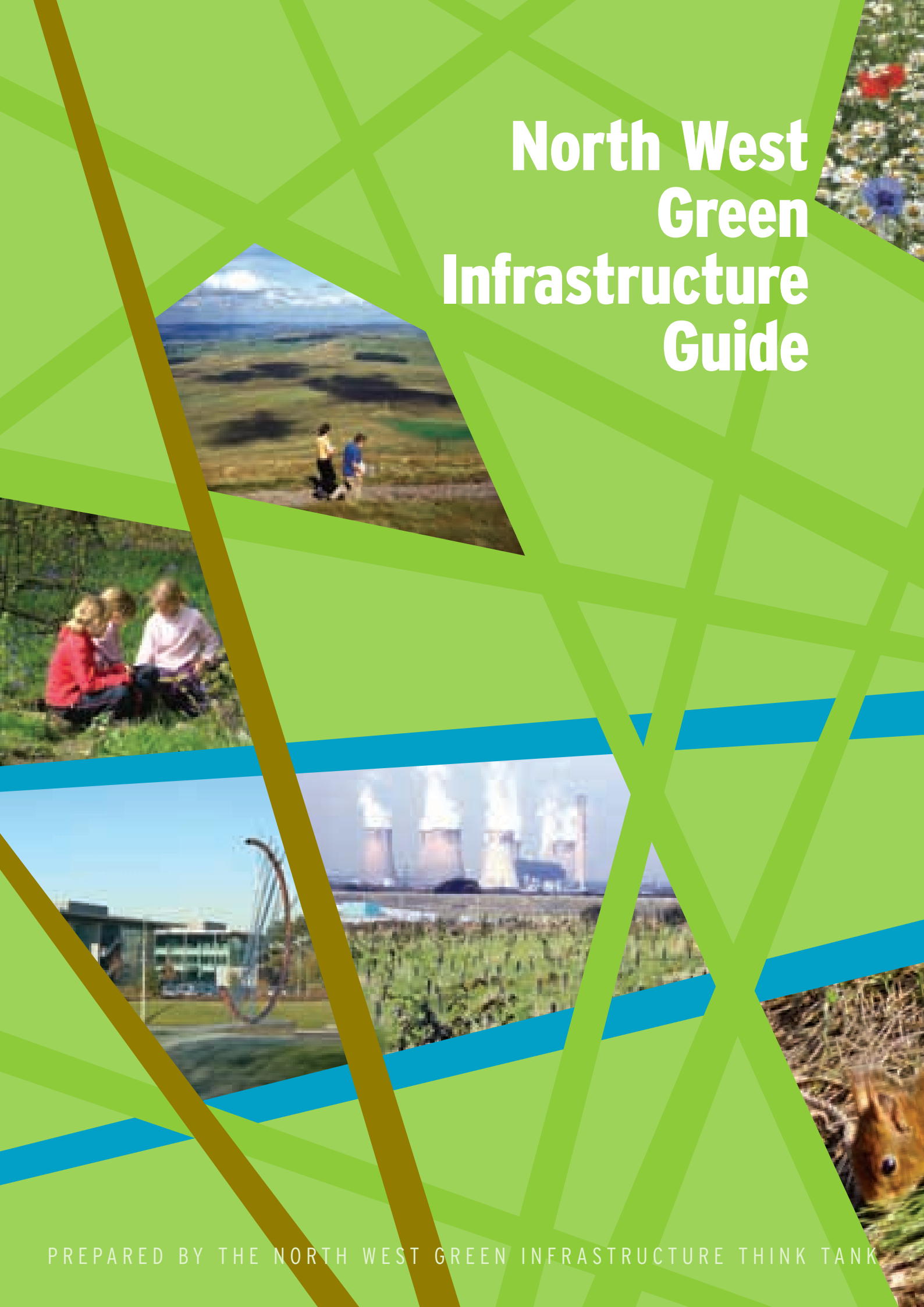
North West Green Infrastructure Guide



PREPARED BY THE NORTH WEST GREEN INFRASTRUCTURE THINK TANK

The North West Green Infrastructure Think Tank Partners:

CABE Space

Cass Associates

Cure

Environment Agency

Forestry Commission

Government Office North West

Green Space North West

Groundwork

Natural England

North West Regional Assembly

Red Rose Forest

TEP

The Mersey Forest

University of Salford

CONTENTS

INTRODUCTION

1.0 What is Green Infrastructure?

1.1 How it Works

1.2 Why is Green Infrastructure Planning Important?

1.3 Green Infrastructure Planning – the Process

1.4 What do you get at the end

1.0 What is Green Infrastructure?

DEFINITION

GREEN INFRASTRUCTURE IS THE REGION'S LIFE SUPPORT SYSTEM – THE NETWORK OF NATURAL ENVIRONMENTAL COMPONENTS AND GREEN AND BLUE SPACES THAT LIES WITHIN AND BETWEEN THE NORTH WEST'S CITIES, TOWNS AND VILLAGES WHICH PROVIDES MULTIPLE SOCIAL, ECONOMIC AND ENVIRONMENTAL BENEFITS.

Components

In the same way that a transport system is made up of a network of roads, rail, airports etc. green infrastructure has its own physical components. These include:

Woodlands
Street Trees
Open Spaces
Lakes
Waterways
Open Countryside
Fields
Hedges
Ponds
Wildlife Habitats
Parks
Private Gardens
Village Greens
Open Spaces
Degraded land
Moorland
Agricultural Land
Allotments, community gardens and urban farms
Grassland and Heathland
Cemeteries, churchyards and burial grounds
Outdoor sports facilities
Coastal habitat

1.1 How it Works

The Northwest Green Infrastructure Guide has been prepared to support the Green Infrastructure Policy in the North West Regional Spatial Strategy (RSS) by providing more detailed information on the concept of Green Infrastructure (GI) than appears in RSS and to provide initial guidance on producing a Green Infrastructure Plan.

The production of additional technical and practical information is underway. This information will be posted on the Northwest Green Infrastructure website www.greeninfrastructurenw.org.uk.

The Green Infrastructure Guide is particularly relevant to those involved in producing Local Development Frameworks (LDF). The LDF's will be a crucial delivery mechanism for any GI plans.

The Natural Economy North West programme (funded by NWDA, Natural England and SITA) has carried out work to develop methods of quantifying the economic impacts of green infrastructure planning. The outputs from this programme help to develop the case for investment in GI and provides elements of the evidence base that are essential to the production of robust planning policy for green infrastructure. The reports from this programme are available on www.naturaleconomynorthwest.co.uk and www.greeninfrastructurenw.org.uk.

What is it?

Each setting will have its own – often very different - make-up of components and there are many different types of Green Infrastructure.

Recent projects in 'green infrastructure mapping' using sophisticated GIS-based systems show how the different components of green infrastructure inter-relate with each other and how various interventions based on assessments from this mapping could sustainably improve the environment. Components of Green Infrastructure can be natural, semi-natural and designed spaces. Green Infrastructure applies at all scales – from planning a major project, such as a Regional Park across a number of local authority areas, to working with residents to green their street with trees and shrubs. It is more about improving the quality of the natural environment at all levels than, for instance, increasing the physical amount of green space.

Where is it?

Everywhere. Anywhere.

For example, in an urban setting, it is possible to see how linking a green space with a pond and a stream by creating a wildlife-friendly footpath corridor, would improve the ecology of the green space and pond, while providing additional opportunities for human recreation. In a rural situation it may be planning to block old drains in upland moorland areas to retain water in the uplands, creating a 'sponge' effect to reduce lowland flooding, improve water quality and restore boggy habitats, helping people and wildlife alike.

Who benefits?

Because Green Infrastructure is multi-functional, it is capable of delivering a variety of benefits in a range of situations.

Using the examples mentioned, it is clear that one action identified as part of the Green Infrastructure process can have multiple

benefits for people and wildlife. It is also a flexible approach so if, for example, an area became prone to flash flooding due to climate change, a range of actions from physical defenses to water catchment changes to planting appropriate trees or crops – or a mixture of all of these – can be put into place relatively quickly. It is also a tool for connecting areas of fragmentation – it may be equally used to increase the physical range of habitat for an important species or ensure that sufficient area is available to sustain a species.

Green Infrastructure can be planned to be close to where people need it most – for example in areas of high deprivation and ill health where it can be a valuable contributor to improving wellbeing. Good green infrastructure is of considerable economic value too. A recent CABE report 'The Value of Public Space' cites many examples from around the world where improvements in green infrastructure have helped attract inward investment, increase local house prices and drive up local economies.

1.2 Why is Green Infrastructure Planning Important?

In the context of climate change, development pressure and a rapidly changing business and agricultural landscape, finding a joined-up and cross-regional approach to planning the North West's future Green Infrastructure – our life support system – is seen as crucial.

The built infrastructure upon which our economy depends – which provides the framework for future growth and development – is planned in advance as a system of interconnected parts. We owe the environment the same consideration and should embrace Green Infrastructure planning as the framework for future land management.

The overall purpose of green infrastructure planning is to answer the question: 'How can the North West's natural environment be conserved, improved and managed to deliver the best social, economic and environmental benefits for the region?' It is a key AID to the delivery of objectives that ALREADY exist at regional, sub-regional and local level rather than an additional Strategy.

The Green Infrastructure approach to planning is important to anyone whose objectives relate to, use, or draw upon the natural environment:

- **Urban renaissance**
- **Rural renewal**
- **Social inclusion and community cohesion**
- **Health and wellbeing**
- **Sustainable development**

Green Infrastructure is a core outcome of any regeneration programme involving land or water. As a planning tool, it is highly flexible and therefore can apply to all of the region's different urban and rural settings.

In this Guide where the term 'Planning' is used it refers to Spatial Planning; 'planning' in the sense of activity is referred to as 'project planning'

1.3 Green Infrastructure Planning – The Process

There are five basic steps to Green Infrastructure Planning (these are expanded upon in detail in section 2).

