Green Infrastructure Study

Exeter Area and East Devon New Growth Point

April 2009

Contents

Chapter

Appendices

This document has been prepared and checked in accordance with ISO 9001 : 2000

Introduction

1.1 Background to the Study

1.1.1 Commissioning the Study

The Green Infrastructure Study for Exeter Area and East Devon New Growth Point has been commissioned jointly by East Devon District Council, Exeter City Council, Teignbridge District Council and Natural England. The study presents a framework for the delivery of Green Infrastructure in the Government recognised New Growth Points of 1: Exeter and East Devon and 2: Teignbridge.

LDA Design has been responsible for project design, development and delivery, with support from the project Advisory Group. Thanks are extended to the Advisory Group and to all stakeholders and consultees involved in the development of the Study. Details of the Advisory Group, Stakeholders and other consultees are presented in Appendix 1.

1.1.2 Scope of the Study

The aim of the project is to establish Green Infrastructure (GI) Networks for the Exeter Study Area for delivery by the relevant local authorities, statutory agencies, developers and other partner organisations in the future. The GI Study also identifies a range of GI Projects capable of being delivered as part of a future programme of work, linked wherever possible to areas of identified growth and development.

The outcomes of the GI Study provide both strategic and physical coordination of current and future green space projects, ensuring a co-ordinated approach to the planning, delivery and management of GI that cuts across local authority boundaries.

Specifically, the study:

- provides a framework to guide sustainable development;
- enhances the accessibility of key assets, leisure facilities, open and semi natural green space, wildlife areas and the countryside;
- identifies new opportunities for walking, cycling and other forms of sustainable transport to enhance the existing network;
- establishes the broad framework required to improve recreation and leisure activities to promote healthier lifestyles;
- identifies opportunities for creating linked habitat networks leading to increased ecological value, biodiversity and species persistence;
- identifies general opportunities for the enhancement of quality, functionality and character of urban fringe landscapes in line with Countryside in and Around Towns (CIAT) guidance;
- draws together existing data on the physical, natural, ecological, landscape and recreational assets; and
- provides supporting information and a steer on the options available to offset/mitigate impacts on national and internationally designated sites in and adjacent to the core study area.

1.1.3 A Commitment to GI

This GI Study is part of an ongoing commitment to GI development and delivery across the Exeter and East Devon and Teignbridge Growth Points that seeks to take a proactive approach to environmental planning, protection and enhancement whilst embracing economic regeneration, growth and sustainable development.

This commitment is set within broader Government initiatives to deliver a bold and exciting environment for existing and planned communities that in the long term will include enhanced biodiversity assets and environmental character, improved access to sustainable modes of transport, enhanced leisure and recreational opportunities, and more sustainable modes of managing land and water resources.

These multiple and often interrelated activities will benefit from an environmentally led and coordinated approach that is inherent in the principles that underpin GI.

1.2 Why is GI Important?

1.2.1 Positive Planning and Delivery

Planning Policy Statement (PPS) 12 - Local Spatial Planning defines GI as a network of green space both new and existing, rural and urban, which supports natural and ecological processes and is integral to the health and quality of life of sustainable communities. A more detailed definition of GI, along with a glossary of other key terms used in this report, is found in Appendix 2.

New development and conservation initiatives, including flood alleviation schemes, are often reactive and focus on specific areas of land rather than considering the wider environment. Even where regional or sub-regional coordination occurs, such as in the South West Nature Map initiative, only a single theme is addressed. GI presents an alternative approach to planning that is proactive, multi-scale and multi-functional.

Major built infrastructure developments such as roads or power distribution schemes succeed because of the long established process of careful planning, design and investment between a number of different disciplines, well in advance of implementation. GI represents a similar co-ordinated interdisciplinary approach to environmental planning and regeneration, comparable to that used in built or ‘grey’ infrastructure planning.

Notwithstanding the benefits to the environment, GI will contribute to the development of better places in which to live, work and invest. It will help create places with

a distinctive and attractive character that function well, are well connected and appealing. It will help forge a closer relationship between urban and rural areas, with the countryside functioning more successfully as a place that feeds and sustains urban populations. It will create an outdoor classroom for learning and an attractive and characterful environment for exploration and recreation. It will do so by combining the efforts, skills and funding of a wide range of organisations in the public and private sector.

GI places the physical environment at the heart of the development process, and environmental processes at the heart of sustainable development and the economy. To succeed, GI will need coordination, sustained investment and a long-term commitment between a wide range of public and private bodies. This commitment must be shared by national, regional and local government authorities, agencies and organisations; land owners and land managers; businesses; developers; the voluntary sector; and the communities that make up the population of the growth point and wider area. It requires a new and positive way of thinking and working that involves close collaboration between these partners.

GI also addresses a number of the Government's objectives for rural areas as set out in PPS 7 – Sustainable Development in Rural Areas, notably those that relate to ensuring new development respects and enhances local distinctiveness and the intrinsic qualities of the countryside and promoting a range of uses to maximise the potential of urban fringe areas.

In parallel with the holistic approach to GI planning is a move towards landscape scale conservation and enhancement of the biodiversity resource, as promoted in PPS 9 – Biological and Geological Conservation. This important guidance document identifies the role that networks of natural habitats have in linking sites of biodiversity importance and providing routes or stepping stones for the migration, dispersal and genetic exchange of species in the wider environment.

GI is also an opportunity to address the goal of establishing multifunctional landscapes around Exeter. The multifunctional approach to land use planning is particularly appropriate to urban extensions and new settlements because it serves to underpin sustainable functioning and 'liveability'. The GI Study presents a mechanism for developing and taking forward the ten key functions for the Countryside in and Around Towns identified by the Countryside Agency and its Partners in 'A Vision for Connecting Town and Country in the Pursuit of Sustainable Development'[1].

1.2.2 GI - A Framework for Sustainable Development

The Draft Revised Regional Spatial Strategy (RSS) for the South West Incorporating the Secretary of State's Proposed Changes (2008)[2] indicates that the Local Development Documents for Exeter and East Devon should make provision for further development of the Exeter area as a centre for business and service sectors, together with specialised science and technology based industries. The draft RSS also states the need for significant new employment land provision and population growth within Exeter city, in the Cranbrook New Community and elsewhere in East Devon and Teignbridge districts.

The GI Study will play an important role in providing a framework for sustainable development, realising the opportunities and potential of the environment in supporting change as well as informing its form and layout and the types of green spaces, habitat improvements and access links that are provided. It

[1] Countryside Agency et.al. The Countryside in and Around Towns – A Vision for Connecting Town and Country in the Pursuit of Sustainable Development. Countryside Agency, January 2005.

[2] South West Regional Assembly, The Draft Revised Regional Spatial Strategy for the South West Incorporating the Secretary of State's Proposed Changes, July 2008

will also inform the nature and character of mitigation measures that are employed where new development will have an adverse impact on the environment as well as strengthen and enhance the identity of new and existing communities. It will also identify initiatives that will aim to meet recreational objectives of existing and future residents close to home, and through this, protect sensitive habitats and landscapes fringing the core study area such as the Pebblebed Heaths, Haldon Forest Park and in the Exe Estuary.

The GI Study will also help to target Section 106, Community Infrastructure Levy (CIL) and other funding streams that can deliver new GI that is not directly related to areas of new development, but will have tangible benefits to existing and new communities and contribute to sustainability objectives.

1.2.3 Contributing to a Bigger Agenda

The UK and other western nations have witnessed widespread exploitation of the earth's resources to fuel industrial and social progress, with little awareness or consideration to long-term impacts on society and the environment. At a global scale we are seeing the consequences of these activities, such as in the increasing and compelling evidence for climate change and environmental degradation. In this country, the effects are evident in the erosion of our diverse and attractive landscapes through agricultural intensification, the expansion of urban areas which often pay little respect to their surroundings, and the loss and fragmentation of semi natural habitats. Indeed, it is notable that in the core study area, landscape character, habitats and footpath networks have all experienced some degree of degradation and fragmentation in recent decades.

GI, and notably habitat enhancement and creation, will contribute towards meeting several international biodiversity obligations, including a commitment to achieve a significant reduction in the rate of loss of biological diversity by 2010 (under the Convention on Biological Diversity) and a European Union commitment to halt the rate of biodiversity loss by 2010 under the 2001 Gothenburg agreement. GI will also contribute to several actions that are in place that will move towards meeting these commitments, such as the Site of Scientific Interest (SSSI) Public Service Agreement target to bring 95% of all SSSIs into favourable or recovering condition by 2010.

