GREEN INFRASTRUCTURE PLANNING GUIDE

Version: 1.1

northumbria UNIVERSITY

NORTH EAST COMMUNITY FORESTS

UNIVERSITY OF NEWCASTLE UPON TYNE

The Countryside Agency Landscape Access Recreation

ENGLISH NATURE

Forestry Commission

GROUNDWORK CHANGING PLACES CHANGING LIVES

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Front Cover Photograph

West Park, Darlington courtesy of Bussey & Armstrong

Abbreviation

Green Infrastructure is frequently abbreviated to as GI and Green Infrastructure Planning as GIP.

Contents

1. Introduction to the Planning Guide

The aim of this Planning Guide is to provide a method by which those interested and involved in pushing forward the development of green infrastructure planning on the ground might develop their own green infrastructure plans. The purpose of the guide is to facilitate the production of geographically-based green infrastructure plans. It is intended that this method might help to provide a more informed and systematic way to consider the competing priorities of green infrastructure within the spatial planning process. The objective is also to provide a catalyst for discussion and for the exploration of methods of green infrastructure planning – it does not aim to provide a prescriptive methodology, but a flexible technique that can be moulded to fit 'real world' requirements.

A short background to green infrastructure is provided, but the main body of this Guide is based on a step-by-step description of the use of Geographic Information Systems (GIS) in order to achieve (a) a baseline green infrastructure map, and (b) a framework whereby six major questions can be addressed in order to establish what should be conserved in the existing environment, what should be enhanced or changed and what or where new green infrastructure should be created.

It is anticipated that the majority of users of this guide are already engaged with aspects of geographical or functional based planning including: Strategists and policymakers; town & country planners engaged in local authority planning and private practice; environmental sector professionals; landscape architects and landscape planners, regeneration specialists, consultants; research students.

2. Definition and Principles of Green Infrastructure

Green infrastructure (GI) is a term that can mean different things to different people and there are a number of definitions available. There is a significant amount of common ground within the available definitions, (a) that GI involves natural and managed green areas in both urban and rural settings (b) is about the strategic connection of open green areas and (c) that GI should provide multiple benefits for people. Stakeholders were asked to formulate a GI definition for use in the development of this guide; the result was a robust and inclusive definition:

Green infrastructure is the physical environment within and between our cities, towns and villages. It is a network of multi-functional open spaces, including formal parks, gardens, woodlands, green corridors, waterways, street trees and open countryside. It comprises all environmental resources, and thus a green infrastructure approach also contributes towards sustainable resource management.

3. Context and Functions of Green Infrastructure

At a general level five broad sets of interests in GI can be identified:

1. Sustainable resource management – particularly relating to the role of GI in the sustainable management of land and water resources, including production (e.g. energy and food crops), pollution control, climatic amelioration and increased porosity of land cover.
2. Biodiversity – particularly relating to the importance of connectivity of habitats at a variety of landscape scales;
3. Recreation – particularly relating to greenways and the use of non-car routes to address public health and quality of life issues;
4. Landscape – examining resources such as green spaces and corridors from aesthetic, experiential and functional points of view;
5. Regional development and promotion – particularly relating to sustainable communities issues relating to overall environmental quality and quality of life.

4. Characteristics of Green Infrastructure

There is a grey-green continuum of thinking relating to concepts surrounding 'infrastructure', although 'green' can be used to denote the function or facility provided by an element, even if it is not strictly 'green' in land use terms. It is suggested therefore that the definition of 'grey' as fundamentally distinct from 'green' may not be altogether helpful, and that, like a colour chart, we can move through a range of shades (see Figure 1): in the middle is grey/green e.g. cycleways.

Elements that might be classed as 'grey', but which contribute to the wider functioning of green infrastructure should be treated as part of the green infrastructure network. Grey infrastructure, such as bus routes, should be made to integrate with green infrastructure networks rather than vice-versa.

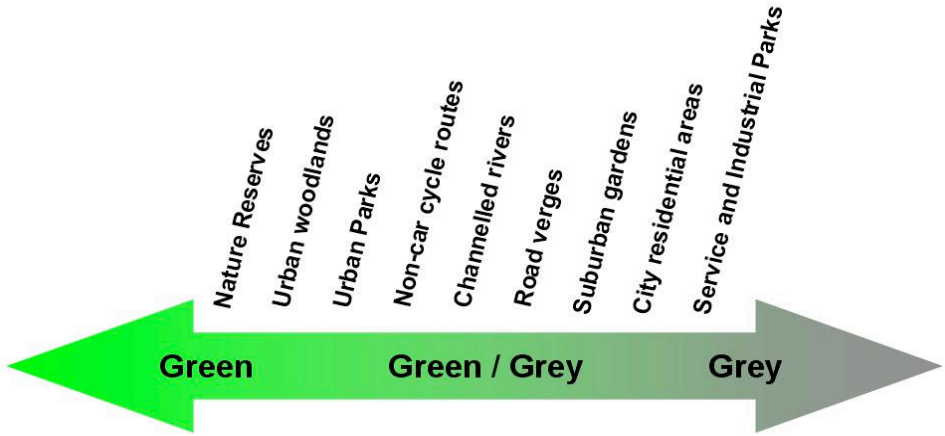

Figure 1: The Grey-Green continuum

One of the problems encountered in considering green infrastructure planning is that it is often hard to visualise and therefore may not be accounted for properly. The green-grey continuum concept may help to overcome the lack of obviousness of green infrastructure compared to grey infrastructure, which is well understood in the planning process.

5. The Typology of Green Infrastructure as developed by stakeholders

Stakeholders in the North East of England formulated a GI typology to be used in planning guide:

Arable
Horticulture
Stock grazing
Energy crops
Orchards
Set-aside and fallow

Amenity woodland
Conservation woodland
Productive woodland
Biomass woodland

Active and disused mineral workings and quarries

Public Parks and Gardens
Public Amenity Green space
Public provision for children and young people (e.g. play areas)
Outdoor sports facilities

Allotments, community gardens and urban farms

PRoWs
Permissive RoW
Greenways (off-road)
Quiet Lanes (on-road)
Defined Cycle Routes
Canals

Cemeteries, disused churchyards and other burial grounds

Domestic Gardens
Residential Institution Grounds
Hospital Grounds
Places of Worship Grounds
School & College Grounds

Restricted access green spaces (e.g. retail park settings)

Controlled access green spaces (e.g. airports and military training land)

Land identified for development
Other vacant land
Contaminated Land
Other Derelict Land

Rivers and Streams
Lakes & Ponds
Reservoirs
Wetlands
Inter tidal zone
Beaches & Dunes
Scrub land
Heathland & Bog

6. Helpful History

It has been suggested that green infrastructure, a concept that is has come to the fore since 2000, is in fact 'old wine in new bottles'. A more positive view might be that green infrastructure has its roots in thinking that goes back several decades. The most significant antecedents are:

Basic connectivity studies in Geography which used links, segments and nodes to describe networks, a language now commonly used in Geographical Information Systems (GIS).

The Tradition of Urban Parks: The human-centred thinking related to improving health, increasing access to wildlife, and providing scenic settings led to the establishment of urban parks and then later to the idea of linked green spaces and 'nature-like' landscapes in residential areas. The emphasis here was on providing a green structure based on ecological principles.

Urban Forestry: Urban forestry is a broad term which is sometimes used to refer to street trees and wooded areas in urban parks, but also now covers the interest in natural processes of establishment rather than tree planting per se. It is also used to describe larger landscapes often found on urban fringes which reflect a traditional forest pattern of trees and open land, and a multitude of land uses and landscape features such as is found in Community Forests in the UK.

Landscape Ecology: a discipline that takes a multi-scaled view of human, biotic and abiotic influences on the development and planning of landscapes. There have been multiple definitions, but the consideration of interacting systems across multiple scales and both human and non-human systems (and values) are characteristic. Connectivity is a key concept in landscape ecology thinking and planning.

Ecological Networks: the literature on ecological networks is extensive (for example Jongman and Pungetti, 2004). Ideas sprang from the need to reduce the isolation of species in human-dominated landscapes, and to understand the importance of spatial scale and provide for the migration and dispersal of species as well as the protection of large core areas such as ancient woodlands.

Greenways and Green corridors: these two concepts are often treated effectively as one, as they are both focused on the provision of opportunities and linear routes with a wide range of characteristics and uses particularly relating to recreation and commuting. Local use of greenways has emerged as a particularly important characteristic with resonance to GI thinking relating to the importance of spatial targeting of green investments where social as well as environmental needs are high. Greenways have been allied with ecological corridors because as they are both based on concepts of connectivity. But although greenways (with a recreational emphasis) and ecological networks (with a habitat and species conservation emphasis) may, at a very basic level, seem similar – they are linear features dominated by vegetation rather than hard human developments – in reality they may be largely mutually exclusive in their detailed prescriptions, especially where species are disturbance-sensitive.

Ecological footprints: The ecological footprint is a measure of how sustainable our life-styles are (Wackernagel and Rees, 1995). It is a concept that has recently attracted increased attention (e.g. www.myfootprint.org and WWF Northern, 2005 and WWF, 2005), not least because it is an effective way to encourage people to visualise the environmental impacts of their lifestyles (see Figure 2).

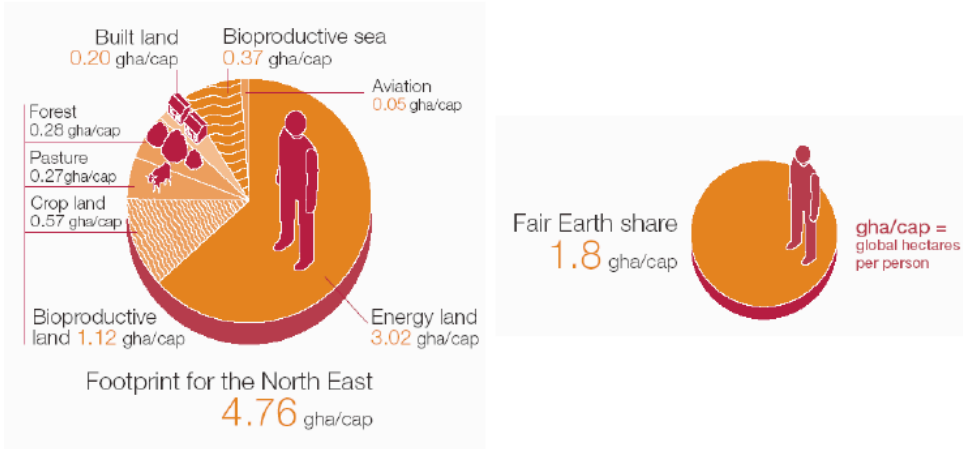

Figure 2: Ecological Footprints (source: WWF-Northern, 2005)

Sustainable development: although this is not directly an antecedent to green infrastructure but the language of sustainable development sets the context for environmental planning. Green infrastructure should be seen in the context of initiatives that aim to render current land use patterns and practices more sustainable. Figure 3, based on Rannikko (1999), emphasises that sustainability is multi-dimensional.

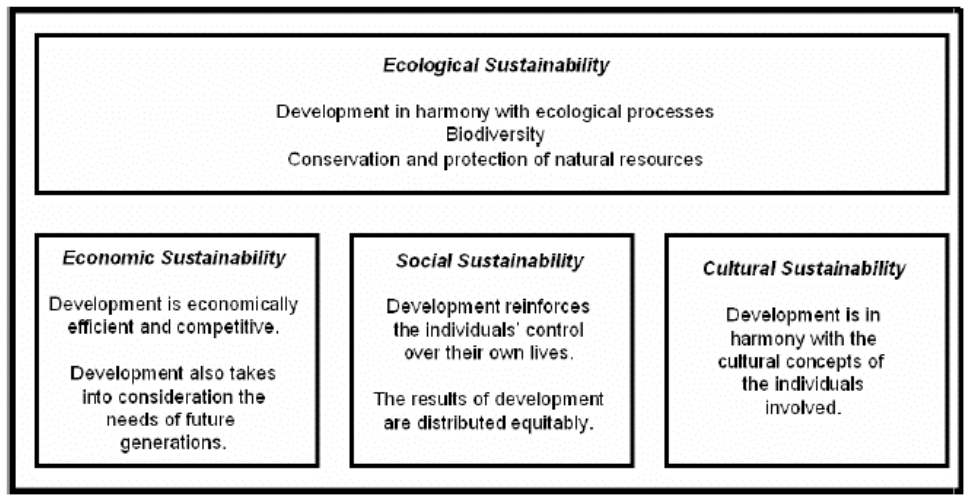

Figure 3: Dimensions of Sustainable Development (after Rannikko, 1999)

Multi-functionality: The Countryside In and Around Towns (CIAT) vision (Countryside Agency and Groundwork UK, 2004) focuses on multi-functionality and identifies a wider set of potential functions for development and enhancement in the urban fringe and areas of land that link urban and rural areas. These include:

- A bridge to the country
- A gateway to the town
- A health centre
- A classroom
- A recycling centre
- A power plant
- A productive landscape
- A place to live sustainably
- An engine for regeneration
- A nature reserve
- A heritage resource

Many of these concur with green infrastructure thinking. Green infrastructure can therefore be seen as a key delivery mechanism for multi-functionality. A range of commonalities can be identified:

1. Aesthetics: developments should be appropriate and of a high quality
2. Enjoyment: ideally 'people will wish to linger rather than move through and exit as rapidly as possible' (Gallent et al., 2004, p.iv)
3. Partnership: defining and realising objectives must be done in partnership with local communities and other interest groups
4. Balance: potential conflicts must be identified and cumulative impacts managed
5. Linkages: physical linkages lie at the heart of green infrastructure but linkages between dimensions of sustainability, quality of life and policy areas must also be identified and fostered
6. Functionality: the CIAT is not, and should not be, a museum
7. Meaning: developments that have little resonance or relevance for local communities are not sustainable
8. Opportunity: opportunity is the precursor to use and it relates to access
9. Image: how things look is important, both internally and externally
10. Viability: this relates closely to meaning and functionality, but developments have to be sustainable in practice as well as attractive in principle
11. Vision: green infrastructure is more than the sum of its parts and multi-functionality goes beyond coexistence, to consider integration, interaction and inclusion.

Community Forests: Green infrastructure is the logical extension of the concepts underpinning the development of Community Forests in urban fringe environments. These are based on a multifunctional approach to the management of the countryside in and around towns and based upon delivery through as partnership led approach. In some cases existing Community Forest partnerships are an obvious structure on which to deliver green infrastructure plans.

