green infrastructure — policies, strategies and challenges

Peter Jones looks at green infrastructure characteristics, strategies and policies, and considers the role and implementation of green infrastructure in planning and housing development

The UK's first 'Green Infrastructure Week', held back in April 2022, had an ambitious and wide-ranging focus in seeking to embrace and celebrate the technologies that will be 'used to deliver the biggest gains in our global transition to net zero'.[1] Green infrastructure (GI) is becoming an increasingly important element in Local Plans, and some housebuilding companies are emphasising the importance of green infrastructure in their development proposals and in helping to create a sense of place. This article outlines the characteristics of green infrastructure, illustrates a number of green infrastructure strategies and policies, and offers some summary reflections on the role and implementation of green infrastructure in planning and urban development.

Green infrastructure

Green infrastructure can mean different things to different people, and Wright has argued that green infrastructure is 'a contested concept', in that 'a single precise meaning of 'green infrastructure' is problematic because the concept is evolving and divided between environmental theory and socio-economic policy'.[2]

That said, a number of definitions can be identified. The National Planning Policy Framework, for example, defines green infrastructure as 'a network of multi-functional green and blue spaces and other natural features, urban and rural, which is capable of delivering a wide range of environmental, economic, health and wellbeing benefits for nature, climate, local and wider communities, and prosperity'.[3]

For NatureScot, Scotland's Nature Agency, 'green infrastructure is what brings our towns, cities and communities alive and makes them great places to live in. It is a term used for vegetated areas such as parks, street trees and green roofs, that deliver a wide range of benefits for people and nature'.[4] The TCPA defines green infrastructure as 'a network of multi-functional green space and other green features, urban and rural, which can deliver quality of life and environmental benefits for communities'.[5] Lennon suggests that while interpretations of green infrastructure may vary, what they share 'is a belief in the ability and necessity of planning, designing, constructing, and managing nature to deliver desired benefits from particular 'environmental resources', be they watercourses, green open spaces or tree-lined streets'.[6]

Writing just over a decade ago, Wright suggested that while the 'the idea of 'green infrastructure' has experienced a quick emergence in planning policy',[2] the concept was not new. Firehock has argued that the term itself 'was first coined in Florida in 1994 in a report to the governor on land conservation strategies and was intended to reflect the notion that natural systems are equally, if not more important, components of our infrastructure', and that the 'the principles that form the basis for the concept have arisen from multiple disciplines'.[7] Mell, for example, has claimed that the concept of green infrastructure assimilated principles from the Garden Cities movement to embrace 'the ideas of connectivity, accessibility and integrated planning' and the 'linearity and connectivity across and between landscape (and administrative) boundaries central to greenways planning to promote multi-functional ecological and recreational routes', as well as 'complementary principles

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identified in landscape ecology and conservation research'.[8]

A wide range of environmental, social, economic and health benefits are claimed for green infrastructure. The environmental benefits are seen to embrace the protection and preservation of terrestrial habitats, improved air and water quality, enhanced biodiversity, and protection for geologically and geomorphologically important sites, as well as providing measures to mitigate the adverse effects of climate change. Economic benefits claimed for green infrastructure interventions not only include economic growth and investment, stemming from the belief that businesses are able to attract and retain more motivated staff in greener settings and will enjoy greater productivity, but also enhanced land and property values, and the promotion of rural tourism. Social and health benefits include increased interaction with the natural environment and enhanced leisure and recreational opportunities, greater community cohesion, and improved physical and mental health.

Green infrastructure—policies and strategies

While commitment to the protection of the natural environment and the provision of green spaces has long been a consistent theme in planning, a specific focus on green infrastructure has been increasing, reflected in a variety of statements, policies and strategies within public sector planning. At the national level, Natural England's Green Infrastructure Framework is designed to 'help local planning authorities and developers meet requirements in the National Planning Policy Framework to consider GI in local plans and in new development', and to 'support better planning for good quality GI and help to target the creation or improvement of GI, where existing provision is poorest and where there are opportunities for these important assets to be better managed for the environment and to deliver a wider range of multifunctional benefits'.[9]

More specifically, the Green Infrastructure Framework is underpinned by 15 principles,[10] which collectively look to answer a series of 'why', 'what' and 'how' questions. In addressing the first of the 'why' questions, focused on securing 'nature rich beautiful places', for example, green infrastructure should, inter alia, 'create and strengthen networks of habitats and reduce fragmentation', 'help deliver Biodiversity Net Gain requirements', 'Integrate with Local Nature Recovery Strategies and seek to contribute to the Nature Recovery Network', and 'be designed to deliver multiple benefits including landscapes that have a distinct sense of place'.

The first of the 'how' questions addresses partnership and vision, and here the focus is on working 'in partnership, and [collaborating] with stakeholders from the outset to co-plan, develop and deliver a vision for GI in the area', and to engaging 'a diverse and inclusive range of people and organisations including citizens, local authorities, developers, landowners, communities, green space managers, environmental, health, climate, transport and business representatives'.