In addition to this, there is scope for the GI Study to contribute towards meeting the requirements of the European Water Framework Directive (WFD). This came into force in 2000 and was transposed into UK law in 2003. Amongst its aims, the WFD is designed to enhance the status and prevent the further deterioration of inland and coastal aquatic ecosystems, and wetlands by 2015.

The European Landscape Convention (ELC) is also of importance. The aim of the Convention is to promote the protection, management and planning of Europe's landscape, and applies to urban, urban fringe and rural areas. Natural England has published a framework for implementing the ELC[3], and will lead its implementation on behalf of Defra. GI meets several key objectives of the ELC, notably through landscape protection, management, planning and common threads of raising awareness of landscape issues. The ELC Implementation Framework also highlights the promotion of a landscape perspective to influence spatial planning and the importance of fostering community engagement. Both of these fundamental principles are integral to guiding the approach to GI planning described later in this document.

1.3 Overview of Planning Policy

The concept of GI has been developing for some time as an important environment led planning tool. GI is now being increasingly and successfully integrated into UK regional and local policies and actions, although the impetus has been largely focused within the urban areas of the South East of England, notably the Thames Gateway and other Growth Areas, such as the East Midlands.

[3] http://www.coe.int/t/dg4/cultureheritage/Conventions/Landscape/default_en.asp

1.3.1 A National Regeneration Priority

The former Office of the Deputy Prime Minister (ODPM's) Sustainable Communities Plan[4] sets out a long-term programme of action for delivering sustainable communities in both urban and rural areas. The Plan includes a significant increase in resources and major reforms of housing and planning, but also signals a new approach to how and what we build, and delivering a better quality of life or 'liveability' for communities.

The Plan consists of several key elements, two of which are directly relevant to GI:

- Liveability. The Plan sets out how the Government intends to intensify efforts to improve the local environment of all communities. This includes cleaner streets, improved parks and better public spaces; and
- Protecting the Countryside. The Plan outlines how land will be used more effectively.

This focus on 'liveability' and the countryside has provided a platform for the wider promotion and understanding of the principles that underpin GI and its importance in the delivery of a healthy and enhanced environment for everyone.

This GI Study therefore forms an integral part of delivering the Government's aspirations and objectives.

1.3.2 Green Infrastructure in the National Planning Policy Framework

The inclusion of GI in Government planning policy is a significant landmark in strategic and collaborative environmental planning and delivery and represents an essential part of the Government's commitment to meeting sustainable development objectives. Relevant planning policies include:

- PPS 1 - Delivering Sustainable Development: fundamental driver through which the implicit requirement to take due regard to environmental issues in meeting sustainable development objectives is set out;
- PPS 7 - Sustainable Development in Rural Areas: sets out the Government's planning policies for rural areas. A key objective of PPS7 is to raise the quality of life and the environment in rural areas through good quality, sustainable development that respects the local distinctiveness and the intrinsic qualities of the countryside;
- PPS 9 – Biological and Geological Conservation: highlights the role that functioning ecosystems can have in promoting sustainable development, and contributing to rural renewal and urban renaissance;
- PPS 12 – Local Spatial Planning: establishes the importance of local spatial planning in creating strong safe and prosperous communities and ensures local plans are supported by evidence of what physical, social and GI is needed to deliver sustainable communities;
- Planning Policy Guidance (PPG) 17 - Sport and Recreation: highlights the requirement to undertake open space audits and strategies, which can inform GI strategies at both the strategic and local scale; and
- PPS 25 – Development and Flood Risk: refers specifically to making the most of the benefits of GI for flood storage, conveyance and sustainable urban drainage systems (SUDS), and re-creating functional floodplains and setting back flood defences.

1.3.3 GI in the Draft Revised Regional Spatial Strategy for the South West Incorporating the Secretary of State's Proposed Changes

Several references to GI are made in the Draft Revised Regional Spatial Strategy for the South West Incorporating the Secretary of State's Proposed Changes (2008) and it provides the policy background to the development of the GI Study. Specific references to GI in the draft RSS are presented in Appendix 3.

The draft RSS clearly identifies the role and importance of GI in the South West Region, as well as establishing several overarching themes that the Exeter Area

[4] Sustainable Communities: Building for the Future. ODPM, 2003

and East Devon New Growth Point GI Study will need to follow. In summary, GI is seen as offering a mechanism for contributing to sustainable communities and delivering a high quality of life for existing and new communities, by protecting and maintaining environmental and cultural assets and enhancing the living environment. It also highlights the importance of GI in providing clear objectives and priorities that can be mapped for incorporation into spatial strategies and development proposals.

It is also relevant to note that GI is identified as forming a key part of the definition of Infrastructure in the Regional Infrastructure Funds Prospectus. Further details are provided in Appendix 4.

1.4 Green Infrastructure in Devon

In addition to regional drivers for GI development and delivery, Devon County Council has acknowledged the importance of GI in the planning system. The County Council recognises the need to deliver GI through a number of the Devon Local Area Agreement initiatives currently being progressed, such as LAA2 - improve the quality, quantity and accessibility of public open space and GI and LAA8 - conservation and enhancement of Devon's biodiversity and geology (these are available on the Councils website at *http://www.devonsp.org.uk/sustainablecommunitystrategy/index.html).*

The County Council is also in the process of preparing a Briefing Paper about GI to provide guidance to the District Councils and others about GI matters that should be addressed in Local Development Documents and to establish the GI Study and the policy framework for its delivery (the published LDF Briefing Papers are available on the Councils website at: *www.devon.gov.uk/ldf-briefing-papers).*

A Vision for Green Infrastructure

2.1 Introduction to the Vision

GI means many things to many people[5] and various definitions and approaches to GI planning exist throughout the country. Despite this, it is acknowledged that there is a significant amount of common ground within the available approaches, notably that GI involves natural and managed areas in both urban and rural settings, is about the strategic connection of open green areas and that it should provide multiple benefits.

To understand the nature and scope of GI in the Exeter Area and East Devon New Growth Point an important first stage in the project was to clarify the role of GI and establish a vision of what it will deliver in the future.

The Vision for GI has therefore been developed by the Advisory Group. It is based upon a refined definition of GI that takes forward the general principles enshrined in national and regional planning guidance, but also takes into account the specific issues and opportunities presented by the local area. The objectives build on the specific aims for the study and draw on the ten key functions of the countryside in and around towns as set out in the Countryside Agency's vision for the urban rural fringe.

The following chapter presents the Vision for the GI in the Exeter Study Area along with specific aims and objectives. The Vision is also presented as a promotional factsheet, a copy of which is presented in Appendix 5.

[5] Clive Davies et.al. Green Infrastructure Planning Guide Version 1.2. North East Community Forests. Newcastle University and University of Northumbria, 2005

2.2 The Vision

The Vision is to achieve a GI Strategic Network that:

- protects and enhances current environmental assets and local identity;
- provides a holistic framework for new sustainable development and regeneration; and
- performs a multitude of life support functions for the benefit of people and wildlife.

In summary, GI will help to create high quality, attractive and functional places that will provide a setting for day-to-day living, enhance the character and diversity of the landscape and protect heritage assets that contribute to the area's unique sense of place and cultural identity. It will enrich the area's wildlife value by addressing the negative impact of habitat loss and fragmentation by promoting habitat enhancement and linkage. GI will also help to connect people to places by linking residents and visitors to leisure and work destinations along a network of safe and clearly defined routes.

In taking forward the Vision, the intention is to place the Exeter and East Devon and Teignbridge New Growth Points at the forefront of strategic GI planning and delivery in the UK.

2.3 Strategic Aims and Objectives

The strategic aims of the GI Study either directly or indirectly, take forward and expand on the ten key functions for the Countryside in and Around Towns, supported by a series of objectives. An additional strategic aim has been added concerning life support systems. These eleven strategic aims are described in Table 1.