1 Partnerships and Priorities

- Build partnerships of stakeholders who benefit from, and lobby for, green infrastructure
- Review relevant policies and strategies
- Determine the key outcomes for the green infrastructure mapping process
- The Partnership determines the scope of the plan based on resources, objectives and information available.
- Build organisational support for the Green Infrastructure Plan

2 Data Audit and Resource Mapping

- Identify available information, including maps, regional and national guidance, datasets, relevant policy frameworks, regional and national strategies and stakeholders
- Generate a map of the physical area showing green infrastructure types and locations (usually on a GIS system)

3 Functional Assessment

- Assess current situation – what the green infrastructure is doing, where it is functioning well and needs to be maintained, where it needs to be improved
- Assess future situation – what are the threats to green infrastructure, where are the opportunities for improvement, how it might need to change, how to secure change

4 Needs Assessment

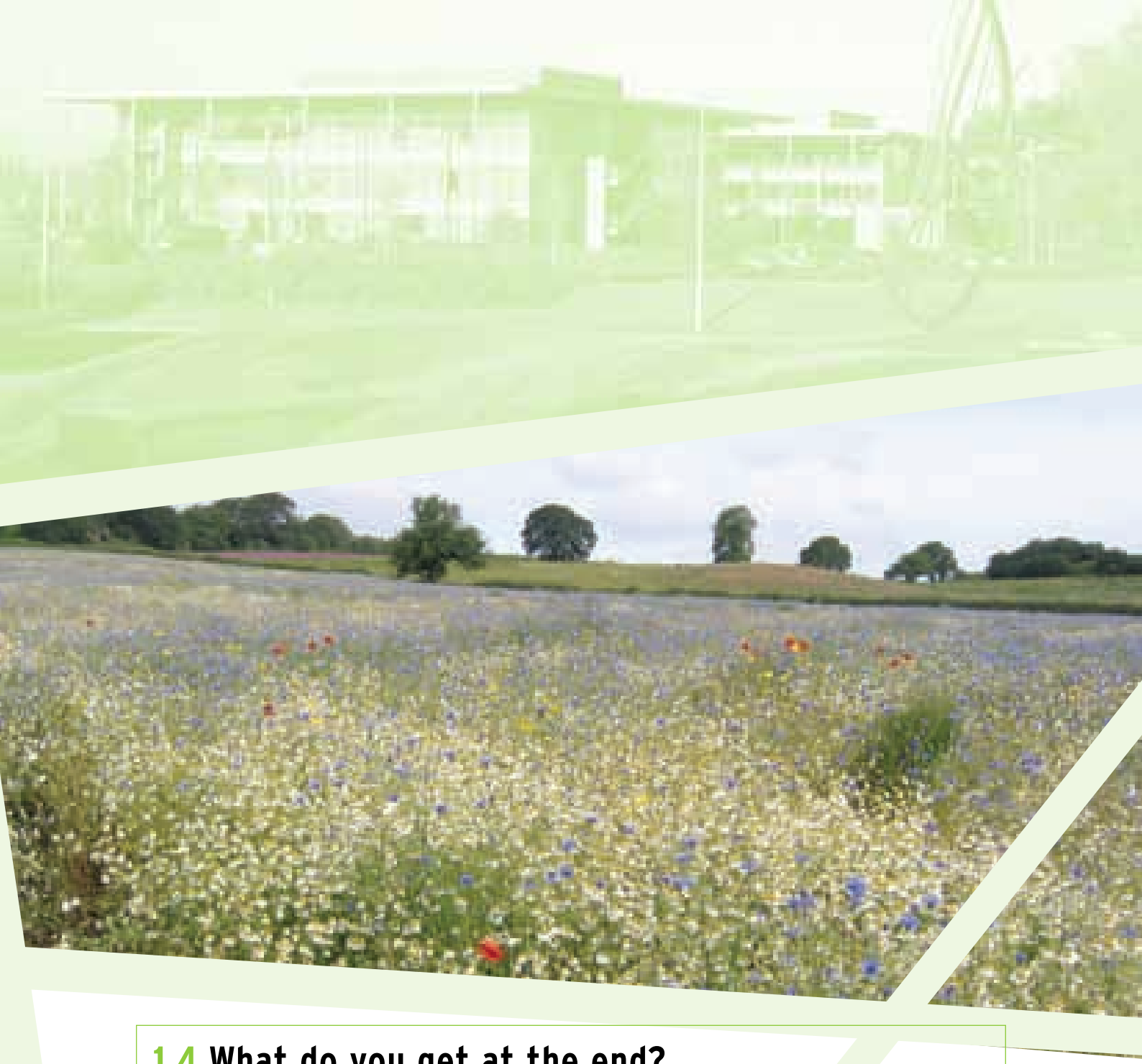
- Cross-reference Green Infrastructure planning with strategic outcomes identified in Step 1
- Reference relevant datasets such as deprivation indices, market research, house prices etc

5 Intervention Plan

The Green Infrastructure Plan will set out:

- What the green infrastructure of an area is
- What it is doing and what it might do
- Where the green infrastructure is functioning well and needs maintaining
- How it needs to change
- What will be done to secure change

The last two elements form the 'Intervention Plan' which works out what changes need to happen at what localities, when and by which means. This will need to ensure that positive environmental changes can be made while taking into account a wide range of related issues such as local character, landscape and resources. It will also determine the type of intervention required – physical/policy, regulatory/incentive, direct/indirect – or combination to achieve the desired change.



1.4 What do you get at the end?

A comprehensive, interactive and highly flexible evidence base for a range of purposes:

- A framework for the sustainable land management of the area
- A tool for predicting the implications of change on the natural environment
- An accurate picture of the green infrastructure of an area – essential in making planning decisions, informing developments and strategies
- A tool for delivering the natural environmental contribution to identified priorities in the fields of health, economy and quality of life etc
- A structured plan for delivering environmental change
- Attracting funding by demonstrating researched needs and outcomes
- Attracting inward investment

North West Green Infrastructure Guide

Section 2

PREPARED BY THE NORTH WEST GREEN INFRASTRUCTURE THINK TANK

CONTENTS

PAGE

Section 2 – Detail

01 2.0 The Green Infrastructure Planning Approach

03 2.1 Step 1: Partnerships and Priorities

05 2.2 Step 2: Data Audit and Resource Mapping

08 2.3 Step 3: Functional Assessment

11 2.4 Step 4: Needs Assessment

14 2.5 Step 5: Intervention Plan

18 3.0 Case Studies

19 3.1 Public Benefit Recording System

20 3.2 East Midlands Green Infrastructure Scoping Study

22 3.3 St Helens Planning for the Countryside In and Around Towns

24 3.4 CLERE Model for multi-functional greenspace

26 3.5 The North East Green Infrastructure Planning Guide

27 3.6 Yorkshire and Humber Green Infrastructure

28 4.0 Green Infrastructure in Relation to emerging Northwest Policy and Strategy

31 5.0 Useful Sources of Information and References

2.0 The Green Infrastructure Planning Approach

A slab of tarmac isn't infrastructure, but a road is. Give tarmac a purpose, some users, a public benefit and a place in a wider network - and it becomes essential infrastructure.

We can use this analogy to help us consider planning of green infrastructure. Just because a piece of land is open doesn't make it "green infrastructure". For 21st century sustainable living, we need our green, blue and open spaces to function as green infrastructure, serving the many needs of society, the economy and biodiversity; now and into the future. A planned approach means we will protect the vital life-support functions of green infrastructure while maximising its social, economic and environmental functions in relation to particular local needs.

Green Infrastructure Planning aims to;

1 Identify the significant needs and opportunities (of a social, economic or environmental nature) in an area of search
2 Assess if green infrastructure components (individually and collectively) meet these needs, now and into the future
3 Conserve those components which are essential parts of the green infrastructure
4 Create brand new components where they can best meet local needs or fill gaps in the existing green infrastructure network
5 Uplift poorly-functioning green infrastructure to meet local needs or fill gaps
6 Target policies, resources and interventions to conserve, connect and re-build a healthy green infrastructure

This part of the Guide sets out a pathway to assist practitioners in GI planning. It is evidence-based. Recognising the demands on the resources of planning authorities, the pathway points to existing sources of information where possible.

It provides a model that can be used by partnerships, but can be adapted to suit local circumstances and resources. However, using the model will enable GI plans to link together to cross administration boundaries and assist in cross boundary working. What is needed is

- a good mapping system
- a thorough understanding of local needs and sustainable development opportunities
- and a "function-oriented" approach to greenspace planning

Examples of tools, data and methods which can be used are outlined in the green infrastructure planning diagram below, followed by more detailed guidance. Case studies and resources (section 3) offer practical applications for green infrastructure planning.

Eight Principles of Green Infrastructure Planning, Design and Implementation (from www.greeninfrastructure.net)

1 Identify and protect green infrastructure before development
2 Engage diverse people and organisations from a range of sectors
3 Linkage is key, connecting green infrastructure components with each other and with people
4 Design green infrastructure systems that function at different scales and across boundaries
5 Green Infrastructure activity must be grounded in good science and planning practice
6 Fund green infrastructure up-front as a primary public investment
7 Emphasise green infrastructure benefits are afforded to all; to nature and people
8 Green infrastructure should be the framework for conservation

Steps in the green infrastructure planning process

Step	Tools and data	Process Steps	Methods
1 Partnerships and Priorities	• Regional & subregional strategies • LDF documents • Community Plans • Local strategies	• Assemble partnerships • Assess policy frameworks • Determine strategic priorities to which GI will contribute • Agree scope and scale of GI planning project	• Identify GI stakeholders & champions • Compile GI strategy position into central evidence database • Local and strategic values • Public Benefit Assessment?
2 Data Audit and Resource Mapping	• Aerial photographs • National Land Use Database • OS Mastermap® & GLUD • Web-sourced geographic and demographic data • Data held by local authorities and partners • Data from Greenspace audits • Socio-economic data	• Identify data shortfalls and how these will be addressed • Identify existing GI components, their quality, distribution, connected-ness • Identify geographic context of GI – relationship to surrounding communities and environmental features	• GIS mapping of green infrastructure components and relationships to surrounding land uses and demographic data
3 Functionality Assessment	• Landscape character assessment • Historic landscape characterisation • Conservation area appraisal • Concept statements • Town and village design statements • Greenspace strategies • Biodiversity Action Plans • Woodland audits	• Identify existing GI components, their quality and functionality • Map of existing functions • Consider spatial implications of forces for change • Map potential functions	• Workshops with key stakeholders to discuss forces for change • GIS mapping of spatial implications of forces for change • Case study methodologies: St Helens Countryside In and Around Towns (CIAT) approach, Green Futures – CLERE model, East Midlands Scoping Study
4 Needs Assessment	• Greenspace provision guidelines • Open Space/Greenspace audits • Census data • Deprivation statistics • Rural economy profiles • Climate change adaptation requirements • Proposed built developments and spatial changes • Strategic priority and forward planning documents	• Identify whether the existing GI is appropriate to local needs • Determine how strategic priorities can be represented by datasets • Relate existing green infrastructure and functionality to strategic priorities and standards	• GIS mapping of local needs and strategic priorities • Comparison of existing GI functions and local needs • Case study methodologies: area based public benefit recording system (PBRS), St Helens CIAT approach
5 Intervention Plan	• GIS datasets and wider evidence database from stage 1, 2 and 3 • Engagement with regional, sub-regional and local policy development and consultation including LSPs • Use of existing, proven delivery mechanisms	• What changes are needed to GI design, development, maintenance and management? • Where are these changes needed? • By what means will changes be sought?	• Using steps 1 to 4 determine type and locations of required changes • Advocacy and promotion through policy frameworks: RSS, RES, Sub/City Regional Plans, LDFs • Incorporate intervention plan into proposed project and programmes e.g. regional parks, rights of way improvement plans • Section 106 agreements, endowments, ring fenced funds and match funding

2.1 Step 1 – Partnerships and Priorities

The process of green infrastructure planning starts by establishing a clear understanding of the partnerships that are needed to plan and deliver green infrastructure in the area and the strategic social, economic and environmental priorities that apply to the area.