7. Liveability of Cities of the Future

Liveability has been defined in terms of interaction between a community and the environment (Shafer et al., 2000).

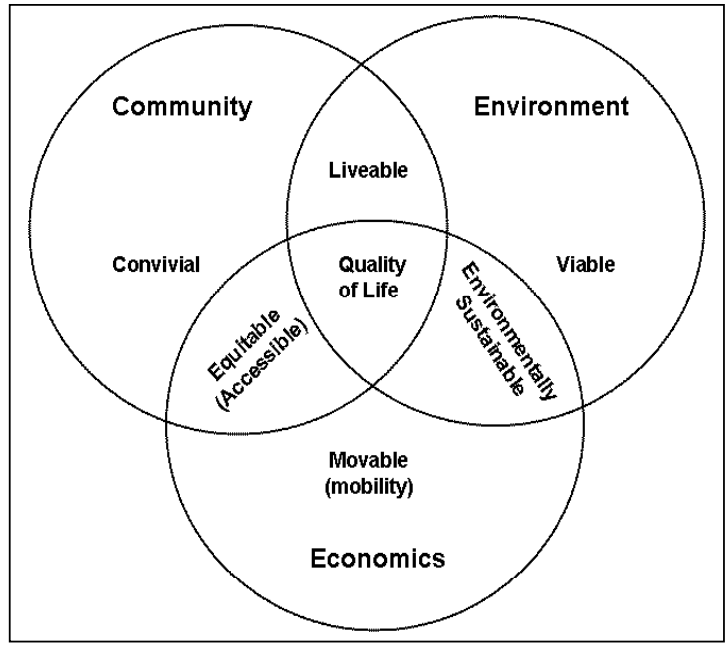

Figure 4: A human ecological perspective on the factors that contribute to community quality of life (Source: Shafter et al., 2000)

Access and positive engagement with local environments that service the range of communities' *wants and needs* define liveable areas.

Green infrastructure can address many of the objectives identified by the need to make cities more liveable. When applying overarching concepts (including Green Infrastructure) there is a requirement to analyse, define and disaggregate the concept if the attainment of 'liveable areas' is to be expressed through (spatially specific) plans.

Such plans need to address both personal objectives (e.g. an attractive, accessible and meaningful local environment) and wider social and governmental objectives (e.g. promoting healthy living and managing the long term finances of health care for an ageing population).

Three different 'qualities' are referred to in a range of policy papers and strategic documents, often from very different areas of government: *quality of place, quality of environment and quality of life*.

Green infrastructure has the clear potential to support the attainment of places, areas and communities that exhibit these qualities. There are definition and measurement issues in relation to all three, but, Quality of place refers to the image of an area as it is projected externally and how this image reflects positive resources and opportunities within an area.

Quality of environment is relatively self-evident, but it is comprised of both elements such as clean air and water and biodiversity where indicators are well established and more 'experiential' aspects in relation to noise, landscape and tranquillity.

Quality of life relates to a wide range of opportunities, for example, education, health and employment, but local environments are increasingly recognised as being extremely important in relation to quality of life in just the same way that the regional environment has very positive implications for quality of place. Green infrastructure is of key importance to all three.

8. Reference Standards

There are a range of useful reference standards that can be used in connection with GI planning:

- Accessible Natural Greenspace Standards - Promoting the Natural Green structure of Towns and Cities, *English Nature*
- Green space Strategies: A Good Practice Guide, *CABE Space*
- Planning Policy Guidance 17: Assessing needs and opportunities for open space strategies (Companion Guide), *ODPM*
- Six Acre Standard: *National Playing Fields Association*
- Space for People Targeting action for woodland access: *Woodland Trust*

<u>Promoting the natural green structure of towns and cities: English Nature, accessible greenspace standards model</u>

No person should live more than 300 m from their nearest area of natural greenspace of at least two (2) hectares in size;
There is provision of at least two (2) hectares of Local Nature Reserve per 1,000 population;
That there should be at least one accessible 20 ha site within two (2) km from home
That there should be one accessible 100 ha site within five (5) km;
That there should be one accessible 500 ha site within (10) km.

<u>Green space strategies: a good practice guide – Cabe Space</u>

None specific.

<u>Planning policy guidance 17 (companion guide)</u>

Example from South Tyneside (Tyne and Wear City Region):

District parks and open spaces: all dwellings should be within 3 km of an open space of at least 30 ha which provides general facilities for recreational activity within a landscaped setting.

Neighbourhood Parks and Open Spaces: all dwellings should be within 1 km of an open space of between 10 and 30 ha which provides general facilities for recreational activity within a landscaped setting.

Local parks and open spaces: all dwellings should be within 400 m of an open space of between 2 and 10 ha which provides facilities for recreation within a localised area, catering for the specific informal needs of occupants of the immediate vicinity.

Pocket parks and small open spaces: all dwellings should be within 200 m of a small formal or informal area of open space of between 0.2 and 2 ha that is suitable for informal use and has high amenity value.

Example from Fareham Borough Council

Minimum Acceptable Size Component – Chapter 6.16

Pitches: a minimum of two pitches plus changing and parking
Other outdoor sports facilities: a minimum of 0.65 ha
Local equipped areas for play: a minimum of 0.5 ha
Neighbourhood Equipped Areas for Play: a minimum of 1.0 ha
Informal play spaces: a. minimum of 0.1 ha, with no dimension less than 10 m

Six acre standard: National Playing Fields Association

A minimum standard for outdoor playing space of 2.4 hectares (6 acres) for 1000 people, comprising 1.6 hectares (4 acres) for outdoor sport and 0.8 hectares (2 acres) for children's play.

Outdoor equipped playgrounds for children of whatever age; other designated facilities for children which offer specific opportunity for outdoor play, such as adventure playgrounds; casual or informal playing space within housing areas 0.6-0.8 ha (1.5-2 acres)

Space for people targeting action for woodland access: Woodland Trust

"Woodland Access Standard" - that no person should live more than 500m from at least one area of accessible woodland of no less than 2ha in size and that there should also be at least one area of accessible woodland of no less than 20ha within 4km (8km roundtrip) of people's homes.

9. Standard for GI Planning

The English Nature Greenspace standard is regarded as having the best fit to GI Planning and is used in this guide in a modified form. The modified standard is referred to as Accessible Natural Greenspace Standard Plus; **ANGST+**. The modified ANGST standard takes account of stakeholder involvement, local decision making and connectivity, the latter being a fundamental component of all infrastructure; green or grey.

- No person should live more than 300 m from their nearest area of natural greenspace of at least two (2) hectares in size;
- There is provision of at least two (2) hectares of natural green space per 1,000 population;
- That there should be at least one accessible 20 ha site within two (2) km from home
- That there should be one accessible 100 ha site within five (5) km;
- That there should be one accessible 500 ha site within (10) km.
- That adjacent greenspaces are interconnected; the priority and extent being determined by local decision making informed by stakeholder involvement.

10. Why Green Infrastructure Planning

Green infrastructure planning represents the coming together of various interests as described above. It is not seen just as a way of providing an improved green structure for the landscape, but also as a mechanism for more informed decision-making and more 'joined-up' thinking in relation to urban and regional environmental planning.

Green infrastructure is seen as a critical part of urban infrastructure and as a positive way to conceptualise greenspace planning. The aim is to increase the quality of natural capital rather than concentrate solely on the quantity of natural capital.

Embedded within green infrastructure planning is the idea that stakeholders should have the opportunity to be involved in the shaping of environmental and greenspace planning at a variety of scales. Recent enthusiasm for pushing forward green infrastructure planning indicates that GI has become a 'muster point' for academic, public bodies and practical agencies interested in greenspace issues and a way to help develop environmental thinking across disciplinary and political boundaries.

Green infrastructure is not seen as a 'fixed' asset and the purpose of green infrastructure planning is to:

- Value existing green areas and prevent deterioration
- Improve the quality and diversity of these areas to better serve local needs
- Connect green areas to present a strategic whole that is greater than the sum of the parts
- Consider the management of all green areas under consideration, whether they are in private or public ownership.

11. Types of GI Plans

GI Plans can exist in many forms thus a robust yet flexible methodology has been devised to provide a consistent framework for these. This is based on the use of available data, the Digital National Framework, GIS techniques (which automates much of the process) and a consultative approach to planning, review and delivery. It is envisaged that the Green Infrastructure Planning guide can assist with the production of:-

- Spatial Green Infrastructure Plans in City Regions
- Strategic GI guidelines that steer decision making in the development control process
- Supplementary planning documents
- Policies embedded within Local Development Frameworks and Local Area Agreements
- Statutory and non-statutory plans produced by organisations including Natural England, Forestry Commission and Environment Agency.
- Proposals included within local Area Based Initiatives
- Proposals included within regional strategic documents.

However, these various policies, plans and related activities are carried out at spatial scales from the neighbourhood or local to the regional scale. It is important therefore to set out how green infrastructure should be identified, represented and treated at different scales of analysis and planning.

At a fundamental level of course green infrastructure is not really different at varying spatial scales; it is ultimately something that exists at a local scale, yet locally specific elements and links interact to create synergies and higher level effects that have significance at a scale greater than the local.

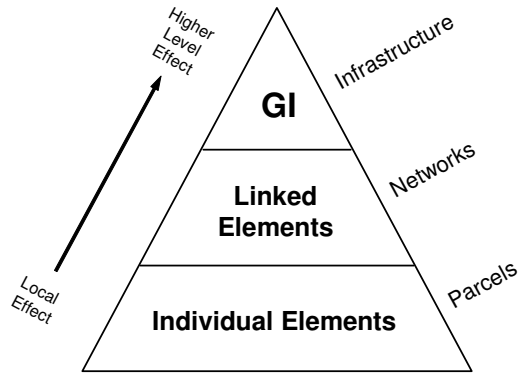

Figure 5: Parcels, Networks & Infrastructure

Underpinning the approach to GI set out in this guide is the premise that higher level effects can be realised by working at the landscape scale than can be achieved at the site-specific, very local scale. This relates to ecological, recreational, amenity and aesthetic outcomes. These higher level effects may be positive, in response to informed and coordinated planning, but they may also be negative as a failure to match the scale of planning with the scale at which problems are created will lead to a 'creeping crisis' in the loss and fragmentation of green spaces and networks. Thus, networks are comprised of parcels and links and infrastructure is effectively a network of networks. The aim is to ensure this is both coherent and of high quality.

So, the issue of scale in relation to green infrastructure is one of establishing at the regional scale what the strategic elements and links are in relation to the multifunctional demands placed upon them and then 'filling in the gaps' at a sub-regional and local level. Filling in the gaps requires that more detail is layered in at a sub-regional and again at a local scale, detail that includes elements and links that are of a commensurate level of significance, and also in a physical sense so that green infrastructure at a local scale is more comprehensive. Set out in these terms this explanation of scale is rather abstract, so the table below illustrates examples of what green infrastructure at three different scales – regional, sub-regional and neighbourhood – may be comprised of, and what the function of green infrastructure planning at the corresponding scales is.

Scale	Examples of Green Infrastructure	Function of Green Infrastructure Planning
Regional (Fig 6) (NE Region)	Nationally designated sites (e.g. NNRs, cSACs, SSSIs, National Parks, AONBs, Heritage Coasts) Major river corridors (e.g. Tyne, Tees, Wear) Major recreational and amenity sites Long distance footpaths (e.g. Pennine Way, Hadrian's Wall Path) National Cycle Network	Strategic environmental capital can be subdivided into natural resources (e.g. carbon sinks, water framework and habitat framework) and cultural resources (e.g. landscape, amenity and recreation such as National Parks and Heritage Coasts). The most significant, usually designated, areas, sites and routes of both of these resources are identified as being the regional green infrastructure. At this level the emphasis is on the identification of the highest priority elements and routes and the establishment of strategic priorities for GI development. Prescriptive details on how areas are to be enhanced or routes to be developed would be inappropriate at this level.
Sub Regional / County (Fig 7) (e.g. Tyne & Wear and Tees Valley City Regions, Northumberland & Co. Durham)	Significant or extensive public parks and gardens such as Country Parks or Forest Parks Local Nature Reserves Significant river corridors (e.g. River Coquet) Significant recreational routes (e.g. Cleveland Way) Significant coastal beaches (e.g. Druridge Bay)	At the sub-regional level the emphasis in GI planning is in identifying those elements which have the potential to qualitatively enhance the area's environment as a whole (including the perception of that environment) and where the infrastructure may be significantly strengthened by higher level initiatives that span local authority boundaries.
Borough or District (Fig 8) (e.g. Castle Morpeth or Stockton on Tees)	Public parks and gardens Other river corridors Public Rights of Way and Greenways Local cycle routes Playing fields Informal green spaces Accessible woodland Reservoirs, water bodies and wetlands Other coastal access areas	At this level GI planning is fundamentally about providing (a) suitable and sufficient green spaces for recreation, amenity and conservation purposes, and (b) a coherent infrastructure of green and green-grey links that provide routes and pathways for multiple purposes. A GI plan should focus on the infrastructure of the area as a whole and how links can provide both local benefit, and integrate with higher tier GI priorities and plans and also those of neighbouring districts or boroughs. At this level opportunities to extend GI through new, perhaps unforeseen, opportunities should be accommodated, so a degree of flexibility to respond to such opportunities is essential.
Neighbourhood (Fig 13)	Street scene (e.g. trees, flower beds) Domestic gardens Allotments and Cemeteries Small water bodies and streams Permissive rights of way Institutional or private grounds Brownfield sites with GI potential Productive farm and forest land with GI potential	At a neighbourhood level formal GI plans may not be created, but the essential principle is that the cumulative effect of many highly localised initiatives such as street tree establishment / management or the encouragement of positive use of private gardens may be considerable. In this respect the enhancement of qualities of life, place and environment at the local or neighbourhood level is a partnership between private individuals and public authorities, to a large degree, although not exclusively, on privately held land.

