

# Green Infrastructure Study

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Produced by Solihull Landscape Architecture and Ecology

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## **1.0 Introduction**

### **1.1 Background**

This Green Infrastructure Study forms part of the evidence base for the Local Development Framework for Solihull MBC, particularly in terms of spatial planning within the Core Strategy. The Core Strategy is a key element of the LDF and will deliver the long term objectives for the Borough. The draft target for new houses in Solihull is a minimum of 11,000 between 2006 and 2028, however this target may increase.

The Green Infrastructure Plan will provide the evidence base for analysis of potential locations for growth in the Borough and provide opportunities to enhance existing and identify areas for new Green Infrastructure.

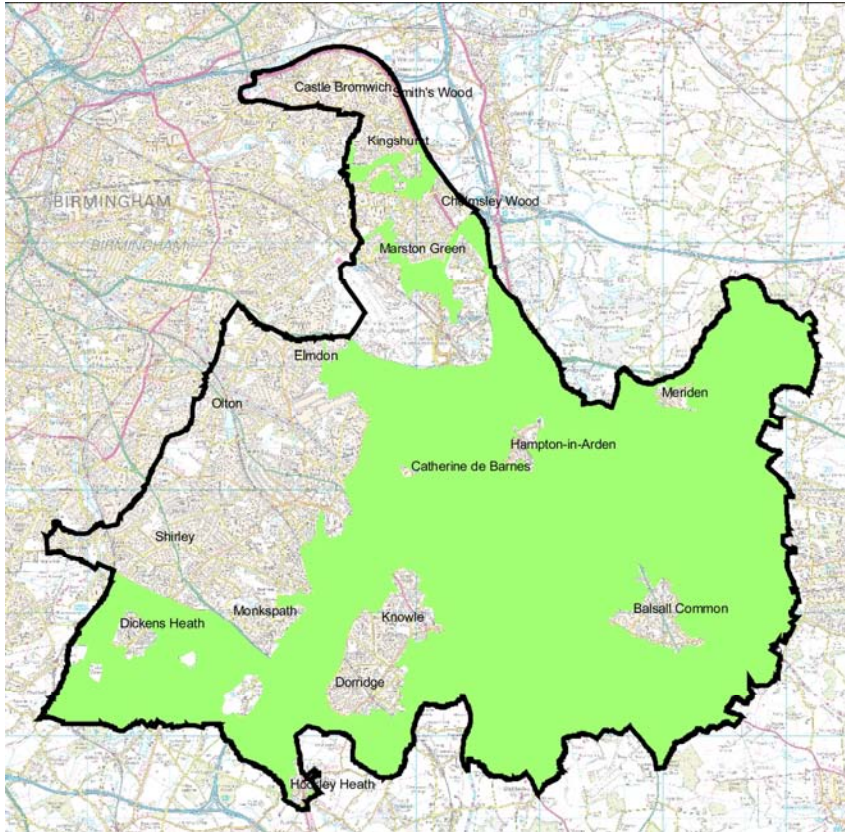
### **1.2 The Study**

The objectives of the study are:

- To identify the current Green Infrastructure provision and connectivity (publicly accessible and non-accessible) in terms of the following — biodiversity, geodiversity, landscape character, urban forest, historic environment, accessible greenspace, greenspace typologies and links, and flood risk.
- Identify current Green Infrastructure projects.
- Produce a current Green Infrastructure function plan and strategic overview.
- Recommendations for future work.

### 1.3 The Study Area

Solihull Metropolitan Borough covers an area of 17,828 hectares, of which 67% is designated Green Belt. Solihull is home to 206,100 people living in around 86,747 households. SMBC lies adjacent to North Warwickshire Borough Council to the north-east, Coventry City Council to the east, Warwick District Council to the south-east, Stratford Borough Council to the south, Bromsgrove District Council to the south-west and Birmingham City Council to the west.



There are two main urban areas, both bordering Birmingham and separated by Birmingham Airport, the NEC and the A45, and numerous small settlements within Solihull's rural south and east. The Council is committed to protecting Solihull's high quality environment whilst fulfilling its role in the local economy and plan for growth. SMBC must balance this against the need to protect the character and quality of Solihull's environment and maintain an affective green belt and a network of green spaces that makes it an attractive place to live, work, visit and invest.

National Household Projections estimate that Solihull will become home to the following numbers of households: 90,000 by 2018, 94,000 by 2023 and 97,000 by 2028. The study must consider this growth and the wards that are most likely to be affected to ensure that Green Infrastructure meet the requirements of both the existing and future population.

## 1.4 What is Green Infrastructure?

There are several definitions of Green Infrastructure; for the purpose of this study we have used those from Planning Policy 12: Local Spatial Planning (PPS12) and Natural England.

*Green infrastructure is a network of multi-functional green space, both new and existing, both rural and urban, which supports the natural and ecological processes and is integral to the health and quality of life of sustainable communities. **PPS12***

*Green Infrastructure includes established green spaces and new sites and should thread through and surround the built environment and connect the urban area to its wider rural hinterland. Consequently it needs to be delivered at all spatial scales from sub-regional to local neighbourhood levels, accommodating both accessible natural green spaces within local communities and often much larger sites in the urban fringe and wider countryside. **Natural England***

Green Infrastructure should be a strategically planned and delivered network comprising the broadest range of high quality green spaces and other environmental features. It should be designed and managed as a multifunctional resource capable of delivering those ecological services and quality of life benefits required by the communities it serves and needed to underpin sustainability. Its design and management should also respect and enhance the character and distinctiveness of an area with regard to habitats and landscape types. It has an increasingly vital role in alleviating the impacts of climate change and contributing to the adaptation imperative to respond to changes in climate, for people and the natural world.