Building Partnerships

A healthy green infrastructure requires continuing input from private, public and voluntary sector partners; including landowners and stakeholders representing the functions green infrastructure serves – economic growth, social inclusion, community values and environmental sustainability. Early stages of green infrastructure planning should bring together as wide a partnership as possible in order to agree shared priorities, broker consensus and build a coalition for implementation. Importantly it should not just be environmental organisations, but will bring together professionals involved in social and economic regeneration and growth too.

Green infrastructure needs champions at regional, sub-regional and local levels. Champions will define and promote a vision for green infrastructure and co-ordinate actions by partners. As key contact points within their organisation or discipline, they will assist practitioners in getting to grips with the green infrastructure concept and key policy requirements; and will assist with constraints and operational issues they may face. Identifying, at an early stage, those individual or groups who may be potential "blockers" to green infrastructure will also be beneficial.

The GI plan may be built up over several years, as resources allow, with particular immediate needs being met either geographically (i.e. an area with obvious poor Green Infrastructure) or thematically (i.e. the role that GI can play in improving the image of an area).

At regional and sub-regional level, partnerships will be strategic in nature, concerned with championing cross-sector working, identifying the major building-blocks of green infrastructure, horizon-scanning and securing support for implementation.

At local level, partnerships will focus on delivering positive change in the quantity, quality, connectivity and functioning of the parcels of open space that form the green infrastructure for their area. Local partnerships should, through consultation, understand how and why their communities value green infrastructure. Statements of Community Involvement (prepared as part of Local Development Frameworks) provide guidance on groups and organisations active in the area and also types of consultation appropriate to different circumstances.

St Helens Together, the nationally accredited LSP for St Helens, brings together at a local level the public sector as well as the private, business, community and voluntary sectors allowing different initiatives and services to support each other and work together. Operating at a level which enables strategic decisions to be taken and close enough to individual neighbourhoods to allow actions to be determined at community level, this LSP has been instrumental in aiding the St Helens countryside in and around towns plan shown as a Case Study in section 3.

Assessment of policy frameworks and determination of strategic priorities

Priorities for green infrastructure planning will be influenced by the partnerships and also by the framework of social, economic and environmental policies and strategies. As these evolve over time, it is useful to retain policy and strategy information in one place.
For St Helens (see Case Study) a central policy database was built which listed all the relevant policies and related the functions of green infrastructure to each policy – in turn this allows intervention plans to explicitly deliver those policies.

National, regional and sub-regional documents set the ethos of green infrastructure planning and stimulate strategic actions. The local context needs to supplement this and should include Local Development Frameworks, Community Plans, Local Strategic Partnerships and other geographic or thematic strategies.

Strategies and policies should be examined in a methodical and thorough way. The following questions can be used as prompts:

- Does this policy aim to create new green infrastructure resources?
- Does this policy aim to change management of green infrastructure resources?
- Could this policy be delivered through improvements to the green infrastructure resource?
- Does this policy directly or indirectly link to one of the five key attributes of green infrastructure?
- Which green infrastructure functions (e.g. health, economic growth, biodiversity) does this policy seek to influence and provide?

During consultation on this guide, practitioners identified a number of documents which help to define priorities for local and/or strategic action (see section 5).

As well as being influenced by partnerships and policy, strategic priorities might also consider a public benefit assessment or sustainability appraisal – this is perhaps more applicable to regional or sub-regional planning. Such an appraisal helps practitioners identify the areas and/or communities of the northwest in deepest need of the multiple benefits that healthy green infrastructure brings. A Case Study describes the PBRS, an approach that is promoted by Forestry Commission as an aid to investment in new environmental resources.

2.2 Step 2 – Data Audit and Current Resource Mapping

This step requires checking and collating data sources that are needed to analyse the existing green infrastructure resource and develop an intervention plan. Mapping the information allows the spatial extent, context and character of the existing green infrastructure resource to be identified.

Assessment of data

An initial understanding of the green infrastructure resource can be made through examination of national datasets; supplemented by locally specific datasets. The choice of datasets will depend on the strategic priorities, local circumstances and character of the area to be planned. Datasets loosely fall into four categories;

- Land Use (e.g Woodland, private garden, general amenity space)
- Land Cover (e.g Improved grassland, broadleaf, saltmarsh)
- Environmental Value
- Demographic Patterns

The National Land Use Database (NLUD) and Land Use Change Statistics (LUCS) are available from the Office of National Statistics (ONS). The Department for Communities and Local Government (DCLG) holds the Generalised Land Use Database (GLUD). When used alongside OS Mastermap®, current land use patterns and an initial estimate of the extent of the existing green infrastructure resource can be determined.

ONS and DCLG also hold demographic datasets, such as the Index of Multiple Deprivation, 2004 (IMD), data on community health, skills and employment, and information about population density – all factors which influence how green infrastructure is planned. The Audit Commission's Area Profiles include data on community perceptions of the public realm and the way greenspace is managed and valued.

- www.statistics.gov.uk
- www.communities.gov.uk
- www.areaprofiles.audit-commission.gov.uk

A number of websites hold national level Geographical Information System (GIS) datasets. These datasets can refine and add information to initial green infrastructure resource estimates, and can begin to identify greenspace functionality. The websites provide datasets available for download and signpost to other organisations who hold datasets.

- www.magic.gov.uk
- www.gigateway.org.uk
- www.landscapecharacter.org.uk

Other useful sources of green infrastructure datasets include:

Natural England	UKBAP habitat areas, ecological frameworks, designated areas, open access areas, landscape character, land management and tenure data, uptake of Countryside / Environmental Stewardship
Environment Agency	water resource management, flood risk, soils and other natural resource management issues
English Heritage	cultural heritage and archaeology
Sport England	playing pitches and sports tracks
Forestry Commission	woodland inventory
Local Authorities (District, County and Unitary)	aerial photography, local environmental surveys and designations, planning allocations, greenspace audits, and numerous other locally specific information re socio-economic and environmental conditions and priorities.
Community Forests, countryside management initiatives, Woodland and Wildlife Trusts	woodland planting and management, habitat creation and management, accessible areas, reserves

Much data on typology and function is already held by Local Authorities, often collected in previous greenspace studies, for instance PPG17 appraisals and Greenspace Strategies or as part of the development of Ecological Frameworks. Many Local Authorities have Citizens Panels whose views on the public realm generally, and greenspaces in particular, will reflect local priorities. Such data, sometimes subjective, is vital to include because it helps ensure the way the community values and interacts with green infrastructure is considered; in turn building partnerships and adding delivery capacity.

When mapping is to occur across administrative boundaries, the availability and consistency of data across boundaries is an important and / or limiting factor. In addition there may be legal restrictions on the use of some datasets which will need to be overcome.

Data shortfalls

Green infrastructure planning should be a dynamic approach to natural environmental intervention which reflects the changing needs of an area over time. Therefore whilst data shortfalls at the outset will prevent a completely accurate assessment from being undertaken, additional data can be incorporated into the intervention plan at later stage. It is recommended that data used to determine intervention should be revisited periodically in order to take advantage of new or amended datasets, recently produced policy and strategy information, and additional stakeholders who can contribute to the planning process.

In the assessment of data, the green infrastructure partnership should consider whether a stand alone GI document is necessary or whether it can be incorporated into other policy/strategy documents.

Identifying and mapping the green infrastructure resource

Green infrastructure components should be mapped based on the typologies outlined in section one of this guide. Using GIS to bring together datasets listed at step 1, the extent and distribution of different types of green infrastructure can be mapped.

The following example is an expansion of the typology detailed in PPG17. The typology used should ensure appropriate, though not over detailed, categorisation of the green infrastructure resource. Using a typology that is similar to one used in existing greenspace assessments will be more efficient and will facilitate cross-boundary working.

Parks and public gardens	**Moorland**
General amenity space	**Agricultural land**
Outdoor sports facilities (including hard surfaces and school playing fields)	**Allotments, community gardens and urban farms**
Woodland	**Cemeteries, churchyards and burial grounds**
Water courses and waterways	**Derelict land (potential future green infrastructure)**
Waterbodies	**Private gardens (easily mapped from GLUD)**
Grassland and heathland	**Coastal habitat**

Typology maps are based on landcover and landuse and are distinct from functional maps – thus green corridors, greenbelt land, green wedges etc. are more appropriately considered as functional elements.

A more detailed technical paper on typologies and functions is available at www.greeninfrastructurenw.org.uk

Street trees are important components of urban green infrastructure and are not readily mapped using GIS techniques. Where they are considered by the relevant partnership to be important components for protection and enhancement in the green infrastructure plan, then there may be ways of identifying, through townscape character assessments or aerial photography, areas of priority.

The resulting green infrastructure typology map should also be set in a geographic and demographic context, so that the relationship of green infrastructure to settlements and socio-economic conditions can be assessed visually.

