UK GBC
Together for a better built environment

Practical how-to guide: Developing and implementing a green infrastructure strategy

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Introduction

Recognising the large role that the built environment sector has to play in Green Infrastructure (GI), the UKGBC delivered a report in February 2015 entitled Demystifying Green Infrastructure. The report focused on defining the benefits of, and the business case for, GI. This 'how-to' guide is a next step and focuses on the practical aspects of how to develop and implement a GI strategy on a project. Built environment professionals working from the neighbourhood scale down to the building scale can benefit from this guidance.

"Green infrastructure (GI) is a catch-all term to describe the network of natural and semi-natural features within and between our villages, towns and cities. These features range in scale, from street trees, green roofs and private gardens through to parks, rivers and woodlands. At the larger scale, wetlands, forests and agricultural land are all captured by the term GI."
Demystifying green infrastructure, UKGBC

Green infrastructure is increasingly considered a fundamental aspect of integrated urban design and can provide important environmental, social and economic benefits.

Well-designed and integrated green infrastructure increases biodiversity, supports wildlife, and enhances climate change resilience. For example, increased tree cover can lower the urban heat island effect in cities whilst the development of Sustainable Urban Drainage Systems (SUDS) can reduce surface water and improve water quality.

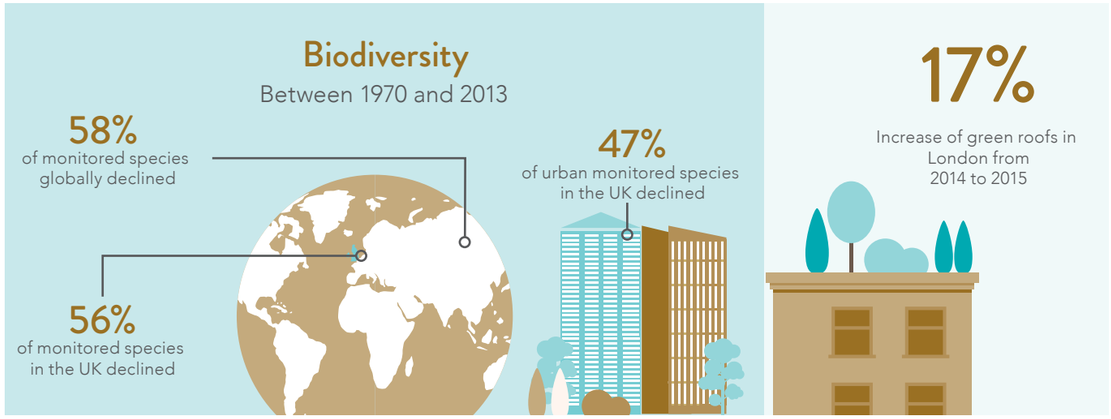
GI can also generate improvements in human health and well being. For example, green spaces can provide opportunities for physical activity, improved social cohesion and can improve mental health. Finally, positive economic returns can be achieved through increased land values, job creation and the development of an environment attractive to inward investment.

As you can see in some of UKGBC's 'State of Sustainability in the UK Built Environment' infographics, there is a particular need to respond to a significant decrease of natural species.

This response is already tangible in trends of installations of green infrastructure, such as green walls and green roofs:

In this 'how-to' guide we will provide some useful insights on practical steps to integrate more and more green infrastructure into projects in our cities.

The guide has been prepared by UKGBC as part of a Natural Environment Research Council (NERC) funded project entitled 'Green Growth: Increasing Resilience in Cities Through the Delivery of Green Infrastructure-Based Solutions'.



UKGBC's 'State of Sustainability in the UK Built Environment' infographics

The project is being led by the Universities of Manchester and Sheffield in partnership with the Manchester Climate Change Agency, Manchester City Council, City of Trees and the Building Design Partnership.

The guide follows a masterclass training event on "Exploring the opportunities of integrating Green Infrastructure into built environment projects" held in Manchester on the 28th of March 2018.

KEY TIPS BEFORE YOU GET STARTED

- Define the business case for GI on your project (note the business case may vary per project or be dependent upon which stakeholder you are talking to). This involves assigning a value to the GI features.
- Put the strategy in place as early as possible in the project, this may end up saving you time and money.
- Understand the policy landscape and the GI frameworks at an international, national and local level.
- Don't forget to value the existing resource that you have to work with.
- Undertake some research on case studies, and learn about what has and hasn't worked before, technically but also in terms of management.
- Size does not matter – GI can be enhanced on any site no matter how small.

Key steps in formulating a GI strategy for your projects and how to embed GI in your organisational strategies

Step 1: Identify stakeholders and collaborative groups

No matter what size your project you will have a wide range of stakeholders you need to engage with to deliver a successful GI strategy; local planning authorities, architects, ecologists, community groups, wildlife trusts, contractors, neighbouring developers to name but a few.