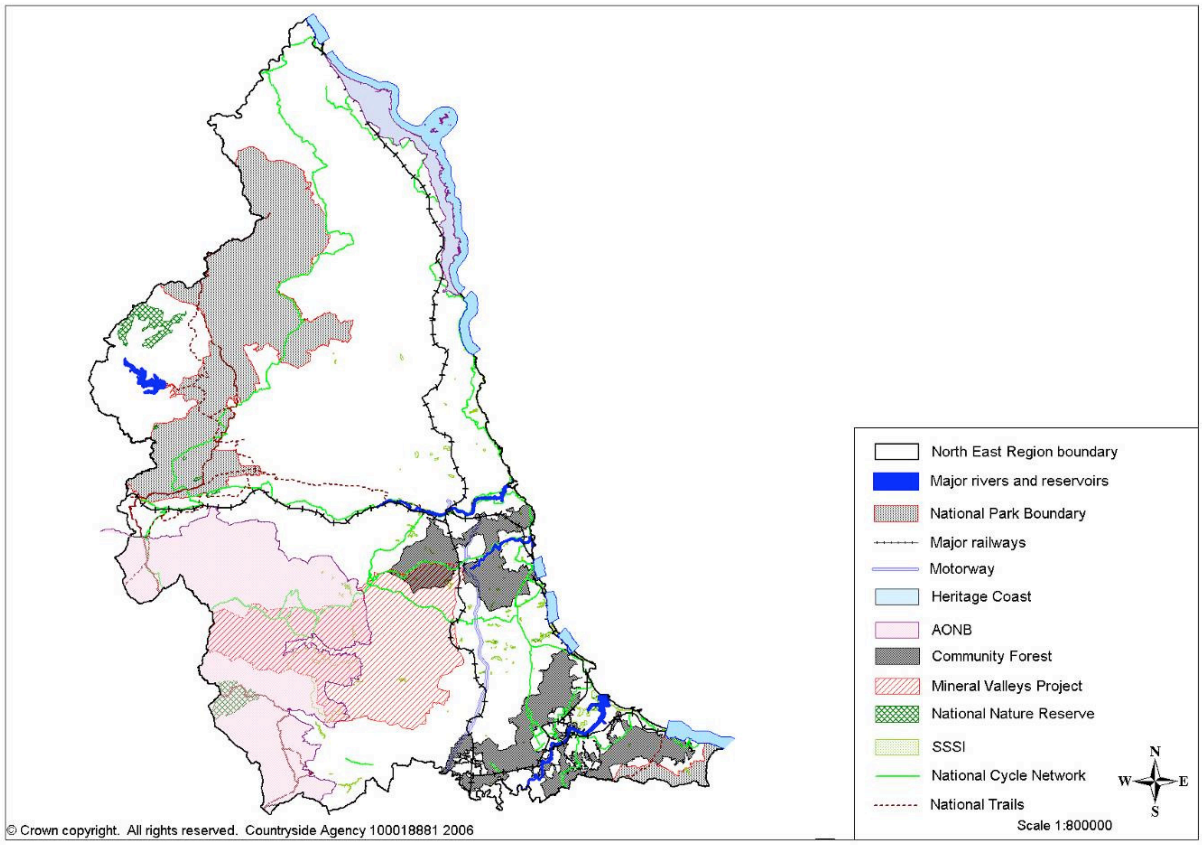

Figure 6: Regional Scale Green Infrastructure

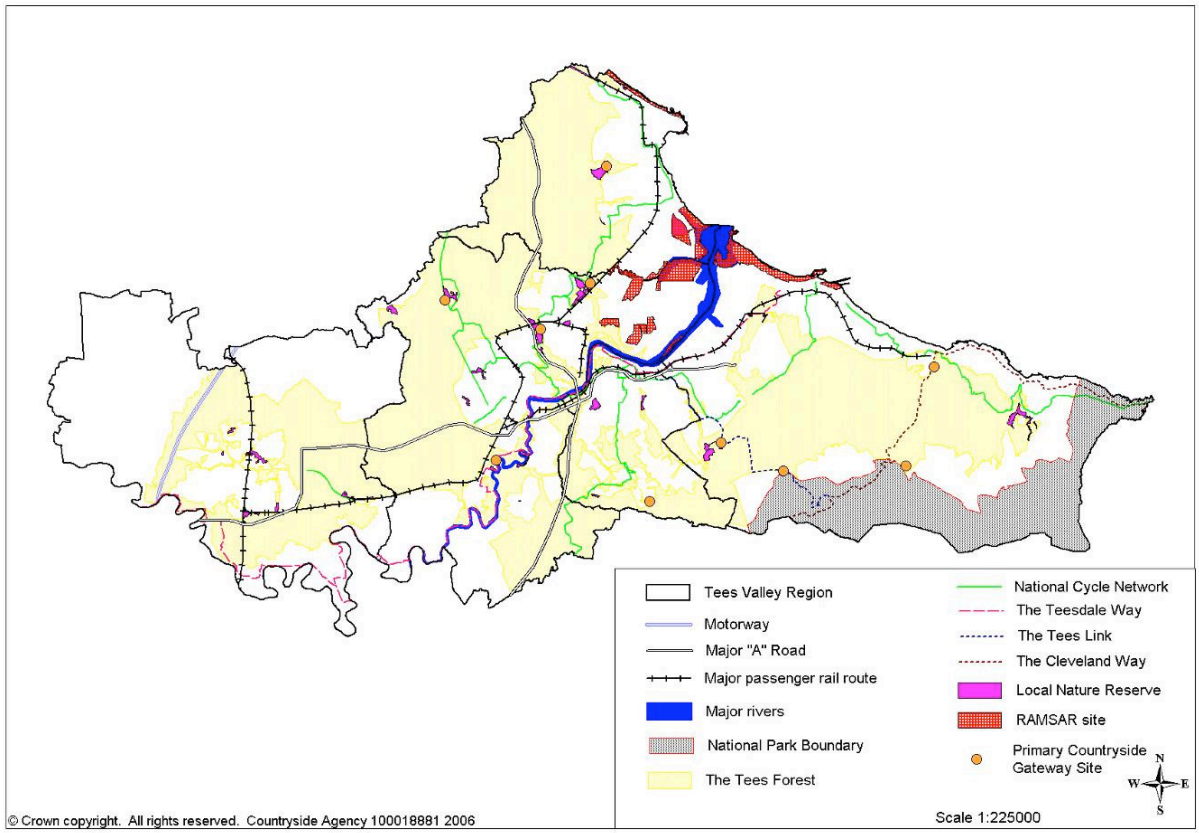

Figure 7: Sub Regional/County Scale Green Infrastructure

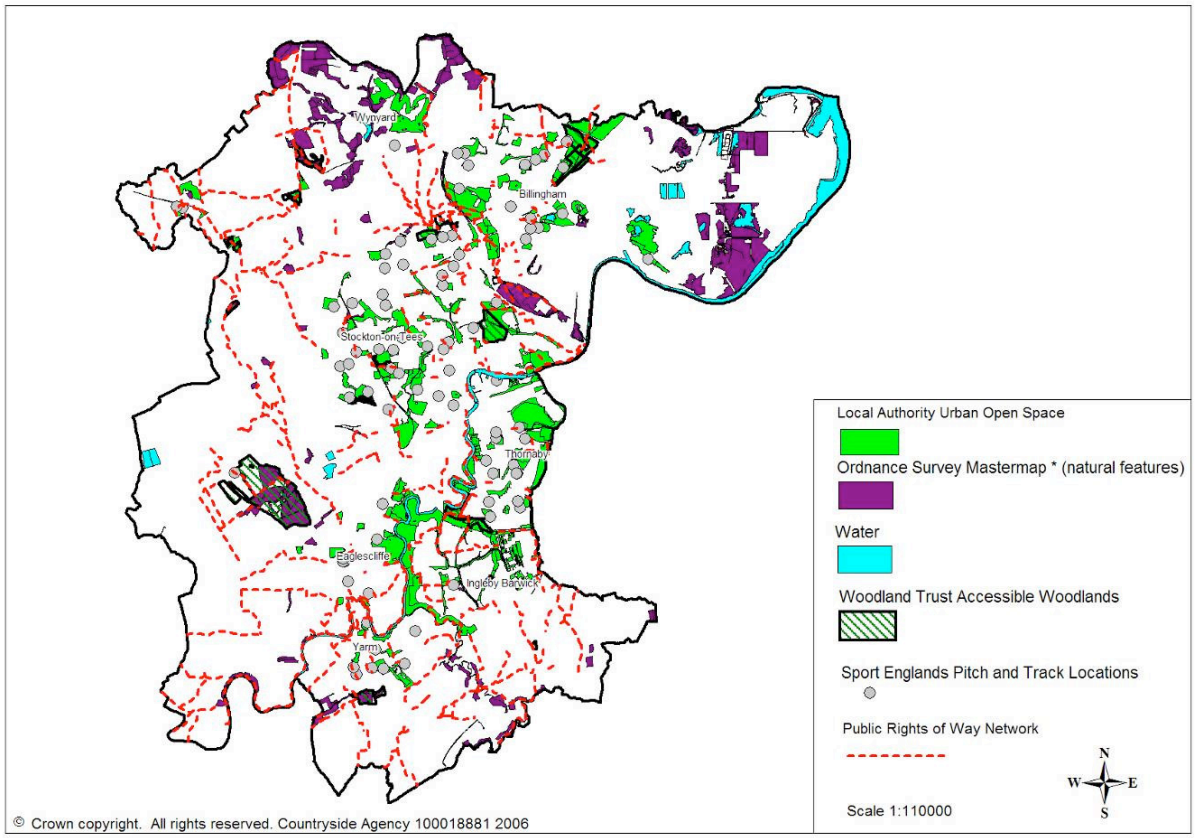

Figure 8: Borough/District Scale Green Infrastructure

12. Developing a GI Plan using Geographical Information Systems (GIS)

The first stage in the creation of a GI plan or the consideration of GI issues in relation to other planning activities has to be the creation of a baseline map of GI. An approach to this using GIS is set out here in relatively prescriptive terms although it is not specific to any individual piece of GI software.

The numbered stages in the flowchart below relate to parts of section 12.

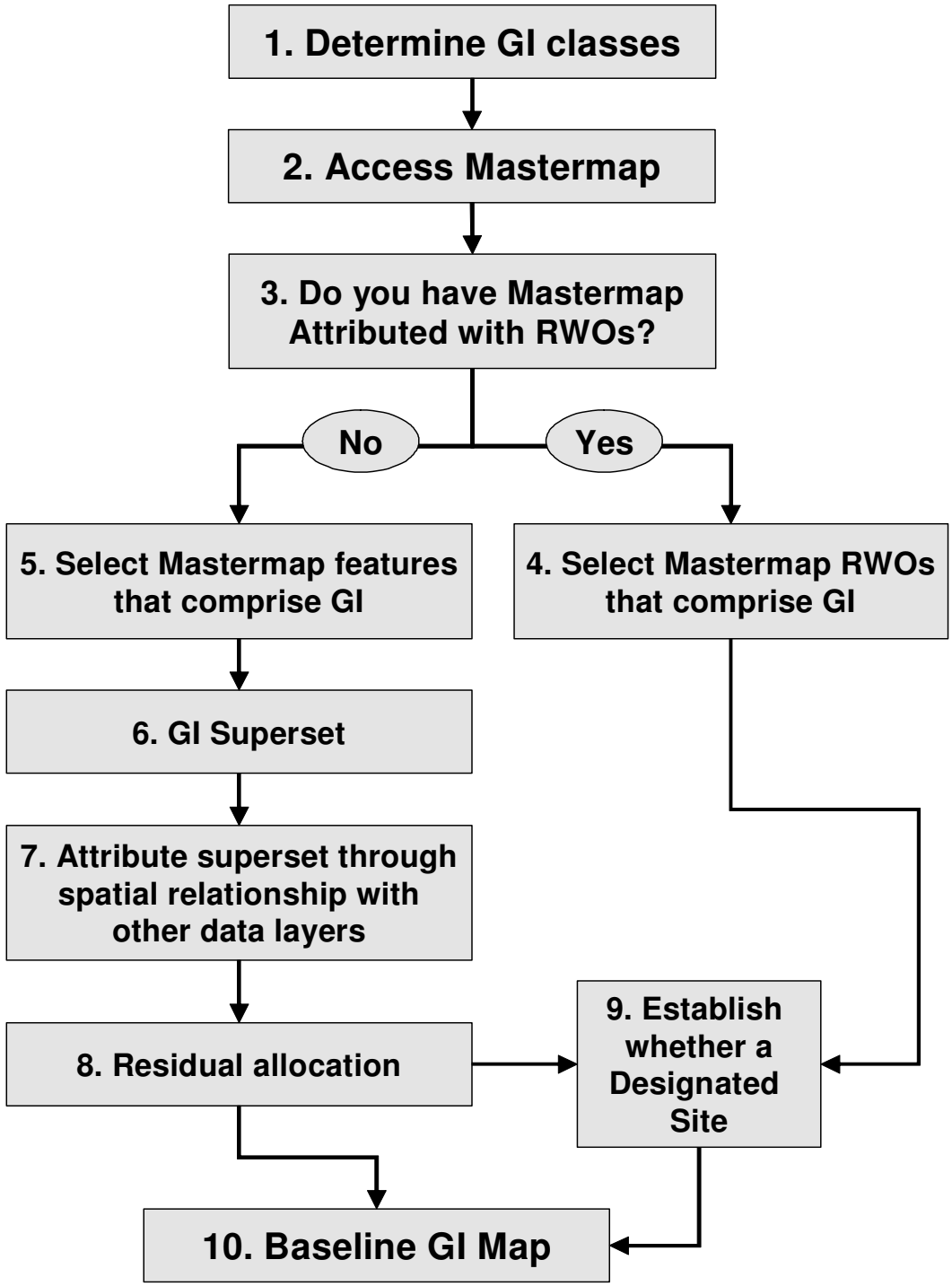

Figure 9: baseline GI mapping approach
*(Note:** **RWOs –** Real World Objects)

1. Determine GI Classes

The first stage is to determine what GI means to you in a local context and adopt an appropriate classification to reflect this. While a widely referenced typology of GI is proposed here, it is recognised that different conditions and varying priorities may suggest a narrower or otherwise different typology.

There are a number of recognised, existing typologies based on different guidance and policies including:

General Land Use Database - (GLUD)

This is an ODPM classification which categorises land parcels in nine relatively high levels, or generalised themes:

- Domestic buildings
- Gardens
- Non domestic buildings
- Road
- Rail
- Path
- Greenspace
- Water
- Other (largely hard standing)

National Land Use Database – (NLUD)

The NLUD is a disaggregation of the GLUD which utilises two hierarchical elements, "Order" which refers to Land Use, and "Groups" which refer to a Land Cover typology. Together these set out a detailed land use typology that is well suited to a range of local authority applications.