The kind of data assessment and mapping described above is equally applicable to local and to sub-regional / regional green infrastructure planning. At the more strategic levels, mapping will inevitably focus on the larger building-blocks of green infrastructure, cross-boundary networks and demographic patterns of strategic importance; rather than fine-scale typology mapping of individual land parcels.

2.3 Step 3 – Functionality Assessment

A functionality assessment is required to locate gaps in physical or functional provision. A spatial representation of the policy framework and consideration of the drivers of landscape change that influence green infrastructure needs to be undertaken in order to inform the resulting intervention plan.

Assessing quality and functionality of green infrastructure

Green infrastructure planning focuses on conserving land of significant green infrastructure function and enhancing the quantity, quality and connectivity of land which could serve such functions.

In order to determine the functionality of green infrastructure components, it is necessary to consider:

- the ways an area is used,
- how it performs;
- and the role it plays at both micro and macro scales.

The functions which green infrastructure performs are discussed in a number of studies (see section 5 – References), notably including Brandt et. al. (2000), Bartlett School of Planning (2004), East Midlands Green Infrastructure Scoping Study (2005), Countryside In and Around Towns (2005) and Barber (2005). Case Studies at section 3 provide more details on these approaches. A range of social, economic and environmental functions are cited. The following list of functions is a very simplified précis of the in-depth analysis in these studies;

- Sport and active recreation
- Access to natural greenspace
- Mental and physical health
- Image and investment
- Land and property value
- Education and life-long learning
- Social inclusion
- Intrinsic value of a place to a community
- Flood management
- Air, water and soil quality
- Climate change adaptability
- Landscape character / sense of place
- Biodiversity
- Connectivity within a network
- Setting for tourism
- Availability for social enterprises
- Food, fishery and energy production
- Historic resource
- Setting for culture

The list is deliberately loosely defined. Some functions appear most relevant when green infrastructure is viewed at "macro" scales (e.g. connectivity, productivity, climate change, flood). Some functions only come into play when there is a specific association between a community and a place. Functions can co-exist, leading to multifunctionality, and can therefore aid economic, environmental and social objectives through the spatial integration of land uses and activities. Where functions co-exist, interactions between functions will occur, some of which will be synergistic e.g. the benefits to community safety and inclusion from sport and culture. Practitioners may use the list, or the source material, to identify those functions most relevant to the strategic priorities for their area of search.

Multi-functionality is generally desirable, as it is encourages efficient use of land, delivers wider public benefit and builds partnerships of user groups, leading to better stewardship. However, there will be sensitive sites where the conservation of one particular green infrastructure function is of over-arching importance.

An understanding of what functions areas of green infrastructure can provide is also informed by people's knowledge of an area and the importance they attach to its greenspaces. It is imperative to have access to people who can provide this information at a local level. Workshops with stakeholders identified in step 1 provide a useful way to capture detailed and wide-ranging knowledge.

It is also useful to consider variables associated with a function that can be used to determine a) if a function is, or is not, present, and b) if it is present, whether it is working well. For instance, the public health function of green infrastructure is particularly needed where greenspace is near populations with negative health indicators (e.g. high risk of heart disease). Whether that green infrastructure is performing to the best of its ability may be determined by a qualitative indicator which shows whether healthy walking schemes operate in the area, or assessments of the current use of an area by local people. This begins to provide a basis for step 4 - a more detailed needs assessment.

The decades of investment in the green infrastructure of Warrington and Runcorn is bringing economic benefit through inward investment, high skills a healthy local workforce, and has enhanced local biodiversity – a dynamic landscape with capacity to adapt to future change

Considering spatial implications of forces for change

To fully understand how changes to green infrastructure should occur, strategic reasons as to why these changes are necessary need to be established. By spatially representing both the forces for change that are impacting on a landscape, and the existing resource, the future for green infrastructure can be planned. Forces for change may be planned (e.g. regeneration of a post-industrial landscape); or may be predictable (e.g. demographic shifts associated with an expanding and ageing population); or may be external and unpredictable (e.g. the effects of climate change on biodiversity and flood-management).

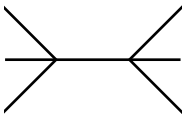
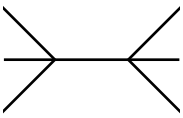
From post-functional brownfield to multi-user strategic space:

At Bold Moss in St Helens, investment in soft end-use reclamation of despoiled colliery land between 1990 and 2000 continues to meet significant local needs for healthy activity, property value uplift, image, skills, training, confidence and community cohesion

Analysis of strategy and policy information, carried out at step 1, can help spatial representation of forces for change. Forces for change may mean that green infrastructure functions must be protected or enhanced. This needs to be considered in the intervention plan. The case study examples from St Helens and the East Midlands provide methodologies for this type of spatial analysis.

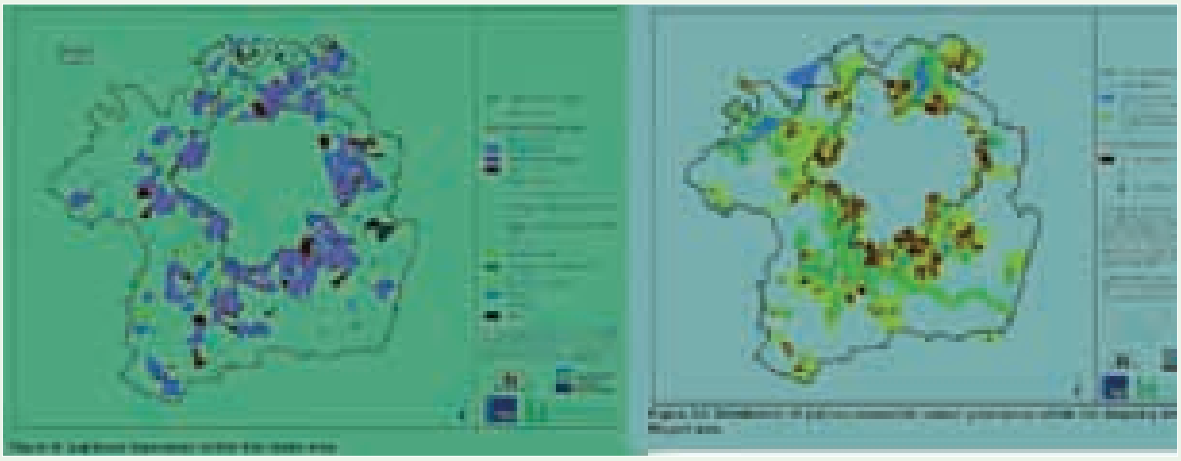
Mapping of potential functions

Potential functions of the green infrastructure resource are a combination of policy and strategic forces for change, and planned physical changes which are likely to occur in the future. Mapping these proposed or potential changes to green infrastructure is necessary to feed into the intervention plan. This information allows existing aspirations and plans for the area to be acknowledged and to ensure recommendations made in the intervention plan take account of these, and consider whether further enhancements to the green infrastructure resource could be achieved through proposed projects.

Typology  **Functions**  **Benefits and services**

The diagram above shows the relationship between typologogy, function and benefits/services. In particular it shows how the realtionship is not a simple linear one, but is a more complicated "many to many" relationship.

The two maps below show how a typology assessment can lead, through functional analysis, to identification of priority areas for intervention. The map on the left shows the various green infrastructure components around a major city (e.g. purple for gardens, buff for farmland, dark green for woodlands). The map on the right shows accessible greenspace in blue. In green are all those areas within walking distance (300m) of accessible greenspaces. By implication, all other areas do not have "doorstep greenspace". Intervention priority should be given to those areas of highest population density, shown by increasing shades of orange



2.4 Step 4 – Needs Assessment

The needs assessment considers how the green infrastructure of an area currently meets the needs of the particular communities it serves; how well it sustains environmental quality; how its performance will be affected by future changes; and how all these can be improved through the intervention plan.

Identifying whether green infrastructure is appropriate to local needs

Step 2 will have indicated whether green infrastructure is operating effectively for all the functions considered to be important in the area. Step 3 allows more detailed consideration of socio-economic requirements, needs and deficits specific to the area of the green infrastructure plan. Locally-distinctive approaches are needed – the green infrastructure needs in a rural district will differ from those of the urban fringes within a City Region.

By comparing the mapped green infrastructure resource with land use and socio-economic information, and with local knowledge, it is possible to identify areas which have specific needs; or where deficits can be identified.

At a neighbourhood level, for instance, there may be nowhere for workers to take a break from employment, relax in the open air, eat their lunch or meet friends. In terms of economics, a local area may have a poor image due to the presence of 'grot spots' or low house prices because of a lack of green infrastructure. Alternatively, the available types of greenspace may not provide for particular needs.
For instance, a local nature reserve will not offer a suitable place for children to play. Deficits may be due to barriers to accessing green infrastructure - such as major transport routes impeding easy access from a needy community to a local sports park, or areas of remote countryside inaccessible to those using public transport.

Increasing the functions of existing spaces:

Furey Woods in Northwich was an abandoned patch of woodland serving little purpose – until residents clubbed together to turn it into a community educational resource – somewhere for children to play and experience wildlife

There are some national standards relating to green infrastructure provision, the best known being the Accessible Natural Greenspace Targets (ANGST). GIS techniques can rapidly locate neighbourhoods which have shortfalls of accessible greenspace – in response, resources can be allocated to creating new greenspaces, or improving the quality of existing greenspaces to improve their capacity.

Where there are no national standards relating to green infrastructure functions such as economic contribution or health, the green infrastructure in an area can still be benchmarked against local and regional averages to identify areas of apparent need.

Needs assessment will benefit from engagement with a diversity of stakeholders. In St Helens, the Local Strategic Partnership focused strongly on issues of crime and health which were seen as barriers to enjoyment of greenspace; and conversely, as social issues which could be tackled through improved greenspace management.

Although a priority at local level, needs assessment is also part of sub-regional or cross-boundary green infrastructure planning – the needs may be more strategic in nature; such as climate change adaptation, flood risk planning, regeneration and biodiversity opportunity.

