechanism, the GI is provided and financed by the developer. As part of the planning application process the amount, quality and functionality of green infrastructure is negotiated between the Local Planning Authority (LPA), relevant stakeholders and the developer. The applicant is expected to dedicate a certain amount of the site to green infrastructure networks covering different functions. A phased plan for the landscaping and provision of other GI elements is usually submitted with the planning application. In some instances, following the granting of planning permission, the site is divided into phases and sold to other developers to complete. For the best results an agreement would be in place or strategic GI provided for the whole site. Planning conditions are used to secure the delivery of green infrastructure in accordance with approved plans.

**Developer contributions:** The above mechanism can be combined with (or, exceptionally, wholly replaced by) developer contributions. In particular, this would be relevant to asset management, off-site GI provision, or schemes requiring larger pools of money. Such contributions could be used, for example, for the creation and maintenance of a Sustainable Drainage Scheme. Developer contributions can be used on their own or be matched with other funding sources. There are currently two types of developer contributions which are described in more detail below: **Community Infrastructure Levy** and **Planning Obligations** including **Section 106 contributions**.

**4.3** Both of these funding and delivery mechanisms could be used for the **long-term management and maintenance of assets** which is an integral part of green infrastructure provision. This is described in more detail in the next section of this chapter.

### Delivery through planning conditions

**4.4** Direct on-site delivery of green infrastructure as part of a development is the most cost-effective approach to GI provision. It provides multiple benefits to developers and ensures successful provision of GI networks on a site. It provides:

Cost-efficiencies . retrofitting GI is generally more expensive than upfront provision;

Considered integration - GI needs to be well-considered and integrated with other uses on the site in order to be successful;

Fragmentation prevention . the site design needs to ensure interconnectivity of green corridors on-site and connectivity with wider networks beyond the site; and

**Viability of development:** It can be difficult to secure green infrastructure contributions in the context of all the other infrastructure requirements (including education and transport) and affordable housing requirements sought from development. It is critical that the combined contributions do not make the development unviable.

**S106 tests:** Recent changes to the Community Infrastructure Levy (CIL) Regulations 2010 have limited the situations in which s106 contributions can be used. Legal tests for when a section 106 agreement can be used are set out in Regulation 122 and 123 of the Regulations as amended. The tests are: necessary to make the development acceptable in planning terms; directly related to the development; and fairly and reasonably related in scale and kind to the development.

**Changes to pooling of S106:** From April 2015 no more than five obligations can be pooled together for one project or type of infrastructure (back-dated to April 2010). This means that it might not be possible to fund some more complex and geographically-wider projects through pooled s106 contributions.

- 4.10** Green infrastructure can be also secured through **a Unilateral Undertaking**. Unilateral Undertakings are simplified planning obligations entered into by the landowner and any other party with a legal interest in the development site. They can be made without the involvement of the LPA and can assist in ensuring that planning permissions are granted speedily, which benefits both applicants and LPAs.

### **Community Infrastructure Levy (off-site green infrastructure)**

- 4.11** The Community Infrastructure Levy (CIL) is a mechanism to ensure developer payments for the provision of infrastructure are captured from qualifying new development/refurbishment to support the additional burden new development makes on both local and strategic infrastructure.

- 4.12** Planning authorities are expected to establish CIL rates for different types of development which can vary by geographic area. The rate should be based on viability and economic growth projections for the area. It needs to be set at a level

**4.15** CIL has the potential to help deliver GI, but there are important considerations to be taken into account if this is to happen:

Early cooperation between stakeholders (including statutory agencies, the voluntary sector, county and district councils) with an interest in green infrastructure to **identify and promote the priorities** is crucial. The green infrastructure priorities have to be among other infrastructure projects on the '123 list' in order to get any share of CIL contributions. In the current times of economic pressures and financial austerity there is a risk that infrastructure considered crucial to supporting economic growth will be promoted at the cost of green infrastructure. However, green infrastructure as an alternative to grey infrastructure should be seen as delivering savings, not generating costs. The value of green infrastructure to the economic prosperity of the county should be made clear to ensure that these priorities are considered on the CIL 123 list.

Whilst each CIL Charging Schedule is district-specific and based on the viability and housing market of the district concerned, the spending of CIL requires collaborative working. **Consensus across administrative boundaries** is needed to establish spending priorities amongst various infrastructure strands. This could be a challenging process because of the different needs and pressures faced by the different planning authorities in the county.

**COMMITMENT TO INFRASTRUCTURE LEVEL IN WORCESTERSHIRE**

Currently, none of the local planning authorities in Worcestershire have adopted a CIL Charging Schedule. A CIL Charging Schedule is dependent on an up-to-date, adopted Local Plan being in place. Only Wyre Forest has an adopted Local Plan, while the remaining five district authorities in the county are at different stages of the Local Plan examination process.

In 2012 Worcestershire County Council, in liaison with the six district councils, commissioned consultants to undertake an independent **CIL viability analysis** of the county to provide the evidence required to develop Charging Schedules across Worcestershire. This evidence was published in early 2013.

The three **South Worcestershire authorities** (Malvern Hills, Wychavon and Worcester City) prepared **joint Revised Preliminary DF3 11SI** **arin cheue**

## Management and maintenance of green infrastructure

### Sources of funding

**4.16** The long-term management and maintenance of green infrastructure assets is critical to ensure that green spaces remain in good condition and well-used by communities. To secure this functionality, revenue funding is necessary. This can come from many sources, some of which have already been described in this section. They include:

**Section 106** . some of the money secured through these contributions can be directed to set up a fund or transferred to the local authority or other third party which would take responsibility for long-term maintenance of green infrastructure assets. Such expenditure must be directly linked to the new development covered by the contribution.

**Community Infrastructure Levy** . money secured through this system could contribute to the revenue of large infrastructure schemes,

establishment of an appropriate management body such as a charitable trust to manage the assets can help to ensure effective ongoing management. Revenue from green infrastructure assets could arise from, for example:

- Orchards . fruit or products produced from fruit could be sold
- Biomass energy from woodfuel, coppicing or arboricultural trimmings and grass cuttings
- Willow stands used for craft and forestry products

**4.22** It needs to be noted that the level of income generated from these sources is only ever likely to be small-scale.

### **Further reading**

Town & Country Planning Association and The Wildlife Trusts (2012) Planning for a healthy environment . good practice guidance for green infrastructure  
[http://www.tcpa.org.uk/data/files/TCPA\\_TWT\\_GI-Biodiversity-Guide.pdf](http://www.tcpa.org.uk/data/files/TCPA_TWT_GI-Biodiversity-Guide.pdf)

- 5.1** As identified in the above sections, green infrastructure will differ from site to site according to the type and size of schemes and their cost. For the purpose of this paper, the costs of various green infrastructure solutions have been collated through a literature review and from real-world information provided by stakeholders. However, it needs to be noted that these costs are only indicative and the actual green infrastructure costs of various developments should be considered and valued on a site-by-site basis.
- 5.2** This information has been collated in a spreadsheet which can be found on the Worcestershire County Council website [www.worcestershire.gov.uk/GI](http://www.worcestershire.gov.uk/GI). The extent of this information is limited due to its availability. Once more robust information