At the sub-regional level, the London Plan has stressed the importance of green infrastructure, requiring that 'London's network of green and open spaces, and green features in the built environment, should be protected and enhanced. Green

infrastructure should be planned, designed and managed in an integrated way to achieve multiple benefits'.[11] More specifically, it states that 'all development takes place within a wider environment, and green infrastructure should be an integral element and not an 'add on' '. The London Plan also includes specific policies on the Green Belt, open land, open space, urban greening, biodiversity, and access to nature, trees and woodland, food growing, and geodiversity.

The overall aim of the West of England Joint Green Infrastructure Strategy,[12] covering the Bath and North East Somerset, Bristol City, North Somerset and South Gloucestershire council areas, 'is to secure investment in GI planning and provision, similar to that of other infrastructure'. The strategy has a number of objectives, including, inter alia:

- 'Providing key concepts and tools to enable a consistent approach to GI across the West of England.'
- Promoting the development and use of a GI evidence base for Local Plan development [and for] the development of projects/business cases to contribute to GI enhancement.'
- 'Recognising the need to prioritise the planning, development of investment in, and monitoring of GI as part of the response to the climate and ecological emergencies, and to new duties including Biodiversity Net Gain and the delivery of Local Nature Recovery Strategies.'
- 'Highlighting [how] organisations, communities, and partnerships can work collectively to create and sustain a fit for purpose GI network across the West of England.'

The Joint Green Infrastructure Strategy identifies a number of ambitious outcomes, including improved and better-connected ecological networks, greater resilience to climate change, health and wellbeing for all, sustainable and local food production, the creation and maintenance of valued healthy landscapes, and building a resilient economy. It also emphasises the importance of connectivity, and here 'an interconnected system of vital landscapes of scale' is seen as 'critical to building a sustainable future.' At the same time, 'well connected natural networks of wetlands, woodlands, grasslands, field boundaries and parklands' are seen as 'critical to provide habitat for wildlife and to sustain ecosystem services such as clean water, climate regulation, and crop pollination'.[12]

At a more local level, the Epping Forest District Council area includes the ancient woodland of Epping Forest, as well as a range of important ecological sites. The council's Green Infrastructure Strategy[13] seeks 'to ensure a strategic and holistic approach is taken to protecting, maintaining and enhancing the ecology, landscape and heritage in the District.' The strategy aims to protect Epping Forest (which is under threat from rising levels of human activity and vehicle emissions), as well as a range of important ecological sites within the local authority's jurisdiction, by 'ensuring that new and existing communities have better access to high-quality and local green and blue, spaces'.[13] The implementation of this strategy will embrace a wide range of projects, including wayfinding, the planting of roadside wildflowers, tree planting designed to boost the district's tree canopy cover, and the creation of new green spaces.

Within the private sector, many leading housebuilders and landscape consultancies have been employing green infrastructure policies and strategies as part of their development proposals for some time. Taylor Wimpey and Bellway, for example, developed a green infrastructure strategy as part of the public consultation exercise for its revised development proposals for some 2,200 new homes for land west of Stafford. This strategy seeked 'to ensure that the development is set within a strong landscape framework and provides easy access to recreation opportunities'.[14] More specifically, the revised proposals included a number of footpath and bridleways radiating from a central park within a connected network of green infrastructure, within and beyond the development area itself, along with ponds and woodlands incorporated in a variety of spaces, as well as the enhancement of existing rights of way to improve access to green infrastructure.

Under the banner 'Giving nature a home', Barratt Developments, the UK's largest housebuilding company, focused upon its Kingsbrook development of almost 2,500 properties, near Aylesbury in Buckinghamshire, and reported that 'fifty per cent of the development incorporates green infrastructure'.[15] Here, the green infrastructure included three parks, for leisure and to encourage biodiversity, boardwalks and footpaths, designed to avoid disturbance to wildlife, the planting of 50 black poplars (an endangered species), and the development of an amphitheatre to provide outside classrooms and local learning opportunities about nature for local residents and children. The company also highlighted its work in 'greening infrastructure' at its developments at Bilberry Chase, near Cannock in the West Midlands, at Hollygate Park at Cotgrave, near Nottingham, and at New South Quarter in Croydon.[15]

The 2B Landscape Consultancy has argued that 'green infrastructure is implicit in our holistic approach as landscape architects', and that development teams must 'think of landscape not only in aesthetic terms but also as a vital component of living landscapes'.[16] In advocating the increasing use of green infrastructure, it suggested that it 'is realised through awareness and utilisation of techniques such as sustainable drainage, and the value of existing ecological corridors and habitats on a site.' More specifically, the Landmark Practice reported[17]

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on the important role of green infrastructure in the development of some 500 vacation homes in a leisure and residential development at Lower Mill Estate, near Cirencester in the Cotswolds.

Summary reflections

The development, enhancement and protection of green infrastructure is widely seen to offer a wide range of environmental, social, and economic benefits, and is increasingly commending itself to planning authorities and housebuilding companies, but three sets of issues merit summary reflection.