Table 1: Strategic Aims and Objectives

STRATEGIC AIMS FOR GI	OBJECTIVES
Bridge to the Country	Identify networks of new and improved open spaces and access routes in continuous green corridors linking the city to the wider countryside
Gateway to the Town	Enhance the quality, character and identity of the landscape to promote the quality of the town and act as a gateway into urban and rural areas
Health Centre	Create a more accessible and attractive urban and rural environment close to where people live and work and the framework necessary to improve recreation and leisure facilities necessary to promote healthier lifestyles
Classroom	Provide a diverse range of environments that can act as outdoor classrooms that supports all parts of the national curriculum with particular emphasis on environmental and rural studies
Recycling and Renewable Energy Centre	Recognise the important role of the landscape in sustainable energy management, recycling waste and water and pollution control
Life Support Systems	Recognise the contribution the landscape can make to life support systems, such as adaptation to climate change, micro-climate adjustment, improving air quality and reducing emissions
Productive Landscape	Identify opportunities for farmers close to the city to take advantage of their proximity to urban markets and encourage small scale urban and community farm initiatives
Cultural Legacy	Protect features and patterns that display the evolution of urban and rural areas and improve opportunities to celebrate and understand the past and enrich the areas varied landscape character and sense of place
Place for Sustainable Living	Inform strategic decisions on the location and nature of major new development and infrastructure projects proposed in and around the city
Engine for Regeneration	Provide a mechanism for raising community confidence and skills in creating and managing community spaces and facilities and in bringing about other environmental improvements to enhance the local area
Nature Reserve	Protect, enhance and link existing and future habitats to raise ecological value and species persistence across the area in urban and rural locations

2.4 Methodology and Baseline Review

The GI Study has been undertaken in two phases:

Phase 1: Baseline Review, Analysis and Interpretation, which reviews existing GI assets and opportunities for improvement and Phase 2: GI Planning, which establishes the priority areas for investment. The methodology is presented in Appendix 6.

Phase 1: Baseline Review, Analysis and Interpretation and Phase 2: GI Planning are accompanied by a range of figures and plans. These are referred to in the text where relevant and a list of all figures can be found in Appendix 7.

The baseline review is conducted under a series of key themes. For each theme and sub theme a summary of the key issues is presented, along with opportunities and constraints. The key themes are listed below and the full baseline review, along with supporting figures, can be found in Appendix 8.

Natural Systems

- Geology and Landform
- Hydrology and Flood
- Biodiversity

Land Use and Human Systems

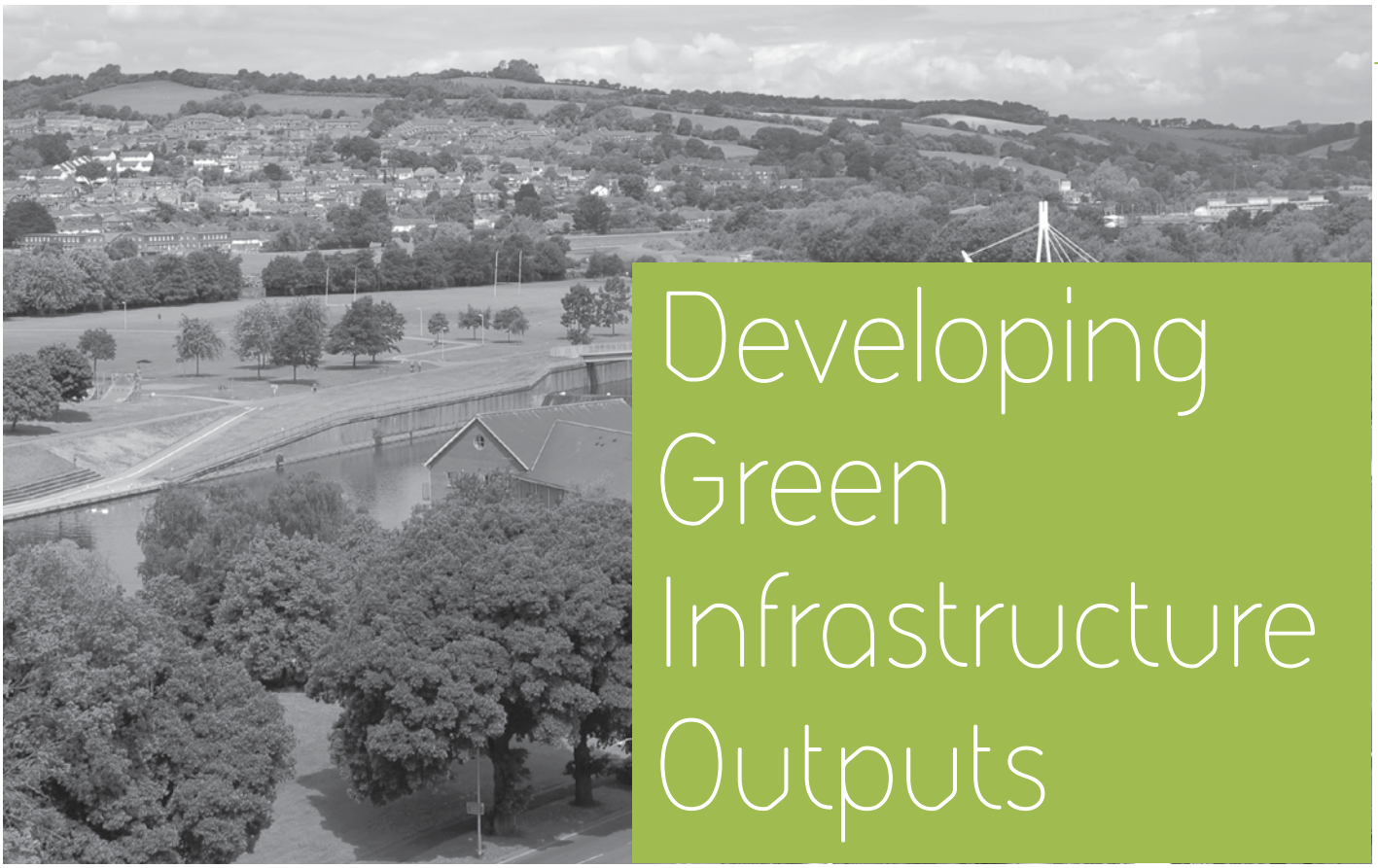
- Land Use and Agriculture
- Heritage and Culture
- Green Space
- Leisure, Recreation and Tourism
- Access and Movement

Landscape and Visual Character

- Landscape Character and Designations
- Visual and Perceptual Character

Landscape Change and Development

- New Built Development
- Land Use Change



Developing Green Infrastructure Outputs

3.1 GI Spatial Framework, GI Networks and GI Projects

GI's primary role is to place the environment at the centre of planning and decision making.

As described as Chapter 2 of this study, the Vision is to achieve a GI Strategic Network that:

- protects and enhances current environmental assets and local identity;
- provides a holistic framework for new sustainable development and regeneration; and
- performs a multitude of life support functions for the benefit of people and wildlife.

The Vision of GI should apply to the entirety of the core study area and contribute to decision making, planning and design at all scales from strategic to local. It is anticipated that the findings of this study will help direct change and also help coordinate and prioritise activity and funding.

The definition of GI in this study recognises the significance of connectivity through the linkage of people and place, the enrichment of the environmental resource through habitat expansion and linkage and through ensuring that all new development is well sited, planned and responsive to its landscape character context. In addition, it also highlights the opportunities presented by projects and initiatives that will

offer site specific GI delivery, or guide positive landscape change across a wide area.

In recognition of this an overarching GI Spatial Framework (Chapter 4) has been identified, along with two principal GI Networks and a series of GI Projects. These four components of the Exeter Fringes GI Study are set out below:

- The GI Spatial Framework builds on the baseline resource to help enhance the physical image and identity of Exeter, and address how the city, surrounding settlements and new developments relate to the landscape;
- The Biodiversity Network is founded principally on the biodiversity resource and opportunities for enhancement and linkage and reversal of habitat fragmentation;
- The Sustainable Movement Network is focused on people and place offering enhanced opportunities for sustainable movement between destinations and assets; and
- GI Projects aim to deliver multifunctional benefit across a number of agendas. They often encompass elements of the spatial networks described above and many will result in new or enhanced open space provision.

The GI Spatial Framework seeks to demonstrate how the city, surrounding settlements and new developments relate to the landscape. It identifies the fundamental landscape elements that can help to shape the legibility of the city, its landscape setting and the quality of life it offers to inhabitants and visitors.

The Biodiversity Network and Sustainable Movement Network are tangible proposals, designed to attract funding for their refinement, design and delivery on the ground. They represent the core of GI delivery in the study area.

GI Projects will vary in scale and scope, although they will aim to deliver multi-functional benefit. For example, an individual project, such as the Clyst Meadows Project can deliver on a number of agendas, combining habitat enhancement, open space and recreation improvements and provision for arts and education.