GI assets include all open spaces and links at all scales in urban, suburban and rural areas:

### **Natural / semi-natural green space**

- Designated sites for biodiversity and geodiversity – SSSIs, LNRs, LWS, LGS
- Other nature reserves (Warwickshire Wildlife Trust, Forestry Commission, Woodland Trust)
- Priority habitats – UKBAP and LBAP
- Quarries
- Flood plain

### **Designed landscapes**

- Parks and gardens – urban parks, country parks and formal gardens
- Amenity spaces – informal recreation<sup>1</sup> spaces, greenspaces in and around housing, domestic gardens, and village greens
- Outdoor recreational facilities – sports pitches, golf courses, school and other institutional playing fields/pitches, canals and other outdoor sports areas
- Productive landscapes – allotments, community gardens, city (urban) farms, and orchards
- Historic environment
- Cemeteries and churchyards
- Urban forest – including street trees
- Living roofs and sustainable urban drainage systems (SuDs)

<sup>1</sup> Recreation is the refreshment of one's mind or body through activity that diverts, amuses or stimulates; all references to recreation implicitly include appropriate sports and subsequently references to recreation facilities/spaces include those where appropriate sports can be played, whether formally or informally.

### Green links

- Long distance paths, rights of way and bridleways
- Cycle routes
- Rivers and canals
- Disused railway lines, roadside verges, field margins, hedgerows
- Other transport links – motorways, road verges, railway lines, green bridges

PPS12 describes GI as multi-functional which means that it delivers a range of ecosystem and social services. Multifunctionality can apply to individual sites and routes, when such sites and routes are linked then a truly successful green infrastructure is achieved. GI should be designed and managed to deliver those ecological services and quality of life benefits required by the communities it serves and needed to underpin sustainability. Its design and management should also respect and enhance the character and distinctiveness of an area with regard to habitats and landscape types.