Identifying your stakeholders early on will help you identify those that could have the greatest influence over GI on your project (See Table 1 for a list of possible stakeholders and their key roles).

- Encourage groups that may not usually work together to collaborate such as the Environment Agency and Local Authorities. Partnerships or collaborative working could be the key to delivering a successful GI strategy and creating a lasting legacy that is properly managed throughout its entire lifecycle.
- Assess the issues facing each stakeholder group and form your list of key issues for the project site which will help you identify the priorities and highlight opportunities for you to enhance and create GI.
- Look at existing information and case studies, draw on the past experiences of your stakeholder groups to see what has been done on similar projects. Take the lessons learned and apply this to your thinking throughout the project.

Local Authorities will often have their own green infrastructure strategies for the local area. Check what their strategic GI goals are and how you can link with these to mitigate your projects' environmental impact whilst creating a beautiful and functional place. There may be many ways in which you can address specific needs in the area through your project.

Table 1. List of possible stakeholders and their key role

Stakeholder	Key role
Local Authority	To ensure GI is incorporated into the Local Plan and Infrastructure Development Plan. Can offer insight into surrounding GI and where your project can link up to provide the best benefit to the area.
Developer & planning professionals	To mitigate environmental impact and to not only protect existing GI but to increase it wherever possible.
Client	To clearly articulate the GI strategy and ensure all involved understand their roles and responsibilities on the project.
Landowner	Management and upkeep of GI is essential for it to function properly and deliver long term benefits. Landowners can look to maximise the benefits of GI by adding revenue streams such as renewable energy or food production.
Landscape professional	To advise clients on the value and range of benefits of GI and tailor its provision on projects to maximise the benefits available on site.
Architect	To collaborate with the client and expert advisors to ensure that designs are not only aesthetically pleasing but also incorporate the maximum GI benefits available for the project.
Ecologist	To advise the client/developer on ecological aspects of GI for the project and the impact on ecology/biodiversity that the project may have. To advise how to mitigate impact and also improve biodiversity and ecological value of the site.
Contractor	To collaborate with client and stakeholder groups to understand the possible constraints to their work during the project (e.g. ecological constraints) and the importance of GI on the project. To feedback to the stakeholders on their impact and progress.
Community group	To communicate the needs of the area from a community perspective and to work with the client/ developer/landowner to deliver the best outcome for the community as a whole.
Statutory agencies	Statutory Agencies such as the Environment Agency, Natural England, British Waterways etc. can provide expert advice.
Wildlife trust/Charity	To collaborate with other stakeholders to offer advice and support on the project. Providing local knowledge and supporting the community post project completion.

Step 2: Engage Experts

Bringing in experts in the early stages of the project could save you time and money. In step one you identified the key issues affecting the site, from this you can determine which areas you need to seek expert advice. You will probably need to consult more than one expert.

- Biodiversity and ecology experts can provide an understanding of the site and what already exists there, guiding you through issues such as the protection of species.
- Local Authorities can advise on alignment with strategic policy goals.
- Hydrology/drainage experts will be able to give guidance on areas that are susceptible to flooding or where surface water run off may be increased.
- Design consultants/landscape architects can help you to decide what the best outcome would be for the overall design and development of the site.
- It may be beneficial to bring the experts together for a combined approach to ensure that there are no conflicting actions as there may be different interventions required at different stages of the project.

Step 3: Understand the policy landscape and establish links to planning frameworks

Make sure you have a clear understanding of the policy landscape and any planning frameworks that may affect the project site. What are the key EU, national and local policies? (See Table 2. for an overview of these).

- Check the Local Authority GI strategy to see if there are any areas in which you can tie in with existing plans. Think outside of the box here as there may be underlying social issues of ill health or biodiversity issues involving protected species that improvements in GI of an area can help to address.
- Use the network of stakeholder groups and experts you have built up from steps 1 and 2 to check that you are linking to all available plans in the area to ensure that there are no missed opportunities.

Table 2. Policies, frameworks and guidance for green infrastructure

Level	Policy	Framework	Guidance
EU	Green Infrastructure Strategy 2013 European Convention 2000	Biodiversity 2020	
National	Natural Environment and Rural Communities (NERC) Act 2006 HM Government, 25 Year Environment Plan, 2018	Policy Framework (NPPF), Updated 2018. National Networks National Policy Statement 2014.	2014 Natural Environment White Paper (NEWP) and Updates. Biodiversity 2020: A Strategy for England's Wildlife and Ecosystem Services.
Local	Localism Act 2011. Section 106 Agreements	Local Authority GI Strategy	Green infrastructure guidance – Natural England, 2014 Planning for a Healthy Environment: Good Practice for Green Infrastructure and Biodiversity – Town and Country Planning Association (TCPA).