*The classification is designed to provide a framework for harmonising existing classifications, to facilitate consistent collection and reporting of land use information and provide a basis for the creation of national data sets. It is the intention that the classification will over time be adopted by all bodies that collect and make use of land use information. Where more detailed or specialised classifications are required or already in use it is anticipated they will establish and provide a direct link to the NLUD Classification (*www.nlud.org.uk)

Further details are available at www.nlud.org.uk

Planning Policy Guidance 17 Typology - (PPG 17)

PPG17 (Planning for Open Space, Sport and Recreation) sets out the role of the planning system in relation to the assessment and provision of sport and recreation facilities and recreational open space. The Guidance for PPG17 sets out a typology for open space assessments. This is narrower in scope that the typology of GI derived here from stakeholder consultation.

The table below relates NLUD and PPG17 typologies to the GI typology, matching categories wherever possible, but it is clear that there are differences in focus, resolution and coverage. However, this will enable cross-reference to be made to existing GIS databases in relation to NLUD or PPG17.

The creation of a GI typology will assist when it comes to the attribution of land parcels at a detailed level. This will, in turn, assist in the decision-making when judging the type of supply, and whether there is under or over supply of specific elements of GI within a given area.

NLUD Order		NLUD Group		PPG 17 Typology	GI Typology
1	Agriculture & Fisheries	1.1	Agriculture		Arable
					Horticulture
					Stock grazing
					Energy crops
					Orchards
					Set-aside and fallow
2	Forestry	2.1	Managed Forest	Natural and semi-natural green spaces, including urban woodland	Amenity woodland
2	Forestry	2.2	Unmanaged Forest		Conservation woodland
					Productive woodland
					Biomass woodland
3	Minerals	3.1	Mineral workings and quarries		Active mineral workings and quarries
3	Minerals	3.1	Mineral workings and quarries		Closed mineral workings and quarries
4	Recreation & Leisure	4.1	Outdoor amenity and open spaces	(1) Parks and Gardens (2) Amenity Green space (3) Provision for children and young people	Public Parks and Gardens
					Public Amenity Green space
4	Recreation & Leisure	4.4	Sport facilities	(1) Outdoor sports facilities (2) Provision for children and young people	Public provision for children and young people (e.g. play areas)
					Outdoor sports facilities
4	Recreation & Leisure	4.5	Holiday camps		
4	Recreation & Leisure	4.6	Allotments and urban farms	Allotments, community gardens and urban farms	Allotments, community gardens and urban farms

5	Transport	5.1	Transport tracks and ways	Green corridors	PRoWs
					Permissive RoW
					Greenways (off-road)
					Quiet Lanes (on-road)
					Defined Cycle Routes
					Road Verges
5	Transport	5.6	Waterways		Canals
6	Utilities & Infrastructure	6.4	Cemeteries & crematoria	Cemeteries, disused churchyards and other burial grounds	Cemeteries, disused churchyards and other burial grounds
7	Residential	7.1	Dwellings		Domestic Gardens
7	Residential	7.3	Residential Institutions		Residential Institution Grounds
8	Community Services	8.1	Medical and health care services		Hospital Grounds
8	Community Services	8.2	Places of Worship		Places of Worship Grounds
8	Community Services	8.3	Education		School & College Grounds
9	Retail				Restricted access green spaces (e.g. retail park settings)
10	Industry and Business				Restricted access green spaces (e.g. airports)
11	Previously Developed Land	11.1	Vacant PDL		Land identified for development
11	Previously Developed Land	11.1	Vacant PDL		Other vacant land
11	Previously Developed Land	11.2	Derelict PDL		Contaminated Land

11	Previously Developed Land	11.2	Derelict PDL		Other Derelict Land
12	Defence				Restricted access green spaces (e.g. live firing areas)
13	Unused Land				Rivers and Streams
					Lakes & Ponds
					Reservoirs
					Wetlands
					Inter tidal zone
					Beaches & Dunes
					Scrub land
					Heathland & Bog

2. Access Mastermap

Definition of Mastermap

OS Mastermap® topology layer is recognised as the main foundation for the Digital National Framework. It is an intelligent digital map designed by Ordnance Survey for use with geographical information systems (GIS) and databases.

Based on the National Grid, it includes topographic information on every landscape feature – buildings, roads, phone boxes, postboxes, landmarks – and represents a significant evolution from traditional cartography.

Each feature has its own unique identifier or TOID® – a 16–digit reference number that can be shared with other users across different applications and systems. This allows easy data association and greater accuracy, focusing on real–world objects on the map.

Further details are available at www.ordnancesurvey.co.uk/oswebsite/products/osmastermap

OS Mastermap ®

Ordnance Survey Mastermap in its native format has the broad descriptive groups listed below.

Descriptive Groups

Building	Inland Water
Glasshouse	Tidal Water
Structure	Political or Administrative
Buildings or Structure	Built Environment
Road or Track	Natural Environment
Rail	Historic Interest
Path	Terrain and Height
Roadside	General Surface
Landform	General Feature
Height Control	

This is then further broken down in to descriptive terms, which can be found in Appendix A.

3. Do you have Mastermap attributed with Real World Objects?
4. Select Mastermap Real World Objects that comprise GI.

These two stages are described together.

Real World Object (RWOs)

These are “Objects that exist in the real world and are represented by OS Mastermap data as a feature or collection of features with attributes” (Ordnance Survey, 2005).

The table below illustrates how immensely detailed the RWO typology is. For a single element of the GI typology all of the RWO classes which provide a possible match are set out. Clearly there is a level of detail which is not necessarily required for GI mapping and assessments. However, if OS Mastermap has been attributed with RWOs this is an immensely valuable resource and the RWO descriptions can determine which broader GI category they may fall in to.

GI Typology	**Ordnance Survey Real World Object**	
Public provision for children and young people (e.g. play areas)	Adventure Playground	Holiday camp
	Artificial Ski Slope	Ice Rink
	Assault Course (civilian or military)	King Georges Playing field
		Lawn
	Baseball field/pitch	Leisure pool
	Basketball court	Lido
	BMX Track	Livery stable
	Boating lake/pond	Paddling pool
	Bowling centre/green	Park (public/private)
	Cadet centre	Pitch and Putt course
	Camping site	Play area
	Climbing frame	Playing field
	Crazy golf course	Play ground
	Cricket field	Polo ground
	Cycle speedway	Rugby ground/stadium
	Equestrian centre	Running track
	Football ground	Shinty pitch
	Fun fair	Skateboard park
	Fun pool	Sports centre
	Games court/area	Tennis court
	Garden (private/public)	Terrarium
	Golf course	Velodrome
	Green	Village green
	Gymnasium	Visitor centre
	Hockey pitch	Zoological gardens

If Mastermap has been attributed with RWOs for existing work such as a Green Space or Open Space Inventory the need for any additional data capture will almost certainly not be needed.

A catalogue of Mastermap RWOs can be found at:

http://www.ordnancesurvey.co.uk/oswebsite/products/osmastermap/pdf/realWorldObjectCatalogue.pdf

5. Select Mastermap Features that comprise GI.

In the absence of Mastermap attributed with RWOs, the first filtering process to arrive at a baseline GI map is to extract **all** elements of OS MM where the “Make” category = Natural. This will select a baseline to work from. At this stage you have not created a GI typology, but you have filtered out those Mastermap elements which are not relevant to the GI typology.

To illustrate steps taken with the GIS a case study area in Stockton-on-Tees has been used and the cooperation of Stockton-on-Tees Borough Council is gratefully acknowledged. However, it should be noted that the illustrations are only intended to be illustrative and nothing should be taken to imply that their represent the position or views of Stockton-on-Tees Borough Council.

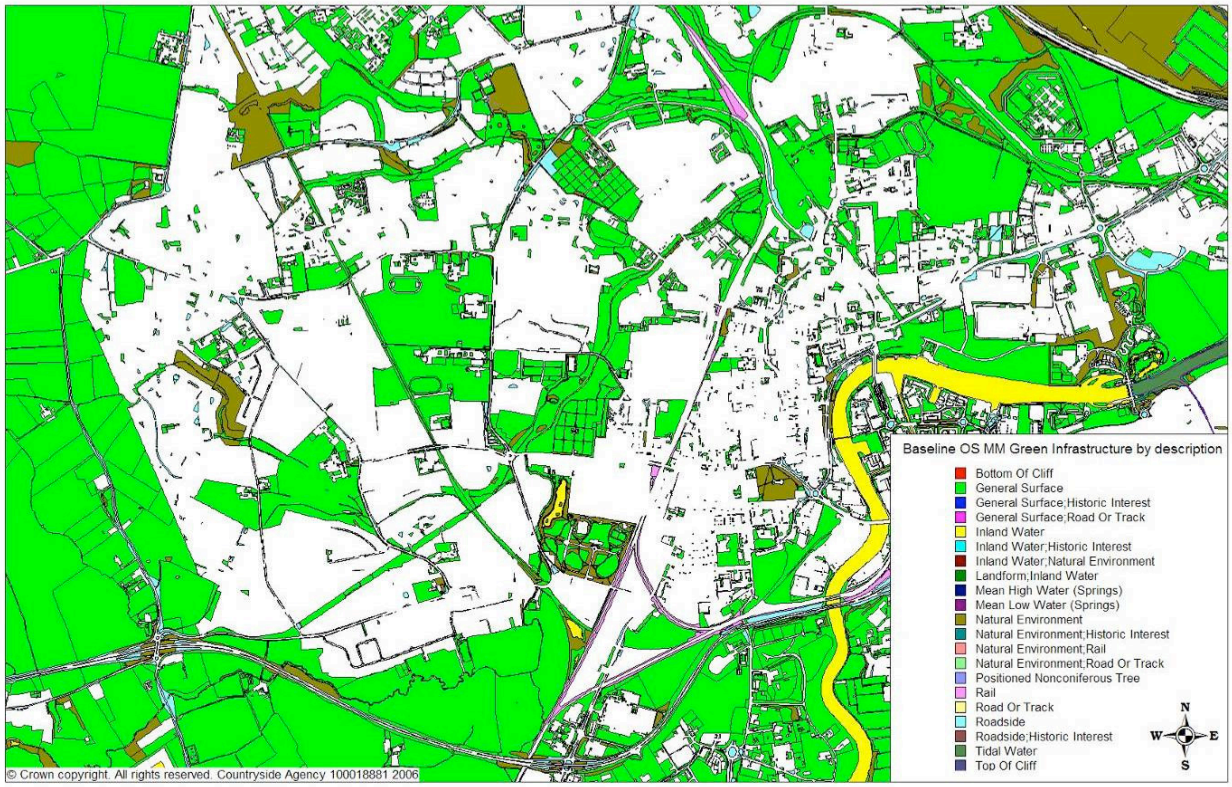

Figure 10: Filtering GI elements from OS Mastermap

Running this process gives a very general view of GI on the ground. Whilst figure 6 indicates that the area is well served with green/natural elements it does not refer to the primary use of the land or whether it may be 'accessible' green space.

The belt of green running to the west of the figure 10 is primarily agricultural land, however the Mastermap descriptive group is General surface and the 'make' is equal to natural. A school playing field can have the same Mastermap classification as arable playing field, so additional stages are required to create an appropriately differentiated GI typology.

Depending on what decisions you are looking to make with regards to Green Infrastructure will determine how detailed the typology needs to be.

6. GI superset

By filtering the Mastermap dataset in the previous stage you will arrive at what can be classed as a GI superset, which, although useful as a first stage, provides a weakly differentiated typology.

7. Attribute superset through spatial relationship with other layers

A large number of datasets are available to narrow down land use typology. By using a backdrop of recent aerial photography or raster mapping, land parcels can be quite readily identified to determine broad descriptive uses such as agricultural, industrial, or institutional land.

Acquisition of data available from external sources, such as Multi Agency Geographic Information for the Countryside (www.magic.gov.uk) , is a very useful way of gaining access to environmental datasets which can be combined with local authority datasets, Census data and other available data layers such as those illustrated in Figure 11. In particular MAGIC can provide information regarding the designation or status of a particular parcel of land.

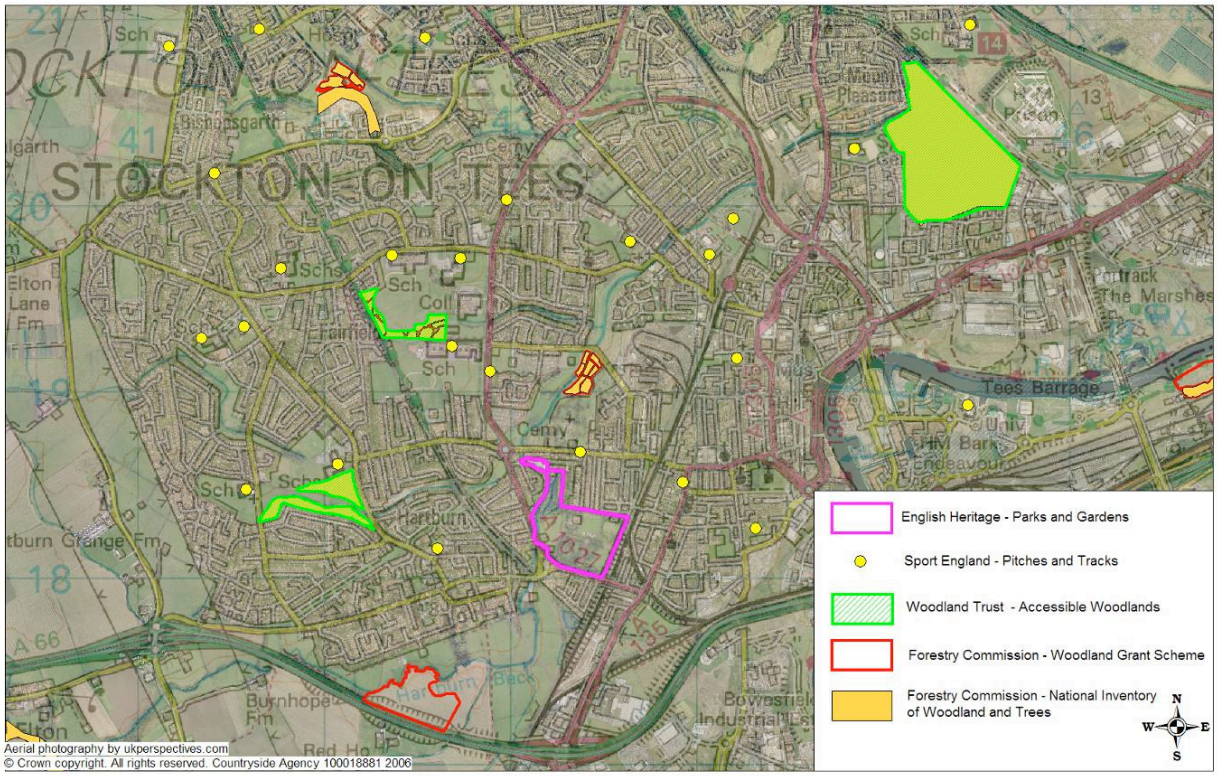

Figure 11: Transparent Aerial photography overlain on 1:50000 raster mapping

8. Residual Allocation

There may be areas of land which cannot be classified from just a desktop study, or there may be datasets which cannot be acquired. There is no real substitute for an "on the ground" survey in the absence of other data.

