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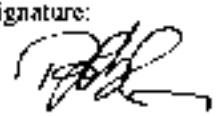
Third Issue - Final	Name: P. Jobson Signature:  Date: 10-4-08	Name: G. Sams Signature:  Date: 10-4-08	Name: R. Garbutt Signature:  Date: 10-4-08
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Herefordshire Green Infrastructure Study

1. Introduction

1.1 The Regional Spatial Strategy (RSS) has targeted Herefordshire for the creation of 16,600 new dwellings up to 2026. Hereford City and the five Herefordshire market towns, Ross–on-Wye, Ledbury, Leominster, Kington and Bromyard are to be considered for new Growth Point status.

1.1.1 Growth Point status means that funding can be allocated from a national budget for communities to carry out studies into the provision and status of green infrastructure (GI).

1.1.2 Previous projects have proposed a number of definitions of GI and all differ slightly in emphasis. However, a common theme in GI planning is that it is an approach that encourages the establishment of strategic networks of green spaces and environmental assets that can interact to support sustainability and quality of life within and around urban areas and across whole regions.

1.1.3 The Green Infrastructure Study (GInS) as applied to Hereford and the market towns contrasts with a number of other studies that have been carried out in that it has a number of Growth Points, rather than a larger Growth Area. This multi centre approach reflects the more rural nature of Herefordshire and the likely approach to the provision of residential sites. The GInS will inform development planning in the county and more specifically around Hereford and the market towns in order to integrate growth points with the rural county.

Herefordshire Green Infrastructure Study (GInS)

1.1.4 This study sets out to develop a geographical information system (GIS) using information supplied principally by Herefordshire Council (HC) itself and will uniquely assess and compare the data across a wide set of disciplines referred to as subsets throughout the Report.

1.1.5 The purpose of using GIS is to allow map-based data with relevance to Green Infrastructure to be collated and interrogated, so that areas of under- or over- provision of green infrastructure can be identified.

1.1.6 With this in mind Chapter 2 will set out the framework for the collection of data for this Study.

1.1.7 Chapter 3 will review existing information collected and identify where the creation of new GIS has been considered necessary.

1.1.8 In chapter 4 each environmental resource will be considered on a countywide level and its GI contribution mapped and analysed. The GInS and accompanying GIS will draw on conclusions and recommendations of current work undertaken by Herefordshire Council e.g. Rights of Way Improvement Plan (ROWIP)[1].

[1] Herefordshire Rights of Way Improvement Plan, Consultation draft.

1.1.9 Through exploring the limitations and the potential of the data collected, a basis for the development of options for a strategy will be investigated and significant points set out in chapter 5.

1.1.10 Chapter 6 will briefly consider the application of GInS at the county level and at the local level. At the local level, the possibility of developing a process to identify the proximity of green infrastructure assets to a specified parcel of land, anywhere in the county will be investigated. This level of interrogation could provide the basis of assessment for planning consideration based on the proximity of existing green infrastructure assets.

Going Forward –

1.1.11 The study will set an aim for GIS development in line with developing strategic planning needs, contributing to a strategic basis for developing long-term project objectives for an enhanced green infrastructure network.

1.1.12 The study should assist local development documents, such as the Local Development Framework (LDF), and produce a set of proposals for the protection, enhancement, and reversal of fragmentation of valuable resources.

2. Environmental Context

2.1 The datasets collected for the GInS have been characterised as describing either Natural Resources or Human Influence and within these categories there are a number of sub-sets:

Natural Resource

- *Topography*
- *Geology*
- *Hydrology*
- *Biodiversity*

Human Influence

- *Landscape character*
- *Historic, archaeological & cultural*
- *Designated public open space*
- *Access & Movement*
- *Land use*

2.1.1 A large part of the study has been the collection of data and HC reports (e.g. PPG17[2], ROWIP etc.) that are of value to, and inform the development of the GInS.

2.1.2 One of the main components of the exercise has been to build a metadata file of GIS information to be used in the Study, identifying that provided by Herefordshire Council and of GIS sourced from alternative data managers. This exercise is important in setting the credentials for the study. Individual sections within the council manage the Datasets and there is no central control or information point for the data. This has necessitated an investigative approach to collection and interpretation. The product of this is attached in Appendix A.

2.1.3 *Frame of reference* – Strategy documents and policies from national and local level are utilised to provide a framework for the development of Herefordshire's Green Infrastructure. Pertinent planning policy is assessed in Appendix B. Other existing GI strategy approaches such as East Sussex Greengrid Strategy[3], the East Midlands GI network[4], and the West Midlands: technical mapping processes have also been considered.

2.1.4 *Climate* – this is a major concern providing the driving force behind the development of GI thinking and it is the continuing change in climate that is likely to affect green infrastructure through changing weather patterns and human influence.

2.1.5 Analysis of the impact of climate on natural resource - Meteorological changes are considered in the water study and will inform the GInS of potential results from the more extreme weather conditions.

[2] Herefordshire Council PPG17 Open Spaces Assessment, Draft Report by Strategic Leisure Ltd, November 2006

[3] http://www.greengrid.co.uk/main.cfm

[4] http://www.emgin.co.uk/images/PDF_Files/Green_Infrastructure_Network/Links/GIMASTER1_13.pdf

2.1.6 For geology, increased instances of flooding and falling trees will become a growing threat. There will be an increased likelihood of sudden structural failures resulting from subsidence and landslips because of soil saturation and the scouring action of rain and rivers.

2.1.7 In terms of biodiversity, general changes in warmer winters and earlier springs can lead to migration of species into new areas and an increase in pests that are normally killed off or controlled by cold winters.

2.1.8 Human influence has a large input for progressively higher levels of background air and noise pollution, which are expected to continue to rise.

2.1.9 The report 'Travel is Good' accepts that climate change is a reality and says that Mediterranean weather could increase travel to and within Britain, resulting in added congestion.

2.1.10 It says that increasing vehicle movements over the past 50 years have turned many streets into "drive-throughs" and generally blighted the environment for people. The fear is that if we don't invest in better street environments and green infrastructure, people, businesses and shops will all move to the edges of towns and cities, so creating new travel problems.

2.1.11 To adapt to change, GI enhancement and effective planning are required to protect the existing green space and develop better connected green space in cities. The provisions of green corridors to contribute to a reduction in environmental stress are considered a priority.

2.1.12 There is an economic dimension to investing in GI that is now being considered in the Treasury Economic note; this reflects a growing recognition that GI provides added value to the environment, and increases desire to live work and play in areas that have been planned with GI networks.

3. Preparation of the Evidence Base for GI

3.1 Review of Existing Geographical Information – Data Validation and Preparation

3.1.1 The project has identified datasets from across the Environment Directorate that would be of benefit for the development of a Green Infrastructure Study. MapInfo has been used to assess the quality and quantity of geographical data within each subset. In the majority of datasets it has been found that the data attached to the GIS has been minimal and of limited use for analysis purposes. This will be discussed further in the following chapter as data limitations to be considered.

3.1.2 Once data has been collected the methodology outlined in Appendix C was employed to assess the quality of the data and understand the limitations and unique value of each dataset.

3.1.3 The preliminary investigation is tabulated in the following pages, it counts the number of records found in each dataset and its distribution characteristics. Where possible the true ownership of the dataset is recognised in order to facilitate future queries and give proper credit.

3.1.4 A review of existing GIS data available to the project was carried out and a preliminary validation undertaken and described. It appears that some of the datasets have not been updated for some time, some are incomplete and it is not in the remit of the study to audit, check or gather new information.

3.1.5 The tables indicate the potential importance of each dataset for developing the green infrastructure strategy:

- The results, ordered by environment subset, include comments on completeness of data for the subset, and the distinctiveness of the data collected.
- The confidence in the GIS level of accuracy with a rating of high, good or poor, ranging from good meaning 'can be confidently used at neighbourhood level', to poor meaning 'provides an indication only and is sufficient for use at county wide level.'
- The column headed GI application comments on potential primary usefulness of the data collected to the development of the study.
- Environmental and biodiversity indicators that affect the GI; Human and biodiversity corridors are features that provide a way of movement and migration of species and/or people, attractors indicate data that contain assets that are possible centres for GI focus and development.

3.1.6 *Natural Resource data validation* - Table 3.1 considers each natural resource subset and describes the full range of GIS for analysis.

3.1.7 A brief over view of this table extracts the following:

- New GIS datasets have been created specifically as a result of the GInS. For geology the Study found that designated sites for RIGS were incomplete and GCRs have not been held by HC to data.

- The biodiversity datasets have been found to occasionally overlay each other geographically, and the proposal is to attribute the greatest available protection designation to a site. There also remains some debate over the value and quality of protected species GIS data and so this has not been pursued to date. Also the Millennium Mapping data is potentially of great value for the later project though too detailed for inclusion at this stage.

- The data obtained for biodiversity is limited by the fact that although it identifies designated areas by location and type, it provides no indication of why the site is designated or the condition of the asset, public accessibility, or last review date etc. Similarly it does not give sound metadata and is often qualitative in terms of dates, modifications, or where to source citation reports.

- The natural resource data is more complete than human influence; to a large extent this is because the data collection has been restricted to designated biodiversity sites and physical geography. Where the data is less complete for biodiversity is for natural corridors such as tree-lines and hedgerows, and the specifics of the classification and current status.

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3.1.8 *Human Influence data validation* - Table 3.2 considers each human influence resource subset and describes the full range of GIS available for analysis.

3.1.9 A brief over view of this table extracts the following comments:

- The Landscape character of the county can be either analysed according to Natural England GIS where there are 5 areas or the Herefordshire landscape character assessment where there are 12 distinctly different natural areas. The first approach would appear more appropriate at this time.

- All GIS is a snap shot view of a particular time. OS base mapping describes the land use when last surveyed. It fills in the gaps and gives context with surrounding land use.

- Current land use is important for understanding the current green infrastructure and its potential for inclusion in a developing strategy. The majority of the specialist datasets e.g. biodiversity, access and movement, cultural do not present a full and accurate coverage of the county, and do not include sites with potential for inclusion. Land use data such as OS Mastermap could provide some of the evidence base for potential sites to assess.

- Air quality and noise mapping datasets have not been incorporated into the study because these layers are at an early stage of modelling by HC/DEFRA.

- The HC sites and monuments dataset is complex and heavily populated. It has been proposed that an expert from the Council extracts a selection of that data for an agreed perimeter belt around each market town and Hereford for inclusion in GInS, for this study an area of 5 km radius around the market towns has been extracted called Earthcrop.

- Cultural information is very sparse and incomplete; to move towards a more thorough inclusion of this aspect of GI new datasets would need to be created.

- The mapping of designated open space relies on the data collected for PPG17.

- Access and movement covers a wide range of datasets and new GIS have been specifically created as a result of the study. New datasets include redundant transport routes, railways and stations.

3.1.10 Much of the data collected for GInS has been created for very specific purposes and may not easily lend itself to analysis. It should also be born in mind that not all potential GI resources are mapped.

3.1.11 The age of some the GIS data is of concern, for instance OS Mastermap data is last updated in 2003. Land use will naturally change over time and GIS may not keep abreast of all changes in the rural areas.

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Table 3.1 **Natural Resource data validation**

Resource	Features	Data Completeness	GIS Accuracy	GI application	Edition Date
Topography	Contour mapping and digital terrain mapping of the whole county.	Supplied by Geosense Ltd. For whole county.	General accuracy: high. Vertical error in the height data is 1m RMSE	Environment Indicator	2004
Geology	Hard rock deposits cover upland areas; sand and gravel cover lowland and river corridors; primary extraction areas are small and mainly lowland. Geological features: There are 37 GCRs held on English Heritage data. These are concentrated in the North Hills, with only a few dotted elsewhere in the county. 105 RIGS are identified and this number is growing. These are mostly located in upland areas with only a few on river courses. Over 30 are described as quarries. OTHER MAPPING TO CONSIDER: Solid geology mapping of structure of County. This data is not held by HC.	BGS adopted deposits. Herefordshire is only part surveyed. Earth Heritage database. **New table** created from grid reference. Data is not currently held by HC. Earth Heritage database. Only small number identified on UDP. **New table** created from grid reference N/A	BGS digitising using OS mapping where possible. Accuracy: High 100m+ general locator only. Poor 100m+ general locator only. Poor N/A	Environment Indicator Environment Indicator Environment Indicator Environment Indicator	Not critical 2007 2007 N/A
Hydrology	Data includes main rivers of interest to EA, flood risk zones, flood storage areas, historic flood mapping, ground water vulnerability, and source protection zones. OTHER MAPPING TO CONSIDER: Ordinary water courses Open water using BAP definition also includes small ponds.	Environment Agency supplied. New table can be extracted from OS Mastermap. This could be a critical requirement for the market town Growth Points analysis.	Accuracy High – though flooding source data aged. Refer to Water Study for more detail. OS accuracy. High	Environment Indicator / biodiversity corridor Environment Indicator / biodiversity corridor/ attractor	2006 / 7 2003
Biodiversity	International, national and local designated sites are covered by HC datasets. Sites are limited to where surveys have been conducted. Some sites may have degraded or disappeared though there is no ongoing monitoring system to report change. There are 51 Herefordshire Nature Trust (HNT) Nature Reserves Forestry Commission land, access agreement OTHER MAPPING TO CONSIDER: Millennium mapping covers the whole county and should be considered for inclusion in Strategy. Protected species data based on sightings and surveys.	Comparison of HC supplied data with that supplied by Natural England highlights some differences in GIS construction information. NE data is more informative and up-to-date though still no indication of the current condition of sites. **New table** created for HNT sites. Access agreements cover half the county and may be useful at later stage. HC biodiversity resources centre. Biased to areas surveyed and sightings reported.	Uses OS mapping where possible. Accuracy: High Uses OS mapping where possible. Accuracy: High N/A 100m+ general locator only. Accuracy: Poor	Biodiversity Indicator/ attractor Biodiversity Indicator	Estimate 2006 N/A

Table 3.2 Human **Influence data validation**

Resource	Features	Data Completeness	GIS Accuracy	GI Application	Edition Date
Landscape character	Natural England natural areas and Herefordshire AONB	Extends into neighbouring counties. There are 2 areas of outstanding natural beauty.	Uses OS mapping where possible. Accuracy: High	Environment Indicator	2007
	OTHER MAPPING TO CONSIDER:				
	Herefordshire landscape character assessment	HC dataset. Alternative and complex local assessment identifying 12 natural areas.	Uses OS mapping where possible. Accuracy: High	Environment Indicator	2006
	Joint Character Areas	A landscape assessment that combines human and natural characteristics.			
Land use	OS MasterMap	Complete base mapping.			
	Waste – 77 landfill sites referenced in mapping project. Further opportunity exists for including approximately 5000 potential waste sites identified as part of a Landmark exercise.	DEFRA / HC	OS accuracy high	Environment Indicator	2007
	OS postcode	Business or residential classifications. Aging data – HC now maintain an in-house LLPG version.	Generally High - some errors.	Environment Indicator	2003
	OTHER MAPPING TO CONSIDER:				
	Possible additions include sewerage works, green recycling facilities, and waste transfer sites.	Inclusion is not in the remit of this report. Sewage works are a part of Water Study.	N/A		N/A
	Air & noise quality considered through Tranquillity Mapping	Not reviewed as a GIS layer, may be available through CPRE as a dataset	N/A	Environment Indicator	N/A
Archaeological, historic and cultural	Archaeological and historic data supplied by HC. There are 266 nationally recognised scheduled ancient monuments in the County.	Following discussion with department further GIS has been made available for areas around market towns (Earthcrop)	SAMs OS accuracy high. Less accurate / approximate indicator for HC data	Human attractor / GI potential	2007
	There are 63 conservation areas and 1 area of archaeological importance	UDP	Uses OS mapping where possible. Accuracy: High	Human attractor	Unknown
	There are 201 historic parks & gardens either registered or unregistered.	HC / NE	Uses OS mapping where possible. Accuracy: High	Environment indicator and/or attractor for human influence	Unknown
	Cultural tourism data is not in GIS format	New table required. Some data can be collated from other datasets.	100m+ general locator only. Accuracy: Poor	Human attractor	N/A
Designated open space	PPG17 GIS data covers 1006 sites in the County. These are publicly accessible play areas, sports grounds, parks, picnic sites, green corridors, commons, archaeological sites, cemeteries and churchyards, and amenity greens.	Elements of dataset overlap other datasets though the unique value to this dataset is accessibility to the public. There is a minimum size requirement for land parcels.	Uses OS mapping where possible. Accuracy: High.	Human attractor	2007
	HBA9 protected open space	UDP protected open space, mainly urban amenity green space. There is no minimum size to land parcels.	Uses OS mapping where possible. Accuracy: High	Human attractor / potential for Biodiversity	Unknown

Resource	Features	Data Completeness	GIS Accuracy	GI Application	Edition Date
Access & Movement	Current routes: Highway main roads, railway and stations.	Highways complete. Rail and stations required new table creation	OS accuracy high	Human / biodiversity corridor	2004
	Publicised cycle routes	Some routes not yet finalised. Visually confusing. Simplification of presentation required.	H&T accuracy good / fair		2007
	Public rights of way – byway, bridleway and footpath.	Complete coverage of County.	Accuracy good – 1:10k for most routes, poor at 1:50k for promoted national walks	Human / biodiversity corridor	2007
	Disused routes	Rail, tram and canal **new table** creation	Accuracy 1:10k good for all routes	Fragmented Human / Biodiversity corridor	2007
	Other	Common land, Forestry open access, stewardships	HC Natural England	Biodiversity Indicator/ attractor	Unknown N/A
	OTHER MAPPING TO CONSIDER: Bus routes	Route information is available and can be utilised in developing a strategy.	N/A		

Notes to support tables:

GIS Accuracy: High – snapped to OS Mastermap data where possible
Good – created using 1:10k OS raster mapping
Poor – point data created from grid references or using 1:50k OS mapping

GI application: Environment Indicator – Build a description of environment
Biodiversity Indicator – Locations where expect good level biodiversity
Corridor – feature with potential for migration and movement of humans / biodiversity species
Attractor – feature with potential for attracting humans / biodiversity species

Edition data: N/A indicates that data is not collected at present.

Abbreviations are described in the Glossary (Appendix G)

RMSE: root mean square error

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4. Evaluation of Evidence Base for GI

4.1 This chapter considers the following points:

- The geographical evidence for GI within Herefordshire. The maps are designed to aid consideration of the wide array of information in each resource topic.

- The evidence base for each GI grouping in order to set a basis for integrated thinking on the preservation, protection and promotion of Herefordshire's natural and human green resources.

4.1.1 Map 4.1, the first map of the series, shows the county and its rivers and main transport routes, and indicates the settlement areas. The information in this map will form the core information on all further maps.

4.1.2 Each topic area will be briefly described and the extent of GIS currently available considered. The relevance for GI development will then be considered from various perspectives, these will be:

- Public accessibility
- Sustainable resource management
- Biodiversity and connectivity
- Recreation
- Regional promotion and development

4.1.3 Pertinent issues and opportunities will be drawn out from this analysis for the conclusion.

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Natural Resource

4.2 Topography – Informs on geographical accessibility and identifies natural corridors; It identifies low-lying areas, ridges, mountains and plateaus making an ideal starting place for identifying the potential GI corridors. Herefordshire is surrounded by hills and mountain upland, with a gently hilly interior and flat central plain. There are the wide river valleys of the Lugg and Wye, Gorges at Symonds Yat and Downton, the Woolhope Dome, Bromyard plateau, North Hills, Golden Valley, all are very distinctive topographical features.