Step 4: Assessment of existing features on project site

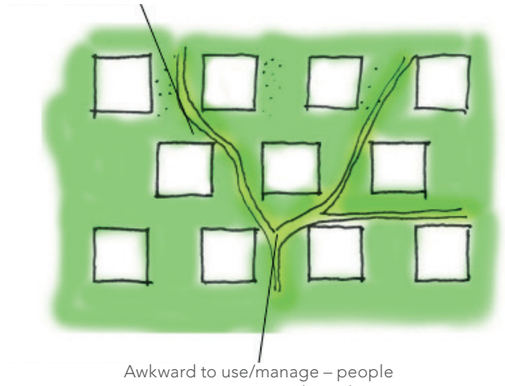
Now that you have an understanding of the plans in place for the area and the overarching policies and frameworks that will affect the project, you can start to assess the site and look for existing GI that can be enhanced and where there may be opportunities to increase GI through new initiatives.

- Identify existing features and characteristics of the site (e.g. through an ecosystem services audit) and considering the findings, plan how current problems could be overcome and how quality could be enhanced.
- Don't limit your assessment to the boundary of the site as you may miss an opportunity to link up to GI just a little further afield that could have a positive impact on your project.
- Careful planning of the placement of buildings can maximise the potential of GI. Looking to the existing features may help to plan this in the most cost effective way.
- Think about GI holistically, it rarely only provides one function. Explore the multi-functionality it can offer. For example, a green roof not only provides a habitat for nature, it also provides thermal benefits for the building, sound proofing, storm water retention etc.
- GI can often be a solution to drainage and flood water issues that can provide protection not only for the site but for the wider community.

Below is an extract from Natural England's Green Infrastructure Guidance showing how a change in placement of buildings can allow for SUDs (Sustainable Urban Drainage Systems) on a site creating useable green space that links permeability.

Few adaptable greenspaces

Greenspace often forms corridors or narrow, afterthought type places – 'spaces left over after planning'

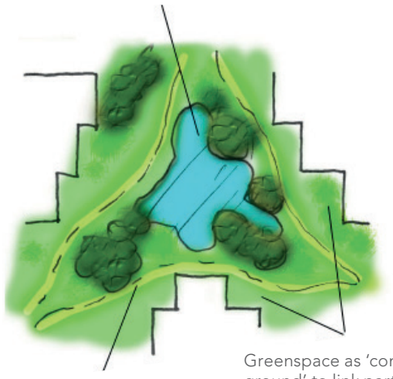


Awkward to use/manage – people initiate own routes or desire lines

Extract from Green Infrastructure Guidance 2014
(Image copywright Natural England)

Fig 1. The 'fitted carpet complex' or 'Spaces Left Over After Planning' – 1970s greenspace planning

Enable planning for SuDS as an integral part of new development (associated opportunities for biodiversity, landscape and sense of place)



Useable greenspace – opportunities for recreation and play with management needs designed in from the outset

Greenspace as 'common ground' to link parts of a development; also permeability

Fig 2. Variation in development layouts (same basic footprint) to provide opportunities for multifunctionality and more meaningful landscape spaces – the green infrastructure approach

Step 5: Develop a green infrastructure plan

Using all of the information you have gathered through steps 1-4 you are now in a position to develop your GI plan.

- Assess local presence of green infrastructure through smart portals such as GIGL (London based green infrastructure map), to understand context and opportunities to create integrated design with the surroundings.
- State what you want to achieve on this project, clearly identifying specifics of your GI design.
- Set clear targets to achieve, you will first need to create a baseline to inform target setting and monitoring. This could be the number of invertebrate species, the biodiversity levels of trees, physical square metres of green space etc. This will help to provide you with a before and after picture to demonstrate impact.
- Create an action plan stating what is to be done, who is responsible/what support you may need and when the action is to be completed. This will mitigate the risk of the strategy becoming diluted as the project moves on.
- Analyse different design options to ascertain where you can add value (See table 3. for some ideas of design approaches for various types of projects).
- Identify the reporting mechanism you will use to keep stakeholders informed of progress. Think about the language you will communicate with. You need to make things clear to stakeholders in a way they can understand.
- Ensure that your plan meets the requirements/addresses the issues you identified in step 1. Re-consult your stakeholder groups to ensure that you will deliver to their expectations, and make improvements to your plan as necessary.