9. Establish whether a designated site.

Site designation may be a critical element when planning GI provision. Attribution of the GI superset with any designation that is known can prove useful in the decision-making processes discussed later in this guide.

By being able to identify designated sites, more specific criteria can be built around these parcels for instance in relation to flood risk or nature conservation designations.

Note that the GI typology does not include such designations (e.g. SSSI or LNR) as a primary defining characteristic. Such designations are additional attributes in the GI typology.

10. Baseline GI Map

Figure 12 shows what a baseline GI Map may look like following all the previous stages. It is worth adding an additional column calculating each parcel area to the attribute data. This allows easier filtering when creating size thresholds for provision of GI.

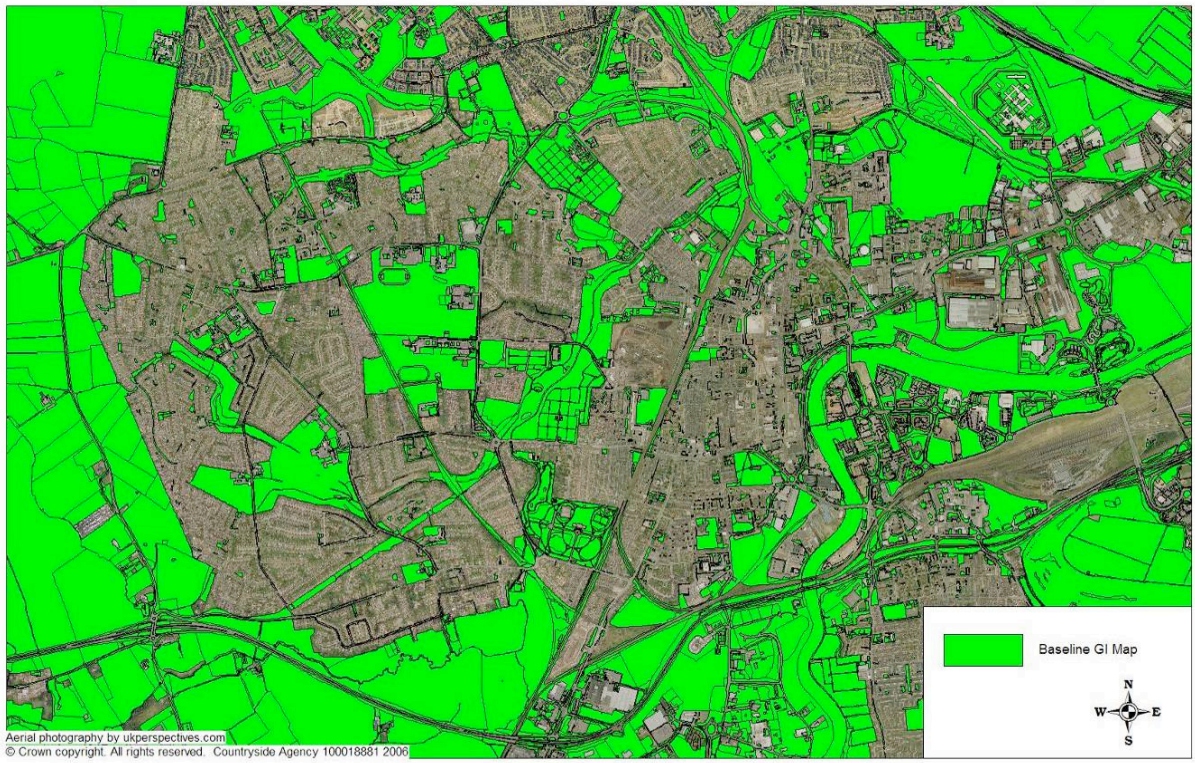

Figure 12: Baseline GI Map

Figure 13 in Chapter 13 displays this same dataset, classified according to the GI typology.

13. Using GIS to make informed judgements about GI

The first part of the GIS element of the GI Planning Guide in Section 12 was relatively prescriptive: it defined precise steps that should be taken to establish the GI baseline map. Once this map and GIS database is created, then it can support planners in making informed judgements about GI within their area of responsibility.

Figure 13 illustrates what a GI typology basemap may look like, with different land and water areas identified and categorised into types. Overlain on this is a point dataset from Sport England which identifies the location of sports pitches and tracks. A map such as this and the associated GIS database is the starting point for this section.

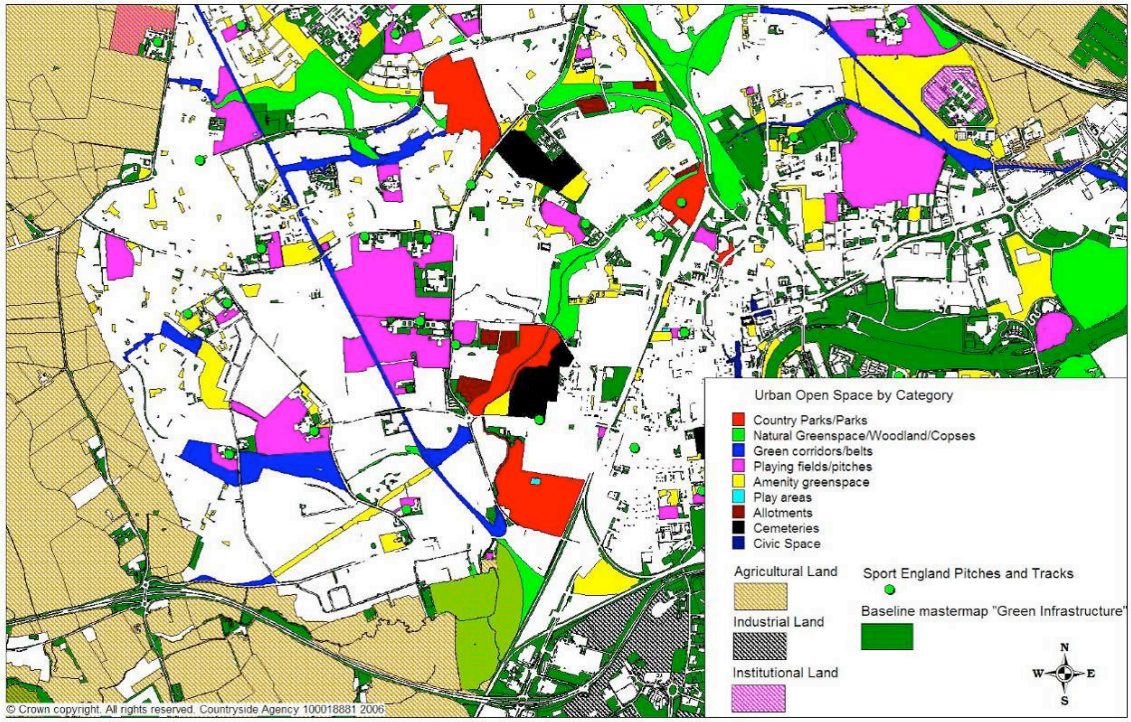

Figure 13: GI Typology Baseline Map for the Study Area

The second part of the GIS element is not prescriptive, rather it is organised around a series of questions that planners should be asking in relation to GI. The role of the GIS is to enable planners to make informed judgements in response to these questions. It should be borne in mind throughout that the GIS is simply a tool; the critical thing is awareness of the geographical dimensions of GI.

The following questions all relate to the matrix in Figure 14. The matrix provides a framework for the assessment of individual green spaces and links and their interrelationships. There are two dimensions to this assessment, quality and infrastructure. Quality, as introduced in section 7, is multi-dimensional and methods for the assessment of green spaces are detailed elsewhere, but the vertical axis broadly distinguishes between low, acceptable and high quality spaces. The horizontal axis focuses on the connectivity and integrity of the networks which combine to form infrastructure. A high quality green infrastructure will be made up of high quality green spaces and linear routes that are linked together to form coherent networks of multi-functional areas and linear features.

This matrix introduces a 'direction of travel' and the fundamental purpose of a GI plan is to ensure that the integrity and connectivity of the infrastructure is enhanced alongside qualitative improvements to the elements of that infrastructure.

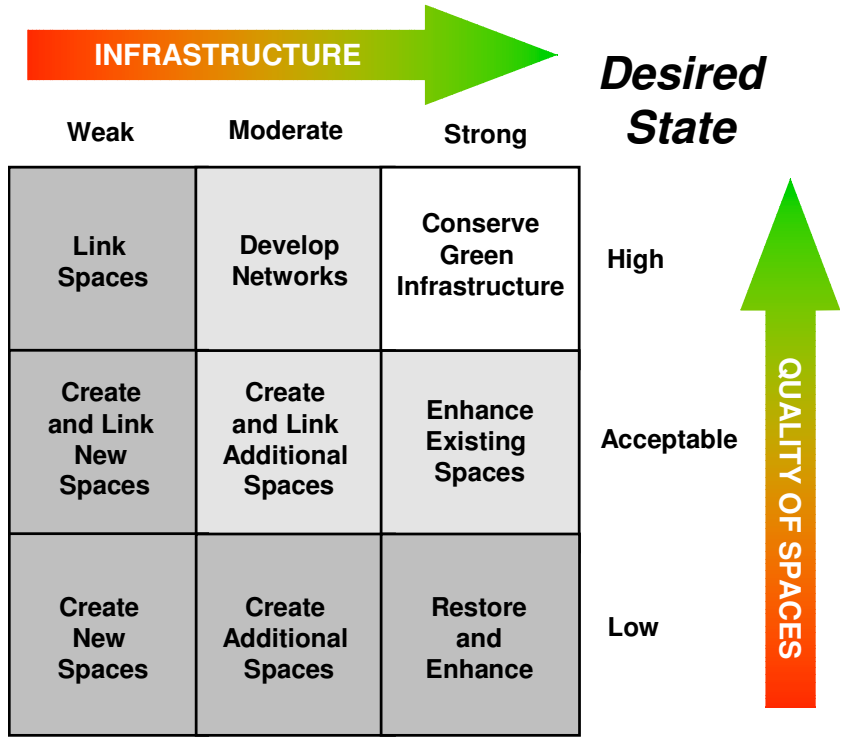

Figure 14: quality of spaces, green infrastructure and the 'direction of travel'

There are three key dimensions to the assessment of green spaces and green infrastructure which should inform judgements about conservation, enhancement, linkages, creation and development initiatives, opportunities and proposals:

a) **Context:** the needs, wants, aspirations and problems of communities, groups and individuals who are actual or potential users of GI must be considered in making judgements about conservation, change or development. This is effectively a demand side issue and relates not just to total population, but also aspects of demography, deprivation and disadvantage. In short, certain areas may have a higher priority need for GI developments by virtue of their characteristics.

b) **Quality:** although quality is to a degree an absolute concept, the quality of green spaces and links is also determined by the concepts of sufficiency and suitability. It is entirely appropriate for planners to conclude that an area has GI that is both sufficient (relative to defined and meaningful standards) and suitable (relative to a careful analysis of the needs of the surrounding area), although this conclusion should be based on the available evidence, as set out below.

c) **Interaction:** GI has multiple functions and many of these functions derive from connections between elements. For example, non-car transportation will be enhanced when high density residential areas are connected to centres of employment, and wildlife corridors are more likely to be effective when they link together relevant nature reserves and other habitats. Thus, linking green spaces to make networks and integrating networks to form an infrastructure realises synergies and can meet demand with supply. However, it is often the case that the links which may have real impact are non-obvious, or are not considered by planners in making decisions which could potentially have ramifications, either negative or positive, for the attainment of these outcomes.

Clearly these elements interrelate, but planners should bear these in mind as the three dimensions which determine the significance of individual elements, links and networks in GI.

Fundamentally there are two points at which planners may focus on GI issues:

i) in considering how to enhance quality of environment, quality of life and quality of place through a focus on green spaces, links and networks of green spaces; and

ii) in considering how to manage development pressures and the implications of development scenarios on existing green spaces, access to green spaces and wider green infrastructure.

A simple division like this might identify the first as being positive planning in relation to green infrastructure and the second as being essentially reactive, but this guide proposes that these should effectively be seen as linked activities; the emphasis is on forward planning and working through scenarios and their implications to promote development that does not degrade environmental quality, promotes quality of life and drives up quality of place. To do this there is a requirement for principles (what am I trying to achieve and why?) and information (what are my options and which is the best way forward?) and this guide sets out both.

Standards and principles

Section 8 sets out a range of standards that have previously been identified, from English Nature's ANGST and the six acre standard of the NPFA. These standards are based on careful research and they are useful in determining levels of provision and gaps. However, simple distance-based standards should be applied with care and thought and three comments are made in particular:

a) the size of the threshold (e.g. the radius around green spaces which ensures 'adequate' access) determines the outcome of the analysis (see figures 15-18). This is of course obvious, but standards must be sensitive to local conditions, constraints and needs, foremost amongst which is low car ownership in areas of high deprivation.

b) drawing a line at a particular distance may appear relatively arbitrary and debate over areas just outside a given distance measurement will always be lively;

c) distance-based approaches are relatively crude and may fail to adequately represent actual travel distance, something that can be addressed with advanced GIS analysis, but where a careful review of results can also head off inaccuracies caused by barriers such as railways and major roads.

Figures 15 to 18 illustrate the effect of different sized thresholds being applied in the assessment of green space provision. Clearly, the larger the threshold, the more complete the coverage appears in the resulting maps. However, different sized thresholds are appropriate for different purposes and scales of analysis. In this guide GI is primarily considered in a local context. However, different scales of analysis may focus on sub-regionally, regionally and nationally significant GI and an awareness of the relative significance at these higher levels of individual features, areas and routes on the ground should inform GI planning at the local scale.