4.2.1 Map 4.2: Topography - The total area for Herefordshire is 217,973 ha of which 106,408 ha (49%) are low-lying between 23 m and 119 m above sea level. This area constitutes the central bowl. Further approximate height statistics are explored in figure 4.1 below.

Fig 4.2 **Approximate height statistics**

- The high land tends to be around the edges of the county – the highest peak is at the edge of the Black Mountains to the south west of the county at 694 m.
- A ridge of high land in the north west of the county runs from Kington in a north easterly direction towards Ludlow, typically reaching between 303 and 423 m high.
- The Bromyard plateau to the north east of the county covers an area of approximately 21,154 ha (10% of the County) and rises from 119 m to 243 m in height.
- The Malvern Hills, in the south east, is the distinctive ridge with its lower slopes extending towards Ledbury.
- Woolhope Dome lies between Ledbury and Hereford rising to 263 m in height.
- Dinmore Hill lies between Hereford and Leominster, rising to 233 m in height.

Note: Height figures are approximate using contour modelling

4.2.2 Topographical features are many; the English Heritage maintained GCR and RIGS lists describe distinctive geological features of rocky outcrops, imposing mountains, plateaus and gorges. The overall experience is a pleasantly changing and undulating landscape throughout the County with high points providing conspicuous landmarks and offering outstanding views across the county and beyond.

Significance for Green Infrastructure

4.2.3 *Public Accessibility* – from desk study and mapping data accessibility to topographical features is generally good. The high areas offer a network of minor roads and public rights of way, with the majority also offering a recreational resource. Woolhope Dome is particularly well served, and the Golden Valley is criss-crossed with a network of public rights of way. Other areas that appear well served are Cradley and Colwall towards the Malvern Hills. Large areas of the Bromyard plateau do not appear very accessible; the quality of access is very high for the Bromyard Downs and good for the historic park at Brockington.

4.2.4 *Sustainable resource management* – topography has an influence on the water strategy and how flooding is likely to behave by identifying watershed areas, flood plains, and suggesting areas of potential concern. Slope has an influence on building strategy where steeper slopes are more difficult to build on, lending better opportunity for green infrastructure development potential.

4.2.5 Identified aspect and viewpoints may influence the decision to build as it is desirable to avoid areas that would alter the profile of the landscape; such as ridges and hill tops. These would change the character of the area but to remain as green space would be ideal for developing green infrastructure and influencing and slowing the speed at which precipitation reaches rivers and acting as pollution barriers.

4.2.6 *Biodiversity & connectivity* – identifying the potential for green infrastructure corridors along natural contours, ridges and valley floors etc. will enhance the development of GI connectivity and increase the possibilities for biodiversity dispersal/migration.

4.2.7 *Recreation* - Topography provides a visual envelope around areas of interest. For areas of greatest business densities the social and health implications can be addressed with GI which has a visual role in relation to these economic locations:

- Provision for involvement with GI in the form of: Outings, volunteering, trim-trails, green gyms
- Potential achievement of these initiatives: Recreation, relaxation, interaction with natural assets

This approach can also be applied to residential areas and potential development areas.

4.2.8 *Regional development and promotion* – Herefordshire has a wide range of topographical features, ideal for walking and other recreational sports. With hills and mountains ranged like a necklace around its boundary it is a unique place to live, work and visit.

4.2.9 There is a strong relationship between topography and known archaeology. Historic hill defences and other early history systems are more preserved in upland areas; important river crossing places have evidence of a long history of settlement.

4.2.10 There can also be determined a strong relationship between topography and landscape character, the topography map is readily compared to that in section 4.6.

4.3 Geology –The solid geology of Herefordshire is dominated by the sandstones, mudstones and conglomerates of the Siluro-Devonian 'Lower Old Red Sandstone Group'. This group of sedimentary rocks underlie much of the county from Leominster in the north to Ross-on-Wye in the south and from Hay-on-Wye at the Welsh border to Ledbury, in the east.

4.3.1 The older 'Wenlock Limestone' and 'Ludlow Shale' of the Silurian Period make up topographically higher areas around the Malvern Hills, the Woolhope Dome, and the hills of the Herefordshire Marches.

4.3.2 The eastern extents of the Malvern Hills in the county comprise much older extrusive and intrusive igneous rocks of the Precambrian. Younger Carboniferous limestones are exposed at the southern limits of Herefordshire around Symonds Yat.

4.3.3 The low-lying alluvial valleys of the River Wye and the River Lugg are dominated by superficial, or drift, terrace deposits of sands and gravels, which overlie the solid geology. Glacially derived till, typically comprising sands and gravels marks the extents of the last glaciation period and covers the north, west and central parts of the county.

4.3.4 These resources have historically provided the county with a diverse selection of construction materials, including sandstones and limestones for building stone, clays used in brick-making and sands and gravels for aggregate. The remnants of these extractive industries can be seen throughout the county in the form of old quarries, which now offer a valuable insight into the geological history of the county.

4.3.5 Available data of use for planning GI can be seen on Map 4.3 and this shows the distribution of important geological deposits, and features that are recognised for conservation. Although mineral extraction is not an exact science, the fact that these areas are highlighted for protection in the UDP, warrants their inclusion for GInS.

Significance for Green Infrastructure

4.3.6 *Public Accessibility* – The continuing classification of new Geological Conservation Review Sites (GCRS) and Regionally Important Geological and Geomorphological Sites (RIGS) offers the potential for identifying new opportunities for enhanced GI access to the outstanding geological features in the County for education and recreation.

4.3.7 *Sustainable resource management* – Preserving Herefordshire's natural geology and soils should remain a key priority to any proposed county strategy. It provides valuable resources in the form of raw materials for construction and it characterises the landscape form (geomorphology). It contributes towards many other economic benefits directly and indirectly such as tourism, recreation and habitat diversity. Sustainable management through planning will secure the future use of this key environmental indicator.

4.3.8 Although there is very good knowledge and mapping available (from BGS), local geology and soils are best characterised by geotechnical site investigation as these provide a more accurate picture through detailed assessment. Combining the GI data gathered with such assessments provides a sound evidence base for future planning.

4.3.9 Paper map solid geology analysis gives a flavour of the information that can be gained from a full set of GIS data. A Herefordshire geological dataset would provide planners, consultants and designers with a valuable tool for selection of sites suitable for development.

4.3.10 *Biodiversity and connectivity* – As previously stated geology and soils characterise the Herefordshire landscape due to their physical and chemical properties, providing a diverse array of habitat for flora and fauna. With respect to connectivity, the geology is stratified and hence the rock and soil types outcrop in distinct bands laterally across the county and indeed the UK. This can influence the patterns of vegetation types by connecting similar types to certain habitats. The sequential effect to this understanding could be the development of greater species diversity.

4.3.11 Connectivity factors can also function within a predictive context whereby known areas of particular geology and or soil type could support habitat creation or restoration opportunities across the county. In a wildlife context, if you wished to encourage a species of bird to an area you could identify suitable habitats in this manner, for instance a particular vegetation type will prefer certain soils. .

4.3.12 *Recreation* – Some geological features have excellent potential to encourage and inspire people to take more exercise. The identification of potential sites for development and increased access and promotion encourage a healthier and more economic population.

4.3.13 *Regional development and promotion* – hard rock deposits form dramatic landscapes of Herefordshire, and sand and gravel the gentler valley bottoms.

4.3.14 A significant advantage that geological knowledge would provide is an understanding of potential geohazards in the region for construction. In Herefordshire these hazards may include unstable slopes, settlement/subsidence, radon etc.

4.3.15 Geological data obtained from previous site investigations can be identified and collated to build a detailed ground model of key areas such as market towns.

4.4 Hydrology – The most significant of the rivers are the Wye, Lugg and Frome. A series of smaller tributaries, some classified as significant with respect to flooding and drainage issues flow laterally across the county feeding into the larger rivers. Herefordshire, being a predominantly rural county, also demonstrates an intricate network of ditches and drains and a significant number of open water bodies.

4.4.1 The catchment network (rivers, tributaries and drains) link the main market towns and Hereford. The River Lugg flows from north to south and confluences with the Wye to provide an aquatic corridor between Leominster and Hereford. The Frome links Bromyard to Hereford and the Wye provides a link to Ross. The Arrow flows west to east in the northwest of the county linking Kington to Leominster.

4.4.2 In Map 4.4 all the market towns and Hereford are on rivers. Due to the implications of climate change, an analysis of the flooding characteristics of rivers is very important.

4.4.3 The historic flood outlines show areas that have previously been inundated, however the true causes and the mechanisms would need further investigation through flood risk assessment (FRA).

4.4.4 The flood zone outlines are modified annually and therefore as more modelling information becomes available zone boundaries are liable to change. This may be only slightly but as more and more development occurs, this could have significant impact.

4.4.5 Flood storage areas are not shown on Map 4.4 due to size. These areas tend to reflect natural low spots and are based on the natural topography (possibly calculated from contour data). Existing and future planned/consented development in these areas may alter storage capacity and the overall hydraulic characteristics. Only further catchment analysis through detailed Flood Risk Assessments and modelling can determine areas of suitability for flood storage.

4.4.6 Open water remains an illusive and important GI asset. OS mapping data does not differentiate between stream, drain and pond. EA data collection only records that which will have an affect on water supply and storage of a significant nature to its service. For GI the small farm ponds and other minor water features are potentially just as relevant to decision making.

4.4.7 Water availability for development is being assessed as part of the Herefordshire Water Study undertaken in tandem with the GI study.

Significance for Green Infrastructure

4.4.8 *Public accessibility* - From the desk study and mapping data general accessibility to all watercourses across Herefordshire is excellent. The county road and footpath networks provide a variety of routes to the watercourses. On the ground some of this perceived 'excellent accessibility' could be false as routes may not be accessible to all i.e. provision of disabled access and the quality of the routes may not be good. Some of the main river courses are navigable for small craft such as kayaks.

4.4.9 *Sustainable resource management* - There is the potential to ameliorate flooding by retaining soft ground and woodland in strategic locations within flood zones. Also the value of woodland occurring in the upper regions of river catchment areas should be considered for its ability to intercept precipitation and control the volume of run-off. Some results of

previous project work could be utilised in identifying further opportunities for GI.

4.4.10 The Main Rivers provide a water supply for homes, industry and agriculture and it is imperative that supply is maintained for future use. Control of abstractions through regulation and water conservation and reuse opportunities exist within the county. Ordinary watercourses ditches/drains also provide opportunity to provide irrigation sources for agriculture. Existing open water features could provide flood defences and a sustainable drinking supply for cattle and other agricultural purposes.

4.4.11 Householders living in built up areas have a tendency of turning over gardens to impervious parking surfaces which increases storm water run-off; called urban creep, this trend is having a consequential effect by increasing the speed and volume of the run-off. However this change in surface type is not distinguished in GIS from green gardens. This is potentially a planning issue and the effect of this trend within Herefordshire, where market towns are located on main rivers would require further study.

4.4.12 *Biodiversity & Connectivity* - Reaches of the Wye, Lugg and Frome are designated Special Areas for Conservation (SAC). These sites are of national importance with respect to biodiversity in particular fish and bird species. The network provides good riparian connectivity in terms of biodiversity as aquatic species can use the river corridors to migrate around the county. The enhancement of aquatic habitat is integral to Herefordshire's Biodiversity objectives therefore an opportunity exists to development provision for existing wildlife as well as encouraging new species to certain areas.

4.4.13 Ordinary Watercourses, ditches, drains and open water provide good habitat for protected species such as Great Crested Newts, Otters, and White Claw Crayfish. This GI needs to be preserved, potentially through the reduced modifications or loss of natural channels and a reduction in hard river engineering approaches through policy changes.

4.4.14 Hydrology presents a significant potential for enhancing biodiversity through the quality of watercourses, connecting habitats and enabling the migration of flora and fauna. An option for GInS is to develop these corridors by buffering the boundaries of the designated sites and looking for opportunities for creating sympathetic features, enhancing and protecting the surrounding landscape.

4.4.15 *Recreation* - In terms of recreation the watercourses and lakes provide a basis and opportunity for many recreational activities such as fishing, water sports and waterside picnicking. This brings with it the benefits of tourism but also some of the more detrimental aspects to the environment. Further studies into the quality of the water environment would be required to make sure that the positive aspects are not out weighed by the potential degradation of the water environment.

4.4.16 *Regional development and promotion* – A feature of regional promotion already with activity sports utilising the Wye and long distance walks following main valley routes. Regional development is dependant on proper respect and conservation of water resources.

4.4.17 With a strategy in place for developing GI it would be possible to create incentives for developers, to encourage the dedication of environmentally sensitive land as part of the planning process, possibly also encouraging the creation of riparian and or wetland with conservation covenant. This would aim to improve and enhance the green corridor network.

4.5 **Biodiversity** - has particular importance in the local context giving Herefordshire its distinctive character; grasslands, woodlands, floodplains and uplands make up its diverse landscape and these are rich habitats to a variety of wildlife. Biodiversity is influenced by the geology, hydrology and topography of the area.

4.5.1 The county is relatively well wooded, of which a significant percentage is designated Ancient Woodland. The county has a strong hedgerow pattern associated with ancient landscapes along with ponds, parkland and orchards providing many biodiversity enhancement opportunities. Urban areas, namely the market towns can also be considered areas as having significant value with respect to biodiversity

4.5.2 Herefordshire's Local Biodiversity Action Plan (LBAP) formally identified four Biodiversity Enhancement Areas (BEA's) that are of significant importance historically as well as culturally:

- The Black Mountains
- The Wye Valley Floodplain
- The Woolhope Dome
- The Malvern Hills

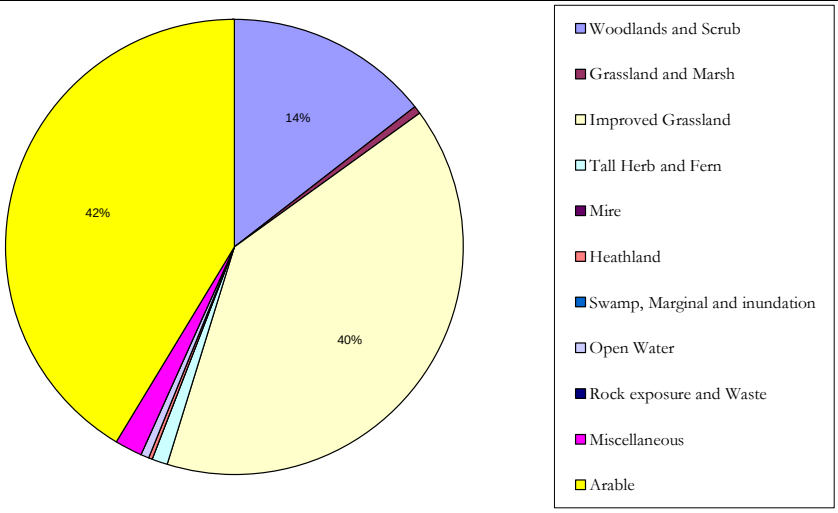
4.5.3 These areas are now integrated into the wider objectives of the Herefordshire Biodiversity Action Plan (BAP) and UDP/LDF.

4.5.4 UK and County Priority Habitats and species for conservation are defined in the Local Biodiversity Action Plan. There are 21 UK and County priority habitats and 156 priority species in Herefordshire.

4.5.5 Herefordshire major habitat types can be summarised in the pie chart below. The results were based on a 'phase one methodology survey' between 1999 and 2004 known as the Millennium Map Project (data sourced from Herefordshire Biological Records Office, January 2008).

4.5.6 The 3 main key habitats in Herefordshire are Woodlands, Improved Grasslands and Arable. This is reflected in the county biodiversity strategy and associated action plans.

Figure 4.5 **– Herefordshire habitats**



Pie Chart Showing Percentage of Habitat Recorded in the Herefordshire Phase 1 Habitat Survey 1999 - 2004

4.5.7 Herefordshire has a varied distribution of designated sites with significance to biodiversity. The table below summarises the area of the sites ordered by highest significant designation.

Table 4.5 **– Herefordshire habitats**

Designation	Area Designated (ha)	County Coverage (%)
Special Area of Conservation (SAC)	1,032	0.47
Site of Special Scientific Interest (SSSI)	4,978	2.28
National Nature Reserves (NNR)	218	0.10
Ancient Woodland	14,231	6.53
Special Wildlife Site (SWS)	18,145	8.32
Local Nature Reserves (LNR)	244	0.11
Site of Importance for Nature Conservation (SINC)	90	0.04
Herefordshire Nature Trust Site	284	0.13
TOTALS	39,222	N/A
Total Area of County = 217973 ha (Cartesian)[5]		

4.5.8 The table shows approximately 15% of county coverage, after accounting for overlap, which is very positive in terms of biodiversity and enhancement opportunity as typically most counties only realistically achieve 10% of their areas afforded protection. Map 4.5 illustrates the distribution of designated sites by level of designation.

Significance for Green Infrastructure

4.5.9 *Public accessibility* - Sites of biodiversity importance have varied issues with respect to public accessibility. If the designated sites are more publicly accessible to humans, then particularly sensitive habitats could be destroyed or sustain permanent damage. Careful planning and investigation would be required to ensure a balance between increased opportunity for access and potential damage caused.

4.5.10 There is evidence of significant biodiversity value in the proximity of urban areas with designated river corridors, mature parks, gardens and urban trees.

4.5.11 *Sustainable resource management* - Biodiversity has a potential key role in sustainable development. It can provide opportunities for natural management of land and water resources although it also needs to be managed in its own right.

4.5.12 Another potential addition to GIS, the Agricultural Land Classification based at 1:250k mapping can be used to identify locations for renewable energy production e.g. coppicing on agriculturally low grade soil. Where air quality is poor then planting woodland is another potentially effective measure.

[5] Figures calculated using MapInfo query tools.

4.5.13 *Biodiversity & Connectivity* - Hedgerows, trees, and other green corridors provide connectivity. The expansion of ecological networks would be worth considering with further study. Some of these could be extracted from current mapping. Input from ongoing studies would also be required. Consultation with other statutory environmental bodies such as Natural England, Herefordshire Biological Records Centre, Nature Trusts and the Environment Agency will also be required and the overall sharing of data and resources will facilitate a more accurate picture for further development.

4.5.14 Biodiversity sites can become 'nodes' for growth or 'corridors' for connectivity. Maintaining connectivity, both physical and biological, will enhance the biodiversity in existing areas whilst creating future opportunity. Species can act as indicators to the potential effects of climate change, loss and destruction of habitat can provide sensitivity indicators in natural and human systems.

4.5.15 *Recreation* - People like to visit and partake in activities associated with the countryside and landscape. A rich and varied biodiversity provide the essential building blocks that increase the opportunity for development in this area.

4.5.16 In terms of locality there is a good spread of designated sites within commutable distance of the market towns. If accessible, these provide tourist and recreation opportunities as well as a sense of community ownership and responsibility.

4.5.17 *Regional development and promotion* - The promotion of wider biodiversity has human and as previously mentioned, historic as well as cultural significance. It generates tourism and recreation opportunities that enhance social well being. This adds value to the county in terms of social and economic prosperity.

4.5.18 The development of the National and Local Biodiversity Actions Plans and the meeting of objectives outlined within these documents will increase the overall variation in biodiversity across the county.