First, there is the issue of maintenance, in that the various benefits claimed for green infrastructure can only be achieved if it is effectively maintained, and here a number of themes can be highlighted. Ideally, green infrastructure should be designed with maintenance in mind, and the methods and frequency of maintenance need to be considered prior to implementation.

Maintenance should also be undertaken in accordance with a long-term maintenance plan, designed to maximise the original benefits of green infrastructure development and enhancement projects. The specification and continued securing of resources and funding for maintenance are also vitally important.

Secondly, the issue of responsibility poses a major challenge for increasing the scale of green infrastructure, and here various sets of stakeholders can be seen to be involved. Where local authorities have planned and created green infrastructure, for example, they might be seen to have the primary obligations for maintaining—and monitoring—the continuing impact against claimed benefits. However, as their budgets are increasingly cut, so local authorities may find it difficult to discharge such responsibilities and justify expenditure on them, given what may be seen as more pressing, and politically charged, calls on their limited financial resources.

Although many housebuilding companies have designed and developed green infrastructure as part of their planning proposals, it remains to be seen if, and how, they will assume responsibility for continuing maintenance and monitoring once the houses have all been sold and the development completed.

For both local authorities and housebuilding companies, there are attractions in encouraging community and volunteer groups to take responsibility for green infrastructure, and in some situations this may work well; but whether such groups will prove able to take responsibility in the long term, and perhaps more significantly whether they will have access to the necessary financial resources to discharge such responsibilities, must remain open questions.

More generally, Zuninga-Teran *et al.*[18] has argued that some of the suggested benefits of green

infrastructure will not be realised until it is more fully mainstreamed into the built environment and design professions.

Thirdly, there is the thorny issue of how green infrastructure fits into sustainability aims. On the face of it, the development and enhancement of green infrastructure might be seen to be very much compatible with sustainable development, and local authorities, housebuilding companies and landscape consultancies generally couch their commitments to green infrastructure within a sustainability idiom.

However, many green infrastructure projects are often developed within the context of supporting and justifying growth and development. In the case of housebuilding, for example, such development involves the conversion of open land to the built environment, the continuing use of scarce natural resources, and, given the suburban, and often rural, nature of many new housing developments, dependence on motor car transport for journeys to work and school and for shopping trips, all of which might be seen to be at odds with the transition to a more sustainable future. Here, the title of Wilson Picket's 1971 hit song, 'Don't Let the Green Grass Fool You', might be seen to offer a cautionary note!

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Notes

1 The Green Infrastructure Week website is at https://greeninfrastructureweek.com/#

2 H Wright: 'Understanding green infrastructure: the development of a contested concept in England'. *Local Environment*, 2011, Vol. 16 (10), 1003–19

3 *National Planning Policy Framework*. Ministry of Housing, Communities and Local Government, Jul. 2021. www.gov.uk/government/publications/national-planning-policy-framework--2

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6 M Lennon: 'Green infrastructure and planning policy: a critical assessment'. *Local Environment*, 2014, Vol. 20, 1–4. www.researchgate.net/publication/272122666_Green_infrastructure_and_planning_policy_a_critical_assessment

7 K Firehock: *A Short History of the Term Green Infrastructure and Selected Literature*. 2011. Available at www.gicinc.org/PDFs/GI%20History.pdf

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9 'How Natural England's Green Infrastructure Framework can help create better places to live'. Natural England Blog entry, 7 Dec. 2021. https://naturalengland.blog.gov.uk/2021/12/07/how-natural-englands-green-infrastructure-framework-can-help-create-better-places-to-live/

10 *Natural England Green Infrastructure Principles (Detailed Version, date January 2023)*. Natural England, Jan. 2023. https://designatedsites.naturalengland.org.uk/GreenInfrastructure/downloads/GreenInfrastructurePrinciples.pdf

11 *The London Plan. Spatial Development Strategy for Greater London*. Mayor of London. Greater London Authority, Mar. 2021. www.london.gov.uk/sites/default/files/the_london_plan_2021.pdf

12 *West of England Joint Green Infrastructure Strategy 2020–2030*. West of England Combined Authority, May 2022. www.westofengland-ca.gov.uk/wp-content/uploads/2020/07/Joint-Green-Infrastructure-Strategy-June-2020-spreads.pdf

13 *Green Infrastructure Strategy. Primer: Introducing Green Infrastructure*. Epping Forest District Council, Apr. 2021. www.eppingforestdc.gov.uk/wp-content/uploads/2022/02/GI_Overall_Final_0-2.pdf

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15 'Giving nature a home'. Case study webpage. Barratt Developments. www.barrattdevelopments.co.uk/building-sustainably/taking-action/case-studies/giving-nature-a-home

16 'Green infrastructure'. Webpage. 2B Landscape Consultancy. www.2bconsultancy.co.uk/green-infrastructure.htm

17 'Lower Mill, Cotswolds'. Webpage. The Landmark Practice. https://thelandmarkpractice.com/project/lower-mill-estate/

18 AA Zuninga-Teran, C Staddon, L de Vito *et al.*: 'Challenges of mainstreaming green infrastructure in built environment professions'. *Journal of Environmental Planning & Management*, 2020, Vol. 63 (4), 710–32