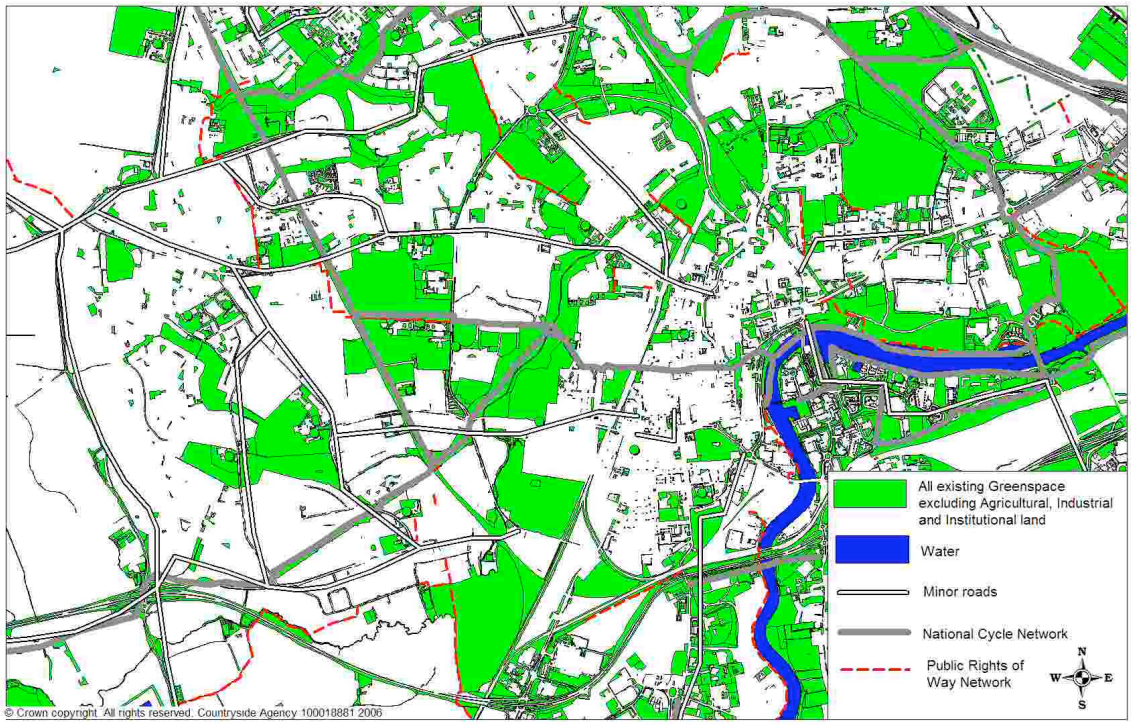

Figure 15: All existing green spaces and water bodies

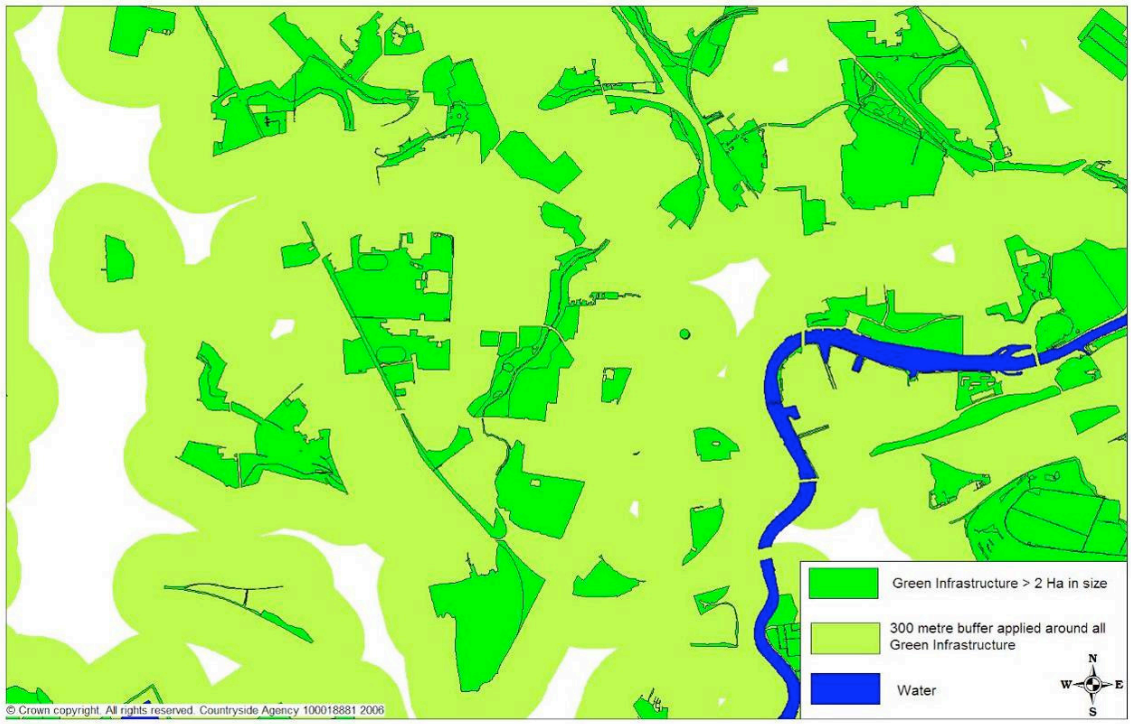

Figure 16: green spaces greater than 2 ha plus water bodies with 300m buffer applied

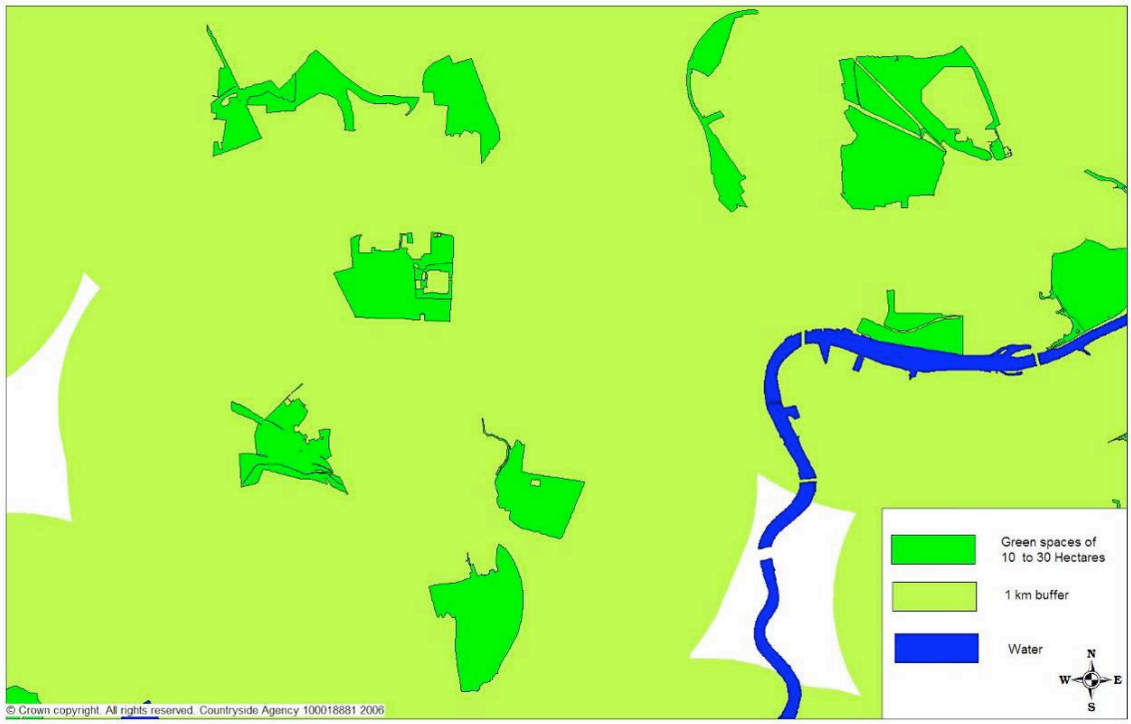

Figure 17: green spaces of 10 to 30ha with a buffer of 1km applied

Figure 18: green spaces of greater than 30ha with a buffer of 3km applied

Figure 5 requires that planners consider individual elements and areas as belonging to one of the defined cells. It is quite feasible for individual elements to be high in quality yet contribute only weakly to the wider GI. Conversely, elements may be critical in infrastructure terms, yet be badly degraded and of very low quality. The matrix defines a 'direction of travel' whereby elements should be enhanced in respect of both their site-specific quality and their network role in the infrastructure. The questions below are intended to assist planners in making judgements about which cell or area of the matrix individual elements belong in and what should therefore be done with them.

14. Questions for Planners

The emphasis in this Guide has been on establishing what GI is and why it is significant. Section 12 was relatively prescriptive, setting out the stages to create a baseline GI map. This second part is altogether less prescriptive and sets out a number of questions which planners should ask, once they have established their baseline map of GI. Some questions will require that the GI typology is combined with other GIS datasets, but this is fundamental to the GIS approach. The questions, elaborated in the following sections are:

- 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 GI?
- Which elements should be linked together?
- Which elements are possibly tradable to achieve net environmental gains in both an infrastructure and qualitative sense?

What to protect?

The concept of Critical National Infrastructure is well established: it defines the power, transportation and communications networks, food and water supply systems and other infrastructure components without which basic economic, welfare and social systems cannot effectively function. It is important that planners apply the same principles in attempting to identify what comprises the Critical Green Infrastructure. The question is 'what can you not afford to lose'? This question must be answered with regard to (a) context (e.g. what else is there nearby?), (b) quality (e.g. is this one of the most significant and valued sites in the area) and (c) interaction (e.g. is this the only green link between a community and a nature reserve or between two large areas of green space?). The answer does not have to be yes to all three to conclude that this is critical GI, and it may be that restoration or enhancement is required, but the critical issue is to identify those elements where loss or further degradation cannot be permitted.

Why is this expressed in essentially negative terms? The reality for many planners is one of managing development pressures where green spaces, and Previously Developed Land (PDL) which also has GI significance, are at a premium. Planning gain agreements may be attractive in realising net gains from developments, yet judgements about whether certain areas may be developed or whether they must be protected and conserved, have to be based on the right information.

Figures 19 and 20 illustrate green spaces and links overlain on an aerial photograph of the study area, with the edge of the built-up space evident to the West and South-West of the image. A simple analysis of these two images will rapidly establish areas of under-supply and relatively tenuous links, which relates to the identification of critical GI.

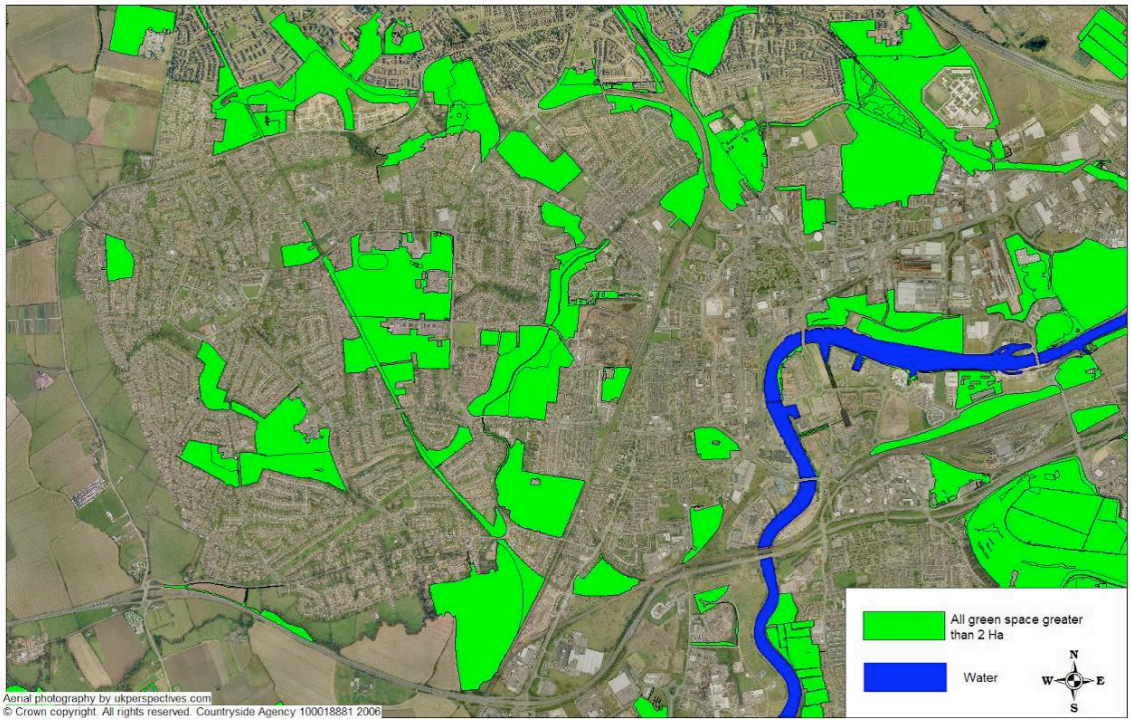

Figure 19: Green Spaces and waterbodies

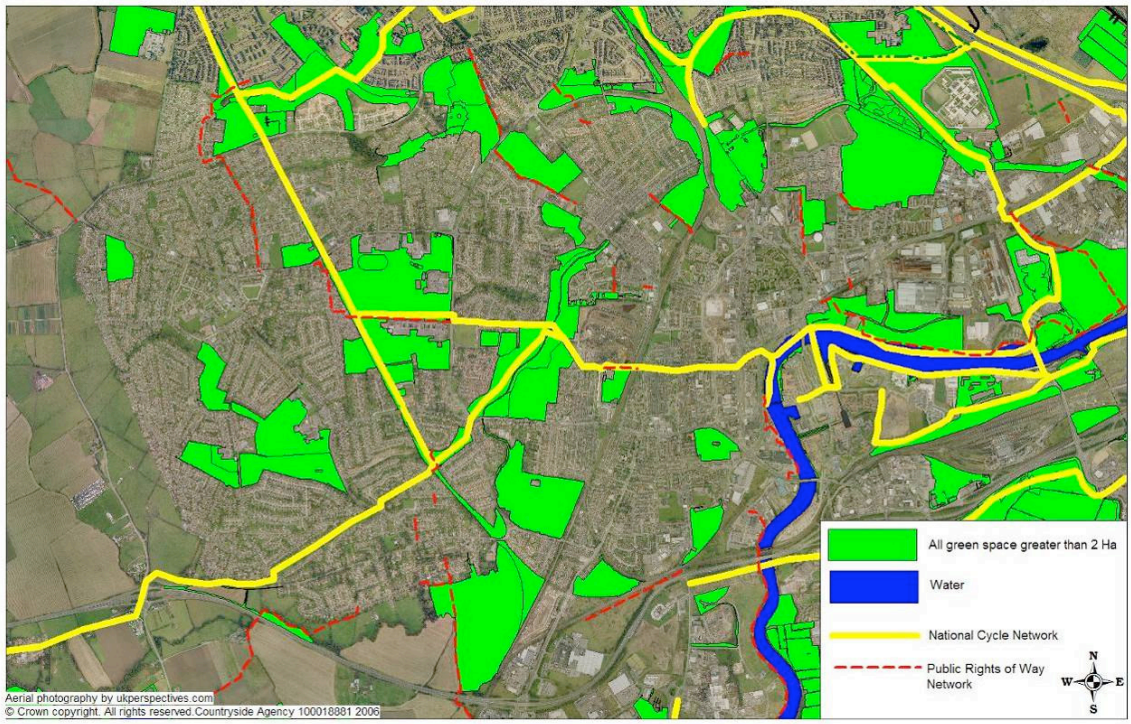

Figure 20: Green Spaces, waterbodies and green links

<u>What to change / enhance?</u>

Although multifunctionality is one of the underpinning principles of GI planning, the reality is that many elements have a defined or actual primary purpose. An appreciation of the context will help planners gain an understanding of whether the site is appropriate. It may be the case that sites are simply not fit for purpose; there is not necessarily anything 'wrong' with them, but they fail to supply the demands evident in the surrounding area.