4.5.19 Herefordshire has a significant proportion of land used as traditional orchard and there are examples from elsewhere in the UK, e.g. Kent, where orchard has successfully been made available for public access for recreation. It is unlikely that privately owned, productive orchards can be used jointly as recreation space, however there may be opportunities for derelict or historic orchards to be made available to contribute to Green Infrastructure. The HC Millennium mapping has the potential to identify further GI resource and orchard information was collected as a particular category.

4.5.20 Future scope for the use of this includes the extensive use of GIS applications through the identification of further GIS resource to enhance knowledge of the environment such as Forestry land, countryside stewardship agreements, etc. This meets the Key strategy aims of protect, enhance and connect.

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Human Influence

4.6 Landscape character – Herefordshire is a predominantly rural county, the two designated Areas of Outstanding Natural Beauty in the county are the Wye Valley and Malvern Hills. These areas overlay into bordering counties of Gloucestershire and Worcestershire, and Monmouthshire (Wales). Natural England has five natural character areas in the county and these enhance understanding of the local diversity and distinctiveness. A particular interest in landscape character will be required to ensure GI enhancement and sympathetic development.

4.6.1 There are two Areas of Outstanding Natural Beauty in the County, the Malvern Hills to the east of the county beyond Ledbury and reaching into Worcestershire, and the Wye Valley in the south of the county below Hereford and enveloping Ross-on-Wye, extending out beyond the county to the south.

4.6.2 Natural England has sub-divided the whole of England into 120 natural areas based on the wildlife, natural land features, land use patterns and historical land use identified. This has created an effective framework for the planning and achievement of natural conservation objectives. Each area has a profile document determining priorities for nature conservation with ecological and landscape integrity, and setting visionary objectives which reflect these priorities. Herefordshire has five such natural areas and these are:

- Clun and North West Herefordshire Hills – lying south of the Shropshire Hills Natural Area and encompassing an area extending from Bishops Castle in the north to beyond Kington in the south, and from the Welsh border almost as far as Ludlow. Predominantly agricultural and moderately well-wooded, commercial forestry is important throughout the central section. Ancient woodlands dominated by native broadleaved trees and medieval deer parks. With geological sites of great international importance.

- Central Herefordshire – consisting of two character areas (Herefordshire Plain and Bromyard Plateau) the area covers 1200 square km. It comprises the flood plains of the River Wye and River Lugg. The valleys of the Rivers Frome and Arrow (major tributaries of the Lugg) are also significant features with areas of good wildlife habitat. Agriculture is the main land-use and woodland is found where river sections run through a steep valley and as larger blocks on the more distinct hills. The urban centres of Hereford, Leominster and Bromyard are located within this area. Rivers and streams are the most significant feature, the River Wye is considered to be the best salmon river in England.

- Malvern Hills and Teme Valley – centred on the ridge of the Malvern Hills and the incised section of the Teme Valley to the north and west of the hills it is located at the extreme east of the county reaching as far west as Ledbury. Rough parallel wooded hills separated by low lying intensively farmed lands and orchards.

- Dean Plateau and Wye Valley - The landscape of the Dean Plateau and Wye Valley is varied with the main features being the large plateau of the Forest of Dean, the valley of the River Wye which passes through a deep limestone gorge, the Woolhope Dome which supports large-scale plantations, and the Monnow Valley along the western boundary of the Natural Area. The Natural Area is dominated by woodland with the largest areas of ancient semi-natural woodland in the

Wye Valley and Woolhope Dome. Remnants of heathland are still found within some forested areas.

- Black Mountains and Golden Valley - This Natural Area is the north-eastern end of an extensive dissected plateau which extends into Wales. To the west, the landscape is dominated by the bulk of the Black Mountains which support upland grassland, heathland and some blanket bog as well as springline flushes. There are numerous rock outcrops and screes. In the eastern part of the Natural Area the more fertile valley bottoms of the Golden Valley have a long history of cultivation and large arable fields are found here. Woodlands are a prominent feature of the landscape in the north and east of the Natural Area, particularly on the low ridge between the Golden Valley and the adjoining lowlands. The rivers and streams of this Natural Area are fast flowing, of high water quality and are important wildlife corridors.

4.6.3 How these natural landscape areas overlap with the surrounding English counties can be seen in Map 4.6 along with the green outlines of the two AONB areas and the black outline of the HC boundary.

4.6.4 A further detailed set of landscape criteria has been developed in the Herefordshire Landscape Character Assessment commissioned by the HC. This is very detailed and more appropriate for detailed analysis at large scale in the next phase. The joint landscape character assessment areas include an assessment of the human landscape as well as the natural landscape and for the development of green infrastructure; this is a more appropriate assessment.

Significance for Green Infrastructure

4.6.5 *Public accessibility* – The central Herefordshire area shows signs of recreation pressure and conflict in some parts, leading to a reduction in biodiversity interest and reducing the general quality of enjoyment. Creating more strategic opportunities for recreation areas would potentially reduce the pressure on existing sites and reverse decline. This theme will be revisited in the following sections.

4.6.6 *Sustainable resource management* – the objectives set out by the NE profiles lend a useful insight into the type of GI enhancement that would suit the local environment. Particular areas of concern are maintaining the water quality of rivers and increasing the porosity of land cover.

4.6.7 The Natural Area profiles give a description of the five distinctive areas within Herefordshire and the visionary objectives of NE. These objectives could be adopted within the framework of GInS to improve the strategic direction of GI. For instance within the Wye Valley there have been wetland woods along the river banks which over time have disappeared to agriculture, the Water Study may point to the reintroduction of some form of water storage and the reintroduction of these woodlands could become part of the strategy. The different NE natural areas appear to favour the development of distinctly different GI enhancement strategy processes.

4.6.8 *Biodiversity & connectivity* - The AONBs present stronger planning constraints than other areas and have a more highly developed strategy for GI on the potential for protection, enhancement and development opportunity as policy documents are already in existence. An opportunity exists to integrate these documents with Herefordshire GI strategy, thus blurring the edges of the AONB and adopting some policies for a wider area.

4.6.9 Water abstraction and waste production also puts pressure on the biodiversity of the SSSI sites of the Rivers Wye and Lugg.

4.6.10 *Recreation* – Each landscape natural area offers a different recreation experience, and understanding the value and developing the opportunities for activities in each area would expand the overall recreation interest of Herefordshire and balance of experience as a whole.

4.6.11 The Central Herefordshire area shows signs of recreation pressure and conflict in areas, leading to environmental degradation and a reduction in biodiversity interest.

4.6.12 *Regional development and promotion* – Through understanding the unique value of each natural area the development of urban areas can be designed in balance with the surrounding environment. This leads to the creation of a more appealing feel and harmonious environment adding economic value to residential and commercial property.

4.6.13 The underlying biodiversity and historic landscape value of the area can be incorporated into the development of green corridors and greenspace ensuring functional corridors offering real intrinsic value.

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4.7 Land use – Land cover and density patterns in the County are described geographically by OS Mastermap offering a balance for the information gained from other sources. There are a number of land types that can be identified such as woodland, coniferous and non-coniferous, building, natural surface. This is not in lieu of landscape character information or millennium mapping datasets but can be used as a general guide on the present land use of an area.

4.7.1 Herefordshire is a predominantly rural county. Using population as an indicator; 46.1% of residents live in rural areas and small villages; the largest concentration is in Hereford city accounting for 31.3% of the total population. The remaining market towns have fairly small concentrations of between 1.8% for Kington and 6.3% for Leominster.

4.7.2 Table 4.7 lists the population of Hereford and the County's Market Towns:

Table 4.7 **- Population figures for Herefordshire**

Settlement	Population	% of total
Hereford	54,842	31.3
Leominster	11,114	6.3
Ross on Wye	10,085	5.8
Ledbury	9,221	5.3
Bromyard	5,788	3.3
Kington	3,176	1.8
Villages & Rural	80,645	46.1
Total	**174,871**	**100**

Source: Herefordshire Council Research team Nov. 2007

4.7.3 Further GIS datasets identify waste and landfill sites. There are very few of these sites, 77 in number, and they are well dispersed throughout the county.

4.7.4 Ordnance Survey maps postcode locations and this information has been used in other GI studies to identify the density and distribution of premises – business density will suggest business district; residential density will suggest housing estates.

4.7.5 Air quality in the County is generally at a very good standard though weather conditions in the winter months and summer months can lead to pollution incidents. The largest contributor to air pollution in the county is traffic emissions followed by industrial and domestic activities. It is important for health to maintain a good standard of air quality and to improve that standard where possible. There are two air quality management areas in the county at Edgar Street, Hereford and Bargates, Leominster; a third area on the A40 corridor, near Ross is undergoing detailed assessment.

4.7.6 Noise pollution for Herefordshire is typified by isolated incidents and roadside nuisance. There is very restricted GIS available for noise and air pollution. Noise and air pollution data is only available for specific project areas, considered important for in depth analysis.

Significance for Green Infrastructure

4.7.7 *Public accessibility* - Aerial photography offers another potential for visual analysis of surrounding land use of a specific site. It may be possible to observe existence of informal paths and tracks through the impressions picked up by photography.

4.7.8 *Sustainable resource management* – Through aerial photography it is also possible to differentiate between land use, seasons and even the health of trees through GIS spectral analysis techniques. This analysis may be further than the present study requirements warrant. There is no plan to develop this potential at present.

4.7.9 The identification of green areas in urban environments can be used to establish a land use spectrum that can be monitored over time. The advent of brownfield site development and infill building can dramatically change the value of urban environments over time though little obvious change is taking place. The development and protection of green corridors can create a lasting and economically valuable refuge.

4.7.10 For a county wide indication of pollution levels Tranquillity mapping may offer some assistance. Tranquillity mapping has been developed by the Campaign for the Protection of Rural England (CPRE) and seeks to identify areas of tranquillity in order to monitor and protect for continued enjoyment. Scored according to a large number of factors including perceived light, air and noise pollution and the methodology is well documented. It is possible to use this type of mapping as an indication of where the most tranquil areas of Herefordshire are in order to seek to preserve their quality. Research suggests these appear to include areas of high ground including the Bromyard plateau, Woolhope Dome, Golden valley, and northern hills. It is possible to identify that the main roads are the most likely disruption to the tranquil nature of the countryside. The least tranquil areas are in the towns and Hereford City presents the largest area of disturbance in the county.

4.7.11 The use of street/public area lighting and the type of lighting methods employed affects the visual appeal and functionality of GI at night as the quality of darkness affects biodiversity. The methods employed also have an affect on the amount of energy used.

4.7.12 *Biodiversity and connectivity* – Woodland, natural surfaces etc. other than designated space are identified in OS Mastermap and offer an opportunity for identifying enhancement strategies. In order to improve GI there is the potential to increase the width of some green corridors, for instance along transport routes, in order that they may mitigate the effects of pollution on local landscapes.

4.7.13 *Recreation* - Waste sites and made land offer the potential for the creation of open space. Waste and landfill sites may present an opportunity for turning into green infrastructure and would potentially need to be avoided for housing development following recent planning guidance. Further GIS is available on historic land use in the HC commissioned waste dataset created from historic mapping evidence that suggests possible land contamination.

4.7.14 *Regional development and promotion* - Greenspace can be planned to separate business areas from other land use areas and add social and health value for employees. Analysis of GI provision in business districts can be used to develop green gateways which can have a very impressive visual impact adding to the economic value of a site. To this end, the location of residential and commercial addresses is important for the analysis of green space in relation to the Green infrastructure planning

4.8 Archaeological, historic and cultural – concerned with the human influence on the development of the landscape – structures, earthworks, water bodies, buildings etc.

4.8.1 Archaeological - Our understanding of the distribution of archaeology develops over time. The speed with which it progresses will depend on the level of resource put in, where significant development is occurring, more investigations will be carried out and the level of archaeological knowledge of the area will increase. Recent finds (last five years) have significantly increased the knowledge of the extent of prehistoric activity on the south side of the Wye in Hereford. We now know that there was a high level of occupation from the Neolithic period onwards. As more development takes place, then it is likely that more archaeological sites will be uncovered.

4.8.2 The archaeological dataset will interact with the historic landscape; there is also an interaction with listed buildings whose settings will affect areas available for development.

4.8.3 Historic - Ancient routes such as Roman Roads form the basis of many modern highways and byways. The road network in and around towns such as Hereford is indicative of historic land use, economic activity and historic transport networks.

4.8.4 Cultural - There are many visitor attractions of archaeological, historical and cultural importance in the county, registered and unregistered historic parks and gardens, scheduled ancient monuments; distinctive churches and churchyards. Some of the celebrated assets of the County include Credenhill Fort, and Croft Castle.

4.8.5 Other rural initiatives of Herefordshire Archaeology are the management and promotion of woodlands for conservation; the rural development implications of reservoirs and potato growing; and the impact of monument erosion.

4.8.6 Urban initiatives for archaeology include strategy statements for Hereford city and each market town identifying the potential contribution of archaeology to urban cultural and economic regeneration.

Significance for Green Infrastructure

4.8.7 *Public accessibility* - Information held by Parish Councils could represent a valuable resource for the GInS. However it is generally acknowledged that there is a great variety in the quality of the returns and this will require further investigation.

4.8.8 In terms of GI, archaeological resources may or may not be open to the public, be easily accessible or be of broad recreational value, and accessibility may not be readily determined from the dataset.

4.8.9 There is a potential to develop the known archaeological datasets into those that are publicly accessible and those that are not publicly accessible within the GI network. Distinguishing these assets in this way, it is possible to develop a strategy to enhance and protect the cultural diversity of the county.

4.8.10 *Sustainable resource management* - There should be a link between early settlement pattern and soil type e.g. environmental archaeological information may be retained in boggy and alluvial ground. Waterlogged areas can have high levels of archaeological preservation, areas of thin soil may retain less archaeology, and rich soils may have supported greater populations.

4.8.11 Public owned land, viewed as a cultural asset, could be identified as a potential Green Infrastructure development resource; in that there is potential for estates controlled by Herefordshire Council to be managed for maximum benefit in terms of green infrastructure. Conservation has plans for reviewing the Council estate owned assets to identify targets for improvement in the management of historic assets, so this would be an extension of that initiative.

4.8.12 Archaeological records only represent known archaeology and such records will not give a guarantee that resources will not be affected by development. It should be understood by decision makers that the GIS cannot be used to guarantee that archaeological impact will not occur during development.

4.8.13 *Biodiversity & connectivity* - It may also be possible to use the GIS to identify landscapes with potential for archaeology e.g. tracts of land at a similar level above datum to land containing crop marks indicating ancient habitation.

4.8.14 The data attached to the GIS is quite limited with a lack of qualitative information such as condition status, public accessibility, last review date etc. The inclusion of this type of data could enhance the GI assessment greatly and provide a more informative decision tool.

4.8.15 *Recreation & promotion* – There is very little GIS for tourism, but should a dataset be created, gravity modelling for tourist attractions could be used in order to indicate the areas from which people would be prepared to travel to visit tourist and recreation destinations. There is a fantastic opportunity to develop this as a new dataset with qualitative input for interrogation.

4.8.16 The elements included in the subset are limited to those held on registers or schedules. i.e. Parks and Gardens, the Schedule of Ancient Monuments and Hereford Area of Archaeological Importance. Sites and Monuments records are held as node information only.

4.8.17 Tourism mapping of GI such as publicly accessible canals / rivers, parks and gardens, scheduled monuments, and nature reserves is not available at present. There is the potential for this information to undergo further enhancement and sharing between departments to form a basic knowledge set for recreation and promotion.

4.9 Designated public open space – publicly accessible green space is defined by PPG17 – Planning for public open space, sport and recreation. The guidance includes accessible green space such as playgrounds, public open space, parkland, and public gardens and nature reserves. As a rural county the publicly accessible informal greenspace available should be high, the formal greenspace low. Historically provision standards are usually based on population density figures.

4.9.1 The available driving dataset for this section at present is concerned with green publicly accessible open space with a defined minimum area; it includes some commons, amenity space such as housing estate greens, allotments, civic space such as town squares, village greens, churchyards, green corridors such as rivers, outdoor formal sports and recreation facilities, school playing fields, parkland. Other datasets to consider for mapping open spaces are within the biodiversity, archaeology sections, and HBA9 – the protected open space layer created for the UDP.

4.9.2 The HC commissioned PPG17 report sets out to assess local open space, sport and recreation provision within Herefordshire in terms of quantity, quality and accessibility; to review existing provision and recommend standards and strategy for a sustainable future.

4.9.3 The quality standards used for guidance include the Green Flag Awards for Parks and open space, RoSPA for play areas, and the National Playing fields Association. The geographical provision standard used is the Natural England ANGST+ which is discussed in more detail in section 6 (page 40).

4.9.4 The report sets out to recognise the value of open space for health, education and recreation. For instance, it considers both formal and informal accessible space for recreation which includes informal walking space e.g. Churchyards, recreation grounds and applies a qualitative approach so that space with limited access, in that there are costs involved in gaining access or there is only seasonal access, are taken into account. The GIS layer that supports this report would be a very valuable resource for the development of GI once the validation exercise is complete.

4.9.5 Map 4.9 demonstrates the county coverage of the PPG17 identified open space. Due to the size of recreation facilities the mapping is a little indistinct; this will become more useful for a regional or local level of assessment of green infrastructure.

Significance for Green Infrastructure

4.9.6 *Public accessibility* – the PPG17 mapping has the opportunity to supply the qualitative information about other subsets on the aspect of public accessibility, this is information that has so far been missing in the datasets reviewed. The mapping held in PPG-17 can be expanded to create the first blocks in the development of vibrant green corridors in turn providing a dynamic living environment.

4.9.7 *Sustainable resource management* – assets that are publicly accessible are vulnerable to aggressive wear and tear, possibly leading to exhaustion of the resource, to which inaccessible assets are not exposed. Identifying these assets can lead to the development of more appropriate maintenance strategies.

4.9.8 Some of the mapping information could be enhanced by guidance or local knowledge e.g. open spaces provision may appear sufficient or over-provided but much of this may not be up to an appropriate standard. Only the owner of

this information, or another, informed HC representative can determine these judgements; there is a lack of qualitative data with the GIS.

4.9.9 The findings of the Herefordshire PPG17 Open Spaces Assessment indicates that amenity space in urban areas is low, and although there is no recommendation for developing new planning policy on amenity space, the development of a green infrastructure approach would benefit the local environment and provide a network of clearly defined functional open space.

4.9.10 *Biodiversity & connectivity* – Though for the main part land in this category is selected on the terms of the accessibility for human recreation and relaxation, there is potential room for improvement of biodiversity through maintenance schedules that are sympathetic towards biodiversity. Using the example of the Black Country green infrastructure scheme, residents can be encouraged to take an active interest in maintaining and observing their local green space. These would provide enhanced health benefits and develop a sense of community identity.

4.9.11 *Recreation* – Identifying the local recreational assets available to the general public allows for an assessment based on GIS to consider the abundance or scarcity for local neighbourhoods. It is possible to break down the town into smaller units and apply ANGST+ principles using the information gathered in this study to assess needs in terms of abundance and deficit of assets. Recreation centres can become hubs for the creation of green corridors ensuring connectivity and access to other centres of attraction such as shops, work places, and homes.

4.9.12 *Regional development & Promotion* – developing local and regional policy for the availability of publicly accessible green space adds value to the properties and living spaces of the county. Not just relying on the availability of rural countryside but taking stock of the value of the accessible greenspace ensures that human connectivity with the surrounding landscape and therefore social community is maintained and strengthened.