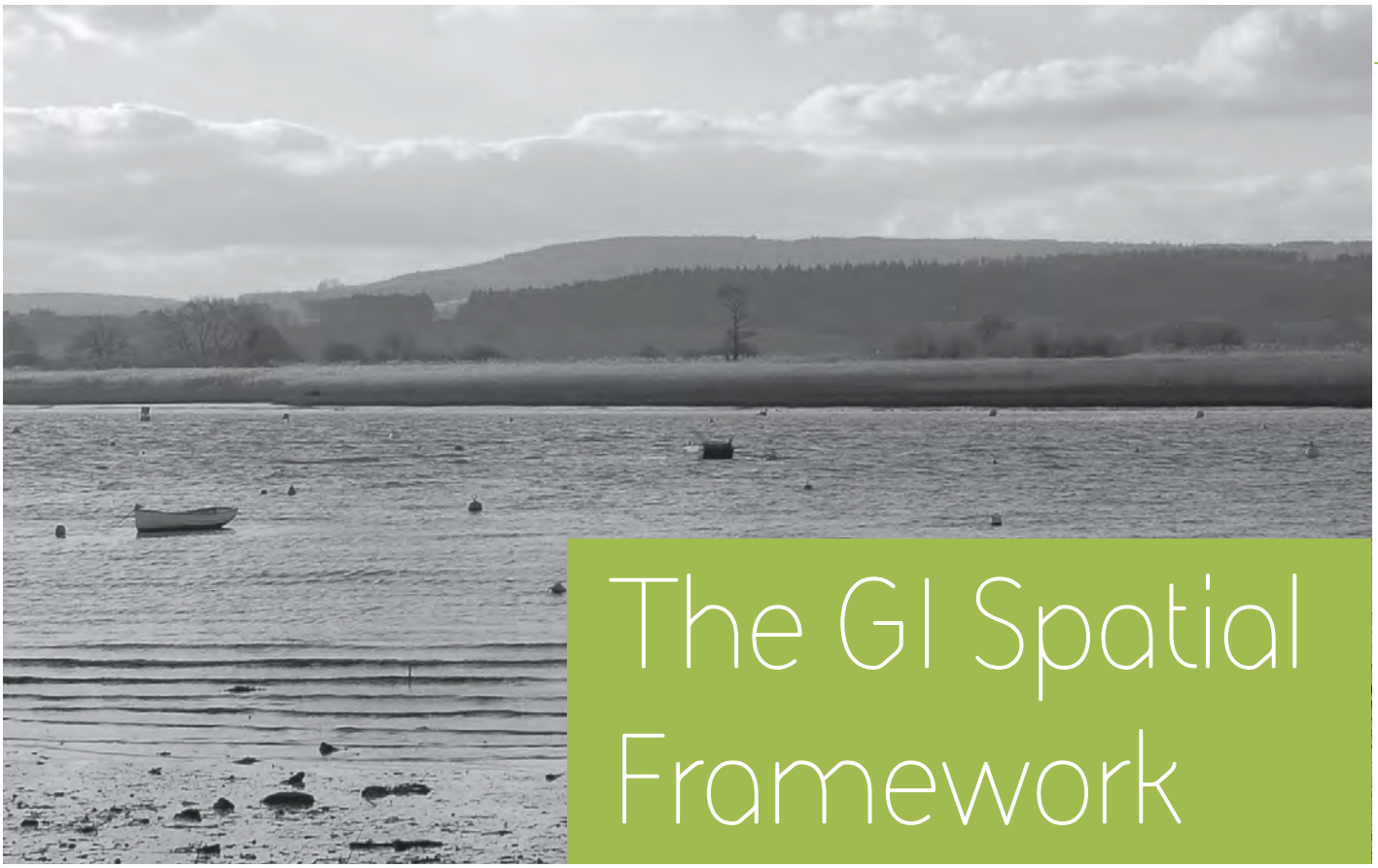
The Biodiversity Network (Chapter 5) and the Sustainable Movement Network (Chapter 6) and the GI Projects (Chapter 7) have been developed in some detail, based on known assets and opportunities (refer to Baseline Review and Supporting Figures in Appendix 8) and through consultation with key stakeholders.

It is acknowledged that these initiatives are closely related and should not be viewed in isolation. Significant refinement of these initiatives will be required at the detailed design and delivery scale in order to respond to the pressures of development, address local priorities and issues such as land ownership and reconcile physical obstacles and barriers. The identification of the networks and projects in this study does not preclude the identification of further initiatives in the future.

3.2 The GI Strategic Network

The GI Spatial Framework, Biodiversity Network, Sustainable Movement Network and GI Projects described above form the main components of a robust evidence base for the future delivery of GI in the core study area.

Although these four components are physically separate and have a different range of functions and thematic objectives, there is a high degree of overlap and interdependence between them, and numerous situations where they occupy the same area of landscape. Where synergy occurs, the greatest opportunities for multi-functional development can be seen to exist. These areas can be regarded as ‘corridors’ forming a part of the GI Strategic Network. This GI Strategic Network, described in more detail in Chapter 8, does not prescribe specific projects or actions. Rather it should be seen as defining target zones for prioritising funding and activity at the strategic planning and allocation scale to help facilitate the growth of Exeter and surrounding settlements. However, given their strategic importance to GI delivery, new development within or adjacent to these zones would also need to be particularly responsive to GI objectives.



The GI Spatial Framework

Refer to:

- Figure 1: GI Spatial Framework (inserted into text – see page 19)

4.1 Introduction to the GI Spatial Framework

The GI Spatial Framework is broader than the Biodiversity Network, Sustainable Movement Network and GI Projects described in the following chapters. It seeks to enhance the physical identity of Exeter, improve the quality of life for people who live in and around the city, and address how the city, surrounding settlements and new developments relate to the landscape.

It will be necessary for any new developments to support the aims and objectives of GI. Developers should therefore liaise with the LPA and/or the proposed GI delivery body to ensure that their proposals are appropriate to the GI Spatial Framework, and conform to the overall Vision for GI. Delivery and implementation is discussed in more in Chapter 9: GI – Making it Happen.

4.2 Context to the GI Spatial Framework

Many of the most beautiful and economically successful settlements are strongly related to the landscape within which they have evolved. Without the seven rocky hills that punctuate its vibrant fabric Athens would not be the same place and Oxford would be a quite different without the tranquil meadows along the Thames and Cherwell Rivers that create the stunning contrast between the city centre and its rural hinterland.

Exeter is fortunate in that it has a relationship with its setting that, in many ways, is every bit as strong as that enjoyed by these iconic cities. Well defined ridges skirt the city to the north, north west and south west, creating a clearly defined rural setting that is visible from most parts of Exeter. The Exe valley cuts through the centre of the city creating a strong landscape and urban structure that is essential to the image of Exeter as well as providing attractive pedestrian and cyclist routes to the surrounding coast and countryside. Green spaces and valley parks extend into neighbourhoods providing linkage between where people live and their setting. The city's existing GI already helps to define it as a place, contribute to its identity and provide quality of life to its residents. The same applies to the many settlements that surround the city in East Devon and Teignbridge. They sit harmoniously within their landscape setting and have easy access to the countryside.

The landscape of the urban rural fringe to the east of Exeter is, however, potentially a different story. Here the landscape has shallower, less distinct topography and accommodates major highways infrastructure, which seeks to disrupt the physical relationship between Exeter and East Devon. Proposed developments, such as the new community at Cranbrook, the intermodal freight terminal and Science Park have the potential to further alter the balance between urban and rural, further blurring the edge of the city.

GI has the potential to identify those spatial and structural landscape elements that might play a role in shaping the city in the future. In the same way that the surrounding ridges and the Exe valley are important, new GI elements can be identified for the eastern part of Exeter and neighbouring East Devon to shape the area in the future. It is possible to draw out a broad Spatial Framework for the study area, identifying how GI assets shape the fundamental form, image and identity of the city, the surrounding settlements and the wider rural hinterland.

4.3 Approach to Identifying the GI Spatial Framework

There is a substantial body of research and consensus about the elements that are most important in defining the identity of a city or other settlement. Foremost amongst these is 'Image of the City' by Kevin Lynch (1960). Lynch's thinking has stood the test of time and still stands as one of the best approaches to the analysis of urban structures. Lynch suggests that change can be managed by considering the 'image of the environment'. He argues that people find it easier to understand, identify with and navigate 'legible' places with a clearly recognisable structure. Such places are also more likely to be perceived positively and have a strong 'sense of place'. He shows how this structure can be understood and planned for by considering the 'paths' that traverse and subdivide the area and the experience these provide; the nature of the edges within the area and how they are defined; the different districts that make the area; and, the presence of nodes and landmarks that act as focal points and aids to navigation.

Many of these structures can be seen within parts of Exeter's setting. The main linkages, for example the cycle link along the Exe valley, provide structure to the landscape and determines how it is experienced. The surrounding ridges create clearly defined edges to the city; the different character areas define distinctive districts; points where routes come together, such as at Topsham, act as nodes; and, there are numerous landmarks such as the trees on the hill at Redhayes.