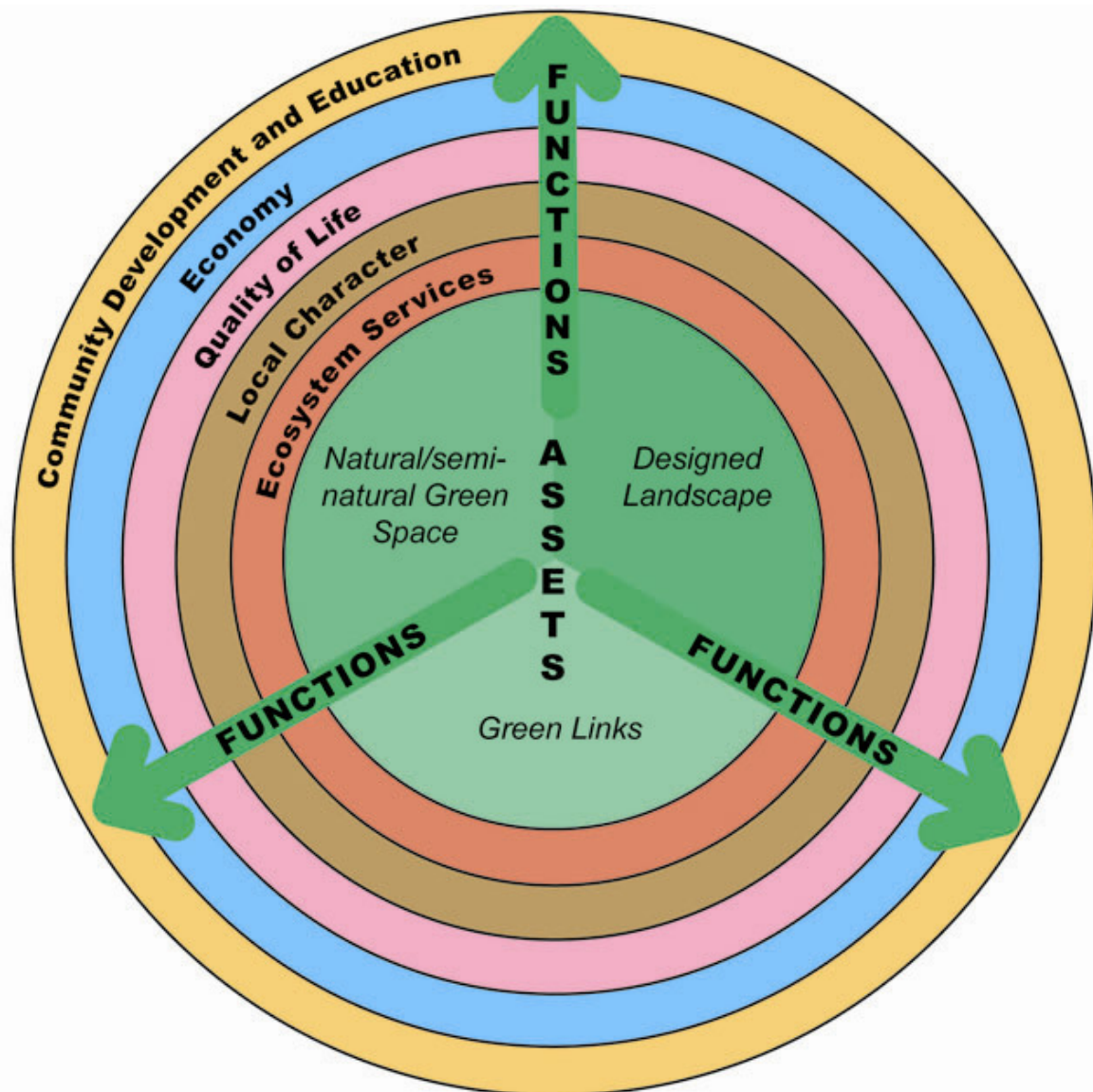


Diagram 1: The relationship between GI assets and their multifunctional nature

## Green Infrastructure requirements:

Green Infrastructure is a vital component of sustainable communities. It is as important in our established communities as it is within areas of housing and economic growth.

It should be:

- **Designed holistically** – like our transport system, Green Infrastructure should be designed to link diverse greenspace elements into a system that functions as a whole, rather than as separate, unrelated parts;
- **Planned comprehensively** – like our electrical and telecommunications systems, Green Infrastructure needs to be planned comprehensively to provide ecological, social and economic benefits, functions and values;
- **Laid out strategically** – like our roads, Green Infrastructure needs to be laid out strategically to cross administrative boundaries. It involves planning at the ‘landscape scale’;
- **Planned and implemented publicly** – like our transport system, our Green infrastructure systems should be planned and implemented with input from and involvement of the public, including community organisations and private landowners;
- **Grounded in the principles and practices of diverse professions** – like the design and planning of social infrastructure, Green Infrastructure should be based on sound science and should build on the knowledge of professional disciplines including urban and regional planning, economics, community forestry and landscape ecology – no one profession has all the answers; and
- **Funded up-front** – like other infrastructure systems, Green Infrastructure needs to be funded as a primary public investment.<sup>2</sup>

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<sup>2</sup> Benedict, M & McMahon, E (2001) *Green Infrastructure: Smart Conservation for the 21st Century*. Sprawl Watch Clearinghouse Monograph Series



## Green Infrastructure Benefits<sup>3</sup>:

### Economic Benefits:



- Provides an inspiring setting for economic growth and that will assist in attracting business and inward investment to the town.
- Increases property and land values
- Helps attract and retain people ensuring stable populations and labour supply
- Provides opportunities for education and training, including lifelong learning for adults
- Delivers urban and rural policy, renaissance and regeneration objectives through robust and cost-effective means
- Provides climate change mitigation and adaptation for example, flood alleviation and micro-climate attenuation
- Sustains environmental tourism providing employment opportunities and boosting local economies

### Social Benefits:



- Facilitates community cohesion, helping to reach across traditional social barriers
- Enables essential contact between people and nature (locally and wider countryside)
- Provides opportunities to maintain or enhance people's physical health and mental well-being
- Helps protect and promote the Borough's rich cultural heritage
- Provides opportunities for reflection and a tranquil respite from the often hectic urban environment
- Provides opportunities to reinforce feelings of local pride and a sense of ownership and belonging

### Environmental Benefits:



- Reinforces and enhances landscape character and local distinctiveness
- Supports wildlife reservoirs and provides a refuge/ buffer from anthropogenic pressures (human disturbance, pollution, invasive/domestic species, etc.)
- Supports environmental processes and natural resource remediation (air, soil and water)
- Provides a framework and encouragement for sustainable development including the use of sustainable transport such as walking and cycling, sustainable urban drainage systems, whilst designing in sustainable urban ecology solutions
- Protects and enhances the Borough's historic assets
- Protects, restores & defragments habitats that support priority species currently threatened by land use/climate change

| Asset                              | Economic benefit | Social benefit | Environmental benefit |
|------------------------------------|------------------|----------------|-----------------------|
| Natural / Semi-natural green space |                  |                |                       |
| Designed Landscape                 |                  |                |                       |
| Green links                        |                  |                |                       |

<sup>3</sup>Adapted from West Midlands Regional Assembly's Environment Partnership (2007) *Green Infrastructure: A Prospectus for the West Midlands Region*

## 2.0 Strategic and Policy Contexts

### 2.1 Neighbouring Green Infrastructure studies

Solihull MBC lies adjacent to North Warwickshire Borough Council to the north-east, Coventry City Council to the east, Warwick District Council to the south-east, Stratford-on-Avon District Council to the south, Bromsgrove District Council to the south-west and Birmingham City Council to the west.

The council's are taking differing approaches to green infrastructure planning and reporting, and to date are as follows:

**North Warwickshire** produced a Landscape Character Assessment in 2010 and has no plans to undertake a Green Infrastructure Study/Strategy.

**Coventry Green Infrastructure Study (2008)** was produced to provide evidence to help inform the selection of potential locations for growth of the city. It identifies and addresses existing and anticipated future Green Infrastructure deficits and provides a vision and opportunities to achieve a significant net gain in green infrastructure value across the city. This will be achieved through the creation, enhancement and sustainable management of new and existing resources.