4.9.13 Cultural data is very limited. Some resources may not be shown on the most appropriate layer e.g. initially the cathedral grounds in Hereford were not captured on any geographical layers, meaning that pedestrian routes and therefore connectivity through the city are likely to be under represented. A clearer process for inter-departmental sharing of information could come out of this study.

4.10 Access & movement – This section can be broken down into four themes, consisting of the main transport network, the public rights of way network, a hybrid network of bus routes and cycleways, and the disused transport network. Each area of interest can be subjected to analysis for connectivity and the potential for sustainable green corridors; a further analysis can be applied to identify deficiencies and abundance in the networks.

4.10.1 Main transport networks – Main roads connect all the main towns and extend out to other urban centres beyond the borders of Herefordshire. The national railway network serves Colwall, Ledbury, Hereford and Leominster and offers a local transport planning and biodiversity resource. Both main roads and rail provide green corridors for flora and fauna. Some of the main roads have noticeably wide verges offering a naturalised grassland environment. Both road and rail follow the contours of the lowland valley areas whenever possible.

4.10.2 The public rights of way (PROW) network - includes bridleways, footpaths and byways – and is identified in Natural England literature for its physical and functional connectivity with the deeper countryside. It also interconnects with the rural road network. The draft Rights of Way Improvement Plan (ROWIP) endeavours to identify the needs and deficiencies of this network. The identification, preservation and enhancement of green corridors are a required aspect.

4.10.3 The rights of ways network includes promoted long distance walks and loop walks that provide easy access into rural areas. And although there are also promoted walks around towns and places of for architectural and archaeological and historical interest, there is no supporting GIS.

4.10.4 The key aims of the ROWIP are:

- Enhance health, well-being and enjoyment of life
- Increase economic prosperity
- Improve sustainable transport
- Provide access for all
- Increase community involvement

4.10.5 Hybrid network – buses and cycleways use the above networks to create routes that best serve human requirements. Sustrans cycle network links between all urban centres of Herefordshire and beyond, balancing directness with safety and topography. Buses connect the rural community to urban centres and reduce rural isolation and increase rural accessibility to develop greener transport system.

4.10.6 Disused transport networks - historic disused transport links can play a role in a developing green infrastructure strategy. There exists the remnant of two canal routes in the County and there are also the remnants of two or three tramways that predate and are constructed in a similar way to railways and typified by a minimal surface gradient. Some sections have disappeared under the railway and others have public rights of way over them. There are a number of disused railways.

4.10.7 Further information on access and movement is provided in the form of Countryside Stewardship Agreements and open access land with advertised permissive routes.

Significance for Green Infrastructure

4.10.8 *Public accessibility* - The opportunity exists to use GIS to identify links that would improve the connectivity of networks. Where the GIS facilitates the comparison of separate networks of GI e.g. green lanes, footpaths, byways etc, opportunities may present themselves to increase the continuity and connectivity of networks such as bridleways to better serve origin and attractor nodes.

4.10.9 The ROWIP draws particular attention to the lack of PROW access opportunities for the disabled, and the lack of a safe and useable network for horse riding in a County with a high potential for horse trails.

4.10.10 *Sustainable resource management* –the proactive development of both the public rights of way and highways networks together could initiate a greenways network for improved foot and cycle access between urban areas and the countryside. This improves the choices for alternative modes of travel and increases the attractiveness for sustainable means of transport such as cycle and pedestrian.

4.10.11 ROWIP identifies some aspects of the network that could be enhanced and developed, such as the bridleway network. These areas may be included in the GI planning phases. The PROW urban network has different requirements and emphasis to the rural network and may require a more detailed and direct strategic approach to enhancing the accessibility potential to green infrastructure.

4.10.12 Some access information may be subject to short-term change, e.g. access restrictions due to foot and mouth disease/blue tongue, also agricultural market forces may mean that some land is taken out of set-aside and into production, meaning that land where there may previously have been some obligation to provide access to the public may be restricted.

4.10.13 The qualitative data on maintenance status of public rights of way, such as whether a path is accessible, is not available with the GIS so any decisions based on this network would require further research.

4.10.14 It is worth noting that the Green Infrastructure programme does not require an analysis of the capacities of the road network; however increased traffic is likely to affect the network.

4.10.15 *Biodiversity & connectivity* - Disused transport networks - The tramways and disused railways may be attractive for GI strategy for providing green corridors and enhanced connectivity for biodiversity rather than providing access for people.

4.10.16 The access and movement networks provides corridors for migration and movement of biodiversity, managed sympathetically the provision can be enhanced and greater movement encouraged.

4.10.17 *Recreation* - Opportunities exist for developing a leisure network for buses and cycles that reduces traffic pressure on rural roads through developing and promoting routes with destinations identified for GI value. An investigation of the potential for joining up different transport corridors to become a dynamic part of the green infrastructure strategy, either for enhancing public access or for biodiversity is a realistic approach with the GIS data held, although quality and abundance indicators will require local and specialist involvement.

4.10.18 *Regional development & promotion* - Development of the network to encourage alternative methods of travel, through designing new green corridors and providing enhanced access to the countryside are the main objectives of GI.

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5 Summary of Significant Points

5.1 This report covers a very large number of disciplines and so to help focus attention on the main points to consider for each subset in relation to the development of GI the following 'bite-sized' comments and observations have been extracted. These should offer a starting point for bringing together all the separate subsets and further detail is contained within section four.

5.1.1 Topography – There is a strong relationship between topography and the other subsets. In preparing a GI strategy the protection of upland areas should be considered and the development of methods of water catchment management.

5.1.2 Geology – A fundamental part of the make up of the landscape. The focus here for GI is on the protection and enhancement of existing RIGS and GCRs. These sites are increasing in number and so consider working with BGS and other groups to enhance and increase the value of newly identified sites and incorporation into GI networks.

5.1.3 Hydrology – the water supply for the County, its quality and the risk of flood are the three key themes. Rivers, for instance, offer connectivity for GI.

5.1.4 Protect and enhance existing hydrology features, identify suitable areas for further investigation for creating new features including dams, reservoirs, flood relief channels and canals. Develop GIS for ponds, pools and drainage ditches in preparation for developing GI corridor network.

5.1.5 Biodiversity – the status and value of existing designated areas are largely unknown. In the developing GI these should be considered for corridor and attractors in the network.

5.1.6 Landscape Character – the developing GI should be in sympathy with the landscape character.

5.1.7 Archaeology, history and Culture – develop GI in sympathy with current knowledge and policy.

5.1.8 Designated public open space – the opportunities of identifying the publicly accessible space is a key theme to developing a GI network that encourages healthy activity and a sense of wellbeing. Consider developing GI with these human attractor nodes as an integral part of the network.

5.1.9 Access and movement – The transport network is the key element for the movement of humans and a contributor to the movement of other species. Some of the networks are fragmented so consider opportunities for creating new links and enhancing existing corridors especially in urban areas where they can have limited biodiversity interest. Consider incorporating enhanced sustainable transport networks utilising information from ROWIP and other transport and local community studies.

6 Application of GInS

6.1 This chapter will set out two ways of further developing the information gathered in the GInS. First it will consider the unique ability of GIS for comparing the subsets in an area wide or region perspective in order to expand knowledge and inform further development of GIS and the individual subsets. Alternatively, for the ability of GIS to collate information contained within all the subsets, and to return a statement on the occurrences within a set proximity to a specific location to inform planning decisions.

Comparison of Sub-sets

6.1.1 The GInS included a set of workshops designed to engage officers within the Herefordshire Council to view the county from the perspective of green infrastructure. The PowerPoint presentation is contained within Appendix D.

6.1.2 The workshop considered the different subsets as they interact with each other. A number of scenarios were presented by layering the mapping for the different subsets over the top of each other. This formed a catalyst for innovative debate, and some of the comments arising have been incorporated into the text of this document.

6.1.3 A data disk is included in Appendix E of the data collected for the study, also a MapInfo workspace that will load all the information for ease of access. Due to the size constraints of the disc, Ordnance Survey data is not included. It is suggested that the data should be regularly reviewed and updated.

6.1.4 It is the intention of this document to make it easier for the comparison of data from the different subsets and disciplines in order to propagate debate and provide a platform for further development of the GIS into an informative structure for forward planning resources.

6.1.5 Consideration should be given to the type of data that has been collected and how the data can be improved for planning. Such improvements would, for instance, be to include accessibility ratings.

GInS Planning Tool

6.1.6 This chapter will now aim to describe an output tool that could form the basis for a site by site analysis of the existing green infrastructure.

6.1.7 The tool could form the first stage for assessing the existing green infrastructure assets and further stages would consider developing that green infrastructure to meet the local development plan policy aims for Herefordshire.

6.1.8 Through consultation with HC specialists and further GI research, the prescribed option is to assess sites based on the Natural England ANGST+ [6]set of criteria:

[6] http://www.greeninfrastructure.eu/images/GREEN_INFRASTRUCTURE_PLANNING_GUIDE.pdf

- 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.

6.1.9 This study proposes to diverge from the NE criteria in that it considers all the GI assets that have been discussed in the earlier chapter, and does not set a minimum size requirement. It is possible to produce a report of the GIS mapping data available based on a query of grid referenced points or areas detailing the GIS interrogated and the quality of that data and its robustness.

6.1.10 The aim is to provide a tool that can be used for any site in the county and to provide a query button within MapInfo. The important element is to identify the range of layers that should be analysed and the scope of information to be reported.

6.1.11 For this preliminary investigation into the use of such a tool the GIS layers were interrogated for a potential development site in Ross-on-Wye.

Case Study: Potential Development Site– Ross on Wye

6.1.12 A specific land parcel was considered and a query set to analyse the proximity of various GIS features discussed in the study.

6.1.13 The GIS data available on Herefordshire is gathered under 9 headings and the query has interrogated each of these subsets.

6.1.14 The result is presented in a report format, and includes age of the data and file where available. Also an indication of the number of each resource located within the range bands of 300m, 2km, 5km and 10km. The results of this query can be found in table 6.1. Further refinement would be to drill down through the information to provide data on the distances to nearest GI resources under each section, its description/name, size where appropriate, and an indication of the total area in hectares or sq km where possible/applicable.

6.1.15 The table in its present format shows a large number of Major Roads, Footpaths, etc. in the columns headed ‘Numbers within a radius’ and these should be interpreted as identifying a significant presence rather that the number of roads.

6.1.16 The query can be further refined after consultation to search on road numbers, etc. Another refinement to consider is a scoring system that would, for instance, rate biodiversity assets higher than landfill.

Table 6.1: Herefordshire Environmental Constraints: Potential Development Site, Ross-on-Wye[7]

	DATA DESCRIPTION	DATE EXTRACTED	DATE UPDATED	No. within radius 300m	2km	5km	10km
	Natural Resources						
GEOLOGY	HARD ROCK DEPOSITS	24.05.07	.	0	1	2	16
	SAND AND GRAVEL DEPOSITS	24.05.07	.	1	6	7	9
	MINERALS PRIMARY EXTRACTION AREAS	24.05.07	.	0	0	0	0
	GCR's		11.09.07	0	1	1	4
	RIGS		11.09.07	0	3	8	30
HYDROLOGY	Areas that benefit from flood defences	01.03.07	04.04.07	0	0	0	0
	Main River centre-lines	01.03.07	04.04.07	1	1	4	19
	Flood Defences	01.03.07	04.04.07	0	0	0	0
	>1% flood risk from river OR >0.5% from sea	01.03.07	04.04.07	3	13	19	53
	>0.1% flood risk from river OR >0.1% from sea	01.03.07	04.04.07	1	9	11	24
	Flood Storage Area	01.03.07	04.04.07	0	0	0	0
	Historic Flood Map - (Floodplains?)	01.03.07	04.04.07	5	6	6	8
BIODIVERSITY	SPECIAL AREAS OF CONSERVATION	24.05.07	.	1	1	1	2
	SITE OF SPECIAL SCIENTIFIC INTEREST	24.05.07	.	2	2	3	15
	NATIONAL NATURE RESERVES	24.05.07	.	0	0	0	0
	ANCIENT SEMI-NATURAL WOODLAND	24.05.07	.	2	6	45	143
	SPECIAL WILDLIFE SITES	24.05.07	.	0	1	1	1
	LOCAL NATURE RESERVES	13.06.07	.	0	0	1	1
	SITES OF IMPORTANCE FOR NATURE CONSERVATION	15.06.07	.	0	0	0	0
	HNT - Nature Reserves		11.09.07	1	3	4	19
	Human Influences						
LANDSCAPE CHARACTER	NATURAL ENGLAND NATURAL AREAS	15.05.07	.	1	1	1	2
	HEREFORDSHIRE AONB	24.05.07	.	1	1	1	1
ARCHAEOLOGICAL HISTORICAL & CULTURAL	SCHEDULED ANCIENT MONUMENTS	24.05.07	.	0	8	17	35
	CONSERVATION AREAS	24.05.07	.	1	1	3	8
	HISTORIC PARKS AND GARDENS	24.05.07	.	4	14	28	47
	Sites & Monuments	11.09.07		6	83	137	139
	VisitorAttractions		17.10.07	0	0	5	11
	Area of Archaeological Importance	26.07.08		0	0	0	0
DESIGNATED OPEN SPACE	PPG17	24.07.07		26	54	76	127
	HBA9 - Protected open space	11.09.07	24.07.07	3	3	3	8
LAND USE	Landfill	24.07.07		2	2	7	16
ACCESS & MOVEMENT	National Byway Cycle routes	24.07.07		0	0	0	0
	Sustrans National cycle trails 44 & 46	24.07.09		1	9	12	14
	Major roads	27.07.07		82	203	336	838
	Footpaths, bridleways and byways	09.08.07		41	114	315	825
	Railways & stations	19.09.07		0	0	0	0
	Loop walks & S.16 Forestry Dedications	09.08.07		1	1	3	6
	Disused Railways	19.09.07		2	2	2	5
	Disused Tram roads	19.09.08		0	0	0	0
	Disused Canal	19.09.09		0	0	0	0
	Open Access Land	31.08.07		0	0	0	3
	Open Access and stewardship	01.09.07		3	7	7	348

[7] Figures are calculated using GIS query processes

Issues

6.1.17 The report should also give a return if a layer has not been loaded into MapInfo to alert the user that they have not searched all relevant GI resources. This would set a start point for the evaluation of GI and data would require further evaluative investigation.

6.1.18 For the development of a GI for an identified Growth Point an investigation would require a very much more detailed approach and the development of plans based on Mastermap OS where potential areas for GI development, enhancement and protection can be identified that is not covered in current datasets. For instance, based on the ANGST+ principles, this would ideally include an area of 10 km radius around the site to ensure that the proper provision of GI is developed and a basis for funding initiated.

Opportunities

6.1.19 Incorporating GI into the planning strategy for Herefordshire – for instance, for zones around new housing development areas, once identified, in order to gain funding for the wider environment from developers.

6.1.20 The process needs to be fair and appropriate. It should be possible to identify the expenditure required for projects and identify how this will be gathered and the funding opportunities sourced to provide a transparent methodology. Where there is an environmental impact, or where datasets are incomplete it will strengthen the request for further survey work or GI enhancement.

6.1.21 Alongside the options for locating residential development at the Growth Points themselves, the GInS and accompanying GIS could be used to explore the potential of development of a new town in Herefordshire. Whilst this may be outwith the scope of Growth Points, under the existing designation, new settlements may be an option in siting residential development away from flood risk areas and ecologically sensitive sites.

6.1.22 The Herefordshire GIS could interact with those being developed by Growth Points in neighbouring counties, such as Worcestershire or Powys, this would facilitate regional and national level development planning.

7. Conclusions

7.1 The GInS GIS will provide the basis for a powerful planning tool and will be able to be used to identify opportunities to enhance GI provision, and identify sites where the level of GI provision would support residential development.

7.1.1 Relationships and interactions between datasets can be explored and tested using GIS queries. Public Benefit/ ANGST type assessments can be made using the GIS promoting further research into qualitative requirements.

7.1.2 With further study this could lead to the opportunity for enhancing GI by looking more specifically at an intermediate, market town, level. Here the work will require development of new GIS and adding qualitative data. This level should encompass the town and a band of the surrounding rural countryside, in detail, to cover the urban and urban fringe environment.

Issues

7.1.3 Interrogation and interpretation of GIS data needs to be by suitably qualified individuals to ensure future policy and strategy is followed and any impacts or opportunities accurately identified.

7.1.4 Datasets can never be guaranteed 100% accurate as most are subject to change for various reasons, therefore an indication from the GIS that GI is present or absent or any indication of its quality or condition cannot be taken as definitive and on-site checking should be carried out.

7.1.5 The GIS must be maintained and updated to retain its value. Datasets and the GIS as a whole require management discipline and an appropriate level of resources to be maintained adequately. The owners of each dataset need to be involved in GIS management in order to inform the managers of the GIS about any issues with the data.

7.1.6 The GIS will have the potential to be a useful tool in assessing the impact of global warming/climate change, in coordination with the parallel water resources study. Future development will require higher standards of flood protection due to increased flood risk.

7.1.7 A process for periodic review of datasets is required as the data provided for the GInS represents a snapshot of the Herefordshire environment and the level of work that has been done to collect data.

Opportunities

7.1.8 The different GI datasets can be overlaid to identify multiple criteria hotspots and so form the basis for enhanced green space; creating a better environment for everyone.

7.1.9 The GInS represents an opportunity to create stronger links between planning disciplines that collectively contribute to quality of life. Development planning, transport planning, health policy, recreational and open space planning and a number of other disciplines can be coordinated using the spatial framework provided by the GIS to give better value from resources available to the local authority. With the use of GIS, GI planning and provision can be more responsive to the requirements of new residential developments.

Appendices

Appendix A - **Dataset Assessment /metadata spreadsheet**

Appendix B - **GIS Validation & Preparation Methodology**

Appendix C - **GIS sample Validation certificates**

Appendix D – **Workshop PowerPoint presentation**

Appendix E – **Data disk**

Appendix F - **Glossary of terms**

Appendix A – Green Infrastructure Environmental Constraints

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Appendix A

Green Infrastructure Environmental Constraints

Introduction

The following tables show the GIS information that have been collected and created for the GInS, and provides a dataset assessment /metadata analysis.

The tables are designed to be used as reference tools for identifying the source information used in GInS, and for contacting data managers. They give a brief description of the table name, and its short name as received from the data owner. Status refers to whether the table is considered complete (denoted by a tick), whether a new table has been created for the project, and left blank when the table has either not been utilised or not received.

The next column indicates how the data should be used for GInS appraisal methods, a node is a focus point of the asset, and a corridor may connect the nodes or more probably present a ribbon type area for habitation and transportation. Notes give a very brief description of the spatial occurance and further explanation of the data. Owner refers to the source responsible for updates.