The methodology for identifying the GI Spatial Framework therefore involves adapting Lynch's thinking to identify those elements most important in building a clearly defined structure for the city and its surrounding settlements. Table 2 shows how this can be achieved.

Table 2: Methodology for Identifying GI Spatial Framework

Urban structure	Description	Landscape structure	Synergy with objectives for a sustainable place
Paths	The channels along which the observer moves (streets, walkways, transit lines, canals, railroads) and for many people these are the predominant elements in their image	Roads, lanes, footpaths, desire lines, key views	Sustainable accessibility
Edges	The linear elements not used or considered as paths by the observer - they are the boundaries between two phases, linear breaks in continuity; lateral references rather than coordinate axes; edge elements are for many people important organising features, and hold together generalised areas	Edges formed by topography, ridges, rivers, hedges, viewsheds or horizons, watersheds, edges formed by existing settlement	Primary linear elements
Districts	The medium-to-large sections of the city, which the observer mentally enters 'inside of' and which are recognisable as having some common, identifiable character	Landscape character areas and types	Character areas
Nodes	The points, or strategic spots, in a city into which an observer can enter, and which are the intensive foci to and from which he is travelling - or concentrations, which gain their importance from being the condensation of some use of physical character	Places with a strong landscape sense of place because of the confluence of paths, edges, landmarks	Node (or junction or intersection)
Landmarks	Another type of external point reference – these are usually a simply defined physical object	Key features in the landscape – distinctive hills, groups of trees, individual trees, buildings, etc.	Landmarks

4.4 The GI Spatial Framework

The GI Spatial Framework conceives Exeter as a compact city with a clear distinction between the urban area and the countryside within which it sits. It is a city supported by linked, self contained and well-defined communities which are both historic and new.

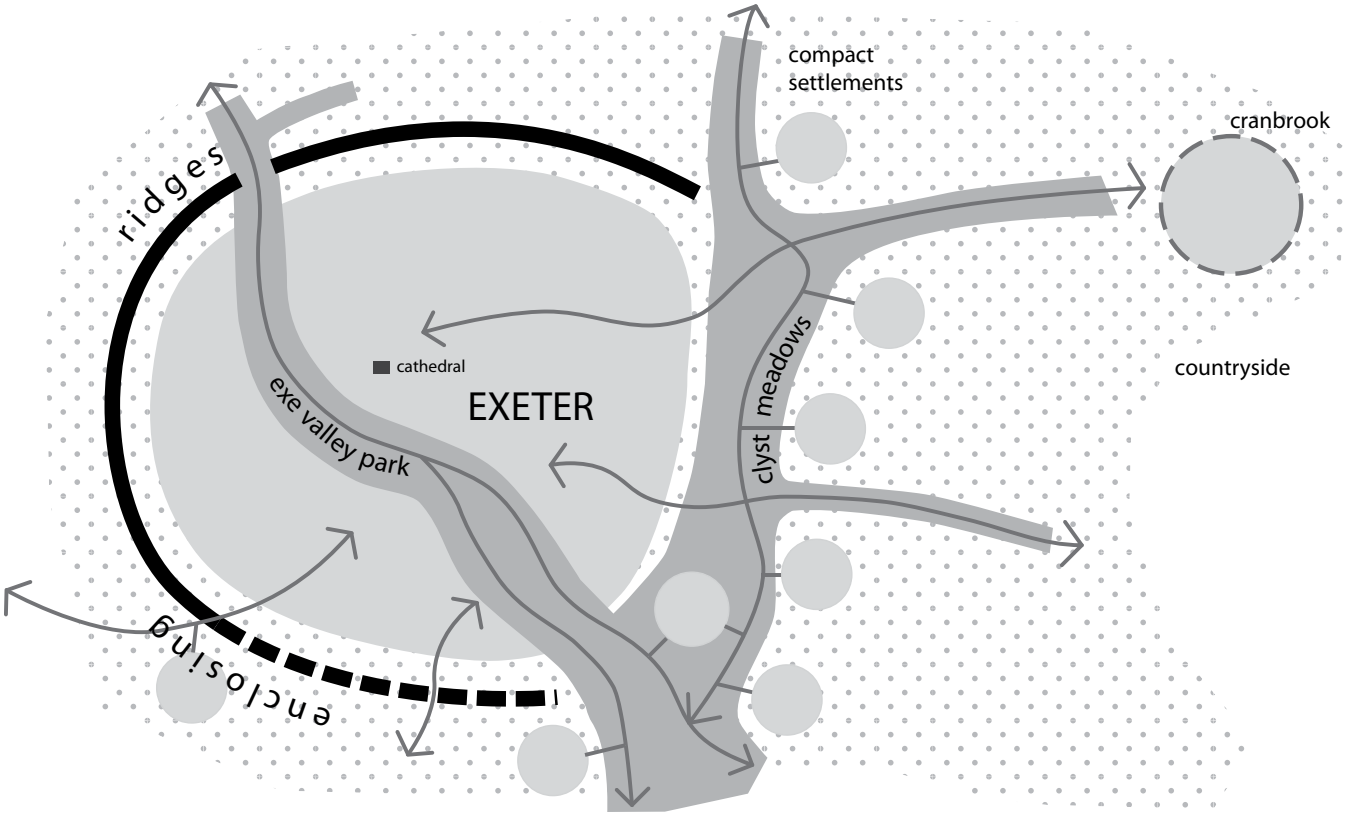
The city is defined by strong landscape ridges to the north and west. To the south containment is provided by an inner ring of hills to the rear of St Thomas and Alphington. More distant visual context and containment is provided by the outer ring of hills of which Haldon Hill is a part. The Exe valley and associated parks creates a major GI element in the heart of the city providing routes to the countryside and creating strong edges between different parts of the city. To the east, the Clyst Valley is a significant GI element which, through landscape management, can become an attractive and rich environment, where particular emphasis is given to biodiversity enhancement, countryside access, environmental education and low-key flood management.

The 'satellite' settlements will be linked into the heart of Exeter by safe, direct, green pedestrian and cyclist links which bridge the barrier created by the M5 and the inner ring road. Linkages from Topsham and Exeter will remain the most important routes, connecting the existing settlements, but a new high quality route will also be created through the new development at Monkerton, crossing the M5 into the Science Park at Redhayes. The route is the key sustainable link from Exeter towards the new community at Cranbrook. The landscape is punctuated by key landmarks, in particular the hill tops and key buildings on them. These include the wooded hilltop of Redhayes and the Science Park; the rugby stadium; and the landscape setting and key buildings around the University.

Key elements of the GI Spatial Framework are described below and illustrated by Figure 1:

1. The ridgelines that define the city to the north, north west and south west;
2. The Exe Valley and the associated valley parks and linkages that help to structure the city and provide routes to the coast and countryside;
3. The Clyst Valley, associated biodiversity reserves and linkages that provide connections between the settlements to the east of Exeter to the city;
4. The network of routes allowing for easy sustainable accessibility between the urban area of Exeter and the surrounding countryside and, in particular the 'satellite' settlements; and
5. Sustainable accessibility between the satellite settlements and the high quality countryside within which they sit.

Figure 1: The GI Spatial Framework (Indicative)



4.5 The Implications of the GI Spatial Framework

This GI Spatial Framework is based on an assessment of how existing and future GI assets might be brought together to help define the form of the city and the nature of its relationship with the surrounding countryside and settlements. Many factors will determine how priorities for development are set and where investment in GI is targeted. Broadly however the GI Spatial Framework has a number of important implications for the future development and management of Exeter and its fringes:

- Protection and management of the key ridgelines that enclose the city and maintenance of a clear distinction between the urban area and the countryside;
- The strengthening of the Exe valley and the valley parks as strong landscape elements with clear urban green space / rural character and continuing enhancement of linkages to the countryside, coast and between the city and surrounding settlements;
- As outlined in the Secretary of State's Proposed Changes to the Draft RSS (2008) allow for consolidation of the urban area up to the M5 and create a positive edge to the east of Exeter.;
- Management and investment of the Clyst Valley to create a well defined network of accessible semi natural green spaces and less accessible biodiversity rich areas, such as along the M5 corridor, defining the edge of Exeter and creating a strong buffer between the city and the countryside;
- Containment of proposed new settlements to the east of Exeter. Proposed new settlements should have well defined edges so that they appear to be physically self-contained urban areas within the countryside rather than as an extension of Exeter; and
- Identification and protection of green routes between the surrounding satellite settlements and Exeter, in particular the creation of a new linkage ('landmark bridge') across the M5 at Redhayes to enhance sustainable accessibility to the east.