Determine how strategic priorities can be represented by datasets and linkages made to existing green infrastructure

Matching strategic priorities and specific needs in an area to the existing green infrastructure resource allows the identification of how green infrastructure currently operates and what changes are needed in order for it to become a more fully functioning system. Specific datasets can assist in spatially representing strategic priorities. The Office for National Statistics offers a vast array of information at a range of spatial scales which can be used to relate, for instance, multiple deprivation to the green infrastructure resource that was identified in step 2. Examples of this approach to spatial articulation of strategic priorities are provided through the case studies in part 3.

In considering need, appropriate responses should be considered from the outset. These three courses of action form the basis for the intervention plan:

- **Creation** of new green infrastructure
- **Conservation** of existing green infrastructure from functional changes
- **Enhancement** through new and/or alternative uses and management of land to provide appropriately functioning green infrastructure

The table shows, for two different land types, how their respective green infrastructure functions might be identified and enhanced in response to local needs. The first example is of urban fringe equestrian enterprise land which is presently performing few green infrastructure functions and delivering relatively little public benefit. Because of its strategic location, its potential contribution to economic growth (through image uplift) and environmental sustainability (through access and habitat improvements), it could perform several new functions; while retaining its ability to sustain existing uses. The need here is for creation of green infrastructure.

The second example is an urban park with obvious importance to surrounding communities. It already delivers significant public benefit so the key is to enhance and refresh those green infrastructure functions which it already provides; while seeking opportunities to create new training and enterprise opportunities, and to diversify and sustain habitats for future climate change.

SITE 1: Urban fringe farmland, used for low-key equestrianism. Near road and rail corridors into commercial side of town. Adjacent river and in floodplain. Few trees, no public rights of way.

SITE 2: Urban parksurrounded by housing of various ages. Pockets of multiple deprivation and several schools within walking distance. Originally a designed landscape, now rather faded.

EXISTING	POTENTIAL	Green Infrastructure Function	EXISTING	POTENTIAL
	✔	Create setting for economic growth/regeneration		✔
✔	✔	Job creation & social enterprise	✔	✔
✔	✔	Skills & training		✔
		Community cohesion	✔	✔
		Community safety		✔
✔	✔	Sport		
	✔	Physical health	✔	✔
		Mental health and wellbeing	✔	✔
	✔	Access to natural greenspace	✔	✔
	✔	Land and property value uplift	✔	✔
	✔	Flood management		
	✔	Climate change adaptation and mitigation		✔
	✔	Air & water quality		
		Natural tourism		✔
	✔	Biodiversity in situ	✔	✔
	✔	Environmental connectivity		
		Culture	✔	✔
	✔	Quality of place	✔	✔

Create new green infrastructure with emphasis on economic and environmental functions. To be achieved by environmental improvements near key economic corridors. Creation of riverside trails and new wetland and woodland habitats; in conjunction with operators of existing enterprise.

Green Infrastructure Strategy

Conserve as greenspace and **Enhance** functions through greater community engagement and links to nearby education, employment and cultural initiatives.

Competing demands

In many instances there may be competing demands on green infrastructure which are mutually exclusive. It is necessary to identify where such instances arise, and how they can be resolved. Whilst the mapping of green infrastructure will be able to identify most of these issues, it is only through local consultation that additional competing demands will be found and the issue of how to address the conflict will be determined.

2.5 Step 5 – Intervention Plan

Mapping green infrastructure is not an end in itself. An Intervention Plan needs to be established. Some interventions are within the reach of the planning system; others require changes in targeting of resources used for land management; others require consideration of green infrastructure as the sustainable development component of investment in regeneration and economic development.

In the Northwest, actions may include

1 creating new green infrastructure associated with new built development;

2 refreshing existing (or creating new) green infrastructure in areas of regeneration priority;

3 improving management of rural and urban open lands so they fulfil more green infrastructure functions, and collectively contribute to a sustainable landscape.

Locally-endorsed intervention and delivery plans should identify type, size and locations of assets required, and the contribution levels expected to assist in their delivery, including the improved resourcing and management of existing and future green infrastructure assets.

Where are changes needed?

Steps 1 to 4 outline where changes in green infrastructure resources are required, based on strategic priorities, functional assessment and specific local needs. These requirements will be unique to the area the Intervention Plan is being prepared for. The implications of adjacent Intervention Plans must be considered to ensure cross boundary compliance and integration of priorities and action on the ground. Regional and sub-regional green infrastructure plans must inform the priorities of local plans and "smooth" cross-boundary working. Equally, local plans need to feed into sub-regional strategies.

From "single-functional" farmland to multifunctional landscapes for living; -

At the new housing development of Stamford Brook, river corridor restoration, creation of new community woodland, neighbourhood greenspaces sustainable drainage systems and new cycle routes meet the needs for improved flood management, property value, biodiversity and healthy recreation. Long-term management is secured through a bespoke estate management body to be set up by developers Redrow Homes and Taylor Woodrow with the National Trust maintaining a long-term board position.

What changes are needed, and by what means are they sought?

When creating and changing green infrastructure, long-term maintenance and management must not be forgotten. One of the outcomes of green infrastructure planning should be that land management takes on a more holistic and rationalised quality. If carried out correctly, effective management will meet a number of policy goals using less resources than if each goal was pursued separately. Acknowledging the multi-functional nature of green infrastructure can help secure funding from different sectors over the long term.

Delivery through the Local Development Plan

The planning system is essential to the integrated delivery of green infrastructure across the region. Strategically significant existing and potential networks and sites of green infrastructure importance should be safeguarded, where appropriate, within Local Development Frameworks and Supplementary Planning Documents. There should be a co-ordinated approach across the plan area (and into neighbouring authorities) to ensure green assets are interlinked.

An example of a core policy from Northamptonshire is provided below. Another alternative, which may be more suitable to some Local Development Frameworks, is to embed green infrastructure principles into policies on other issues. The content of the policy prescription should see the planning, design, management and maintenance of green infrastructure as an integrated, multidisciplinary and continuous requirement. This includes a requirement to protect and conserve existing green infrastructure where it is of high quality and already providing appropriate functions, improve or add functionality where required, and create new assets where green infrastructure is lacking.

North Northamptonshire Core Strategy – Policy 5: The Green Framework

A net gain in green infrastructure will be sought through the protection and enhancement of assets and the creation of new multi functional areas of green space that promote recreation and tourism, public access, green education, biodiversity, water management, the protection and enhancement of the local landscape and mitigation of climate change, along with green economic uses and sustainable land management.

Sub-Regional Green Infrastructure corridors will connect locations of natural heritage, green space, biodiversity or other environmental interest. They will be safeguarded through:

a) Not permitting development that compromises their integrity and therefore that of the overall green infrastructure framework

b) Using developer contributions to facilitate improvements to their quality and robustness

c) Investing in enhancement and restoration where the opportunities exist, and the creation of new resources where necessary

Development will contribute towards the establishment, enhancement or ongoing management of a series of local corridors linking with the sub-regional corridors. Priorities for investment will be those areas where net gains in the range of functions can be improved, particularly those that improve access to the urban core and rural service centres and remedy local deficiencies in open space provision and quality.

Endowments or other sources of ring-fenced funds should be sought from development and set aside for future revenue requirements. This could include taking a strategic approach to the use of Section 106 agreements to deliver green infrastructure via the planning system. This approach has been investigated in the South East Growth Areas where a framework for securing the delivery of strategic and local infrastructure through land value capture, based around the planning system, has been set out in a paper produced for the Milton Keynes-South Midlands Inter-Regional Board in October 2004. This advocates a joined-up approach to the delivery of infrastructure through developer contributions, encouraging local planning authorities to consider how a range of developments can contribute to the delivery of necessary infrastructure.

The way in which planning gain is used is actively under review which may have implications for the Northwest's ability to deliver strategic green infrastructure. However, developer contributions alone will not deliver sufficient funds to provide a significant gain in green infrastructure in the Northwest, other than in localised areas associated with development.

Delivery through alignment with regeneration and infrastructure schemes

Of course, the development control aspects of the planning system only have a limited sphere of influence and find it particularly difficult to secure investment in green infrastructure ahead of development. There are many areas of the Northwest where there will be significant physical regeneration and investment in economic development. These include major developments in the three City Regions, Housing Market Renewal Areas, Strategic Sites, Urban Regeneration Companies, Coalfield Portfolio sites, Rural Key Service Centres, key tourism areas and many other local initiatives. Government agencies will also be investing in physical infrastructure (road / rail / waterways).

Regional Economic Strategy highlights the importance of investment in greenspace and environmental quality for such areas. Sub-regional and local intervention plans should prioritise such areas and seek structural funding for investment in green infrastructure where it can be shown to deliver transformational benefits to such initiatives.

At a local level, the inclusion of green infrastructure in LSP delivery plans and Local Area Agreements will help to secure mainstream and bespoke funding streams (managed at local level) focus on green infrastructure creation and management. This is a rapidly emerging area of activity and practitioners should take advantage of the opportunities afforded – many LAAs do seek "Cleaner, Safer, Greener" outcomes, for example.

> "For the Central Lancashire City Region Development Plan, the driver for green infrastructure is economic; and the emphasis will be on pursuing only those works which add value to the overall objectives of the CLCRDP. This will involve the development of comprehensive yet strategic green infrastructure as a transformational action. This will include the further development of regional parks in Lancashire"
>
> Lancashire Economic Partnership – consultation response, August 2006

Delivery through Land Management

This need to manage green infrastructure to meet social, economic and environmental agendas may also open up opportunities to attract match funding from a range of organisations, including realising opportunities to increase the contribution of rural areas to green infrastructure through improved management and access. This may be partly assisted by, for instance, the new Environmental Stewardship Scheme which promotes sustainable land management. Land managers will therefore be a key group of stakeholders with whom to engage in terms of long-term management of green infrastructure including consideration of possible new structures for managing land in a way which supports green infrastructure. Contributions from corporate social responsibility and carbon-sequestration initiatives provide resources for green infrastructure implementation.

In order to take advantage of the changing political, planning and corporate frameworks, we may also want to look at examples of longer term governance models for green infrastructure development and management, including:

- An informal partnership of supportive organisations
- A semi-autonomous, formalised partnership of supportive organisations
- A group of existing Local Delivery Partnerships
- An independent Trust or Company
- A new Park Authority or similar organisation
- A Regional Park Development Company

What is a good green infrastructure plan?