This may be a quality issue, for example where use of an area is depressed by problems such as vandalism, poor drainage, excessive litter or dog fouling. In this case qualitative enhancement is required.
Alternatively it may be that use is depressed by a mismatch with demand. It has been observed that many metropolitan areas have a good supply of amenity grassland yet a paucity of green spaces that are more natural and 'interesting'. This is in part a spatial issue. For example, densely populated areas with a high proportion of children are likely to see high levels of use of such space. As another example, where several such green spaces are nearby or there is one large expanse of such space, the potential exists for a change to the character of some of the available green space.

What/where to create?

'Gap analysis' is a widely applied term and is increasingly used in a non-spatial context. However it is used here in an explicitly geographical way to define areas that have a level of provision and access to green infrastructure that fails to meet defined standards, or is otherwise judged to be insufficient or lacking. However, although multifunctionality lies at the heart of green infrastructure thinking, it is a reality that most spaces and links have a clearly identifiable primary function or use, and this is reflected in the GI typology. For example, playing fields are distinctively different from areas of woodland which in turn are different from publicly accessible common land that is used for grazing. An awareness of the sufficiency of supply must be complemented with an appreciation of the suitability of supply. So, specific questions that arise from this would include:

Where are there gaps

- **In green space of any type?** As a basic principle, reasonable access to green space of any type is better than no access at all. While there are a range of standards (see section 8) which can help define absolute gaps in access to green space, it must be borne in mind that such standards must be carefully applied and sensitive to barriers such as major roads. A failure to determine standards that are locally meaningful and then apply them intelligently is critical if unduly optimistic or simply false levels of provision are to be avoided.

- **In supply of specific types of GI?** While the basic principle set out above is that access to any green space is better than no access at all, it is often the case that one particular type of GI may be over-provided relative to the spatial pattern of demand, to the detriment of other types of GI where demand may be unmet. Demand in this context is not necessarily straightforward and measurable in human terms through local consultation. For example, the development of a wildlife corridor may require decisions to transform the character of open spaces away from those which have utility for informal games, football, kite flying, etc towards a more natural form of land cover that has landscape and nature conservation gains. The key point is that communication needs to be wide and involve partner organisations such as Wildlife Trusts and Natural England in determining where the gaps are, why they are significant and what might be done to address them.

- **In linkages?** Green infrastructure is fundamentally a network of networks. These networks may be very localised and of local significance, or they may incorporate features, areas and links that are of regional or national significance, such as National Nature Reserves or Long Distance Footpaths. How these networks are linked is significant; at a physical level links may be either an area or linear area of green space or they may be more towards the grey end of the green-grey infrastructure spectrum (figure 1), such as multi-user routes or cycle paths through urban areas which link green spaces and networks. However, such links must exist for green infrastructure to develop. In addition to their simple physical existence, links must be of an appropriate level of quality to encourage users, make them feel safe and enjoy the experience. Context can pose challenges to this, as routes through areas of high deprivation often experience problems such as vandalism, graffiti, broken glass and damaged lighting and signage which require a high and often sustained level of revenue expenditure to resolve.

- **In areas of higher need?** The question of demand is relatively straightforward to resolve if the premise that all areas are of equal significance is adopted. However, this premise is questionable on two levels:

  a) *population is unevenly distributed:* all other things being equal, the greatest effort should be targeted where the greatest net benefit may be realised for the investment and this means targeting where population density is highest.

  b) *deprivation is unevenly distributed:* the use of datasets such as the ODPM Index of Multiple Deprivation (IMD) provides an evidence base for targeting investment where deprivation and relative disadvantage is highest. In the context of green infrastructure it is something of a leap to infer that demand for GI is highest in areas of the greatest relative deprivation, but the principle that areas of high deprivation should have priority attention for GI development, enhancement or creation works is proposed. The basis for this is multi-dimensional but, for example, opportunities for exercise are critical in areas of long term illness, obesity and heart disease, all of which are associated with disadvantage and deprivation. Car ownership is lower in areas of high deprivation so attention to journeys that link foot, bicycle and public transport is important. Finally, and more contentiously, areas of low deprivation are often those where access to private green space (primarily gardens) is good, and where car transport is available to access more distant areas of green space in the countryside.

Figures 21 and 22 illustrate the use of GIS to combine GI, population and deprivation datasets.

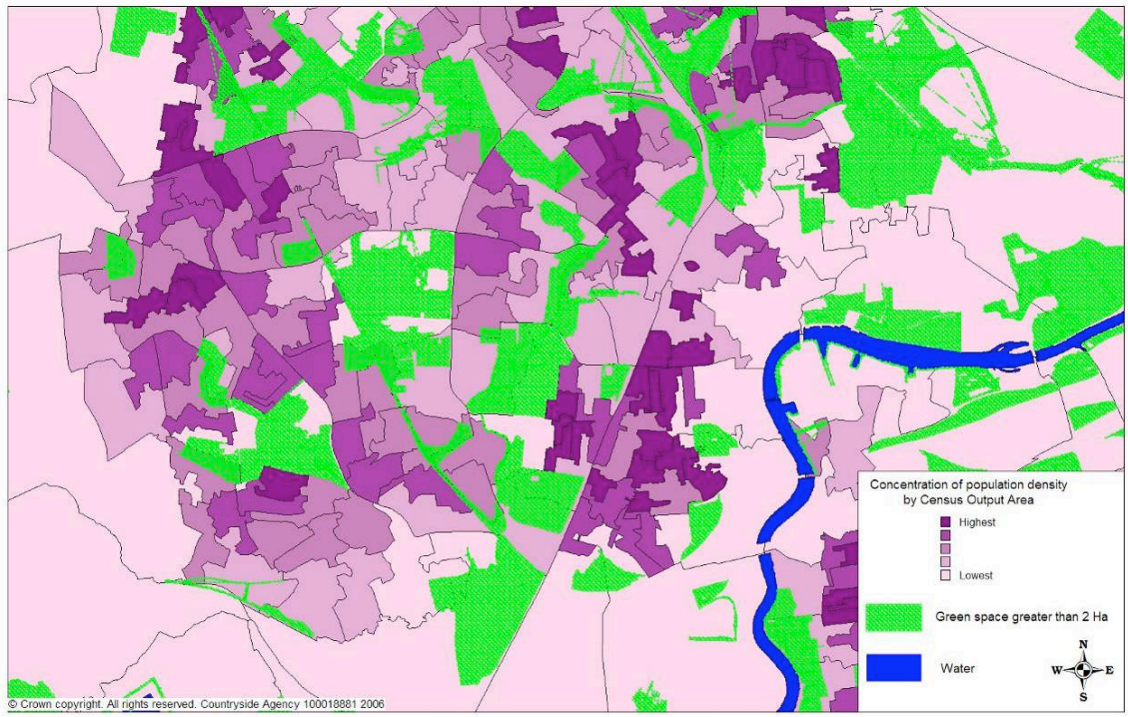

Figure 21: Green Spaces overlain on population density data

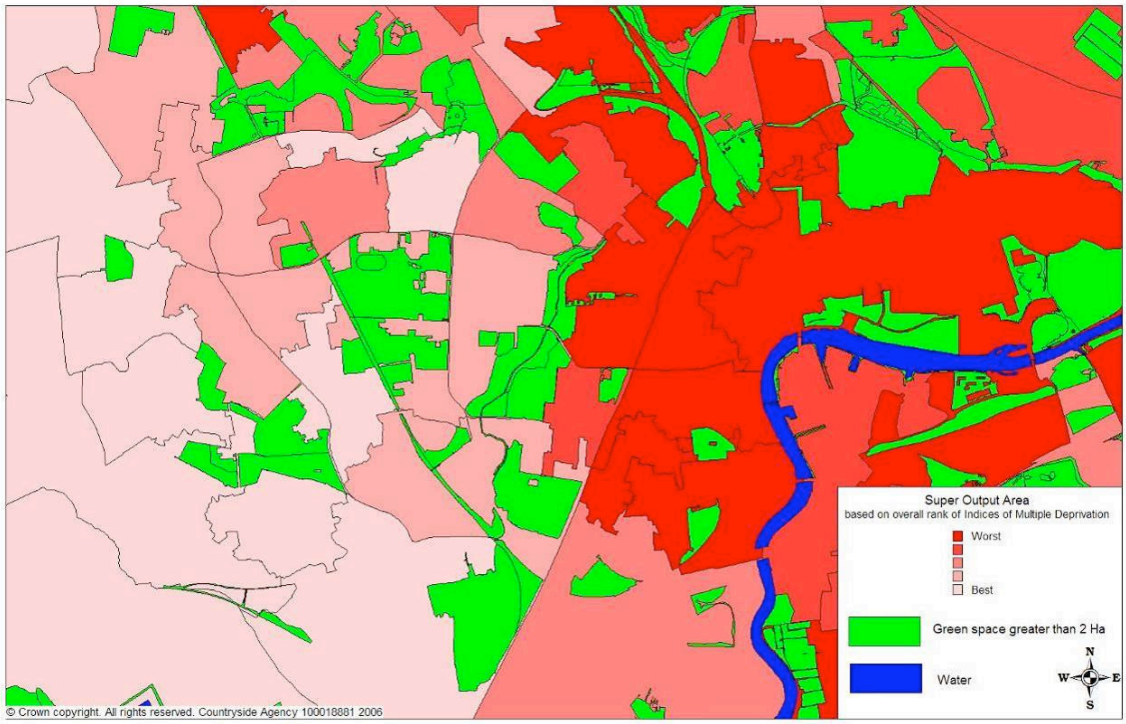

Figure 22: Green Spaces overlain on Index of Multiple Deprivation (IMD) data, clearly illustrating a relative paucity of green space provision in the relatively most deprived areas.

Addressing many of the issues identified above may initially be done at a relatively strategic scale, to identify where investment should be targeted to protect, conserve, enhance or create green infrastructure. However, actions on the ground must of course be targeted at a tactical level which gives rise to another question:

Where are there viable opportunities to create new elements and links?

Working towards strategic objectives and a vision for green infrastructure ultimately requires actions on the ground, in specific areas and locations. To achieve this an appreciation of which opportunities are viable in respect of, for example, land ownership, financial implications and land conditions requires appropriately detailed information in a GIS database. Conservation, especially at a landscape scale, has in the past been described as 'the art of the possible' and the development of green infrastructure that exhibits both network connectivity and coherence and element-specific quality and fitness for use requires that tactical opportunities are matched with strategic need. Again, GIS enables a range of datasets to be integrated that allow this level of connected decision making to be supported.

What/where to integrate?

This is not just about grey OR green infrastructure or simple metrics of loss and gain – there is a qualitative dimension that requires green and grey infrastructure to be developed together. Two key questions are identified in this context:

a) Should new housing be developed in an area that is already well served with GI, so that the quality of place, environment and life for the incoming residents is high?
b) Should new housing be planned in an area of low quality or spatially incoherent GI so that design and planning gain can be used to 'leverage' net gains for the new residents, and also enhance the coherence and quality of the wider GI?

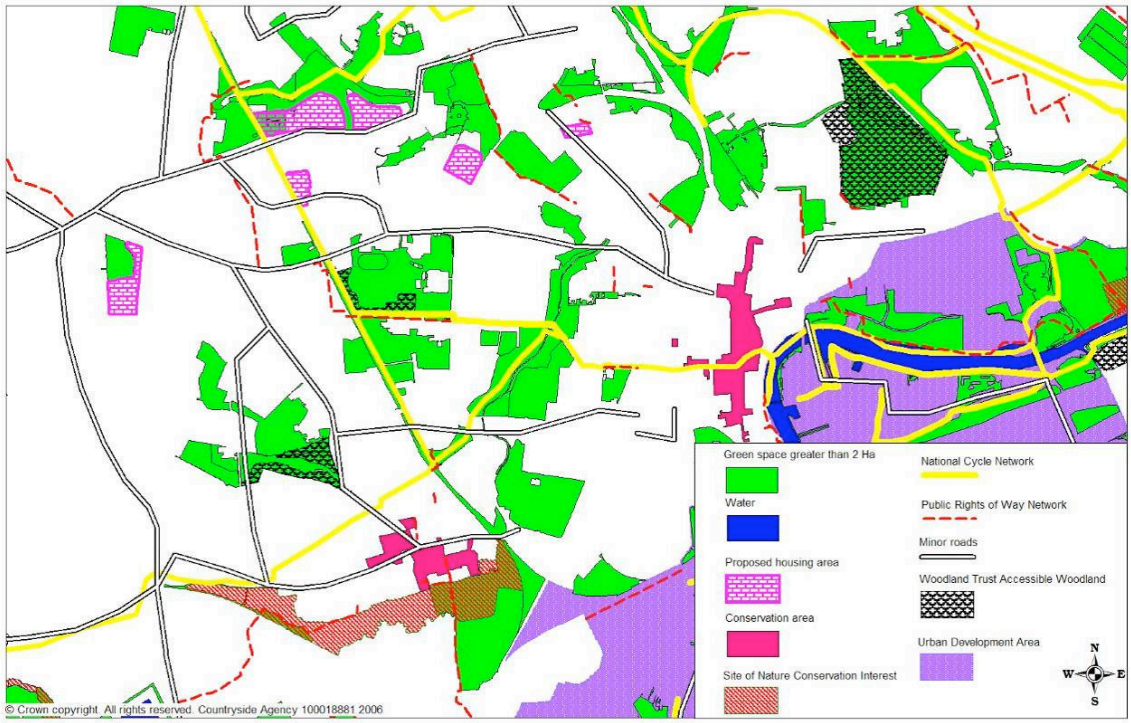

Figure 23: Local Plan information integrated with GI datasets

Figure 23 illustrates the integration of local plan information with GI which permits the evaluation of different development scenarios. However, this is not just a location issue, for there are layout and design issues to be considered as well. For example, high density housing developments may have a more constrained immediate 'footprint', but they may also represent a lost opportunity to integrate public green spaces and links into a development that may have significance for the wider GI far beyond one specific development.