Green Infrastructure Environmental Constraints

DATA DESCRIPTION	TABLE	Status / Proposal	CORRIDOR / NODE / GENERIC	Notes	Owner	DATE EXTRACTED	LAST UPDATED	ADDITIONAL NOTES
Natural Resources								
GEOLOGY								
HARD ROCK DEPOSITS	HARD_ROCK	✔	Node	77 sites	? (HC provided)	24.05.2007	.	
SAND AND GRAVEL DEPOSITS	SAND_GRAVEL	✔	Node	87 sites; total 80.4 sq.km	? (HC provided)	24.05.2007	.	
MINERALS PRIMARY EXTRACTION AREAS	MINERALS_PEA	✔	Node	7 sites	? (HC provided)	24.05.2007	.	
GCR's	Create	New	Node	37 GCR general locations	**Amey created (Earth Heritage data)**		11/09/2007	http://www.jncc.gov.uk/earthheritage/gcrdb/GCRsearcharea.asp?authority=UKG11
RIGS partial	RIGS - UDP		Node	88 RIGS, only 37 identified in UDP	HC - MVM	11.09.2007		http://www.earthheritagetrust.org/blog/OurEarthHeritage/_archives/2005/9/29/1269465.html
RIGS	RIGS - Earth Heritage	New	Node	Grid referenced point data	**Amey created (Earth Heritage data)**			
Solid Geology / Soils	Opportunity exists to purchase		Generic		Natural Environment Research Council			1:50K for 1 user for 1 year for Herefordshire (2,180sqkm) = £732.00 + VAT
								1:100K Mineral deposits for Herefordshire (2,180sqkm) = £496.00 + VAT
HYDROLOGY								
Areas that benefit from flood defences	nat_areasbenefit_v1_9	✔	Node		Environment Agency (HC provided)	Mar-07	04.04.2007	
Main River centre-lines	nat_centrelines_v3_0	✔	Corridor		Environment Agency (HC provided)	Mar-07	04.04.2007	
Flood Defences	nat_defences_v2_2	✔	Corridor		Environment Agency (HC provided)	Mar-07	04.04.2007	
>1% flood risk from river OR >0.5% from sea	nat_floodzone3_v3_4	✔	Corridor		Environment Agency (HC provided)	Mar-07	04.04.2007	*How can opportunities for Wetland creation be identified?*
>0.1% flood risk from river OR >0.1% from sea	nat_floodzone2_v3_4	✔	Corridor		Environment Agency (HC provided)	Mar-07	04.04.2007	
Flood Storage Area	nat_fsa_v1_9	✔	Node?		Environment Agency (HC provided)	Mar-07	04.04.2007	
Historic Flood Map - (Floodplains?)	nat_hfm_v1_8	✔	Generic		Environment Agency (HC provided)	Mar-07	04.04.2007	
Ordinary water courses	Extract from OS	✔	Corridor		OS			SQL Legend '0400 Inland water' includes open water
Open water (including ponds)	Not available		Node	Table creation required for strategy	OS derived			Possibly SQL select on polygon size from OS
Groundwater Source Protection Zones (SPZ)	Source_protection_zones	✔	Node	Groundwater contamination assessment	Environment Agency (HC provided)	29.10.07		
Groundwater Vulnerability Mapping	GWV_100k	✔	Node	Groundwater contamination assessment	Environment Agency (HC provided)	29.10.07		
TOPOGRAPHY								
CONTOUR MAPPING	COLOUR_10M_Contour	✔	Generic		HC	06.02.2004		
DIGITAL TERRAIN MODEL	DTM_Hfds	✔	Generic	Proposed 25m contour	Get Mapping	12.02.2004		Created by Geosense Ltd
BIODIVERSITY								
SPECIAL AREAS OF CONSERVATION	SAC	✔	Node / Corridor	6 thin sites along river banks	Natural England (HC provided)	24.05.2007	.	
SITE OF SPECIAL SCIENTIFIC INTEREST	SSSI	✔	Node / Corridor	77 sites - rivers and uplands	Natural England (HC provided)	24.05.2007	.	
NATIONAL NATURE RESERVES	NNR	✔	Node	3 sites well dispersed	Natural England (HC provided)	24.05.2007	.	
ANCIENT SEMI-NATURAL WOODLAND	ANC_WOODLAND	✔	Node	1021 sites well dispersed	Natural England (HC provided)	24.05.2007	.	*Mapping consolidate into European/National, National and Local designations*
SPECIAL WILDLIFE SITES	SWS	✔	Node	709 sites well dispersed	Natural England (HC provided)	24.05.2007	.	
LOCAL NATURE RESERVES	LNR	✔	Node	7 sites south west	Natural England (HC provided)	13.06.2007	.	
SITES OF IMPORTANCE FOR NATURE CONSERVATION	SINC	✔	Node / Corridor	56 sites Hereford	Natural England (HC provided)	15.06.2007	.	LOCATIONS OF SINC IS RESTRICTED TO HEREFORD CITY ONLY
Protected Species	Information available from HC/HBRC		Node	Table required for strategy	HBRC			The detailed information contained in this data is more relevant to location specific analysis
Millennium Mapping Habitats	Information available from HC/HBRC		Node	Table required for strategy	HBRC			The detailed information contained in this data is more relevant to location specific analysis
HNT - Nature Reserves	HNT_Nature_Reserves	NEW	Node	51 Sites around the river corridors	**Amey created**		11.09.2007	Created using 6 fig. Grid ref. - point data only.

OS BASE MAPPING	**Analytical Tool**							
OS MASTER MAP	MULTIPLE - MAPINFO TAB	✔		Pre-PAI - last updated 2003 or earlier	OS (HC provided)	12.06.2007	15.01.2004	
OS ADDRESS POINT	ADDPOINT	✔	Node	Not updated since 2003	OS (HC provided)	12.06.2007	17.12.2003	PRE - PAI ADDRESS POINT DATA FOR USE IN GAZETTEER
1:10,000 Scale Raster	Hfds10kColSeamless	✔	Generic		OS (HC provided)	12.06.2007	10.04.2007	
1:50,000 Scale Raster	Hfds50kSeamless	✔	Generic		OS (HC provided)	12.06.2007	09.08.2006	
1:250,000 Scale Raster	UK250kSeamless	✔	Generic		OS (HC provided)	12.06.2007	22.08.06	
HEREFORDSHIRE COUNTY BOUNDARY	HFDSBDRY	✔	Generic		OS (HC provided)	13.06.2007		
Epoch 1 (c1881-1891) Herefordshire	HfdsEpoch1		Generic	Some tiles missing	Landmark Information Group Ltd (2007)	11.09.2007		
AERIAL PHOTOGRAPHY	**Analytical Tool**							
Countywide Aerial Photos	AerPh_County	✔			OS (HC provided)	.05.2007	.05.2001	Flown between 04.05.1999 to 23.05.2001

Green Infrastructure Environmental Constraints

DATA DESCRIPTION	TABLE	Status / Proposal	CORRIDOR / NODE / GENERIC	Notes	Owner	DATE EXTRACTED	LAST UPDATED	ADDITIONAL NOTES
Human Influences								
LANDSCAPE CHARACTER								
NATURAL ENGLAND NATURAL AREAS	9023na	✔	Node	Define Landscape character	Natural England (HC provided)	15.05.2007	.	http://www.english-nature.org.uk/pubs/gis/GIS_Register.asp
HEREFORDSHIRE LANDSCAPE CHARACTER ASSESSMENT	LCA	✔	Node	Considered over complicated	HC	15.05.2007	18.05.2006	\\Horatio\GIS\GISdata\Conservation\LCA\LCA-Data
HEREFORDSHIRE AONB	AONB	✔	Node		Natural England (HC provided)	24.05.2007	.	
Historic Landscape Characteristics	HLC		Node		HC	28.08.07	2000	
Lifescapes	Not found			Leader+ Rivers project report	N/A			
Land use								
Land cover/density pattern	OS Mastermap	✔	Generic	Orchard, woodland, heath, scrub	OS (HC provided)			Construct thematic from Mastermap
Waste and landfill sites			Node	Table required for strategy	Created using historic mapping			Available for later analysis from HC, (Bruce Chantres)
Herefordshire settlements	Mercury Towns	✔	Node	320 locations refered to as settlements in mapping	HC	24.07.07		Source H&T, HC
Herefordshire towns & villages	H1 Urban & H4 village boundaries		Node	6 H1 sites and 60 H4 sites	HC	11.09.07		
Air & Noise quality	Tranquility Mapping		Generic		CPRE	N/A		Very early stage of appraisal for both and no GIS available.
Landfill	Landfill	✔	Node	77 sites	HC			
Air quality management areas	AQMA		Node	Possibly include AQMA areas for strategy phase	HC	N/A		
Commons	Commons	✔	Node	Includes commons with no public access rights	HC	7	??	
Employment land		Propose	Node	Possible additional GIS layers	HC	N/A		Useful for later analysis
HC property		Propose	Node	Possible additional GIS layers	HC	N/A		Useful for later analysis
ARCHAEOLOGICAL, HISTORIC & CULTURAL								
SCHEDULED ANCIENT MONUMENTS	ANC_MONUMENT	✔	Node	266 sites	Natural England (HC provided)	24.05.2007	.	
CONSERVATION AREAS	CONSV_AREA	✔	Node	63 areas and none in SW	HC provided	24.05.2007	.	
HISTORIC PARKS AND GARDENS	HPG	✔	Node	201 sites Reg. and unregistered	HC provided	24.05.2007	.	
Sites & Monuments	Earthcrop	HC create	Node		HC			***Extract strategic elements - some important but not yet appraised by EH***
Area of Archaeological Importance	AAI	✔	Node	1 site - Hereford city		26/07/2008		
Visitor attractions	VisitorAttractions	New	Node	Partial mapping on available information	**Amey created (HC data)**			
Landmarks		Propose	Node	Definition required and creation of new table.	N/A			
Principal visitor attractions		Propose	Node	Definition required and creation of new table.	N/A	01/08/2007		Visitor figs for a number of locations, plus List from Tourism
Information & orientation points		Propose	Node	Definition required and creation of new table.	N/A	17/08/2007		Tourism has provided a list
Developing urban space			Node	Available but not pursued at present	N/A			
Historic buildings appraisal			Node	Available but not pursued at present	N/A			
Designated Public Open Space								
PPG 17 SITES	PPG_Sites&Facilities2	✔	Node / corridor	1153 sites - some repetition with other tables, some content is not relevant to project	HC	20.07.2007	16.07.2007	LYSANDER\GIS\GISDATA\PPG 17 SITES - (Supplied by Ruth Jackson).
HBA9 - Protected open space	HBA9_Protection_Open_Areas	✔	Node	66 sites	HC	11.09.07	24.07.07	
Access & Movement								
National Byway Cycle routes	National Byway	✔	Corridor		HC	24.07.2007		Source H&T, HC
Hfd & Clos Canal	H&G & RST9 H&G		Corridor	Partial and only approximate location of course - missing extent below Ledbury	HC	24.07.2008		Source H&T, HC does not
Sustrans National cycle trails 44 & 46	Sustrans NCN routes	✔	Corridor	Visually confusing presentation	HC	24.07.2009		Source H&T, HC
Major roads	a_roads, b_roads	✔	Corridor	OS data	OS (HC provided)	27.07.07		Source IT, HC
Footpaths, bridleways and byways	Footpath, bridle, byway	✔	Corridor	1:10K or landline accuracy	HC	09/08/2007		Source PROW, HC
Railways & stations	Railway	New	Node / corridor	UDP - 5ish sites e.g. Pontrilas yard	**Amey created (OS data)**			
Loop walks & S.16 Forestry Dedications	Allwalks, Section 16 Dedications	✔		1:10K or landline accuracy	HC	09/08/2007		*Mapping consolidate into Main transport routes, public rights of way, hybrid, and disused networks*
National footpath/trail networks	HC- PROW	✔	Corridor	1:50Kaccuracy; 4 routes connecting the market towns	HC	24/08/2007		
Disused railways	Historic rail	New	Corridor		**Amey created**	19.09.07		
Disused tramroads	Historic tram	New	Corridor	Paper plans from Conservation	**Amey created**	19.09.08		
Disused canal	Historic canal	New	Corridor		**Amey created**	19.09.09		
Open Access Land	Edu access, open access	✔	Node		NE	31/08/2007		
Countryside StewardshipAgreements	permissive access	✔	Node		NE	31/08/2007		
T1 Public transport facilities	T1_public_transport_facilities		Node	3 disused rail shunting yards	HC	11.09.08		
T10 Safeguard of road schemes	T10_safeguarding_of_road_scheme		Corridor	6 schemes: Already/being built	HC	11.09.09		
Common land	Common	✔	Node		HC			
Public road network	Allroads		Corridor	3258 km	HC	N/A		

Appendix B – Planning Policy Context

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Appendix B

PLANNING POLICY CONTEXT

Introduction

The aim of this section is to establish the significance of the impacts of the proposed scheme on the achievement of current National, Regional and Local Policy objectives.

Assessment Approach

Methodology

In the United Kingdom a planning system operates at the national, regional and local levels to guide and regulate land use and development decisions. Planning policy at the national level provides an overall framework and sets out direction and guidance for application at the regional and local levels. Regional policy is prepared by the relevant regional bodies and presented in the Regional Strategy and local policy is formulated by Local Authorities and presented in Local Development documents.

The following documentation has been examined in order to assess the potential effects of the proposals on planning policy:

- Planning Policy Guidance / Planning Policy Statements (PPG/PPS)
- Regional Spatial Strategy for the West Midlands (RSS)
- Herefordshire Unitary Development Plan (UDP)
- Herefordshire Local Transport Plan (LTP)

Table B.2 below summarises the assessment of anticipated effects of assessing greeninfrastructure on national, regional and local policy. The impact significance on each policy objective is a summary of the technical assessments carried out within each environmental topic area. The effects are graded negative or positive according to whether they conflict or agree with the aims of the policies concerned to a large, moderate or slight degree. Scores were ascribed to each criterion using a 7-point scale shown in Table B.1.

Findings

Where the findings of the study do not fully meet the objectives of a current relevant policy, an opportunity may exist by tailoring a policy to the specific need to deliver a particular aspect of the Green Infrastructure Study using the Local Development Framework (LDF) as a mechanism.

Table B.1: Scoring for planning policy appraisal

Large Adverse	Moderate Adverse	Minor Adverse	Neutral	Minor Beneficial	Moderate Beneficial	Large Beneficial
						

Table B.2: Planning Assessment

Planning Authority	Policy/ Document	Objectives	Effects post study/strategy delivery	Comments
National Policy				
DCLG	PPS1 – Sustainable Development	Sets general principles and policy for the planning system and seeks to balance economic and social needs whilst protecting the environment.		Conservation, Protection and Enhancement of GI will mutually benefit many sustainable development objectives through good planning.
	PPG2 – Green belts	Seeks to protect land around urban areas through aiming to secure environmental improvements and maximise a range of beneficial uses of this land, whilst reducing potential conflicts between neighbouring land uses.		GI will complement strategy however some perceived loss may be observed with significant gain in other areas of the county. For example “Managing Green Space

Planning Authority	Policy/ Document	Objectives	Effects post study/strategy delivery	Comments
DCLG	PPS3 – Housing	Seeks to encourage housing provision in locations with good access to community facilities and reusing previously developed land.		GI identifies parcels of land with potential for developing 'community facilities'.
	PPS6 - Planning for Town Centres	Seeks to promote the vitality and viability of town centres by planning for the growth and development of existing centres.		Designated Open Space is a GI resource that can be utilised for public benefit in urban areas eg notable verges and 'street trees' provide micro habitats.
	PPS7 - Sustainable Development in Rural Areas	Encourages the protection of the countryside whilst sustainable economic activity is also encouraged.		Conservation, Protection and Enhancement of GI will mutually benefit many sustainable development objectives through good planning.
	PPS9 – Biodiversity & Geological Conservation	Requires nature conservation issues to be considered and aims to keep impact on designated sites to a minimum.		Biodiversity and Geology are principle GI topic areas. Identification within GInS will encourage conservation, protection and enhancement (eg SSSI)
	PPG16 - Archaeology and Planning	Impact of development on sites of archaeological interest should be kept to a minimum.		Historic features and archaeology are key GI resources that will be identified for protection and enhancement under GInS.
	PPG 17- Planning for open space, sport and recreation	Supporting urban renaissance. Supporting rural renewal. Promotion of social inclusion and community cohesion. Health and Well being. Promoting more sustainable development.		Managed open space provides opportunities to build GI networks tailored for health and well being.
	PPS23 – Planning & Pollution Control	Requires pollution issues to be considered that may arise from development.		GI Resources provide natural pollution abatement and can be utilised alongside traditional engineering technologies.

Planning Authority	Policy/ Document	Objectives	Effects post study/strategy delivery	Comments
DCLG	PPG24 - Planning and Noise	Seeks to reduce the impact of noise, encouraging the control, reduction and mitigation of noise impacts.		Connecting biodiversity corridors, hedgerows, scrub and tree lines can provide natural screening from the effects of noise.
	PPS25 – Development & Flood Risk	Seeks to ensure flood risk is properly taken into account at all stages in the planning process; prevent inappropriate development in areas at high risk of flooding; and direct development away from areas at highest risk.		GI resources facilitate natural flood attenuation and detention through identification and development of riparian corridors.
Regional Policy				
West Midlands Regional Assembly	Regional Spatial Strategy for the West Midlands, June 2004	Objectives include maintaining economic growth, encouraging sustainability, safeguarding and improving the environment, and improving communications and accessibility.		GI provides a number of social, economic and environmental benefits that compliments the RSS.
County Planning Policy				
Herefordshire UDP: March 2007	Policy S1	Promotes sustainable development that protects and enhances the natural environment and conserves and minimises natural resources.		GInS promotes the need to conserve, provide and enhance meeting the needs of Herefordshire's sustainability agenda.
	Policy S2	Provides for the contribution of developments to a sustainable pattern of land use and those that respect the County's environmental resources.		Land use and landscape character are key GI resources and will contribute to Herefordshire's overall sustainability agenda.
	Policy S9	Sustainable and efficient use and management of minerals including through preventing the unnecessary sterilisation of existing mineral reserves		Soils and geology are key GI resources and will be protected where appropriate under policy

Planning Authority	Policy/ Document	Objectives	Effects post study/strategy delivery	Comments
Herefordshire UDP: March 2007	Policy DR4	Provides for the protection of the environment including regard to provision of services, resource use, flooding, pollution, open space, biodiversity, landscape character and enhancement wherever possible.		Mapping of GI resources, utilising GI and the protection, enhancement and provision of new GI will enhance the Herefordshire landscape.
	Policy DR6	States that development will not be permitted where there is the likelihood of an unacceptable risk to the availability or quality of water resources.		Hydrology is a key GI resource and hydrological characteristics will be protected and enhanced through GInS.
	Policy DR7	Provides for the consideration of flood risk. Requires proposals in flood risk areas to be accompanied by a flood risk assessment and requires protection, compensatory, mitigation and other measures where development is unavoidable.		GI resources facilitate natural flood attenuation and detention, and incorporate current knowledge of flood risk areas.
	Policy DR10	Provides for development on or adjacent to land which is known or suspected to be contaminated and requires a site investigation, risk assessment and proposals for appropriate remediation and protection measures.		GI can provide natural protection and enhancement opportunities also 'natural remediation potential of contaminated land.
	Policy T10	Protects land required for new road schemes and improvements of existing roads from development, which would be likely to prejudice their implementation.		Managed roadside verges including marginal vegetation provide biodiversity opportunity for habitat creation as well as providing connectivity to fragmented habitats.
	Policy LA5	Provides for the protection of trees, woodlands and hedgerows, including retention wherever possible and compensation when lost to development.		Mapping the provision of identified GI resources, utilising protection, enhancement and provision of new GI will enhance the Herefordshire landscape.