**Warwick District Council** has undertaken a Green Infrastructure Study (2010) as part of the evidence for their Core Strategy. The Study will for followed up with a GI Strategy, which may include an implementation study.

**Stratford-on-Avon District Council** is working on a PPG17 Sport and Recreation audit and not undertaking a Green Infrastructure Study at present. They have produced an Initial Green Infrastructure Scoping Study (May 2010) with the intention that it becomes an SPD; GI themes, evidence and key data sets have been identified. A GI study/strategy is currently being prepared by UE Associates (due Oct/Nov 2011)

**Bromsgrove District Council** – Worcestershire County Council are working on a document entitled *Planning for a Multifunctional Green Infrastructure Framework in Worcestershire: Green Infrastructure Study* (draft June 2010). This paper is the second in a series of papers towards the development of a Worcestershire GI framework and strategy that will enable the strategic planning, co-ordination, delivery and management of existing and future green spaces that cuts across local authority administrative boundaries.

**Birmingham City Council** – have produced a *Green Infrastructure: An Evidence Base for Birmingham* (July 2010). This discusses what GI is and gives examples of current GI projects. BCC plan to produce a Green Infrastructure Strategy and this document discloses its intentions.

**Warwickshire, Coventry and Solihull sub-regional GI Strategy (2011)** – A sub-regional strategy has been produced which focuses primarily on accessible greenspace.

### 2.2 Policy and guidance

Relevant Green Infrastructure policy is summarised in appendix 1.

### 3.0 Solihull's existing Green Infrastructure assets

Resources which make up the borough's green infrastructure network (such as landscape character, biodiversity, accessible greenspace, green and blue links and historic features) were identified as key green infrastructure assets and therefore important elements of the borough's green infrastructure network which should be protected. This section describes the existing green infrastructure sites and connectivity within Solihull. The information will be presented in written form and on a series of plans, divided into the following key areas:

|                                     |  |
|-------------------------------------|--|
| <b>Green Infrastructure Assets</b>  |  |
| Natural / Semi-natural Green Spaces | Biodiversity and geodiversity<br>Water   |
| Designed Landscapes                 | Landscape<br>Food production<br>Historic environment<br>Accessible green space |
| Green Links                         | Access and links   |

#### 3.1 Biodiversity and Geodiversity Assets

Data used:  
Habitat Biodiversity Audit (HBA) 2009  
Solihull MBC  
Warwickshire Wildlife Trust

See Figure 1.1: Biodiversity and Geodiversity, Figure 1.2: LBAP habitats

##### Introduction

*Biodiversity is the variety of life on earth and includes all species of plants and animals, the genetic variation within them and the natural systems that support them.*

*Geodiversity is the variety of rocks, fossils, minerals, landforms and soil along with the natural processes that shape the landscape.*

Biodiversity is the source of many ecosystem goods, such as food and genetic resources. Changes in biodiversity can influence the supply of ecosystem services. Biodiversity is a key component of GI; the majority of GI already provides specific habitats, connects habitats, or has the potential to do so. Geodiversity sites, where exposed strata is evident e.g. at quarry sites, may present opportunities for the site to become incorporated into the wider open space network and be linked into the historic environment.

##### Existing assets:

##### Wildlife/geological conservation sites

Within the borough there are statutory sites such as Sites of Special Scientific Interest (SSSIs) and Local Nature Reserves (LNRs) and non-statutory sites such as Local Sites

(Wildlife and Geological). They are subject to special protection in law and the LDF respectively, because of their contribution to nature conservation, heritage and local distinctiveness.

### Sites of Special Scientific Interest

There are five SSSIs in the borough:

- Berkswell Marsh — is located in the Meriden gap between Birmingham and Coventry. It lies on alluvial deposits over Keuper Marl. The site is made up of an area of fen meadow bisected by a tributary of the River Blythe and two blocks of wet woodland. The marsh forms the largest-known example of fen meadow in the West Midlands County.
- Bickenhill Meadows — consists of two groups of fields comprising species-rich grassland situated to the south and west of the village of Bickenhill on predominantly neutral soils overlying Keuper Marl. The meadows comprise one of the richest grassland floras in the county, with flood and hay meadow on site.
- River Blythe — has a wide range of natural structural features such as riffles, pools, small cliffs and meanders. The structure of this river is very variable and its importance is increased because of the rarity of such examples in lowland Britain. The mean number of plant species found in any 1 km stretch is above average for a lowland river, as is the number of species recorded for the whole length of the river. Botanically, the Blythe is one of the richest rivers in lowland England with the most species-rich sections containing as many species as the very richest chalk streams.
- Monkspath Meadow — is the best example of a species-rich, unimproved hay meadow in the West Midlands County.
- Clowes Wood & New Fallings Coppice (only part of this is within the borough) — broad-leaved woodland on acid soils bisected by railway line. Diverse habitat includes heathland and wet meadow. Bluebell, lily of the valley, cow-wheat and bilberry. Woodcock and all 3 species of woodpecker.

Natural England assesses the condition of the sites periodically and the borough's sites are variable:

- Berkswell Marsh is partly favourable and partly unfavourable no change (due to under grazing)
- Bickenhill Meadows is unfavourable recovering (grazing re-instated)
- River Blythe is unfavourable no change (due to water quality and invasive species)
- Monkspath Meadow is favourable
- Clowes Wood & New Fallings Coppice is favourable.