<u>What to link?</u>

This element is relatively self-evident, following on from the previous sections. Analysis of existing patterns of access, demand for access and gaps in the green infrastructure and the grey-grey infrastructure (e.g. minor roads with pavements) should establish the areas of highest priority for network extensions and enhancements.

<u>What is tradable?</u>

This is definitely the most contentious of the questions, but the reality of planning is one of managing change, and at the heart of green infrastructure planning lie the three qualities of environment, place and life. In many settings, perhaps most commonly in urban fringe areas, we have low quality places and environments that contribute little to quality of life. Regeneration requires development, and even environmentally-led regeneration involves building and the transformation of brownfield and Greenfield sites. GI planning is not proposed as an approach to block such developments, rather it is an approach that should guide land allocation, siting and design of developments such that the green infrastructure is not weakened, and also that existing GI can provide high quality settings for development and those that live and work there. In addition, there must be a focus on net gains and this requires an ability to determine where trade-offs might best be made. Such trade-offs might result in the loss of an area of green space, but planning gain agreements may potentially make available land and/or resources that could strengthen the green infrastructure in other ways or in other areas.

There is no simple, universal equation to determine whether elements of GI may be traded and if so for what and where. The approach adopted here has been to encourage planners:

a) to take an explicitly geographical view on the relationship between green spaces, links, other green spaces and networks;

b) to promote communication with partners and other interested parties to understand and appreciate the significance of elements and links; and

c) to promote communication with partners and other interested parties to understand and appreciate the significance of gaps in provision and networks.

These are not issues that GIS can resolve, however data rich they are. Nor are they issues which individual agencies, working in isolation, can resolve either. They require appropriate information, consultation and careful judgement, but the potential gains from trading in a development context are considerable.

15. Green Infrastructure Plan delivery

Translating Green Infrastructure Plans into delivery is a crucial activity to be addressed as an integrated part of the GI planning process.

It is suggested that at a strategic geographical level (refer to Chapter 11) that Landscape Scale partnerships represent the best delivery mechanism. In some cases such arrangements will already be in place (for example Community Forest partnerships), in other areas where no landscape scale partnership exist a process to create or enable a new landscape scale partnership will be required.

At a neighbourhood level (refer to Chapter 11) there may well be a number of existing delivery mechanisms available, such as Groundwork Trusts.

The production of a publicly available delivery plan identifying which partners will deliver which aspects of the GI plan over what timescale and at what cost (including sources of funding) appears to represent good practice.

There are numerous models available for delivery plans and it is suggested that the right delivery plan for any given area is likely to be a bespoke document based on other planning documents already in use in the locality. Should there not be a satisfactory template available locally then the framework used by the North East regional Forestry Strategy can be recommended as a format and is available in PDF format on the internet: http://www.forestry.gov.uk/forestry/infd-6fcf3q

16. Delivery Priorities

Delivery priorities have been related back to the 'key' functions of Green infrastructure planning set out in section 3 of this Guide. It should be noted that the list of priorities will vary according to the spatial scale of the planning taking place or the landscape context, nevertheless by taking a high level view it is possible to identify a list of delivery priorities in each category.

Delivery priorities for sustainable resource management: *Green infrastructure that …*

- Protects key assets (*and also extends their beneficial qualities*) including critical water resources and delivers aspirations arising from catchment planning in the context of the Water Framework Directive.
- Delivers both the strategic goals and implements the key strategies of competent authorities and leading NGO's (*such as Environment Agency, Natural England, RSPB etc*)
- Delivers the outputs and outcomes identified within key regional strategies (*such as regional spatial strategy, environment strategy and sustainable development strategies*)
- Improves or protects essential environmental capital including 'soils' and 'air quality'.
- Ameliorates the anticipated impact of climate change especially in regards to liveability in urban settings.
- Helps minimise the ecological footprint of a recognised spatial area.

Delivery priorities for biodiversity: ***Green infrastructure that …***

- Maintains and enhances existing green areas by:
  - Preventing deterioration of overall quality
  - Bringing quality improvements which are of direct benefit to communities whose local environment is currently deficient in the qualitative benefits of access to nature.
  - Maintaining critical biodiversity assets and providing long term security for these as identified in Biodiversity Action Plans.
  - Providing connectivity at the landscape scale where this will favour expansion of biodiversity assets and lead to an overall increase in ecotones (*edge habitats)*. It is noted that strategic isolation can be a positive green infrastructure approach in certain situations.
  - Facilitating the re-wilding and natural regeneration of Brownfield land leading to the creation of habitat rich post industrial landscapes.
  - Diversifying (*and hence increase the multifunctional benefits*) monotonous green landscapes (*stakeholders critically refer to extensive areas of close mown municipal green space)*, through for example meadow management or landscape planning which introduces new features.
  - Maintaining existing Geodiversity assets and providing access and interpretation of these.

- Provides new green areas which:
  - Secures additional biodiversity facilitated through the strategic planning system, new commercial and housing developments
  - Enables new 'green links' to be attained between existing green areas
  - Provides transitional landscape types (*these can be highly beneficial for biodiversity for example young woodland types*)
  - Buffers existing green infrastructure assets (*for example by providing woodland buffer zones achieved through natural regeneration or planting of local provenance material adjacent to ASNW*)
  - Creates new Geodiversity assets.

Delivery priorities for recreation: ***Green infrastructure that …***

- Provides 'close in' green infrastructure development which provide opportunities for green exercise (examples include walking and cycling routes close to places of work and links to areas with high levels of multiple deprivation).
- Provides local 'gateway' access to 'natural areas' at confluence points between significant pavement networks (*for example on housing estates*) and open green areas.
- Enables delivery of Rights of Way Improvement Plans and links to open access areas.
- Facilitates delivery of local authority walking and cycling strategies.
- Provides space for outdoor sport and active recreation activities (*e.g. orienteering, equestrian, running*)
- Provides a resource to educators and families for learning and creative play.

Landscape: ***Green infrastructure that …***

- Works at the landscape scale, achieves connectivity between landscapes and provides a framework for landscape enhancement, renewal and where necessary recreates landscape quality.
- Improves the diversity of urban green areas and delivers multi-functional benefits achieved through landscape led improvements.
- Connect 'green areas' together to achieve a 'strategic whole' that is greater than the sum of the parts.
- Achieves cooperative management of joined green areas whether they are in private ownership (such as gardens) with adjoining public areas (such as parks or the street scene)

Regional development and promotion: ***Green infrastructure that …***

- Provides a landscape framework (*for example by screen planting*) to ameliorate visually unappealing industrial and commercial structures for the benefit of local residents, investors, employees and visitors.
- Provides a landscape framework adjacent to critical 'grey infrastructure' assets including trunk roads, passenger rail corridors and main transport hubs (e.g. airports and ferry ports).
- Tackles local environmental issues such as fixation of particulates (*from motor transport or industrial processes*) and creation of sound barriers.
- Demonstrably ties together existing regional and local economic, social and environmental strategies.
- Delivers environmental regeneration priorities (*for example that release more land for tree planting in community forest areas*)
- Contributes to the regional tourism offer either by adding value to existing tourism attractions, providing new attractions or creating links between them.

17. References

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18. Future Developments

A web based HTML version of the GI Planning Guide will shortly be available and will be amended and updated regularly.

19. Contact information

www.greeninfrastructure.eu

Appendix A: OS Mastermap Descriptive Terms

OS Topographic Area

Descriptive Group	Descriptive Term	Make
Building		Manmade
Building	Archway	Manmade
General Surface		Manmade
General Surface		Multiple
General Surface		Natural
General Surface		Unknown
General Surface	Multi surface	Multiple
General Surface	Step	Manmade
Glasshouse		Manmade
Historic Interest		
Inland Water		Natural
Landform		Manmade
Landform		Natural
Landform	Cliff	Natural
Landform	Slope	Manmade
Natural Environment	Boulders	Natural
Natural Environment	Boulders (Scattered)	Natural
Natural Environment	Coniferous trees	Natural
Natural Environment	Coniferous trees (Scattered)	Natural
Natural Environment	Coppice or Osiers	Natural
Natural Environment	Heath	Natural
Natural Environment	Marsh Reeds or saltmarsh	Natural
Natural Environment	Non coniferous trees	Natural
Natural Environment	Non coniferous trees (Scattered)	Natural
Natural Environment	Orchard	Natural
Natural Environment	Rock	Natural
Natural Environment	Rock (scattered)	Natural
Natural Environment	Rough Grassland	Natural
Natural Environment	Scree	Natural
Natural Environment	Scrub	Natural
Path		Manmade
Path	Step	Manmade
Provisional Or Unverified	Unclassified	
Rail		Manmade
Rail		Unknown
Rail		Unmade
Road Or Track		Manmade
Road Or Track	Traffic calming	Manmade
Roadside		Manmade
Roadside		Unknown
Roadside		Unmade
Structure		
Structure		Manmade
Structure	Overhead construction	Manmade
Structure	Pylon	Manmade
Structure	Upper Level of Communication	Manmade
Tidal Water		Natural
Tidal Water	Foreshore	Natural

OS Topographic Line

Descriptive Group	**Descriptive Term**	**Make**
Building	Outline	Manmade
Building	Outline	Manmade
Building	Division	Manmade
General Feature		
General Feature	Overhead construction	
General Feature		
General Feature		
General Feature	Tunnel edge	
General Surface		Natural
General Surface	Step	Manmade
General Surface	Step	Manmade
Historic Interest	Course of CRT Heritage	
Historic Interest		
Inland Water	Tunnel Edge	
Inland Water		Manmade
Inland Water	Culvert	Manmade
Inland Water		
Landform	Top of Slope	Manmade
Landform		
Landform		Manmade
Landform	Bottom of Cliff	Natural
Landform	Ridge or Rock line	Natural
Landform	Top of Cliff	Natural
Landform	Bottom of slope	Manmade
Network Or Polygon Closing Geometry	Inferred property closing link	
Network Or Polygon Closing Geometry	Polygon Closing link	
Path	Tunnel edge	Manmade
Political Or Administrative	District	
Political Or Administrative	Electoral	
Political Or Administrative	Parliamentary	
Political Or Administrative	County	
Political Or Administrative	Parish	
Pre-Build		
Rail	Narrow gauge	
Rail	Standard gauge track	
Rail	Buffer	Manmade
Rail		
Rail	Tunnel edge	Manmade
Road Or Track	Tunnel edge	Manmade
Road Or Track	Public	Manmade
Road Or Track	Traffic calming	Manmade
Roadside		
Structure		Manmade
Structure	Pylon	Manmade
Structure	Network Closing Link	
Tidal Water	Mean High Water (Springs)	Natural
Tidal Water	Mean Low Water (Springs)	Natural

OS Topographic Point

Descriptive Group	Descriptive Term	Make
General Feature	Positioned Non-coniferous	Natural
General Feature	Positioned Coniferous	Natural
General Feature	Positioned Boulder	Natural
Historic Interest	Site Of Heritage	
Historic Interest	CRT Structure	
Inland Water		Manmade
Landform		Manmade
Landform	Disused Feature	Natural
Landform		Natural
Political Or Administrative	Boundary Post or stone	
Pre-Build		
Provisional Or Unverified	Unclassified	
Rail	Switch	
Rail	Structure	
Roadside		
Structure		Manmade
Structure	Structure	Manmade
Structure	Triangulation Point or Pillar	Manmade
Terrain And Height	Air Height	
Terrain And Height	Spot Height	
Tidal Water		

Appendix B – Datasets used

ORGANISATION	DATASET
Countryside Agency	Open Access land
Community Forests	Community Forest Boundaries
DEFRA	North East Public Rights of Way
English Heritage	Battlefields
English Heritage	World Heritage Sites
English Heritage	Protected Wreck Sites
English Heritage	Scheduled Monuments
English Heritage	Parks and Gardens
English Nature	Ancient woodland
English Nature	National Nature Reserves
English Nature	Special Areas of Conservation
English Nature	Site of Special Scientifc Interest
English Nature	RAMSAR sites
Environment Agency	Fluvial/Tidal Flood Plains
Forestry Commission	National Inventory of Woodlands
Forestry Commission	Woodland Grant Schemes
Office for National Statistics	Census Output Area boundaries
Office for National Statistics	Super Output Areas (lower level)
Office for National Statistics	Population Statistics
Office of the Deputy Prime Minister	Indices of Multiple Deprivation
Ordnance Survey	OS Mastermap
Ordnance Survey	1:10000 colour raster
Ordnance Survey	1:50000 colour raster
Ordnance Survey	1:250000 colour raster
Ordnance Survey	Strategi
RSPB	Important Bird Areas
RSPB	Bird Reserves
Sport England	Sport, Pitches and Tracks North East Region
Stockton Borough Council	Urban Open Space data
Stockton Borough Council	Local Plan data
SUSTRANS	National Cycle Network
UK Perspectives	Aerial photography (25 cm pixel resolution)
Woodland Trust	Accessible Woodlands - GB
Woodland Trust	Major/Minor concentrations of Ancient Woodland