Planning Authority	Policy/ Document	Objectives	Effects post study/strategy delivery	Comments
	Policy LA6	Provides for landscaping schemes to be submitted as an integral part of any development proposals that will affect the visual amenity or character of the location.		Provision of GI resources, utilising GI and the protection, enhancement and provision of new GI will enhance the Herefordshire landscape.
Herefordshire UDP: March 2007	Policy NC1	Provides for the consideration of biodiversity and features of geological interest when determining development proposals.		Biodiversity is a key GI resource and indicator.
	Policy NC4	Safeguards sites of local importance from development that could directly or indirectly adversely affect them.		Supports protection and conservation of GI resources.
	Policy NC8	New development proposals should seek to enhance existing habitats and take opportunities to provide new areas of wildlife habitat.		GI incorporates biodiversity therefore will compliment the policy.
	Policy M5	Safeguards identified mineral resources from surface development, which could sterilise potential future mineral workings.		Natural Resources and availability of raw materials is essential to sustainable development in which GI will support.
Herefordshire LTP2: 2006/7 to 2010/11	Objective: Better access to jobs and services	Seeks to improve access to jobs and services, particularly in rural Herefordshire, through measures including raising travel awareness and improvements to public transport and pedestrian and cyclist routes.		Enhanced GI connectivity providing opportunity and healthy living space.

Planning Authority	Policy/ Document	Objectives	Effects post study/strategy delivery	Comments
	Objective: Safeguarded environment	Seeks to safeguard the environment through consideration and mitigation of any potential environmental impacts at each stage of scheme development.		Enhanced through GI Resources identification and improved culture for development.

Appendix C – GIS Planning Methodology

Appendix C

GIS Planning Methodology

The Inception Report of July 2007 set out the standards to be expected of the GInS.

Validation techniques used for the study have necessarily been of a basic nature as a more involved analysis of quality and accuracy or field investigations are outside the remit of the project.

Data validation methodology for GInS considered the following points:

- Completeness of coverage within each subset, and identification of further data that may be of use in creating GI network.
- Age of data
- Quality of data and appropriate level of confidence
- Original format received
- Consultation with data custodians
- Comparison of a number of datasets received from HC with externally available datasets to determine if data is up-to-date

Data preparation:

- Colour conformity and rationalisation within datasets
- Establish ranking system where appropriate
- GIS creation where gaps identified
- Recommendation of which datasets to work with where there is a choice

The West Midlands Green Infrastructure Mapping work book was referred to in anticipating the manipulation of data required to determine strategy.

General Observations of the data

A number of the GIS layers, for instance, the biodiversity and sites and monuments GIS data, are supplementary to legal protection and supplied by Natural England.

In considering the database information attached to the geographical mapping data, the data held in the Council does not use the potential of the database properties of MapInfo to its full extent. There is very little supplemental data to the physical location of the feature and its legal designation. This will affect the methodology adopted in later parts of the study.

The validity of and accuracy of the data supplied by outside organisations, Natural England for instance, is qualified within the metadata supplied with the data records. It provides comments on the accuracy of the data collection and this report has extended this approach to all layers received for GInS,

which can be found in section three of the main report and again in Appendix A.

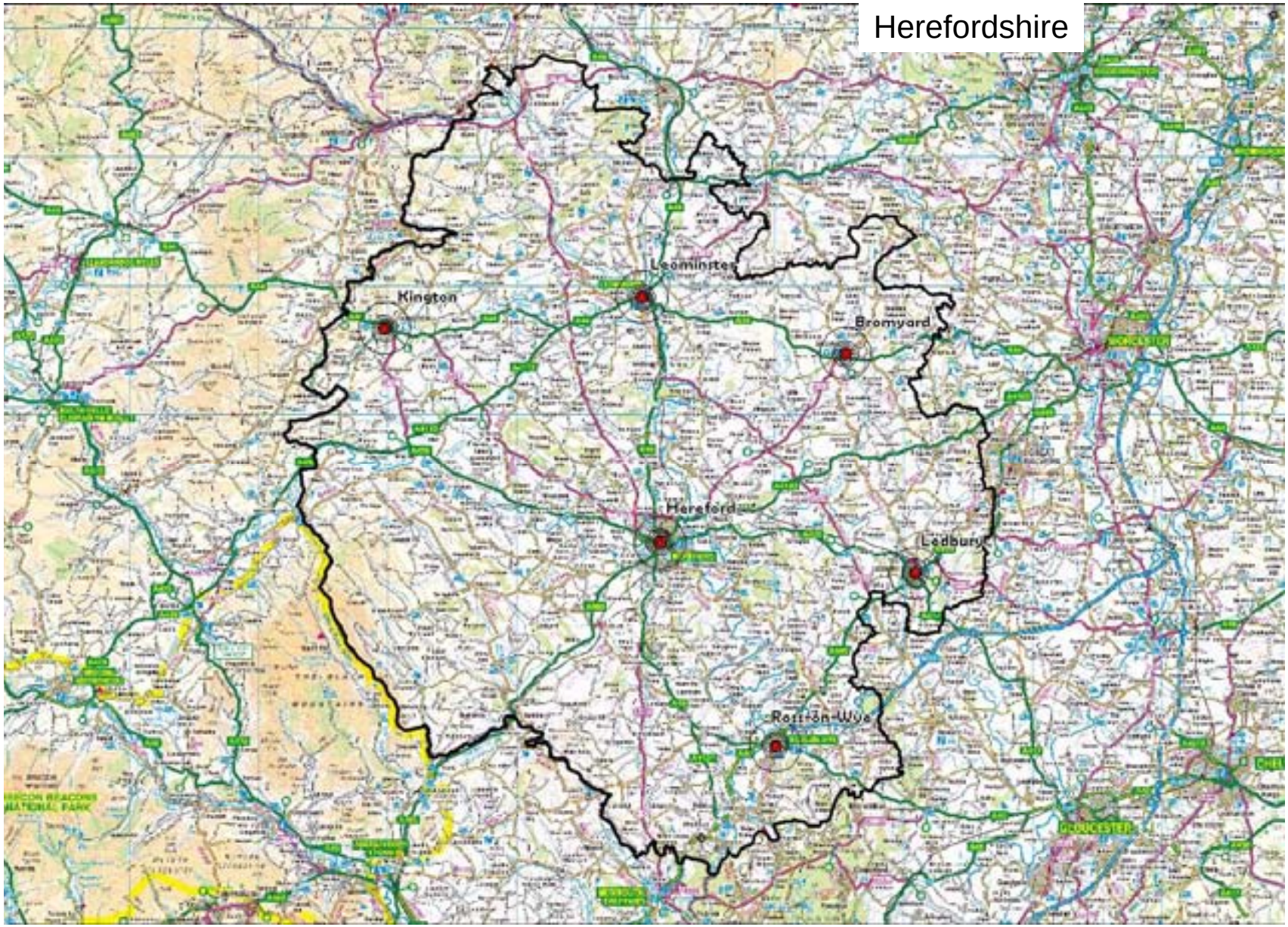
Appendix D – Workshop PowerPoint presentation

Appendix D

Workshop PowerPoint Presentation

Two workshops were run in October 2007 to introduce the concept of Green Infrastructure.

The presentation used GIS mapping to illustrate the concept and promote discussion.



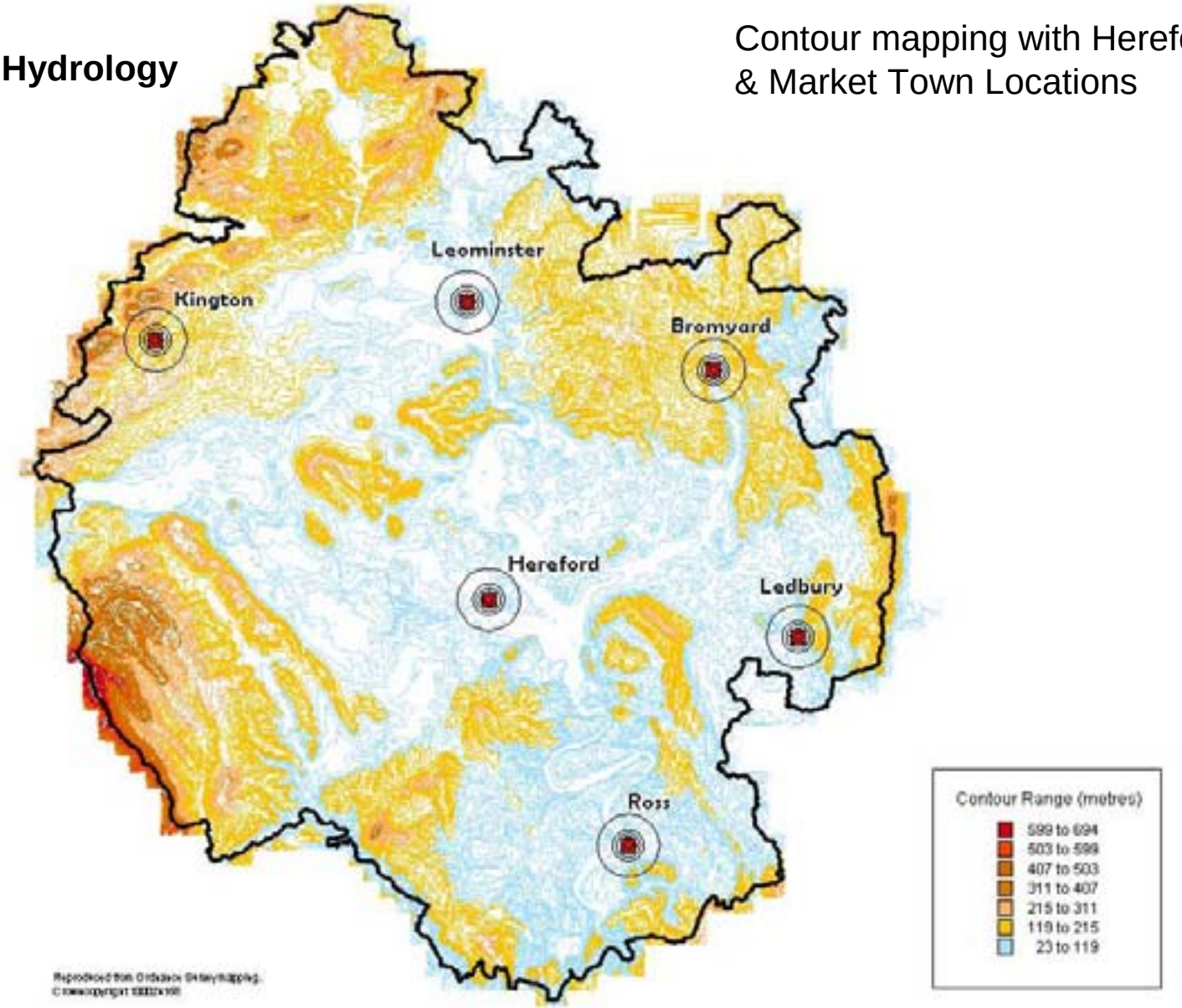
Presentation Slides

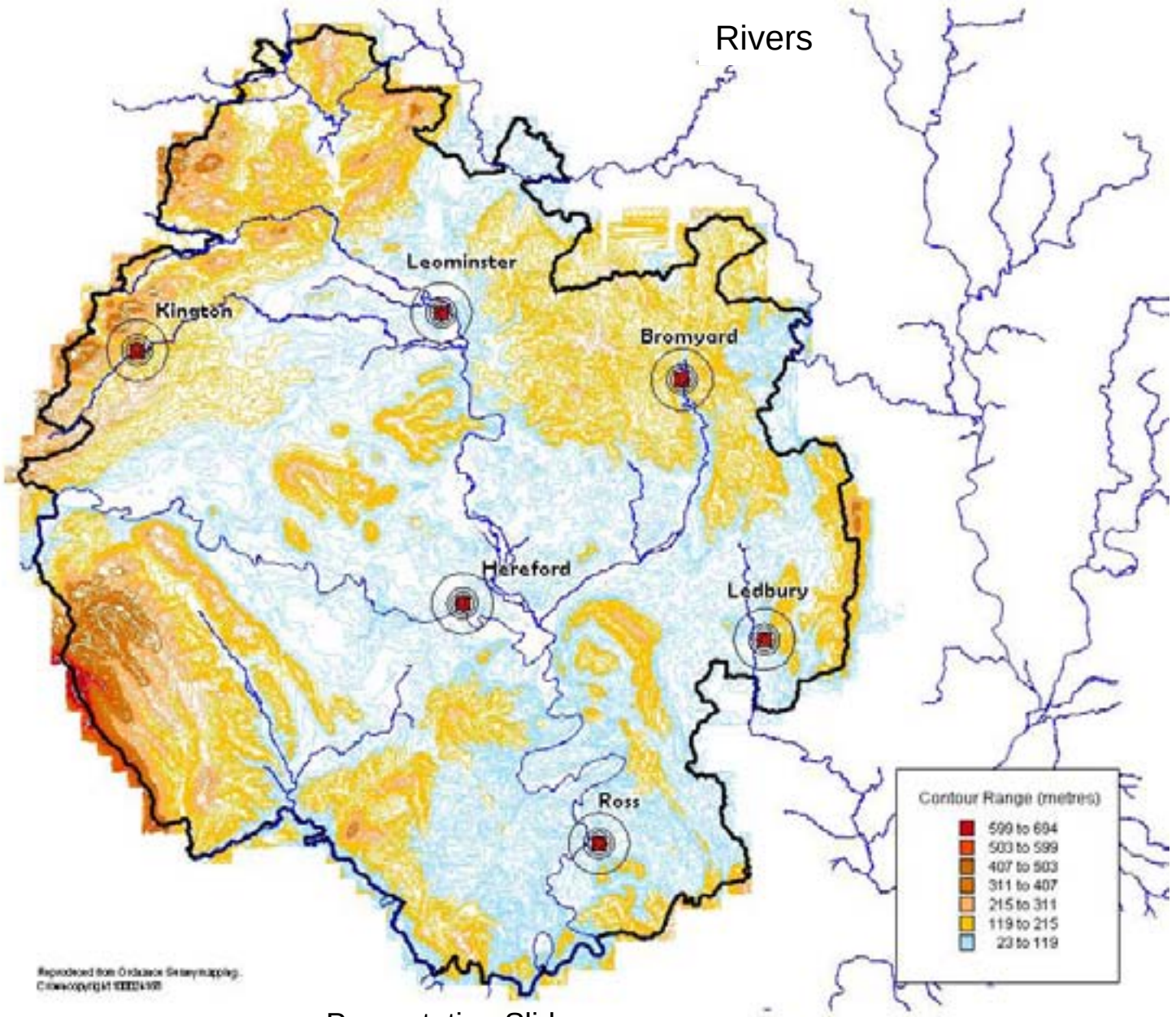
Herefordshire Green Infrastructure Study

- Workshop presentations October 2007
- Workshop One: Ecology, Property Services, Archaeology, Planning.
- Workshop Two: Parks & Countryside, Cultural Services, Tourism, Transportation