The Biodiversity Network

Refer to:

- Figure 2: Biodiversity Network - Woodland and Grassland Assets
- Figure 3: Biodiversity Network - Wetland and Open Water Assets
- Figure 4: Biodiversity Network - Habitat Reservoirs and Links

5.1 Introduction

If a vibrant and robust biodiversity resource is to be achieved, maintaining and enhancing existing habitat networks will be important. Therefore, the Biodiversity Network element of GI plays an important role in the maintenance and improvement of biodiversity assets into the future. By expanding the area of habitat, improving connectivity and enhancing the quality of the existing assets the chances of species becoming extinct will be reduced and there will be a resource more capable of adapting to future changes in climate and other pressures such as land use change and development.

In addition, a functioning and coherent biodiversity resource will provide opportunities for significant landscape enhancement, improved access to areas of high quality countryside and semi-natural green space and a framework for environmental education, active and passive recreation and a fitting setting for historic sites and monuments.

The importance of networks of natural habitats, and the role they have to play in biodiversity conservation, is recognised in the latest government guidance on nature conservation: PPS 9 - Biodiversity and Geological Conservation. An extract follows:

"Networks of natural habitats provide a valuable resource. They can link sites of biodiversity importance and provide routes or stepping stones for the migration, dispersal and genetic exchange of species in the wider environment. Local authorities should aim to maintain networks by avoiding or repairing the fragmentation and isolation of natural habitats through policies in plans. Such networks should be protected from development, and, where possible, strengthened by or integrated within it. This may be done as part of a wider strategy for the protection and extension of open space and access routes such as canals and rivers, including those within urban areas".

Natural England also recognises the importance of landscape scale habitat creation and restoration as a key part of the overall strategy for maintaining biodiversity in England. Further details can be found in English Nature's research reports on Landscape Scale Biodiversity Opportunity Mapping (report numbers 687 and 641). Several large areas of contiguous habitat cover occur in the landscape surrounding the core study area. Of particular note are the Pebblebed Heaths, mixed woodlands and open grassland areas at Ashclyst Forest and Haldon Forest and wetlands, mudflats and open water in the Exe Estuary.

However, within the core study area, and most notably in farmland to the east of the M5, a landscape of fragmented terrestrial habitats is displayed. This is largely as a result of widespread agricultural improvement and modern development. Whilst some habitat resources are in evidence, they are generally isolated in areas of agriculture or built development and poorly connected to other areas of habitat.

The current highly fragmented habitat resource leaves many species vulnerable to extinction by virtue of the small size of the available resource and the isolated nature of remaining populations. Habitat creation, improvement and connectivity are therefore an important part of landscape enhancement.

At the regional scale, the South West Nature Map identifies the best areas to maintain and expand wildlife habitats through appropriate management, restoration and/or creation. However, at the local scale, it is acknowledged that its strategic focus may result in a lack of accuracy and that all areas of local importance will not be covered and opportunities fully exploited. The Biodiversity Network element of the GI Study therefore provides a mechanism for providing a more refined and locally responsive plan of habitat enhancement and connectivity.

5.2 Approach to Identifying and Characterising the Biodiversity Network

The starting point of the Biodiversity Network assessment was to identify and map the existing biodiversity resources within and surrounding the core study area. This was achieved by plotting the available spatial data illustrating designated sites including Sites of Special Scientific Interest (SSSI), Nature Reserves and County Wildlife Sites (CWS) as well as non designated sites of biodiversity interest or potential such as Ancient Woodland and grasslands forming part of the Exeter Riverside Valley Park or Exeter Biodiversity Network. Aerial photographs and local knowledge were also used to identify areas with high biodiversity potential, such as areas of semi improved grassland within a strong network of hedgerows and a high occurrence of field trees that is visible in the east of the core study area. The main terrestrial habitat types (and sources) identified are:

- Heathland (Natural England);
- Woodland (National Inventory of Forest Types and Mastermap);
- Lowland meadow (Natural England);
- Remnant historic parkland (derived from the Devon HLC and verified on aerial photographs);
- Agricultural land with habitat potential (rough grassland with thick boundary hedgerows and trees - identified on aerial photographs);
- Grasslands fringing tributary streams (buffering of mastermap data);
- Designated wildlife sites (Local Planning Authorities);
- River Channels (Mastermap);
- Ponds (Mastermap);
- Fens, mudflats and floodplain grazing marsh (Natural England); and
- Peat (derived from geology mapping and confirmed by CWS designation).

Once the mapping of existing habitats was completed, the next stage involved the identification of habitat clusters. The principle behind this approach is that habitat creation or enhancement within these clusters would be of maximum benefit in stabilising and improving the existing habitat resource.

Buffer analysis was undertaken to increase the visibility of key terrestrial habitats in and surrounding the core study area, to aid the identification of habitat clusters. 100m Buffering was therefore applied to woodlands identified on the National Inventory of Woodlands and lowland hay meadows. A 50m buffer was established along tributary stream channels feeding the Clyst and Exe to identify potential semi-improved grassland corridors fringing water courses. Buffering also helped identify zones around existing terrestrial habitat that may offer potential for natural regeneration and consolidation of existing assets through protection.

Buffer analysis was not undertaken for heathland and riparian/open water habitat on account of their increased visibility in the study area and recognition that restoration or creation can only occur within tight geological, pedological or hydrological constraints.

Similarly buffer analysis of areas of nature conservation designation, remnant parklands, farmland with habitat potential and smaller areas of trees and woodlands was not undertaken due to their strict geographic limits and proximity to built development.

The analysis of habitat distributions and identification of reservoirs and links is presented on Figures 2 and 3.

5.3 Description of the Biodiversity Network

The composite Biodiversity Network, as shown on Figure 4, illustrates the distribution of habitat reservoirs and habitat links identified through the analysis stage. Areas of woodland, heathland and river channels are identified for context. Other habitats and designated nature conservation sites (illustrated on Figures 16 and 17 and described in Appendix 8) were considered in the analysis, however are not illustrated.

Larger habitat blocks and groupings of smaller blocks of habitat in close proximity to each other are referred to as habitat reservoirs. These will be the focus of habitat protection, enhancement and creation. A combination of habitat protection and creation, perhaps through new planting or natural regeneration will be encouraged, and protection, for example from pesticide drift will be afforded through the use of landscape buffer strips.

Linear features, such as river corridors or hedgerow networks, or a series of unconnected habitat patches in close proximity to each other that have the potential to link the reservoirs, are referred to as habitat links. Habitat links, in addition to providing additional habitat resources will also have an important role in connecting habitat reservoirs and clusters together.

It should be noted that the habitat links and reservoirs that are identified are not the only areas where habitat protection, enhancement or creation will be encouraged. The protection, conservation and enhancement of areas of existing semi natural habitat will continue to be important, as will the creation of new habitats and habitat links as opportunities arise.

5.4 Habitat Reservoirs

Six habitat reservoirs have been identified from the analysis of habitat distribution, landscape type and designations. A distinction is made between terrestrial and wetland/open water types. These are described below.

5.4.1 Wetland/Open Water Habitat Reservoirs

Clyst Valley

The Clyst Valley habitat reservoir extends along the floodplain of the River Clyst from the weirs upstream of Clyst St Mary northwards to the north west of Broadclyst.

The floodplain landscape is predominantly improved or semi improved pasture, although some arable land uses are evident. Hedgerows within the floodplain are not characteristic, although remnant hedgerows and linear belts of scrub are evident along some field boundaries and fringing the river channel. Parkland at Bishops Court is included in the Habitat Reservoir as a consequence of its close proximity to the Clyst and its floodplain landscape. Semi improved parkland grasslands, bodies of standing open water, parkland trees, woodland copses and tree belts are all characteristic, and make an important contribution to the range of habitat types represented.

The geographical extents of the habitat reservoir is broadly defined by the outer limits of the floodplain, and unlike the area to the south of the weirs at Clyst St Mary, the area is not subject to tidal flooding.

Except for a woodland County Wildlife Site (CWS) to the east of Belfield House at the northern extent of the habitat reservoir, there are currently no biodiversity designations within the area. Despite this the Clyst Valley has been identified as a habitat reservoir because of the combination of grassland, wetland, parkland, woodland and farmland within a connected series of habitats linked by the River Clyst.

Lower Exe and Clyst Valleys and Exe Estuary

The Lower Exe and Clyst Valleys and Exe Estuary habitat reservoir comprises the tidal reaches of the rivers Exe and Clyst and the Exe Estuary. The Exe is tidal up to the quay at Haven Banks, and the Clyst up to the weirs at Clyst St Mary.