### Local Nature Reserves (LNRs)

LNRs benefit from statutory protection and there are currently 20 LNRs in the borough at the time of this study (see Figure 5.5); generally these tend to be focused in the urban areas and close to or within villages:

**Yorks Wood** – Fordbridge Road, Kingshurst; 10ha of semi-natural ancient woodland.

**Bills Wood** – Bills Lane, Shirley; 7ha of semi-natural ancient woodland.

**Millisons Wood** – Albert Road, Meriden; 11ha of semi-natural ancient woodland.

**Elmdon Manor** – Elmdon Park, Solihull; 4.6ha of a former walled garden managed by Warwickshire Wildlife Trust.

**Dorridge Wood** – Arden Road, Dorridge; 7.5ha semi-natural woodland.

**Palmers Rough** – Jacey Road, Shirley; 6.5ha semi-natural woodland.

**Babbs Mill** – Fordbridge Road – Kingshurst; 24ha mixed grassland, lake and woodland habitats.

**Alcott Wood** – Moorend Avenue, Chelmsley Wood; 5.7ha semi-natural ancient woodland.

**Malvern and Brueton Park** – Old Warwick Road, Solihull; 30ha mixed grassland, woodland and marsh.

**Jobs Close** – Longdon Road, Knowle; 3.5ha grassland and woodland with pond.

**Smiths Wood** – Windward Way, Smiths Wood; 4.5ha semi-natural ancient woodland.

**Marston Green Park** – Brooklands Way, Marston Green; 9ha grassland, ponds and a tree-lined brook.

**Cole Bank Park** – Chester Road, Chelmsley Wood; 13.26ha of grassland, ponds, scrub and hedges along the river Cole.

**Lavender Hall Park** – Lavender Hall Lane, Balsall Common; 11.23ha of grassland, ponds and new plantation.

**Olton Jubilee Park** – Dene Court Road, Olton; 3.91ha of woodland, grassland and a brook.

**Hillfield Park** – Monkspath Hall Road, Solihull; 23.5ha of lake, brook, woodland, scrub and grassland.

**Hobs Moat** – Hobs Moat Road, Olton; 5ha including 2.5ha ancient moated site now oak woodland.

**Dickens Heath Country Park** – Aldershaws, Dickens Heath; 7.3ha grassland and wetland.

**Elmdon Coppice** – west of Damson Parkway; 5.27ha semi-natural ancient woodland.

**Millennium Wood** – Bickenhill Lane; 10ha of woodland planted for the millennium.

The Council is already committed to a programme of increasing LNR provision across the Borough.

### **Other Nature Reserves**

There are 5 Warwickshire Wildlife Trust nature reserves in Solihull (Clowes Wood and New Fallings Coppice SSSI, Elmdon Manor, Priory Fields, Shadowbrook Meadow SSSI, Temple Balsall).

### **Local Wildlife Sites (LWS) and Potential Wildlife Sites (pLWS)**

Local Wildlife Sites are not statutorily protected. There are 95 Local Wildlife Sites and over 100 potential LWS (pLWS) distributed across the borough. The largest site is Castle Hill Farm Meadows LNR at 76Ha, which consists of species rich grasslands which are both locally and nationally rare and therefore recognised as national and local Biodiversity Action Plan (BAP) habitats. The wet grassland in this area is considered to be exceptionally rare in the European context and is listed as a priority habitat in the EC Habitats Directive. Within Britain this type of wet grassland has a very restricted distribution (confined to lowland floodplains. Canals are a Local Biodiversity Action Plan (LBAP) habitat and as such are an important biodiversity asset, offering diverse habitats and wildlife corridors. The Grand Union and the Stratford-upon-Avon Canals are present in the south and central areas of the borough and have been identified as pLWS. When the LWS survey process is complete it is likely that certain stretches of the canals will be more beneficial to wildlife than others. The Grand Union Canal passes through the countryside east of Knowle and north to Catherine-de-Barnes, passing close to the River Blythe SSSI, areas such as these may be important.

The current system of wildlife sites has recently been reviewed and the resulting (Lawton) Report<sup>4</sup> identifies that many of the UK's wildlife sites are either too small, insufficiently protected, under managed, lacking in natural connectivity or are inaccessible to the public. It recommends that to enhance the resilience and coherence of England's ecological network we need more, bigger, better and joined areas. In addition to recommendations for further statutory protection of sites it states that pressure on important habitats should be reduced by improving the surrounding habitat by buffering wildlife sites. The main recommendation is the establishment of ecological restoration zones to ensure that the delivery of a coherent and resilient ecological network can be achieved. Green Infrastructure has the potential to deliver ecological restoration zones and the Green Infrastructure study has the potential to inform the process of identifying them.

### Local Geodiversity Sites (LGS)

There are three LGS within the borough:

- Arden Brickworks — a large active brickworks that is 28m deep, situated on the south side of the A45, just west of Stonebridge Island. This site provides the best fresh exposures of the Triassic, Mercia Mudstone Group within the former Warwickshire county boundary. The strata comprise irregularly bedded red clay and mudstone, interbedded with green mudstone and green sandstone sherry horizons.
- Meriden Hill Cutting — the site includes the exposures on both sides of the Birmingham Road, known as Meriden Hill, from the junction of Church Lane eastwards for a distance of 250m. Exposures up to 7m high on the north and south sides of the road, showing coarse sandstone belonging to the Allesley Member of the Upper Carboniferous Salop Formation.
- River Blythe Oxbow — this small oxbow lies 500m south of Cheswick Green. The small oxbow pond or lake appears to be entirely natural. Oxbow features are not common.