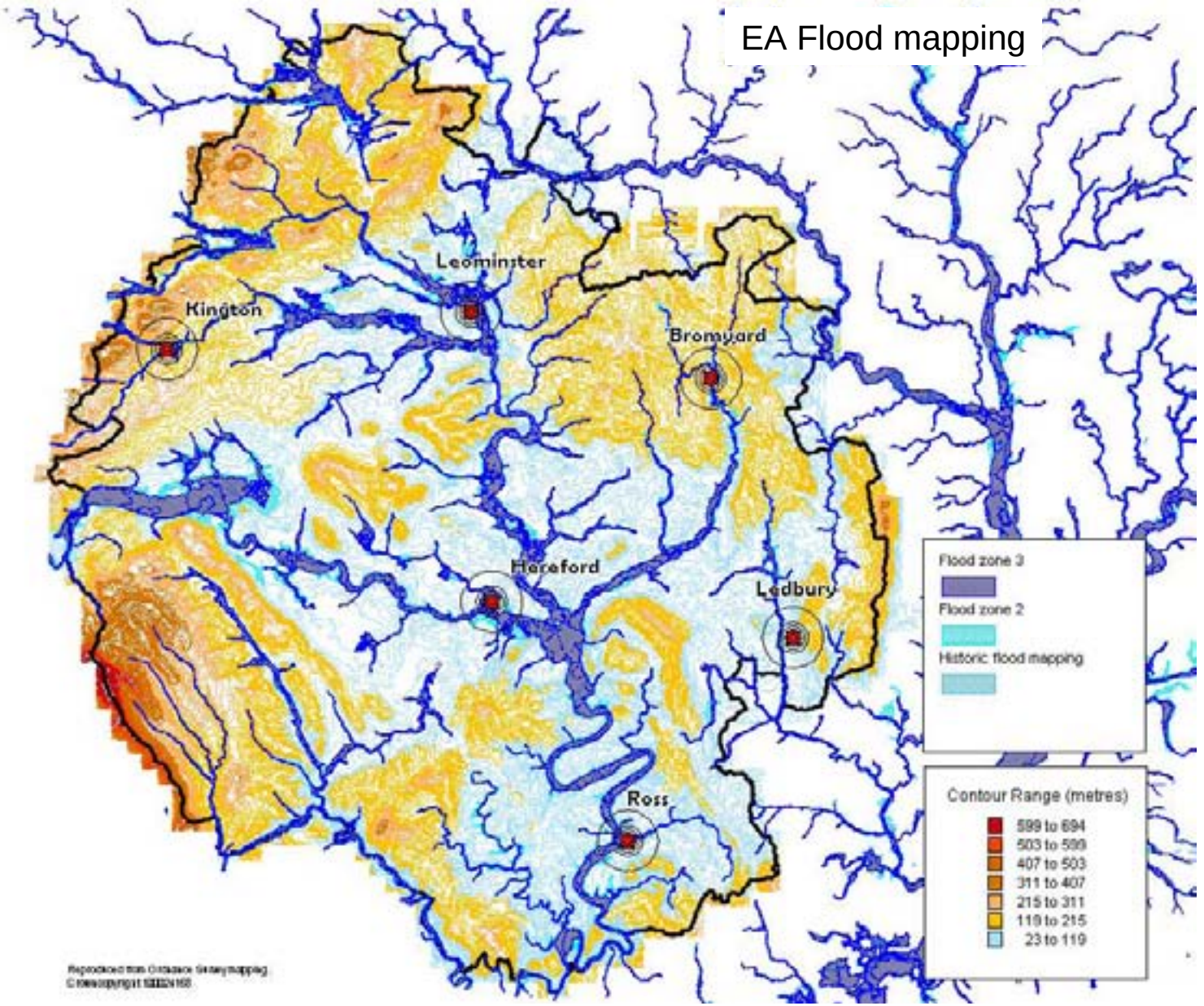
Option One:
Contours and Hydrology

Contour mapping with Hereford & Market Town Locations





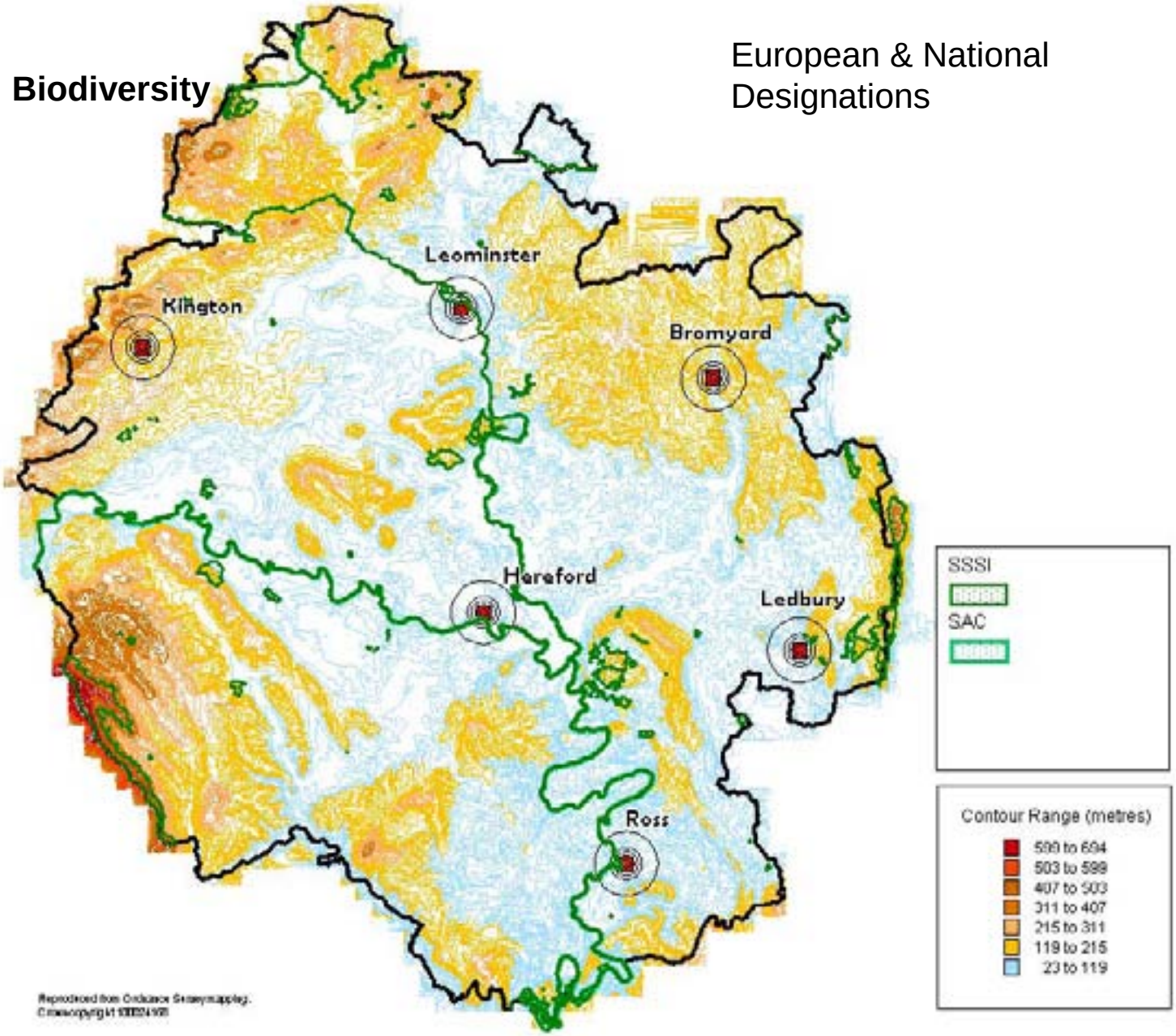
Presentation Slides



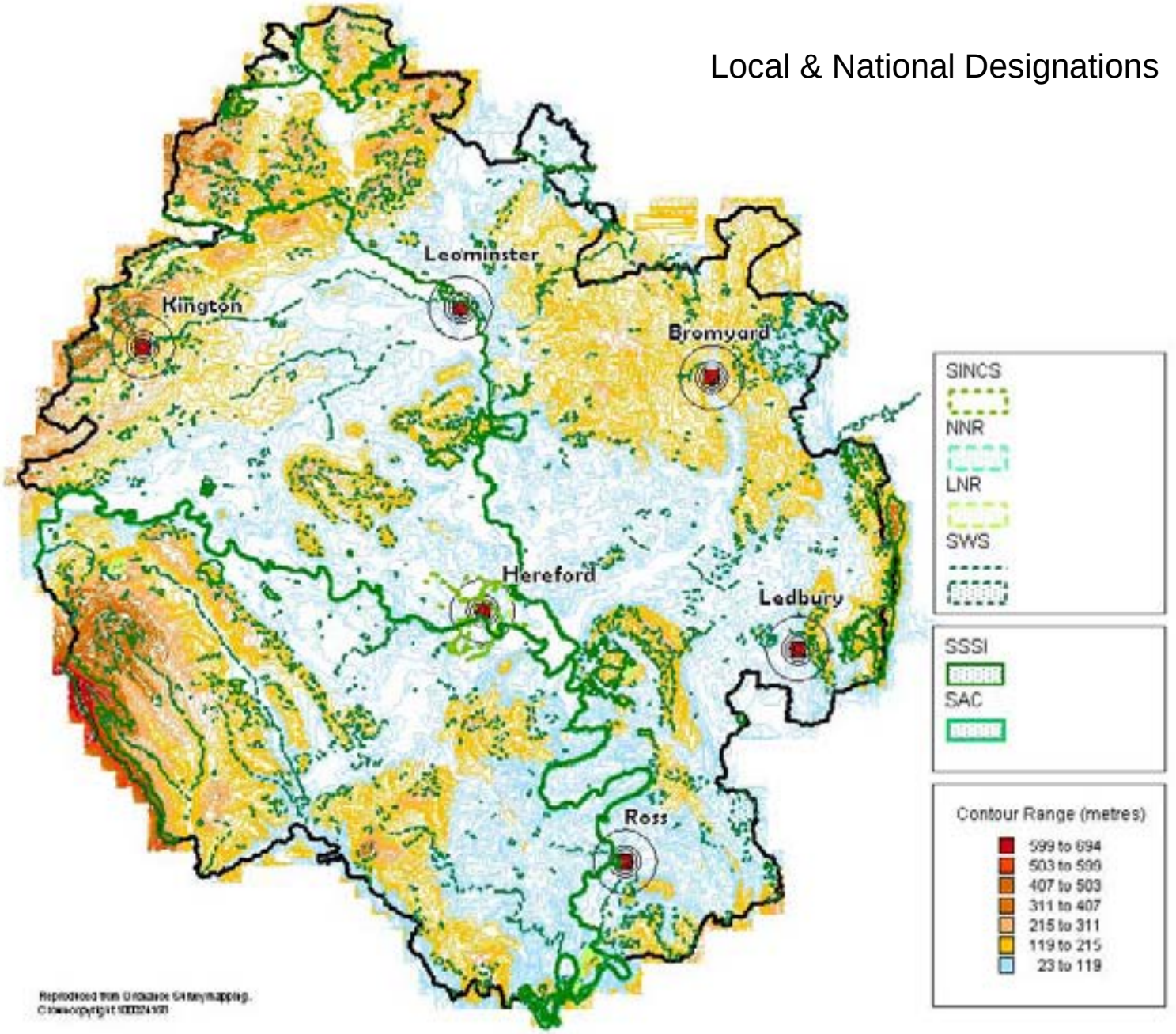
Presentation Slides

Option Two:
Contours and Biodiversity

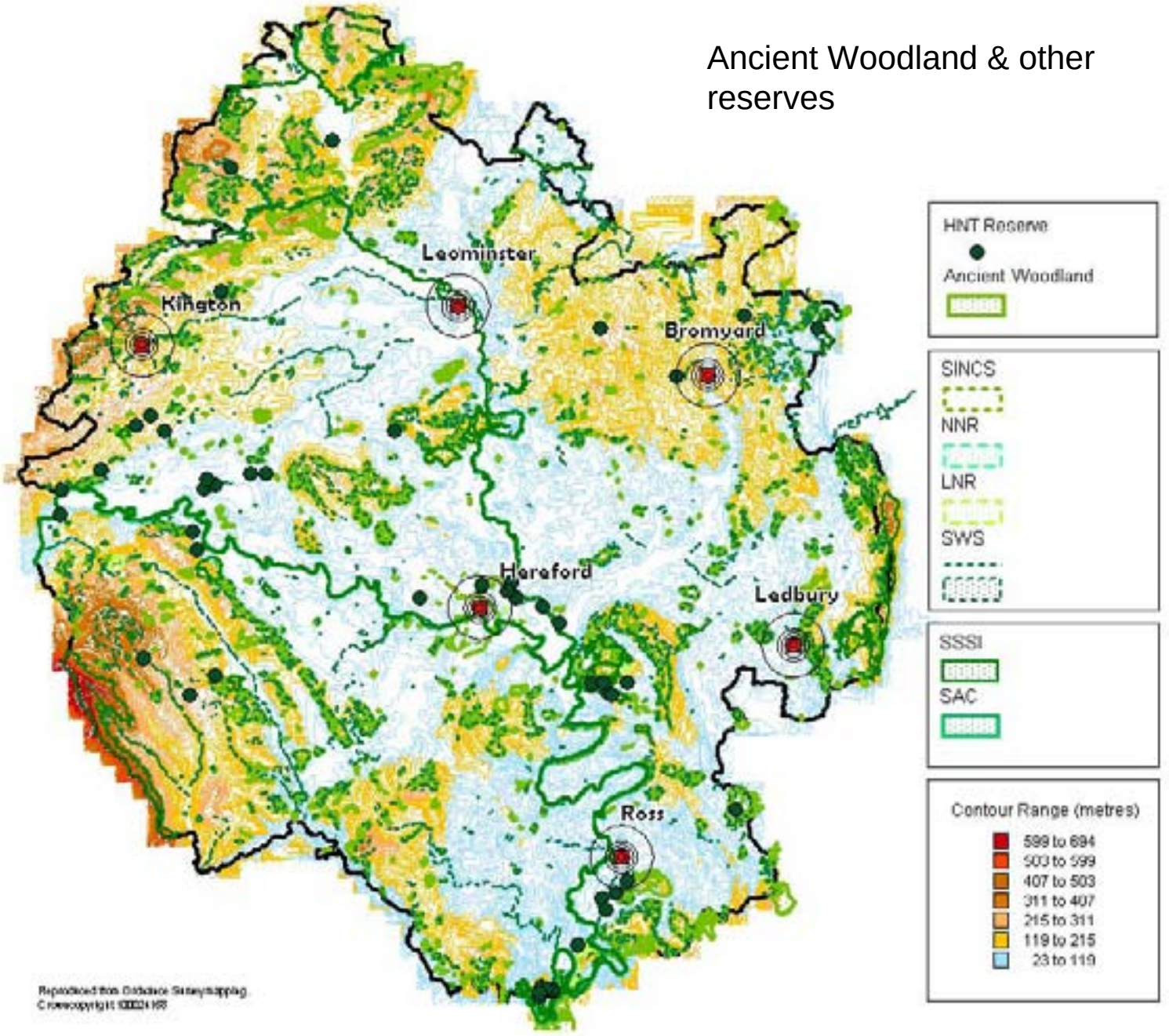
European & National Designations



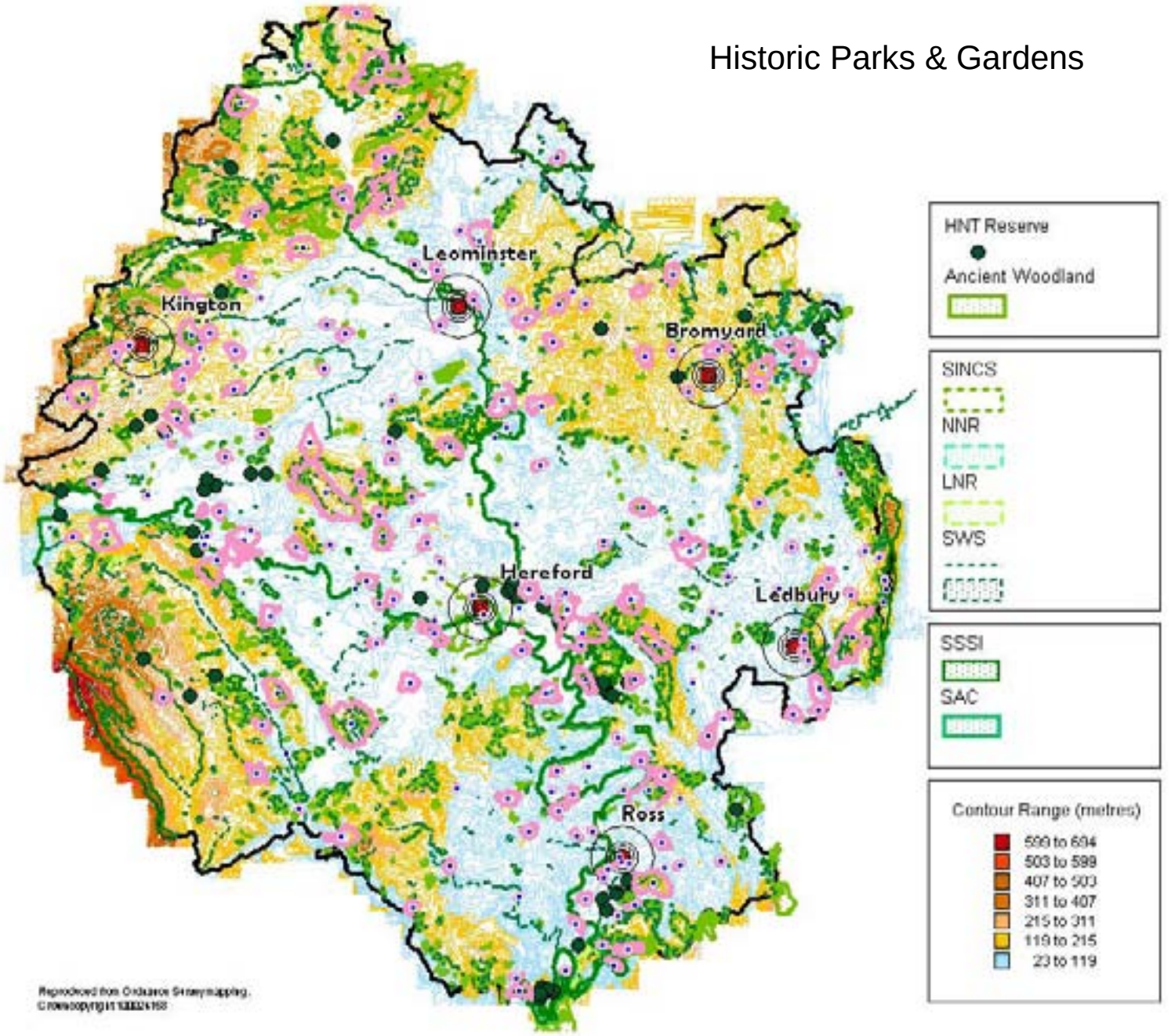
Local & National Designations



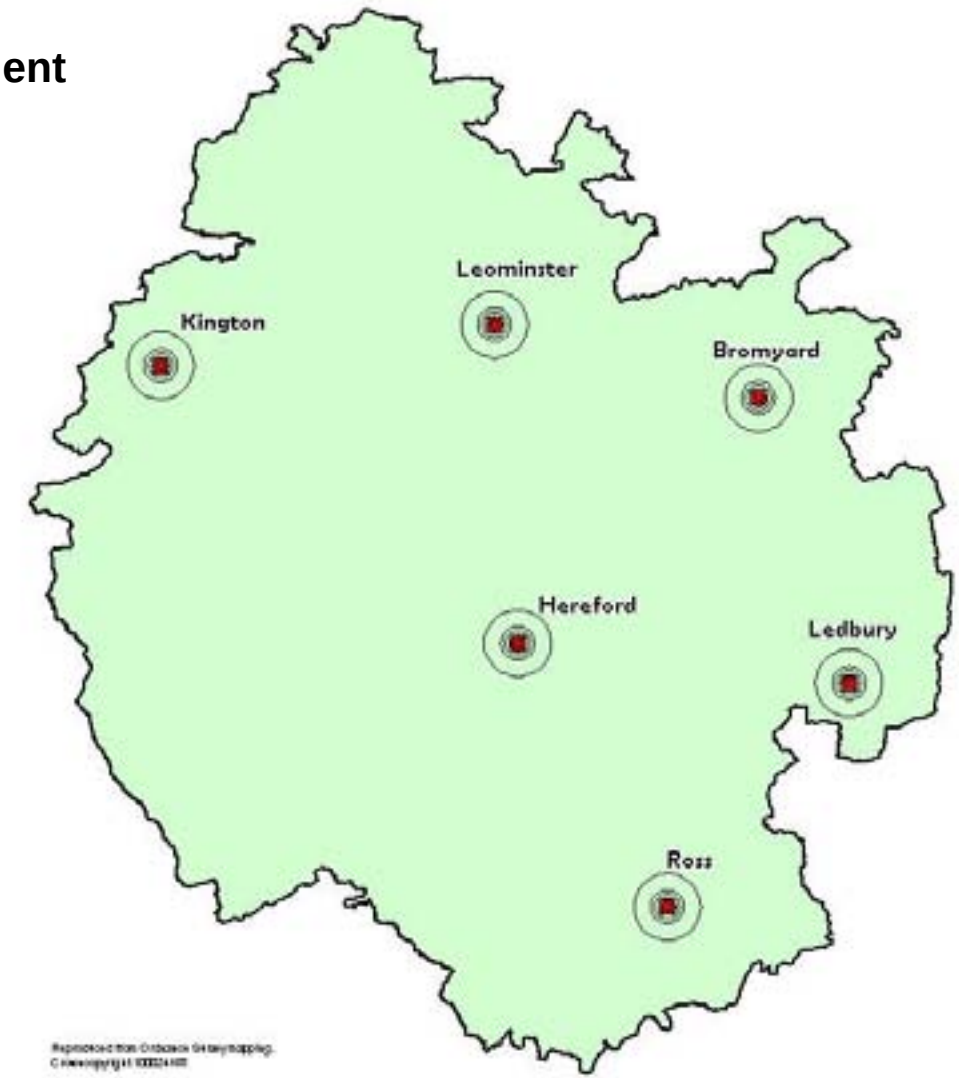
Ancient Woodland & other reserves



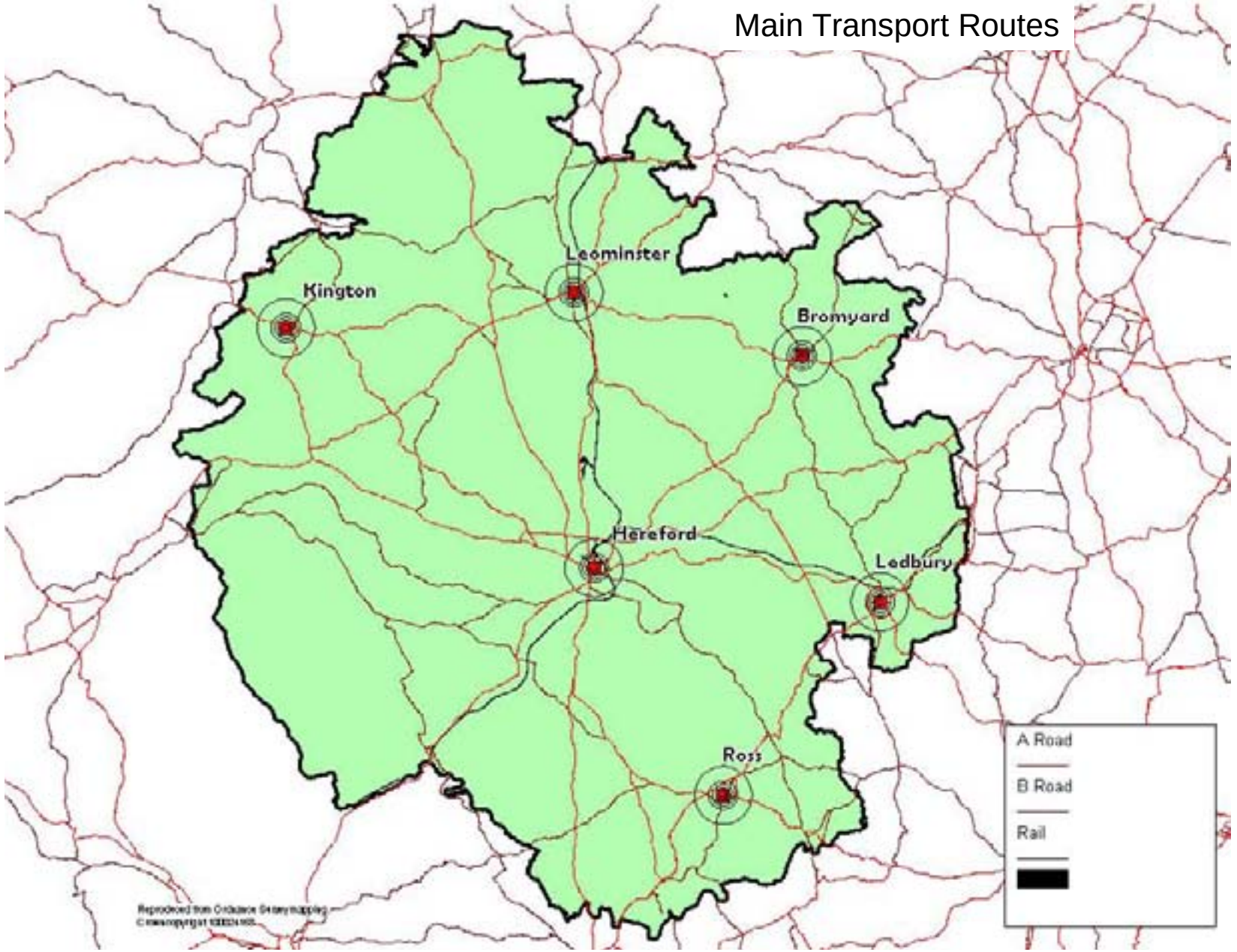
Historic Parks & Gardens



Option Three:
Access & Movement



Main Transport Routes



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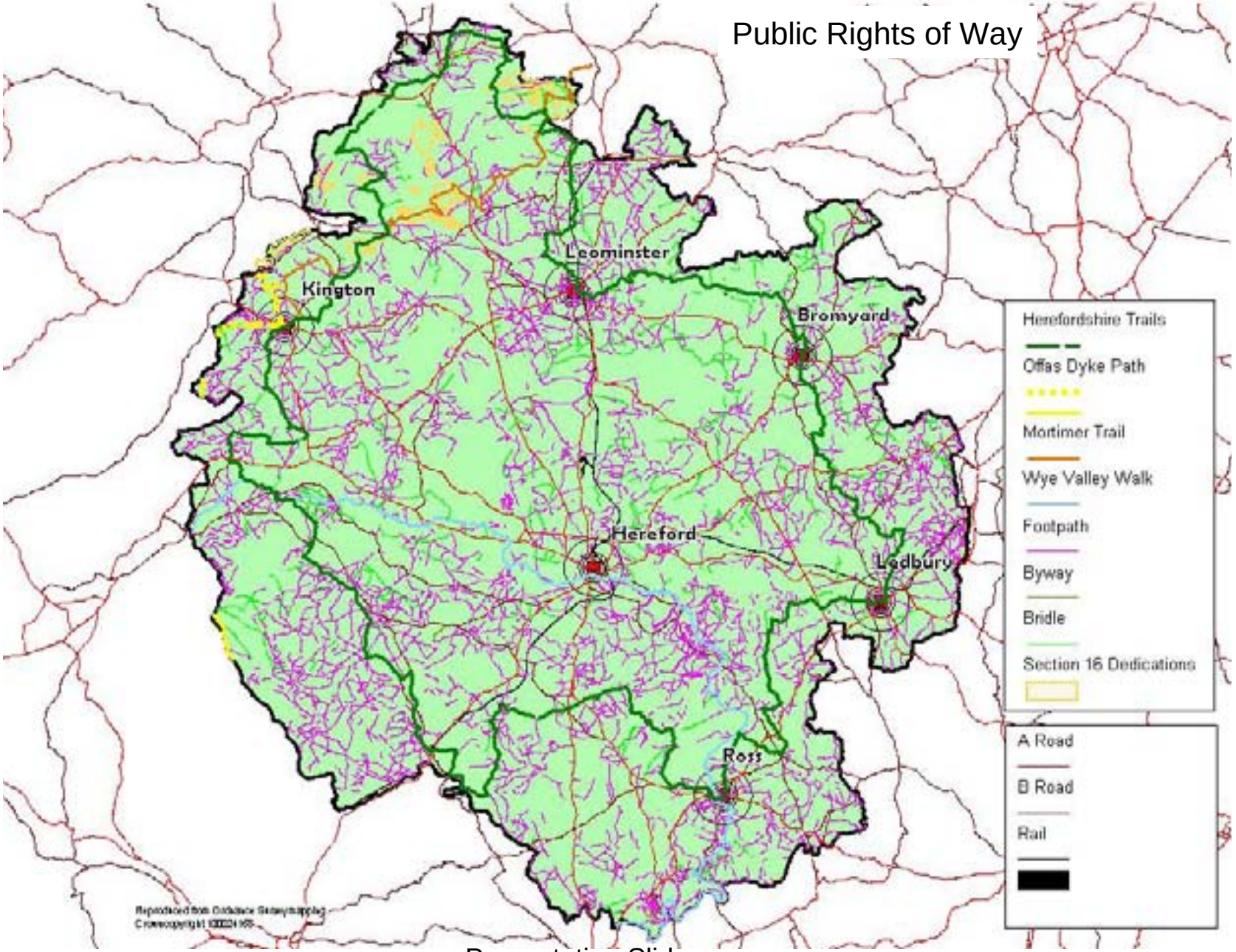
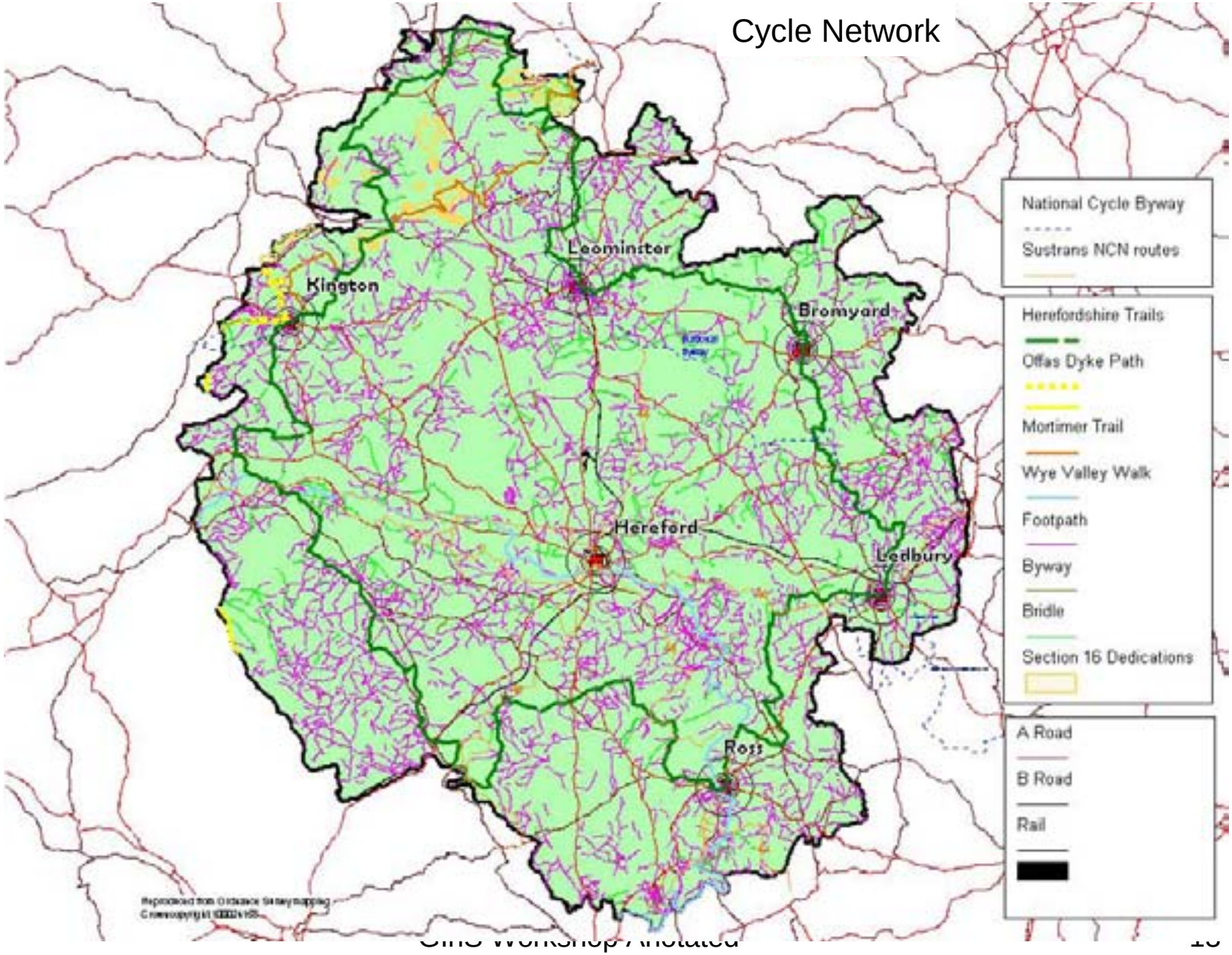
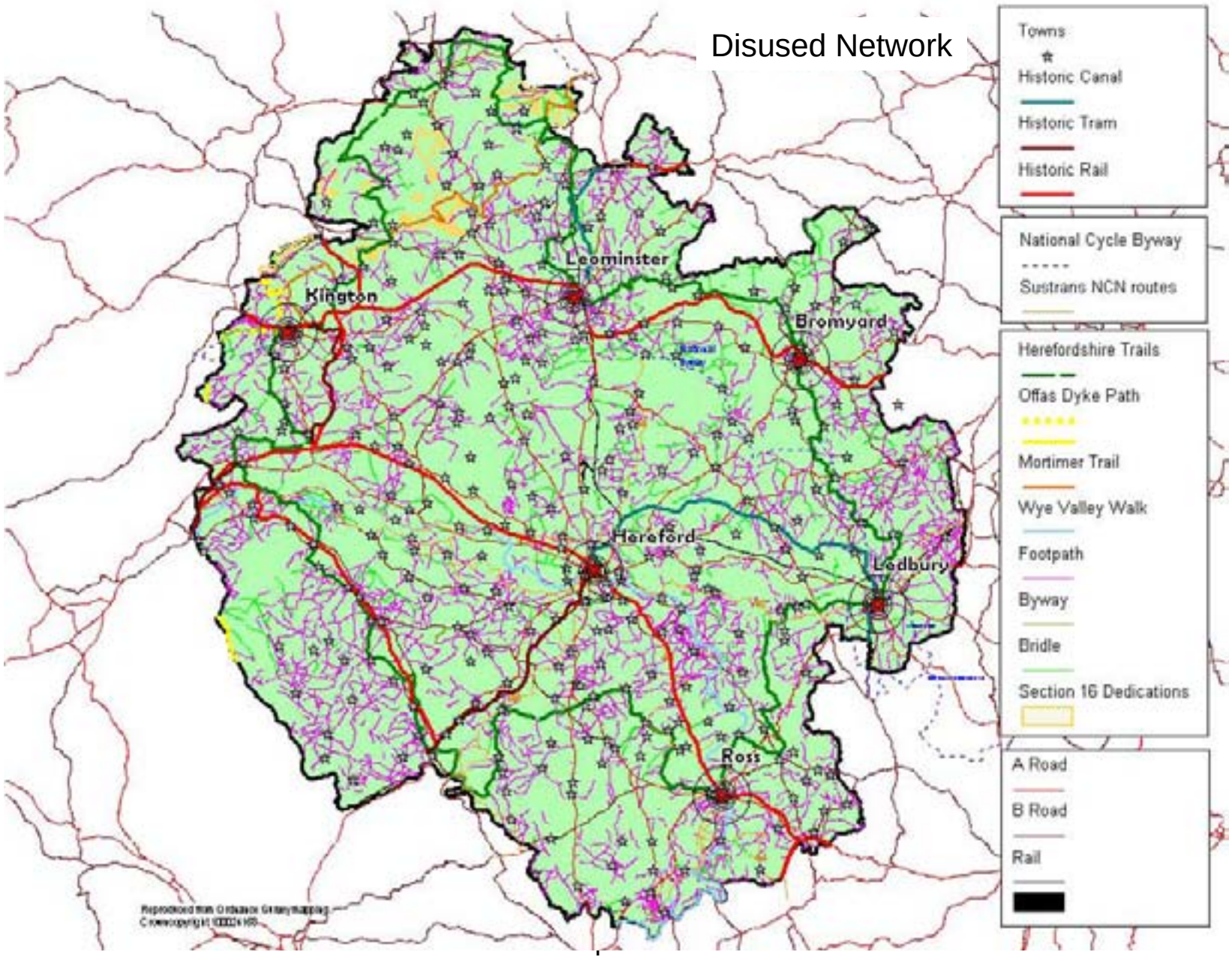


Presentation Slides

Cycle Network





Presentation Slides

Appendix E – Data disk

Appendix F - Glossary of terms

Appendix F

Glossary

ANGST+	Accessible Natural Greenspace Standard Plus
AONB	Area of Outstanding Natural Beauty
Appropriate Assessment	The purpose of an Appropriate Assessment is to assess the impacts a Local Development Document will have on a range of European designated sites. As of October 2006 all councils must decide if they need to carry out an Appropriate Assessment on the Local Development Documents they produce. If an assessment needs to be carried out it can either form part of the Sustainability Appraisal, or can be a document in its own right.
BAP	Biodiversity Action Plan: A plan identifying targets for improving and protecting biodiversity in an area. There are regional, county and local BAPs.
BEA's	Biodiversity Enhancement Areas - identified in RSS and planning guidance associated with regional BAP that includes mapping features and principal habitats. Four areas are identified in Herefordshire's Local Biodiversity Action Plan (LBAP)
BGS	British Geological Survey (BGS) - is the world's longest established national geological survey and the UK's premier centre for earth science information and expertise. It provides expert services and impartial advice in all areas of geoscience.
Biodiversity	The variety of plant and animal life in the world or in a particular habitat.
Buffer Zone	In GIS it is the creation of a zone of a specified width around a point, line or polygonal area. The resulting buffer is a new polygon, which can be used in queries to determine which entities occur either within or outside the defined buffer zone.
Corridor	A route providing connectivity between features; can be natural or physical.
COW	Critical Ordinary Watercourse
DEFRA	Department for Environment, Fisheries and Rural Affairs
Designated public open space	
Ecological Enhancement	Measures taken to increase the biodiversity interest of a particular site, habitat or feature.
Ecology	The study of the relationship between organisms and their environment-the latter including both physical environment and biological environment.
Ecosystem	Community of plants and animals and the physical environment they inhabit, forming a recognisable unit within which energy and nutrients are cycled.
Fauna	Fauna is all of the animal life of any particular region or time.
Flora	In botany, flora (plural: floras or florae) of an area or of time period, refers to all plant life occurring in an area or time period, especially the naturally occurring or indigenous plant life.

GCRs	Geological Conservation Review Site. The GCR was designed to identify those sites of national and international importance needed to show all the key scientific elements of the Earth heritage of Britain. These sites display sediments, rocks, fossils, and features of the landscape that make a special contribution to our understanding and appreciation of Earth science and the geological history of Britain, which stretches back hundreds of millions of years.
Geohazard	A geologic hazard - Geohazards are any geological or hydrological process that poses a threat to people and/or their property.
Geoscience	Any one of the sciences, such as geology or geochemistry, that deals with the earth.
GI	Green Infrastructure (GI): is a planned network of multifunctional green spaces and inter-connecting links which is designed, developed and managed to meet the environmental, social and economic needs of communities. It is part of, and contributes to, a high quality natural and built environment and is required to enhance the quality of life for present and future residents and visitors, and to deliver "liveability" for sustainable communities.