The valley floors of the Lower Exe and Clyst comprise a rich mosaic of habitat types ranging from riverside

meadows, scrub, tree copses, hedgerows, salt marsh, mudflats and open water. The Exe Estuary south of the M5 is characterised by semi improved and seasonally wet pastures and a multitude of drainage channels and creeks, with fewer trees and hedgerows in evidence. The nature conservation value of the Lower Exe and Exe Estuary is highlighted by the range of nature conservation designations evident. Of particular note is the SSSI, Ramsar site and Special Protection Area (SPA) designations below Countess Weir. The semi-improved marshy grassland, saltmarsh and species-rich ditches of the lower Clyst between Topsham and Clyst St Mary are also recognised as important habitats, with an area of floodplain within East Devon District designated as a CWS.

Above Countess Weir the Exeter Riverside Valley Park contains several areas with local designations, including areas of woodland and grassland fringing the floodplain.

This area has been identified as a habitat reservoir because of the high importance of the estuarine, wetland, riparian and river floodplain habitats it supports and the large continuous nature of this semi-natural open space.

Upper Exe Valley

This habitat reservoir includes the River Exe and its floodplain upstream of Exeter City centre and extends northwards to include the Brampford Speke SSSI. A more limited palette of habitat types is evident when compared to the Lower Exe and Exe Estuary. However, old water courses, open pools, and ditches, semi improved grasslands and riverside meadows contribute local habitat diversity. The Brampford Speke SSSI contains a richer habitat resource, with a number of riverside tree belts and remnant hedge-lines marked by isolated trees and hedge plants. The area is also notable as an example of floodplain development, with examples of lateral meander movement and channel accretion. The course of the dismantled railway line is also significant, displaying intermittent stretches of regenerating scrub and woodland. The Brampford Speke SSSI might be regarded as a model for enhancement of the remainder of the Upper Exe Valley habitat reservoir. Subject to local habitat enhancement potential exists to extend the habitat reservoir northwards along the floodplains of the River Culm and Creedy, both of which are tributaries of the River Exe.

5.4.2 Terrestrial Habitat Reservoirs

North Exeter Wooded Hills and Meadows

This is the largest and perhaps most complex of the habitat reservoirs on the edges of Exeter. It is characterised by woodlands and an intricate farmland landscape with a patchwork of fields with strong hedgerows connecting the woodland blocks. Much the farmed land is in arable cultivation or managed as improved pasture, and as such is of limited biodiversity interest. However, along the urban fringe there are patches of scattered scrub, small woodlands and unimproved meadows or semi improved grasslands that form a richer habitat mosaic.

The largest area of woodland is Stoke Woods SSSI, which is noted for supporting a rich diversity of trees, breeding birds, fungi and butterflies. Ancient semi-natural oak woods and small streams which traverse the woodland floor are particularly important components of the available habitat resource. There are also notable areas with local landscape or biodiversity designations, including the Duryard Valley Park.

Nadderwater

The steep sided valley of the Nadder Brook contains a rich mosaic of habitats, comprising an intricate patchwork of deciduous woodlands and small semi or un- improved pastures connected by a dense network of wide, mature hedgerows. To the south of Pocombe Bridge, the landscape is more open, and as such hedgerows and riverside trees, in combination with semi improved pastures are the predominant habitat type. However, north of the bridge, the valley becomes steeper and increasingly more wooded. Stretching outwards from the wooded valley is a network of dense hedgerows with numerous hedgerow trees that form the framework for a rich habitat reservoir. The Alphington Whitestone Valley Park, and several local biodiversity designations are located within and neighbouring the valleys. Most notable are unimproved or semi improved neutral grasslands at Old Wheatley Field, Upper Old Wheatley Farm and Culm grassland at Spring Brake.

Cowley Wooded Hills

This habitat reservoir is located to the west of St Andrews Road to the north of Exwick, and comprises an intricate pattern of small and moderately sized woodlands and tree belts, typically on steeply sloping landform. The woodlands are connected by an intricate network of strong hedgerows bordering predominantly pasture fields, some of which contain mature field trees, which further contribute to the areas biodiversity interest. Parts of the reservoir are protected by local landscape or biodiversity designations.

5.4.3 Habitat Links

The Rivers Exe and Clyst are clearly elements of the landscape that create landscape scale habitat corridors through the core study area. However, analysis of habitat resources indicates that further habitat links through the countryside and within the urban envelope are viable, in areas that may be perceived as being of limited biodiversity interest. These links are derived from clusters of habitat and are particularly important in providing connectivity between the habitat reservoirs previously identified, but also mark areas in the landscape with demonstrable potential for biodiversity enhancement. Indeed, where enhancement of larger areas of contiguous or clustered habitat is successful, it may be possible to define several new habitat reservoirs in the future.

A summary of the key habitat links and clusters are presented below:

- The Eastern Tributaries – five tributaries of the Clyst and Exe drain westwards through areas of agricultural landscape that has limited biodiversity interest. Aerial photographs indicate that narrow stretches of streamside pastures, riparian habitat, trees and hedgerows border the tributaries, which have significant potential in providing corridors of continuous terrestrial habitat. These perform an important function in linking the Clyst and Exe Estuary habitat reservoirs to the Pebblebed Heaths and Ashclyst Forest and habitat clusters on the fringes of the core study area characterised by areas of remnant historic farmland, discreet areas of denser hedgerows, small fields and pastures, isolated species rich meadows and deciduous woodland blocks and shelterbelts. Of particular note is the unimproved grasslands CWS at Beautiport Farm. Clusters of habitat also perform a linking function across the watersheds of adjacent streams;
- The A30 road corridor – runs parallel to a tributary of the Clyst, and supports linear stretches of woodland and grassland. There is scope to improve the habitat resource bordering the route and develop a continuous habitat corridor from the cluster of habitats identified around Rockbeare House to the Clyst Valley habitat reservoir and on into the eastern fringes of Exeter, via the Science Park site;
- The dismantled rail line to the north of Alphington – provides an important link between the Nadderwater and the Lower Exe and Estuary habitat reservoirs. A stretch of the stream course is designated as part of the Exeter Biodiversity Network. However, further enhancement of biodiversity interest along this corridor will be necessary to enhance its linking capabilities;
- The A379 corridor (Junction 30 to Ludwell Valley Park) – represents an opportunity to enhance habitat links between the Lower Clyst Valley and the Lower Exe and Estuary, through the built up areas of Exeter. Of particular note are the linear belts of woodland and trees, set within a grassland framework bordering the busy road corridor. Ludwell Valley Park represents a sizable habitat cluster within the city, and a notable 'stepping stone' of grassland habitat forming a link between the Lower Clyst and Lower Exe and estuary habitat reservoirs. The importance of this to strategic nature conservation objectives is recognised in the designation of Ludwell Valley Park as a Regionally Important Geological and Geomorphological Site (RIGGS), along with other local landscape or biodiversity designations. Similarly the A379 corridor is also recognised as performing an important function, with notable stretches protected by local landscape or biodiversity designations.
- Whilst not recognised at this strategic scale, it is acknowledged that linear features such as rail lines and roads also present important linking habitat. Several stretches of rail line and roads

within and fringing the built up areas of Exeter have been protected by local landscape or biodiversity designations on account of their existing or potential wildlife value. Habitats bordering roads in the vicinity of Monkerton and the main line railways into the heart of the city are particularly striking; and

- New development within the core study area has a significant role to play in delivering components of the habitat reservoir and links identified. For example, the Science Park site performs an important linking function on a habitat link running from the city eastwards along the A30, and as such continuous belts of woodland or grassland habitat and hedgerows should be maintained or created in this location. For sites that do not lie within or adjacent to the habitat links or corridors, it is not likely that a contribution can be made to delivering the aspirations of the strategic Biodiversity Network. However, the provision of appropriate habitats should continue to be encouraged, with perhaps greater emphasis given to maintaining and enhancing local habitat networks and increasing the gross area of functional habitat in the study area. Future reviews will identify new habitat reservoirs and potential links, incorporating biodiversity gains arising directly or indirectly out of new development.

5.4.4 Links to Major Habitat Reservoirs outside the Core Study Area

Three significant habitat reservoirs are located outside the core study area; Ashclyst Forest, the Pebblebed Heaths and Haldon Forest. They are important considerations in the development of the Biodiversity Network, and where possible habitat links have been identified to provide connectivity to these areas. Again, clusters of available habitat or land with notable biodiversity potential have been used to identify these links.

5.5 Potential for Landscape Scale Habitat Enhancement

In recent years attention has been given to the potential for the restoration of semi-wilderness areas in the UK (Taylor, 2005). This is more than an aspiration and re-wilding theory is gaining support.