The previous sections have shown that green infrastructure planning should take account of local need. However, there are certain features that should be common to any good green infrastructure plan. Any plan should:

- Effectively communicate the concept of green infrastructure
- Holistically address the three pillars of sustainability
- Build effective partnerships and leadership at strategic and local levels
- Recognise and advocate the need for improved management and funding of resources for green infrastructure
- Ensure commonality with other Local Authorities, thus ensuring an integrated approach across boundaries, while allowing local distinctiveness
- Provide a comprehensive map or plan of the existing GI resource – and a vision of how it might be improved and sustained
- Set and determine strategic priorities taking account of regional and sub-regional strategies, public benefit assessment and stakeholder opinion
- Give a public statement of a will to improve green infrastructure
- Set targets and outline mechanisms to attain such targets
- Provide long-term targets
- Monitor and revise the plan based on best available information
- Be a 'Living' document, updated and enhanced as resources and information becomes available so that it remains relevant and a source of information to all those involved in planning and delivering green infrastructure

3.0 Case Studies

The following case studies illustrate aspects of green infrastructure planning, and represent differing spatial scales, strategic priorities and local circumstances.

Public Benefit Recording System

The Public Benefit Recording System (PBRS) was developed as a system to anticipate and measure the delivery of socio-economic and environmental benefits through green space provision and derelict land remediation. It can be considered on two levels: as a technical, GIS based aid to strategic planning and investment, and as a philosophy for assisting social, economic and environmental sectors to work together in land management and regeneration.

East Midlands Green Infrastructure Scoping Study

The Scoping Study was commissioned to investigate the underlying causes of the under-investment in green infrastructure in the East Midlands region, outside of the Milton Keynes Growth Area. It demonstrates a detailed approach to typology mapping and functional assessment of greenspaces. It also identifies drivers of landscape change and recommends actions for organisations in the region to collectively improve delivery of green infrastructure.

St Helens Countryside In and Around Towns approach

The approach integrates the Countryside Agency and Groundwork UK, Countryside In and Around Towns Vision (CA207) into the planning of the urban fringe. The Metropolitan Borough of St Helens was used as the test area with the project forming part of the wider national Countryside Agency programme of Countryside In and Around Towns.

Green Futures CLERE Model for Multifunctional Greenspace

The CLERE model identifies five broad functions of greenspace; community, landscape, ecosystem, recreation, and economy. It provides detailed examination of the rationale behind each function and management strategies to enhance each function. This model is taken from the recently published book Green Future (published by GreenSpace Publications).

The North East Green Infrastructure Planning Guide

The North East Green Infrastructure Planning Guide was undertaken by a number of partners in the North East of England. It is an aid to the production of geographically based green infrastructure plans, and provides practitioners with a more informed and systematic way of considering the competing priorities of green infrastructure within the spatial planning process.

Countryside In and Around Towns: The Green Infrastructure of Yorkshire & the Humber

Similar to the St Helens case study, the Countryside Agency and Groundwork's Countryside In and Around Towns (CIAT) vision provided the basis for this regional study to map green infrastructure assets and explore those policies and mechanisms by which green infrastructure is recorded, protected and enhanced.

Case Study 1: Public Benefit Recording System

What is PBRS?

The Public Benefit Recording System (PBRS) was developed as a system to anticipate and measure the delivery of socio-economic and environmental benefits through green space provision and derelict land remediation. It provides a combined social, economic and environmental baseline of needs and opportunities, helping to aid decision makers on where green space provision actually meets green infrastructure principles: conserving, creating and improving open spaces that meet local needs or fill gaps in the green infrastructure network.

PBRS can be considered on two levels: as a technical, GIS-based aid to strategic planning and investment, and as a philosophy for assisting social, economic and environmental sectors to work together in establishing a new understanding and approaches to green infrastructure delivery.

How does PBRS work?

An area's public benefit potential is assessed using an objective GIS map-based system. This is applied by decision makers - assisting in the prioritisation of green space investment to maximise sustainable project outputs.

Data from across the social, economic and environmental spectrum is gathered in layers:

Layer 1 is comprised of the existing Government data on socio-economic deprivation contained in the Indices of Deprivation (ID). In general terms, the PBRS approach seeks to determine the broadest profile of deprivation and, as such, tends to use all of the seven ID domains together. However, for a more refined or targeted approach, it is possible and appropriate to select and de-select particular domains, and to benchmark ID for the region, or to rural / urban settlements.

Layer 2 (Thematic Focus) contains additional data which can be laid on the socio-economic baseline to perform a variety of analytical functions. Again, this layer of data can include a number of distinct datasets depending on the scope of the PBRS, tailoring it to provide a particular thematic focus.

Layer 3 (Constraints & Opportunities) contains information on opportunities and constraints, considering the practicalities of project delivery to take account of physical, legal and policy contexts in relation to the illustration of public benefit potential created by Layer One and Layer Two.

Layer 4 holds information which helps to define the target areas, themes or outcomes on specific sites or spatial areas, to further the appreciation of scope for project delivery or solely for recording site attributes and useful information.

PBRS can be applied on almost any geographical scale, from site based to regional (provided that appropriate data is available), allowing results to be finely tuned or broad-based in nature.

The Value of Local Knowledge

PBRS demonstrates an evidence base from which planners and decision makers can make reasoned judgements on maximising public benefit through green infrastructure planning and green space provision. Some level of vision and 'entrepreneurship' is needed to make those decisions and carry out those actions which really deliver the results, and the intelligence and insights generated by PBRS need to be considered alongside local knowledge and local priorities to truly guarantee that green infrastructure investment is maximised to meet local needs and respond to opportunities.

Examples of PBRS application

PBRS has been applied in several projects to identify gaps / opportunities in provision and to target activity namely Newlands, Environmental Equity, Affordable Housing in Cumbria.

Developed by:

TEP and Forestry Commission NW, in partnership with NWDA, GONW, Defra RDS, Community Forests Northwest, and other regional and sub regional stakeholders.

Case Study 2:
East Midlands Green Infrastructure Scoping Study

The Integrated Regional Strategy for the East Midlands identifies the enhancement of Environmental Infrastructure as a key challenge for the region. Environmental Infrastructure is the overall framework that provides for the sustainable use of environmental resources (minerals and water), waste management, sustainable travel and construction, and a high quality built and natural environment. Green Infrastructure is a central component of Environmental Infrastructure and has been identified as the first priority for improved action across the region.

Foundations for a GI Network

The success of the study in achieving its objectives is a direct result of the constructive and enthusiastic input of organisations working at all levels across the East Midlands through Stakeholder Workshops and dialogue. However, this study marks the beginning of a long but vital process. Success will rely on the commitment of stakeholders to act upon the recommendations arising from the study, which are commended to the region by the East Midlands Regional Assembly Environment Group.

Strategic Fit

The role of green infrastructure in contributing to sustainable development and prosperity, in conjunction with wider environmental provision and considerations, is reinforced by its strong fit within key national and regional policies. At a regional level, green infrastructure sits firmly as a spatial and thematic concept, reinforcing the objectives and priorities of the Integrated Regional Strategy, the Regional Environment Strategy, the emerging Regional Spatial Strategy and the Regional Economic Strategy.

Identifying Existing Green Infrastructure Typology and Function

Mapping commenced with the identification of green infrastructure 'typologies' (categories of greenspace) through aerial photography interpretation. A wide range of spatial data was then analysed to determine the role of each greenspace in relation to a range of economic, social and environmental themes. This analysis identifies which spaces have multiple functions or important single functions, and also where physical intervention might unlock further functions that are not presently apparent.

Delivery Impediments

- The misalignment of key policy drivers and funding mechanisms, most notably in relation to the restrictive nature of single pot funding criteria which focus heavily on direct economic outputs
- A lack of consistent understanding of the principles and benefits of green infrastructure across the region
- Land and environmental constraints relating to the resource intensive nature of negotiations with landowners, the need for long-term stewardship that may extend beyond the capacity or interest of landowners, which is exacerbated by a paucity of revenue funding mechanisms for asset management
- The prevailing silo mentality of many public sector organisations resulting from the separation of functions and geographic remits between departments

Key Recommendations

Several measures can be implemented by partners in the region to overcome many of the issues relating to green infrastructure mapping and delivery of enhanced greenspaces. They include:

- Stakeholders need to coalesce into a GI Network, to help drive the agenda on Green Infrastructure forward
- Bring together the Green Infrastructure Network to develop a public benefit assessment framework that is aligned to the multi-functional role of Green Infrastructure in order to determine strategic priorities
- The policies that support green infrastructure at a national and regional level should be reflected in the Regional Economic Strategy and flow through to sub-regional and local policies and plans.
- The GI Network should work to ensure sub-regional plans reflect regional and national level plan focus
- A central data resource should be created within the region that is owned by the GI Network i.e. a regional digital data exchange portal that allows organisations to download spatial datasets for synthesis in a GIS platform
- Mechanisms for providing long-term stewardship of green infrastructure and for accruing endowments to provide for long-term maintenance should be explored within the region and with central Government, with particular emphasis on the feasibility of a Regional Environment Fund.

Delivering Public Benefits through green infrastructure

A further study was undertaken to identify whether the Public Benefit Recording System (PBRS) could be applied to identify where the greatest public benefit could be derived from investments in Green Infrastructure in the East Midlands region.

Geographical Information Systems (GIS) were used to map where green infrastructure could contribute to the 17 social, economic and environmental objectives of the Region's Integrated Regional Strategy (IRS), resulting in the production of 'public benefit' maps.

The maps highlight particular areas within the region where social, economic, environmental and combined needs and opportunities are greatest, with the greatest depth of public benefit generally derived where greatest need and opportunity coincide and where multiple objectives may be delivered in parallel. The implications of these results were assessed in terms of priorities for the delivery of green infrastructure and the implications for the region's spatial strategy, population growth, quality of life and sustainable development, providing a firm evidence base for strategic investment in green infrastructure to deliver regional objectives in an integrated manner.

Champions and Delivery Partnership

The database of stakeholders developed through this project will form the basis of a Green Infrastructure Network (GIN) for the coordinated delivery of green infrastructure across the East Midlands region.

The East Midlands Green Infrastructure Scoping Study was prepared by TEP, IBIS Environment & Design Consultants, and Alison Millward Associates. For further information please contact TEP on 01925 844004.