GInS	Green Infrastructure Study
GIS	Geographical Information System is an integrated system of computer hardware, software and trained personnel linking topographic, demographic, utility, facility, image and other resource data that is geographically referenced.
Green Infrastructure	A physical, natural or human unit or asset that shapes the overall landscape character. See GI above.
Green Infrastructure Study	An assessment of the value of green infrastructure to Herefordshire.
Growth Point	Growth Points are locations identified within the Regional Spatial Strategy (RSS) where there is considered a good case for accelerated, additional economic and housing growth, that can be shown to relieve pressure on high demand areas and tackle affordability issues. Growth Points will be subject to the usual statutory planning processes and therefore should be compatible with the underlying principles of the relevant current or proposed RSS in terms of growth strategy and capacity, but they should also commit to longer term sustainable growth.
Habitat	A place providing all or part of the living requirements of a particular species-the term can be used in a wider sense to refer to specific recognisable assemblages of plants and animals found together (e.g. Woodland Habitat)
HNT	Herefordshire Nature Trust
Hydrology	The science of the properties and distribution of water on the earth's surface.
Interbedded	Alternating layers of different materials in a section of bedded rocks.
Landscape Character	Physical appearance of landscape made up of key habitats.
LBAP	Local Biodiversity Action Plan
LDF	Local Development Framework
LDP	Local Development Plan
Main River	Means a watercourse shown as such on a main river map and includes any structure or appliance for controlling or regulating the flow of water into, in or out of the channel which (a) is a structure or appliance situated in the channel or in any part of the banks of the channel; (b) is not a structure or appliance vested in or controlled by an internal drainage board (LDA and WRA 1991)
Market Towns	The main towns in Herefordshire - Bromyard, Kington, Ross-on-Wye, Leominster, Ledbury.
Metadata	Data about data'. Information specifically relating to data sources
Mitigation	Measures taken to reduce the effects of a development.
NNR	National Nature Reserve

Node	Point or cluster of points providing a particular focus of interest.
Ordinary Watercourse	Means a watercourse that does not form part of a main river. See Main River
OS	Ordnance Survey of Great Britain
PPG 17	Planning Policy Guidance No 17: Planning for Open Space, Sport and Recreation.
Precipitation	rainfall
Protected sites	specific designated land areas that have some legal restriction on land usage and management.
Protected species	specific species that have some level of legal protection.
PROW	Public rights of way network including footpath, bridleway and byway
RIGs	Regionally Important Geological and Geomorphological Sites (RIGS) are important sites which underpin and complement the SSSI coverage. RIGS are selected by voluntary local RIGS groups
RMS	Root mean squared. Measure of data error.
ROWIP	Right Of Way Improvement Programme
SAC	Special Area of Conservation
SAMs	Scheduled Ancient Monument
SINC	Site of Importance for Nature Conservation.
SPA	Special Protected Area
SSSI	Site of Special Scientific Interest
Topography	The arrangement of the natural and artificial physical features of an area or a detailed description or representation on a map of such.
UDP	Unitary Development Plan - a former development plan, now being replaced by the LDF which provided a land use designation for every piece of land within the District and set out policies and proposals for the provision of new development and the protection of the environment.
Watercourse	Includes all rivers and streams and all ditches, drains, cuts, culverts, dikes, sluices, sewers other than public sewers within the meaning of the Water Industry Act 1991) and passages through which water flows.
Wildlife	Non-domesticated organisms.
Zone of Influence	An area around a piece of Green Infrastructure that has an influence on that particular feature.