Several significant projects are already underway throughout Europe and the UK including the Cambrigeshire Fenland Project, which is focused on the Wicken Fen National Nature Reserve. This proposes the re-creation of wet fen, open water, wet pasture, scrub and carr habitat across a wide area and land is already being acquired to enable this. In Holland the establishment of the Oostvaardersplassen reserve, covering approximately 5000 hectares, is allowing the natural development of 'wildland' with minimal human interference.

As a consequence of intensive agriculture and land management for many hundreds of years, and the subsequent fragmentation of semi natural habitat within the core study area, re-wilding is not as viable as elsewhere in the sub region.

However, whilst the nature of settlement, complex land ownership and productive land-use may preclude large scale initiatives such as those described in Holland and Cambridgeshire, it may be possible in a number of locations and on a smaller scale, to re-wild areas whilst respecting the requirement to maintain the productivity, aesthetic quality and functionality of the landscape.

Re-wilding should be focussed on the largest areas of continuous high quality habitat. An obvious candidate is the Exe Estuary which is characterised by its semi natural and wilderness state, or perhaps stretches of the Clyst Valley, and any re-wilding opportunities should be undertaken as part of the overall proposals for these sites.

Legend

- Core Study Area
- Floodplains, Fens, Mudflats and Coastal Grazing Marsh
- Woodland*
- 100m Buffer of Woodlands
- Lowland Meadow**
- 100m Buffer of Lowland Meadows
- Remnant Parkland***
- Farmland with dense hedgerows and habitat potential****
- Heathland
- Grassland/arable land nature conservation designations lying outside floodplain

* Forestry Commission National Inventory of Woodland Types (NIWT)
** Natural England Data
*** Identified on Devon HLC and verified on aerial photographs
**** Identified on aerial photographs

Exeter
T 01392 260430

LDADESIGN

LANDSCAPE
URBAN
ENVIRONMENT
ECOLOGY

EXETER AREA AND EAST DEVON NEW GROWTH POINT GREEN INFRASTRUCTURE STUDY

Figure 2: Biodiversity Network
Woodland and Grassland Assets

DATE	March 2009	DRAWN	RP
SCALE	1:50,000 at A3	CHECKED	PS
STATUS	FINAL	APPROVED	FO
DWG.NO.	2594LE/0002		

Source: Ordnance Survey, Project Advisory Group & Cartographic Engineering

0 2,000m

X:\JOBS\2594_Exeter GI\gis\Projects\2594LE_0002\Bio_Network_Woodland_Grassland.mxd

Legend

- Core Study Area
- River Channels and Open Water (includes peat habitat CWS at Dog Village)
- 50m Buffer of River Channels, Open Water and Peat Habitat*
- Floodplains, Fens, Mudflats and Coastal Grazing Marsh

*50m Buffer of River Channels, Open Water and Peat Habitat illustrated only for areas outside floodplain grazing marsh, fens and mudflats

Exeter
T 01392 260430

LDADESIGN

LANDSCAPE
URBAN
ENVIRONMENT
ECOLOGY

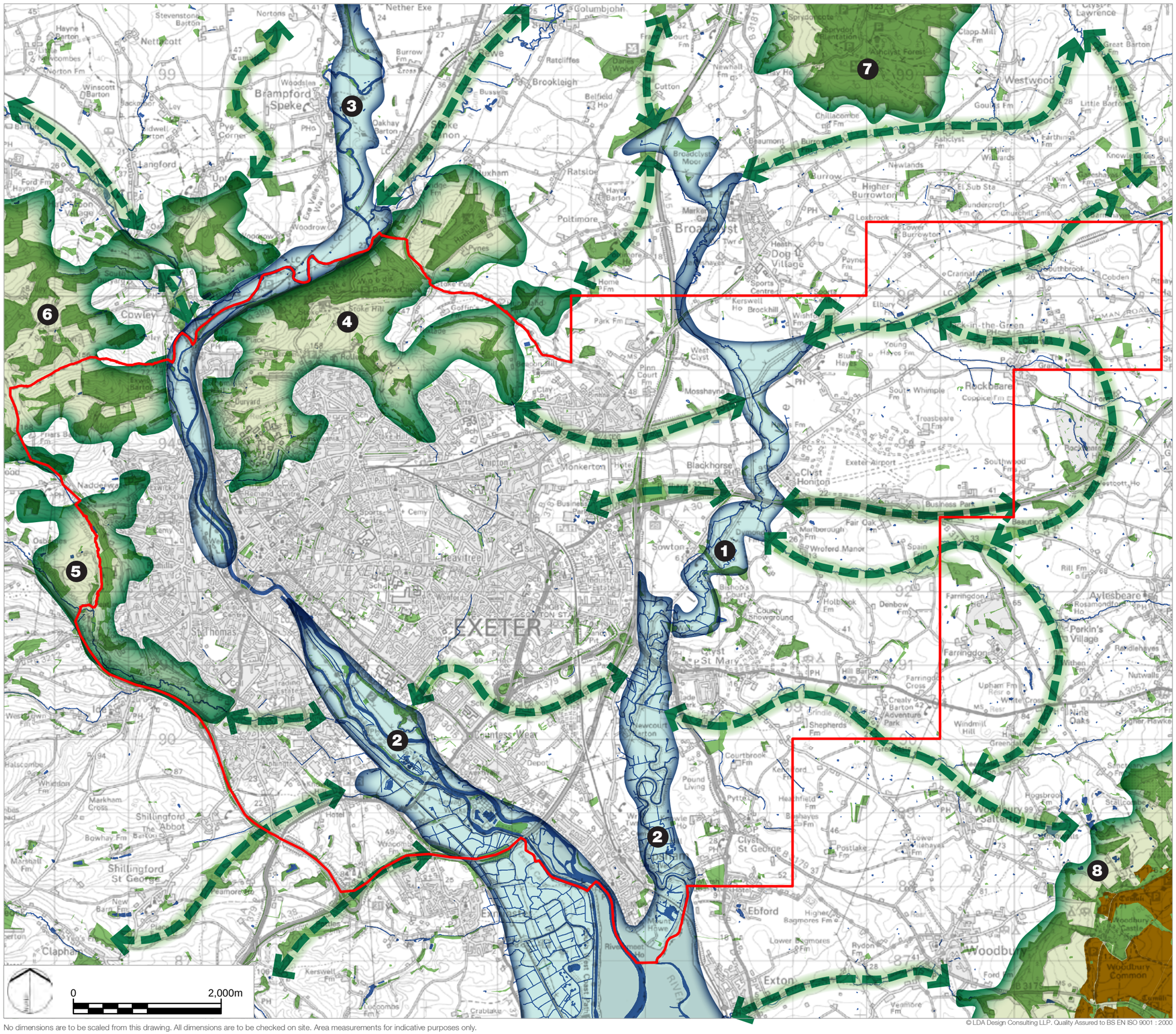
EXETER AREA AND EAST DEVON NEW GROWTH POINT GREEN INFRASTRUCTURE STUDY

Figure 3: Biodiversity Network
Wetland and Open Water Assets

DATE	March 2009	DRAWN	RP
SCALE	1:50,000 at A3	CHECKED	IH
STATUS	FINAL	APPROVED	FO
DWG.NO.	2594LE/0003		

Source: Ordnance Survey, Project Advisory Group & Cartographic Engineering

X:\JOBS\2594_Exeter GI\Bgis\Projects\2594LE_0003\Bio_Network_Wetland_Open_Water.mxd



Legend

Core Study Area

Wetland / Open Water Habitat Reservoirs
1. Clyst Valley
2. Lower Exe and Clyst Valleys and Exe Estuary
3. Upper Exe Valley

Terestrial Habitat Reservoirs
4. North Exeter Wooded Hills and Meadows
5. Nadderwater
6. Cowley Wooded Hills
7. Ashclyst Forest
8. Pebblebed Heaths and Wooded Fringe

Habitat Links

Principal Habitat Types

Woodland

River Channels

Heath

Exeter
T 01392 260430

LDADESIGN

LANDSCAPE
URBAN
ENVIRONMENT
ECOLOGY

EXETER AREA AND EAST DEVON NEW GROWTH POINT GREEN INFRASTRUCTURE STUDY

Figure 4: Biodiversity Network
Habitat Reservoirs and Links

DATE	March 2009	DRAWN	SG
SCALE	1:50,000 at A3	CHECKED	IH
STATUS	FINAL	APPROVED	FO
DWG.NO.	2594LE/0004		

Source: Ordnance Survey, Project Advisory Group & Intermap Technologies Inc