Case Study 3: St Helens - Planning for the Countryside In and Around Towns

The countryside in and around towns in St Helens is significant in size and opportunity. Over half of the Borough is designated as greenbelt with additional green wedges and greenways running through the central urban core, linking town and country.

At the outset of the project, a steering group comprising the Countryside Agency, Groundwork Trust, The Mersey Forest, the University of Liverpool and St Helens Council was put in place to guide development. The Mersey Forest provided the lead and a dedicated project officer.

Initially the study area was categorised and mapped in order to build a picture of its existing functions. This drew together 96 datasets (including local authority information, habitat coverage, designations, and historic characterisation) to form individual function maps of the area. This was matched by analysis of local and regional strategies such as Transport Plans, Greenspace Strategies and Agricultural Landholdings Plans to identify policies which would help to contribute to an improved green infrastructure in and around St Helens. Policy statements were spatially articulated by linkage to individual and multiple functions through an evidence database.

Green infrastructure functions were grouped into four themes; health, education, recreation, and regeneration. These are particularly relevant to the priorities of the Community Plan and Local Strategic Partnership, and reflect wider sub-regional and local focus topics.

These themes were also used to understand the different types of needs and negative trends found in local communities which could be improved through increased accessibility to, and use of, high quality countryside in and around towns. 2001 census data, Index of Multiple Deprivation, Attitudes Questionnaire, an Open Space Audit and local expertise were used to identify needs in each thematic area. Mapping the co-existence of functions within each theme allowed multi-functional resources to be understood. Opportunity areas within the urban fringe were identified from this analysis allowing raised awareness of the significant resource already available to local people.

A landscape character assessment considered urban, urban fringe and rural landscapes, and these character areas were compared with the functions. This showed which character areas were strongly associated with particular themes and how recommendations for retaining and improving landscape character and quality could be incorporated into emerging policy for the countryside in and around St Helens. The evidence database was used in the emerging Local Development Framework process.

Recommendations were developed at three levels recognising the important positive contribution the countryside in and around St Helens can make to a range of social, economic and environmental agendas.

- Firstly, the evidence database should be maintained and updated as it provides an excellent source of information with many uses for both St Helens Council and other interested organisations
- Secondly, through the project the understanding of the urban fringe had been improved, and awareness and recognition of the importance of different functions and their inter-relationships meant that the countryside in and around St Helens should be integrated into the Local Development Framework
- Finally, recommendations specific to the issues found in St Helens within each of the themes of health, education, recreation and regeneration were developed. These ranged from making the evidence database available for schools' use to providing an integrated approach for use in considering the development of a Forest Park

The demonstration project has been a successful starting point for raising awareness and understanding of the sometimes overlooked countryside in and around towns, and the many functions and uses these areas can provide for local communities. In St Helens this approach is being taken forward through further engagement with the Local Strategic Partnership. Through the work of The Mersey Forest Team it is also anticipated that this approach will inform the planning and delivery of high quality, multifunctional green infrastructure across the Mersey belt.

For further information please contact Paul Nolan at The Mersey Forest on 01925 816217 or email paulnolan@merseyforest.org.uk

Case Study 4: CLERE Model

Barber (2005) proposed the CLERE model for multi-functional greenspace. It identifies 5 broad "types" of greenspace: community, landscape, ecosystem, recreation and economy. A detailed examination of the rationale behind each type and the associated management issues is provided.

THE 'CLERE' MODEL FOR MULTIFUNCTIONAL GREENSPACE

Function	Rationale	Typical Management issues
As an agent for **C**ommunity development and education	Local parks and green spaces help to strengthen the spirit of community amongst resident populations who share an interest in their welfare. Community involvement brings social benefits and, through an engagement with local politics, helps to conserve the quality and multifunctional use of the greenspace system. Children, in particular, are able to learn about the natural environment, and develop skills through play.	Providing venues for community events Creating opportunities for volunteers Supporting families and inter-generational mixing Creating partnerships with business and voluntary groups Enabling alternate, sociable transport routes As a focus or catalyst for participatory planning exercises
As **L**andscape to be conserved	Parks and green spaces are cultural landscapes and an integral part of the built form of urban settlements. Landscapes help to define a sense of place, local character and identity. Whole 'Cityscapes' are celebrated and action is taken to conserve their quality. More than 200 public parks are on the English Heritage Register of Historic Parks and Gardens as distinct landscapes. Natural features within the city are often conserved as landscape in their own right.	Conserving historic landscapes, woodlands and nature reserves Conserving views from and into green landscapes Maintaining structural elements such as trees, lakes and pathways Using park and green landscapes as settings for cultural activity such as outdoor theatrical and musical performances Using landscapes as an educational resource through school and volunteer programmes

Function	Rationale	Typical Management issues
As an **E**cosystem providing urban services	Green spaces provide services to the urban environment through sustaining natural process. This includes delaying flood water, moderating urban temperatures and humidity, reducing air and water-borne pollution and supporting wildlife. Their proximity for recreation and community activity helps to reduce air pollution and energy consumption generated by motor traffic.	Supporting sustainable urban drainage systems Creating and managing wildlife habitats Promoting recycling, environmental education Improving connectivity between green spaces for walking and cycling Planting for shade and wind-protection
As a **R**ecreational resource for health and well-being	Recreation is the use of leisure time to refresh and regenerate mind, body and spirit. Greenspace systems enable a wide range of recreational activity for urban dwellers, local and largely free to users. Parks and green spaces provide an escape to tranquillity and access to the healing powers of the natural world within the urban environment.	Staging events, promoting sport. Encouraging healthy lifestyles. Conserving tranquillity, providing facilities such as changing rooms, cafés & toilets Providing safe areas for children's play. Resolving conflicts between users
As a contributor to the local **E**conomy	Good quality greenspace enhances property prices, and the value of the taxable urban asset base. Recreational use contributes to raising productivity, saving on the cost of medical care, and promoting domestic and social harmony. Increasing community involvement and programming diversionary activity can reduce crime. Greenspace can help to promote tourism and create a favourable image of place to encourage inward investment and improve recruitment and retention of staff. It can help to nurture skills such as food production, horticulture and nature conservation craft skills.	Monitoring surrounding property values Contributing to tourism Promoting diversionary youth activity schemes Running health and education programmes in partnership with local employers and schools Promoting and marketing recreational opportunities Creating opportunities for conservation and horticultural skills development

Case Study 5:
The North East Green Infrastructure Planning Guide

Partners in the North East of England have produced a Green Infrastructure Planning Guide, facilitating the production of geographically based green infrastructure plans, and providing practitioners with a more informed and systematic way of considering the competing priorities of green infrastructure within the spatial planning process.

The Guide presents a 10 step guide to the use of Geographic Information Systems, resulting in a baseline green infrastructure typology map.

This can then be used as a tool to support planners in making informed judgements about green infrastructure within their area of responsibility, identifying 6 key questions which must be considered once the baseline map is established (some of which will require extra GIS datasets to be combined with the baseline green infrastructure typology):

- What green infrastructure elements must be protected?
- What elements should be changed in character or enhanced?
- Where is there a need to create new elements and what type should they be?
- Where should the development of grey infrastructure be integrated with green infrastructure?
- Which elements should be linked together?
- Which elements are possibly tradable to achieve net environmental gains in both an infrastructure and qualitative sense?

The questions are based on a matrix that considers quality and infrastructure to provide a clear but flexible framework for the assessment of individual green spaces and links and their interrelationships. The 'quality' elements distinguishes between low, acceptable and high quality greenspaces, while the 'infrastructure' axis focuses on connectivity and integrity of the networks which combine to form infrastructure – with a high quality green infrastructure recognised as high quality green spaces and routes that are linked together to form coherent, multi-functional networks.

This approach provides users – including planners, strategists and policymakers, landscape architects and regeneration specialists – with a flexible technique that will assist in establishing those existing green infrastructure resources that should be conserved, those which should be enhanced or changed, and where new green infrastructure should be created.

Developers:

Northumbria University, North East Community Forests, University of Newcastle Upon Tyne, The Countryside Agency (Landscape, Access, Recreation), English Nature, Forestry Commission, Groundwork. Available at www.necf.org.uk/inc/getDoc.php?id=46

Case Study 6:
The Green Infrastructure of Yorkshire & the Humber

The Countryside Agency and Groundwork's Countryside In and Around Towns (CIAT) Vision provided the basis for this regional study to map green infrastructure assets and explore those policies and mechanisms by which green infrastructure is recorded, protected and enhanced.

Approach taken

Using GIS software, comprehensive mapping of green assets was undertaken, allowing the region to be assessed as to where any gaps in green space provision lay and identifying options on how green infrastructure potential could be better realised. An analysis of relevant strategies and plans from the local to the national level determined not just where green infrastructure was represented and supported, but also how it was 'joined up' in policy and its promotion in the region's emerging spatial planning framework.

Key Findings

The study found that there is great potential for the development and application of a green infrastructure approach in Yorkshire and the Humber.

GIS technology was considered to be an effective tool for mapping both the extent of and potential for green infrastructure, and a useful method for future policy development, especially in relation to Countryside In and Around Towns. However, the indication was that there was scope for much more joined-up thinking about green assets, how to link them into networks and how to better realise their potential contribution to the region.

Recommendations

The development of green infrastructure approaches in Yorkshire and the Humber was considered both an achievable and realistic progression from the current situation, but that certain recommendations would have to be acted upon:

- An agreed definition of green infrastructure and the green infrastructure approach (as suggested in the study's report) should be adopted across the region
- The commitment of key regional stakeholders to the green infrastructure approach should be explicitly reflected in regional strategies, most urgently the Regional Spatial Strategy
- GIS and related data should be gathered and held as a central regional resource to help map and support regional green infrastructure development
- Natural England in Yorkshire and the Humber should continue in the development and promotion of both the CIAT agenda and the green infrastructure approach, particularly in promoting urban-rural connectivity aspects
- Regional ecological structure and recreational routes networks should be mapped, using an inclusive approach that would result in a 'people's map' of green infrastructure, encourage participation in local spatial planning and help build community cohesion
- Key mainstream funding bodies should seek to provide substantial and reliable financial support for NGOs and communities to undertake locally important green infrastructure projects

- A Green Infrastructure Pathfinder Project (GIPP) should be supported to test out alternative ways to realise the green infrastructure approach on the ground, and to explore the potential for local communities and enterprises to become actively involved and take ownership of local green spaces
- A regional Green Infrastructure Network should be established, developing a strong and diverse partnership that can pursue the green infrastructure approach, secure 'buy-in' of and ownership from key stakeholders, and to act as a signpost to green infrastructure resources and advice

www.yhub.org.uk/resources/Statutory%20Bodies/CIA-report-July06.pdf

4.0 Green Infrastructure in Relation to Emerging Northwest Policy and Strategy

National, regional and sub-regional documents set the ethos of green infrastructure planning and stimulate strategic actions. Four key regional documents with a strong influence on green infrastructure are outlined below. These are followed by a table listing a number of types of document which were identified during consultation on this Guide which can help green infrastructure practitioners identify the priorities for their area of search and scale of influence.