### Natural Areas

Natural England has defined a series of Natural Areas covering the whole of England, which describe the wildlife, habitats and natural features of each area. Solihull borough is in Natural Area 43: Midlands Plateau<sup>5</sup>. The Midlands Plateau is an area marking the division between the southern lowland and northern upland.

The Midlands Plateau has a variety of geological features which have influenced the natural landscape, soils and habitats. The majority of the underlying rock in Solihull is the Triassic Mercia mudstone formation, consisting of red marls and siltstone. Deposits of sand and gravel are found in the Meriden Sands area — east of Meriden, between Berkswell and Hampton-in-Arden. An outcrop of Lias limestone around Knowle, accounts for the calcareous nature of some grasslands. Large expanses of the borough are covered in boulder clay with interesting glacial lake deposits between Cheswick Green and Hockley Heath and south of Balsall Common. In addition there are well developed river terrace deposits on both sides of the River Blythe.

Major habitat types are heathland, woodland and associated grassland; unimproved grassland is found within the borough, as are meadows and field ponds. Habitats within the urban areas are ranging and include ancient woodlands e.g. Yorks Wood and Smiths Wood.

The River Blythe (also an SSSI) links into the River Tame to the north of the borough. It has a variety of features such as riffles, meanders, pools and small cliffs, with marshland habitat commonly found.

<sup>4</sup> Lawton, J.H., Brotherton, P.N.M., Brown, V.K., Elphick, C., Fitter, A.H., Forshaw, J., Haddow, R.W., Hilborne, S., Leafe, R.N., Mace, G.M., Southgate, M.P., Sutherland, W.J., Tew, T.E., Varley, J., & Wynne, G.R. (2010) *Making Space for Nature: a review of England's wildlife sites and ecological network*. Report to Defra

<sup>5</sup> Natural England's Natural Areas, available on Natural England's website: [www.naturalengland.org.uk](http://www.naturalengland.org.uk)

Objectives for Natural Area 43: Midland Plateau are:

- to prevent further loss and degradation of all semi-natural habitats within the Natural Area, and to enhance and expand the most important and characteristic types such as rivers and streams, wetlands, heathland, woodland neutral and acidic grasslands
- to enhance the nature conservation value of the wider countryside and urban areas and to restore degraded areas while retaining the essential character of the Natural Area
- to maintain and expand the populations of internationally and nationally important species, together with key species which are characteristic of the Natural Area; and
- to maintain the geological and geomorphological features of the Natural Area for research and enjoyment.

### **Priority habitats and species**

Of course the borough's wildlife has no recognition of administrative boundaries or the boundaries of a wildlife site and therefore a site does not need to be designated to have some biodiversity value. These habitats and species are recognised by Section 74(3) of the Countryside and Rights of Way (CROW) Act 2000 and section 41 of the Natural Environment and Rural Communities (NERC) Act 2006 which require the Secretary of State, to publish a list of species and habitats which are of principal importance for the conservation of biodiversity in England. The list of species and habitats (drawn up in consultation with Natural England) are those which have already been identified as priorities under the UK BAP. The S41 list is used to guide decision-makers such as public bodies, including local and regional authorities, in implementing their duty under section 40 of the Natural Environment and Rural Communities Act 2006, which requires every public body in the exercising of its functions to 'have regard, so far as is consistent with the proper exercise of those functions, to the purpose of conserving biodiversity'. In particular:

- Local Planning Authorities will use it to identify the species and habitats that should be afforded priority when applying the requirements of Planning Policy Statement 9 (PPS9) to maintain, restore and enhance species and habitats.
- Local Planning Authorities will use it to identify the species and habitats that require specific consideration in dealing with planning and development control, recognising that under PPS9 the aim of planning decisions should be to avoid harm to all biodiversity.
- All Public Bodies will use it to identify species or habitats that should be given priority when implementing the NERC Section 40 duty. Integrating the needs of England's priority species into habitat management

### **National Biodiversity Action Plan habitats**

The UK Government launched the UK Biodiversity Action Plan (UK BAP), a national strategy which identified broad activities for conservation work over the next 20 years, and established fundamental principles for future biodiversity conservation in 1994. This produced lists of threatened and declining species and habitats (amended and updated in 2007) with targets and specific actions for protecting and enhancing their conservation status. Local Authorities are expected to contribute towards achieving the targets for the listed habitats and species.

Priority habitats found within Solihull are:

- Arable Field Margin
- Hedgerows
- Lowland Meadows
- Lowland Mixed Deciduous Woodland
- Open Mosaic Habitats on Previously Developed Land New habitat (originally Post-industrial sites)

- Ponds
- Purple Moor Grass and Rush Pastures
- Reedbeds
- Rivers
- Traditional Orchards
- Wet Woodland
- Wood-Pasture & Parkland

Priority species occurring within Solihull include:

- Great Crested Newt
- Slow-worm
- Common Toad
- Grass Snake
- Common Lizard
- Bats
- Otter
- Water Vole
- West European Hedgehog
- Song Thrush
- Skylark, Bullfinch, Yellowhammer amongst many other farmland birds

### **Local Biodiversity Action Plan priority habitats**

The LBAP contributes to national targets wherever these are relevant to Warwickshire, Coventry and Solihull but also sets local targets. The LBAP contains action plans for all our local habitats (woodlands, wetlands, grasslands, etc.) and many of our threatened and declining local species (e.g. barn owl and otter).