Table 3. Green infrastructure design approaches

Space/project type	Design approach	Business case for GI
Urban areas	Plazas, streets/boulevards, green roofs, green walls etc	Creates better living space for communities, improves air quality, increases health and wellbeing, etc.
Business parks	SUDs, rain water collection, waste water cleansing.	Attractive settings to attract investment, health and wellbeing in the workplace, reducing flood risk and impact of climate change.
Suburban housing	Green spaces for community engagement, outdoor sports, allotments, social interaction.	Increased health and wellbeing, interconnected communities, etc.
Community centres	Green roofs, rain water collection, geothermal heating and cooling.	Healthy living, employment community inclusion.
Parks	Increase habitats, green spaces.	Active recreation, learning and employment opportunities.
Green corridors	Trees, green spaces, cycle routes etc.	Sustainable transport routes, reduction of climate change impact.
Blue corridors	River valleys, waterways, bodies of water	Mitigating urban heat island effect, additional space for wildlife and biodiversity.
Community centres	Green roofs, rain water collection, geothermal heating and cooling.	Healthy living, employment community inclusion.

Step 6: Implement, monitor and manage your GI plan

IMPLEMENT

You now have your GI plan for the project site that has been carefully created through consulting your stakeholders, using expert advice and taking account of the policies and frameworks that are in place that may affect the site.

Identify who will be responsible for the implementation of the GI plan linked to this project and what the checkpoint mechanisms will be. If you are handing over the GI plan to a project manager to implement, ensure they are fully aware of the importance of GI on the project and where they can look to for support throughout project implementation.

MONITOR

As you have set targets within your GI plan, these will need to be monitored and reported on to your stakeholder groups.

Capture the project benefits and provide feedback, look for any areas for improvement where the GI plan can be amended (or inform future plans) for optimum benefits. Think carefully about how to communicate progress.

MANAGE

There is often a misunderstanding that GI can be expensive due to the management legacy once the site has been developed. This is usually due to the fact that a clear management legacy may not have been agreed beforehand. To avoid this it is important that you agree early on who is responsible for the legacy/upkeep once you leave the site whether that be the Local Authority, a trust, a charity or a management company; and ensure costs are clearly identified at the design stage and built into the full project plan.

Make sure that the legacy includes either a management or operation plan that states key actions that need to be taken in the short and long term maintenance of the GI. These plans will need to be reviewed so make sure that this is accounted for in your agreements.

Step 7: Consider a GI strategy at an organisational level

Green infrastructure makes sense on so many levels that it is easy to sell to a company, what is often lacking is why it matters to the organisation and what are the benefits. Once packaged in a way an organisation can understand, it shouldn't be too hard to embed the principles across multiple projects.

- Reinforce the message through internal training – why is GI important to the organisation?
- Find GI champions within the organisation – look for a personal connection e.g. is the finance director a birdwatcher on weekends? Does your CEO secretly like long walks in the countryside? Did your Head of IT do a geography degree first at university? Try and get them onboard to support and champion GI.
- Obtain senior support from the decision makers – Get to know your organisation and how decisions are made, you will need backing from someone senior in the organisation that can support the weight of the checkpoints, policies and procedures.
- Policies and procedures – a great place to start, first look to your sustainability policy and make sure it mentions GI, then work towards a GI policy.
- Project checkpoints – with policies and procedures in place you can set certain checkpoints for projects to ensure they have complied.
- Engage the organisation on progress – communicate successful projects that have achieved a good level of GI, what impact has this had on the people, the environment, the organisation? What was important in terms of the approach taken to this project? What are the lessons learned that can be applied to future projects?

The only way to embed GI and make it work for an organisation is to use its own language and make it matter to those who make decisions.

Resources

REPORTS

- Demystifying Green Infrastructure (2015) – UKGBC
- The State of Sustainability in the UK Built Environment (2017) – UKGBC
- Rethinking Green Infrastructure (2014) – ARUP
- Green Infrastructure: Connected and Multi-Functional Landscapes (2009) – Landscape Institute
- Green Infrastructure: An Integrated Approach to Land Use (2013) – Landscape Institute

POLICY AND GUIDANCE

- Green Infrastructure Guidance (2014) – Natural England
- Delivering Green Infrastructure Benefits to Communities and Places Through Planning (2010) – TCPA
- Natural Environment White Paper (2014) – Department for Environment, Food and Rural Affairs
- Manchester Green and Blue Infrastructure Strategy 2015
- 25 Year Environment Plan (2018) – HM Government
- National Planning Policy Framework (NPPF) (updated 2018) – Ministry for Housing, Communities & Local Government
- National Networks National Policy Statement (2014) – Department for Transport
- City of London Biodiversity Action Plan 2016-2020

CASE STUDY EXAMPLES

Elephant Park, Lend Lease

Kingsbrook, Aylsebury, Barratt Developments

Olympic Parklands Green Infrastructure, London Legacy Development Corporation

National Grid Headquarters, Warwick

St. Ermins Bee & Bee Hotel, St Ermins Hotel London

Wild West End Project London

BOOKS

Green Infrastructure: Linking Landscape and Communities (2006) – Mark Benedict and Edward T. McMahon

What Has Nature Ever Done for us? (2013) – Tony Juniper

Green Infrastructure (2015) – John W. Dover

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