Regional Spatial Strategy

Draft Regional Spatial Strategy policy EM3 on green infrastructure states that plans, strategies, proposals and schemes should;

- Identify, promote and deliver multi-purpose networks of greenspace, particularly where there is currently limited access to natural greenspace or where connectivity between these places is poor

And

- Integrate green infrastructure provision within existing and new development, particularly within major development and regeneration schemes

This policy is also cross referenced to draft policy EM4 on Regional Parks and RT7 which promotes a regional framework for walking and cycling. There are also numerous references within the Regional Spatial Strategy and its policies to high quality design, improving local environmental quality, cleaning and greening neighbourhoods and developing sustainable communities, including within its sub-regional development frameworks.

When adopted, the statutory nature of the Regional Spatial Strategy will mean policy EM3 will eventually form part of the development plan.

Regional Economic Strategy

Two transformational activities within the Regional Economic Strategy relate directly to green infrastructure. They are;

- Transformational activity 113 – Develop the economic benefit of the region's natural environment through better alignment of environmental activities and economic gain
- Transformational activity 119 – Invest in quality public realm/greenspace/environmental quality focussed on the cities of Liverpool, Manchester and Preston; Tourism "Attack Brand" and "Signature Project" locations and key arrival points; Housing Market Renewal and Urban Regeneration Companies; Key Rural Service Centres

In addition, delivering more, higher quality and improved functionality of green infrastructure relates to a number of other activities within the Regional Economic Strategy. These include;

- Improving regional image
- Adapting to climate change
- Reducing worklessness
- Reducing long term health related work absences

Regional Rural Delivery Framework

The Regional Rural Delivery Framework Priority 6 concerns;

- Enhancing the quality of, and promotion of, our rural environmental inheritance

Outcome 6.3 calls for;

- Maximising the contribution the rural environment can make to the economic and social wellbeing of the region, where the natural and historic environment is an integral component and recognised for the socio-economic benefits it provides

Key Objective 6.3.4 calls for;

- The development and implementation of a strategic approach to planning and delivering more and improved green infrastructure

Improved provision and functionality of green infrastructure relates to many of the objectives within RRDF Priority 6 as well as those within Priority 2 (promoting a prosperous sustainable farming and food sector that contributes to the environment and social wellbeing of the region).

Regional Forestry Framework

The development of more, higher quality and improved multi-functional green infrastructure relates to many of the priorities set out in the Regional Forestry Framework, including those under;

Action Area 2 – Regional Image.

Action Area 3 – Biodiversity and Landscape.

Action Area 4 – Health, Well-being and Quality of Life.

Action Area 5 – Climate Change and Energy

Policy and Strategy Documents which can influence the direction and purpose of green infrastructure planning	Scale of Influence		
	Ethos-setting	Strategic	Local
Kyoto Protocol	✔		
Regional Economic Strategy	✔	✔	✔
Regional Spatial Strategy	✔	✔	
Regional Forestry Framework	✔	✔	
Regional Rural Delivery Framework	✔	✔	
Northwest Plan for Sport and Physical Activity		✔	
Water Framework Directive	✔		
National Park & AONB Statutory Management Plans		✔	✔
Environmental Stewardship Agreements			✔
City Region Development Plans		✔	
Sub-Regional / Community Forest Woodland Plans and Visions		✔	
Health Improvement Plans		✔	
UK Biodiversity Action Plan & NW Biodiversity Audit	✔		
Local Biodiversity Action Plans			✔
Shoreline Management Plans			✔
Community Forest Plans	✔	✔	✔
Integrated Coastal Zone Management Plans	✔	✔	
River Catchment Management Plans		✔	
PPS9: Nature Conservation	✔		
PPG17: Open Space Audits	✔		✔
Land Regeneration Strategy (NWDA)	✔	✔	
NW Climate Change Action Plan	✔		
Market Town Action Plans			✔
Parish Plans			✔
Greenspace Strategies			✔

5.0 Useful Sources of Information and References

The following section aims to provide some background information, evidence and relevant contacts for those practitioners who may not yet have been involved in green infrastructure planning or management but who will be integral to the successful development of green infrastructure. It also sets out some key literature references that provide a starting point for thinking how green infrastructure may help you derive benefits for your own work.

NW Green Infrastructure Unit

The NW Green Infrastructure Unit is a partnership between Community Forests Northwest and Natural England. The Unit exists to develop and promote green infrastructure concepts and planning in the NW region.

A regional website is maintained by the NW Green Infrastructure Unit. The website provides a central resource for information on green infrastructure in the NW including projects ongoing (this guide is available to download). It will continue to be developed into a regional resource and can be accessed at www.greeninfrastructurenw.org.uk

NW Green Infrastructure Think Tank

The NW Green Infrastructure Think Tank is a group established by the Green Infrastructure Unit that exists to provide cross-sectoral technical advice and feedback on developing regional green infrastructure approaches and activities. The group is drawn from a variety of practitioners, academics, policy makers and agencies relevant to green infrastructure.

NW Green Infrastructure Forum

The Green Infrastructure Forum is an open Forum for discussion of GI concepts, development of technical information and showing of ideas.

References

- A better quality of life – a strategy for sustainable development in the UK (1999), DETR
- Barber A, (2005) Green Future, GreenSpace Publications
- Barker, G (1997) A Framework for the Future: green networks with multiple uses in and around
- towns and cities. Research Report No. 253, English Nature, Peterborough
- Bartlett School of Planning (2004) Vision for a sustainable multi-functional rural-urban fringe
- Biodiversity by Design: a Guide for Sustainable Communities (2004), Town and Country Planning Association (http://www.tcpa.org.uk/biodiversitybydesign/index.htm)

- Brandt J, Tress, B and Tress, G (eds) (2000) Multifunctional landscapes: interdisciplinary approaches to landscape research and management, Centre for Landscape Research, Roskilde University, Denmark
- CABE Space (2004) Green Space Strategies: A Good Practice Guide
- Countryside Agency and Groundwork UK (2005). Vision for the Countryside in and Around Towns, Countryside Agency publications
- East Midlands Green Infrastructure Scoping Study (2005), East Midlands Regional Assembly and partnership
- Enriching Our Region: an Environmental Manifesto for the West Midlands (2005), West Midlands Regional Sustainability Forum (http://www.cprewm.org.uk/EnvManifesto.pdf)
- Green Infrastructure for the Liverpool and Manchester City-regions (2005), Community Forests Northwest & The Countryside Agency
- Green Infrastructure Strategy (2006), Cambridgeshire Horizons. (http://www.cambridgeshirehorizons.co.uk/Document_links_det.asp?id=3433)
- Green Infrastructure for Sustainable Communities (2005), Environment Agency, Countryside Agency & Partners (http://www.culturesoutheast.org.uk/media/uploads/18/4%20Pager.pdf)
- Green Spaces, Better Places (2002), The Urban Greenspaces Taskforce, DTLR
- Greenhalgh, L and Worpole K (1995), Park Life: Urban Parks and Social Renewal, Comedia and Demos
- Harrison C, Burgess J, Millward A and Dawe G (1995) Accessible Natural Greenspace in Towns and Cities. Research Report No. 153, English Nature, Peterborough
- Nature for People: the importance of green spaces to East Midlands communities (2004), Research Report No. 567, English Nature, Peterborough
- Nature Conservation and Local Community Strategies (2003), English Nature Leaflet

POTENTIAL ROLES FOR THE GI PLAN

Potential Role	Specific element of the GI Plan	Usage
GI Plan as part of the LDF	All	GI Plans as described this guide can form a part of the Local Development Framework, as a Core Policy, Supplementary Planning Document or potentially as part of an Area Action Plan.
Providing a GI evidence base	Functional Assessment and Needs Assessment	Bringing together the needs and current functions information and mapping these provides a powerful evidence base to show where there is good/poor provision of functionality against the identified needs (which may be economic, social or environmental).
Plan for predicting change	GI Spatial Plan, Functional Assessment and Needs Assessment	Use of GIS to analyse the Functional Assessment and Needs Assessment provides a tool that can be used to model how change to an area (e.g. new development) may impact on the functionality in the vicinity and how that in turn either increases or reduces provision against the assessed need. This can support the decision making process and, depending on the sophistication of GIS, can allow several scenarios to be developed.
Plan for targeting intervention	GI Spatial Plan, Functional Assessment and Needs Assessment	GI Spatial Plan highlights areas where intervention is required.
Plan for engaging stakeholders	GI Spatial Plan, Functional Assessment and Needs Assessment	The Functional Assessment and Needs Assessment provides the evidence base that enables issues to be discussed sensibly with stakeholders about the need for intervention (or why non intervention is the option).
Plan to engage and involve local communities	GI Spatial Plan, Functional Assessment and Needs Assessment	As for stakeholders.
Basis for discussion on funding allocations/ funding bids	GI Partnership, GI Spatial Plan, Functional Assessment and Needs Assessment	A widely owned, evidence based and spatially articulated plan provides a good basis for preparing funding strategies and bids as well as discussing funding priorities with government bodies.

The North West Green Infrastructure Think Tank Partners:

CABE Space

Cass Associates

Cure

Environment Agency

Forestry Commission

Government Office North West

Green Space North West

Groundwork

Natural England

North West Regional Assembly

Red Rose Forest

TEP

The Mersey Forest

University of Salford

North West Green Infrastructure Guide

PREPARED BY THE NORTH WEST GREEN INFRASTRUCTURE THINK TANK