The plans have clear measurable targets and assemble the local people and local organisations that are ideally placed to deliver the necessary action. The Local Biodiversity Action Plan contains 26 Species Action Plans and 24 Habitat Action Plans<sup>6</sup>.

### **Key GI Issues**

- The development of a GI network should address the loss of and fragmentation of habitats; statutory and non-statutory protected sites are inadequate at addressing biodiversity priorities in isolation. There is a necessity to maintain, protect, buffer and expand protected sites and priority habitats and establishing ecological restoration zones. Ancient woodlands and veteran trees are irreplaceable assets that should be protected.
- Non-statutory sites (such as LWS/pLWS) and priority habitats and species are GI assets and an important part of the GI network. GI assets deliver multiple benefits and therefore schemes which involve land use change/development should look to retain in GI assets and integrate them into their designs. Currently many LWS/pLWS/important habitats are destroyed/degraded due to their lack of statutory protection and perceived values.
- Survey, condition/reassessment and management of statutory and non-statutory sites and the resourcing to enable these actions is important.
- Species data should also be used to supplement habitat data, to identify further areas of high biodiversity value and also for monitoring change.
- Existing green corridors need enhancing and new green corridors need establishing.
- Currently there is minimal access available to LGS as they are in private ownership e.g. Arden Brickworks.

<sup>6</sup>Source: The LBAP Partnership, [www.warwickshire.gov.uk](http://www.warwickshire.gov.uk) <http://tinyurl.com/24dl8z3>



- LGS are also vulnerable from activities such as extraction and land fill which have existing planning permission.
- Condition of SSSIs/LNRs/LWS/BAP priority habitats – maintaining and enhancing the quality, ensuring required management is carried out (particularly if more sites are to go from public to private ownership).
- The Comprehensive Spending Review (Oct 2010) has highlighted potential resource cuts in terms of agri-environmental schemes; this will have an impact on biodiversity associated with farmland.
- The quality and extent of wildlife sites needs constant monitoring and review, this has fiscal implications.
- The spread/control of non-native/invasive species (schedule 9, Wildlife and Countryside Act 1981) can degrade priority habitats and needs consideration when planning to connect habitats.
- The implementation of GI should result in opportunities for urban ecology becoming design considerations and becoming “built-in” features e.g. the use of living roof on developments where biodiversity enhancements at ground level are limited whilst addressing sustainable urban drainage, or providing built-in bird/bat boxes in low/zero carbon buildings<sup>7</sup>
- An improved GI network presents opportunities for water quality/biodiversity improvements within the floodplain and river corridors.
- The requirement for biodiversity enhancements through PPS9 should facilitate the delivery of a robust GI network within the urban and rural environment.
- Creating a robust GI network will minimise the impact of climate change on biodiversity by enabling it to adapt.
- Reedbeds offer multiple benefits: the treatment of waste, provision of biodiversity, in addition to creating a potential recreation facility.

### 3.2 Water Assets

Data used:

SMBC

Environment Agency

Strategic Flood Risk Assessment (Halcrow Group Limited, 2008)

See Figure 2.1: Flood Risk, and Figure 2.2 Surface water flooding and hotspots

#### Flood Risk

The borough is covered by seven Main River catchments: the River Blythe, Ravenshaw Brook, Shadow Brook, Hollywell Brook, Low Brook, Kingshurst Brook and the River Cole. The Cole flows north through Birmingham then eastward through Chelmsley Wood and to Coleshill where it joins the Blythe. The Blythe flows north through the centre of the borough, where it joins the River Tame. There are a number of brooks which are tributaries of the Cole and Blythe.

The Blythe’s flood zones are predominantly within agricultural land. The flood zones of the Cole and the Kingshurst Brook are within the Kingfisher Country Park, which forms a linear green space east to west through the north of the borough, and north to south along the recent (2010) extension (the extent determined by the Kingshurst Brook’s floodplain).

<sup>7</sup> Williams, C (2010) Biodiversity for Low and Zero Carbon Buildings: A Technical Guide for New Build

There are two canals in the borough, the Grand Union and Stratford-upon-Avon, both of which have the potential for overtopping and/or breach. However, equally, British Waterways could use the canals to reduce flood risk by controlling flood flows within the canal, potentially allowing the canals to receive flood water and act to temporarily store water, or to transfer it.

There are also a number of large water bodies within parks (e.g. Babbs Mill Lake), business parks (e.g. Pendigo Lake) and privately owned land (e.g. Olton reservoir, Barston Lake and Lavender Hall Pools). Other water bodies such as field ponds are important features in pastoral landscapes where historically they were used for watering livestock. They remain common in most parishes...retention of ponds should be a priority in pastoral areas where they have greater wildlife potential in association with permanent grassland<sup>8</sup>.

Although the Environment Agency is responsible for the management of flooding from main rivers, the EA has produced Catchment Flood Risk Management Plans (CFMP) which requires actions to be delivered by local authorities to support the EA in a national joined up approach to flood risk management. The borough is included in Policy Units 6 and 10 of the River Trent Catchment Flood Risk Management Plan (CFMP): under Policy Unit 6 the Council is required to take action with others to store water or manage runoff in locations that provide overall flood risk reduction or environmental benefits, locally or elsewhere in the catchment and under Policy Unit 10 the Council is required to take further action to reduce flood risk.

The West Midlands Regional Flood Risk Appraisal<sup>9</sup> has not identified any of the borough's rivers as being a significant flood risk. The Council considers that there are no significant locations in the borough which are not defended against flooding to a satisfactory standard as there are several major formal flood defences within the borough. With each defence there is a residual risk of overtopping, breach or blockage, which could result in significant damage to buildings and highway infrastructure as well as posing danger to life, however the report did identify flood risk as a 'significant factor in strategic planning in the borough, with a significance rating of 5'.

PPS 25 requires that new developments must demonstrate that they will not themselves flood and will not contribute to flood risk elsewhere. The existing floodplain is too valuable as a resource to allow further encroachment of built development into it. The Trent CFMP identifies that strategically, given the level of growth proposed, and the local flood risk characteristics, SMBC should be aiming to reduce flood risk across the borough and elsewhere. This is a significant task, even without taking the future effects of climate change into account. The simplest way of reducing this risk is by minimising the amount of developments at risk of flooding by not building new developments in areas of risk, and where possible relocating vulnerable uses to less risky areas. PPS25 supports this principle via the requirement to apply the Sequential and Exception Tests; however SMBC should go further than this and allocate formal areas as Blue Corridors.

Blue Corridors would relate broadly to the high risk Flood Zone 3 (1 in 100 years), and remain undeveloped. This would keep these corridors unobstructed for flood flows, allow space for future flood alleviation works, and also provide vital elements of green infrastructure in the borough. Flood water can then safely and naturally flood an undeveloped river valley causing minimal impact to local residents.

In areas of flood risk which have already been developed over time (such as Olton) a variation on this approach should be adopted: a Blue Regeneration Corridor. Within these areas redevelopment should be encouraged to relocate outside of the floodplain, or if this is not possible, developers should be encouraged to open up culverts, enlarge and naturalise

<sup>8</sup> WCC (1993) Warwickshire Landscape Guidelines: Arden (p37)

<sup>9</sup> WMRA (2007) *West Midlands Regional Flood Risk Appraisal*

existing engineered channels and retreat the development as far as possible from the floodplain – as is appropriate for that specific location.

Such an approach to flood risk management will preserve existing floodable spaces and also cover existing developed land that floods. This will encourage development to move away from the floodplain and encourage works to reduce the overall extent of floodplain over time and thereby reduce risk. With the effects of climate change, future flood risk is anticipated to increase without any additional development being endorsed within this zone. Applying this policy would act to reduce the amount of built development at risk, in the simplest way possible and hopefully create areas to flood instead of built development. At the same time it will preserve and enhance the network of river corridors that pass through the Borough.

### **Other Sources of Flooding**

Surface water flooding is defined by the Environment Agency as, ‘An event that results from rainfall generated overland flow before the runoff enters any watercourse or sewer. Usually associated with high intensity rainfall resulting in overland flow and ponding in depressions in the topography, but can also occur with lower intensity rainfall or melting snow where the ground is saturated, frozen, developed or otherwise low permeability. Urban ground water sewerage/drainage systems and surface watercourses may be completely overwhelmed, preventing drainage.’

Since the introduction of the Flood and Water Management Act (2010), the Council is legally responsible for flooding from all sources (which includes permanent water courses that have not been classified as a ‘main river’). The Council is currently undertaking a Preliminary Flood Risk Assessment which will map areas that are susceptible to all forms of flooding. This study will identify areas which require more detailed flood risk studies and result in the production of flood risk management plans by 2015; it is important that these plans take into account existing green infrastructure and the opportunity for incorporating new green infrastructure as forms of flooding management. The successful sustainable management of precipitation (surface water) will be an essential element of reducing current and future flood risk in Solihull.

PPS1: Delivering sustainable development and PPS25: Development and flood risk requires that local planning authorities should promote sustainable drainage systems (SuDS) and include policies within their LDF to encourage sustainable drainage practices. The Flood and Water Management Act (2010) makes the Council the official SuDS approving body and responsible for all ‘designated features’; if SuDS systems are declared as ‘designated features’ this would make the Council responsible for all SuDS whether not a Council asset.

### **Water quality**

The Water Framework Directive (WFD) came into force in December 2000 and became part of UK law in 2003. The WFD requires all countries throughout the European Union to manage the water environment to consistent standards. The WFD addresses the ecological health of surface water bodies as well as achieving the traditional chemical standards. Therefore in addition to pollution needing to be tackled, the maintenance and enhancement of hydromorphology (the shape of the river channel) will also need to be addressed, and the consequent need to make space for watercourse to allow natural processes to occur. The WFD requires each country to:

- prevent deterioration in the status of aquatic ecosystems, protect them and improve the ecological condition of waters;
- aim to achieve at least good status for all water bodies by 2015. Where this is not possible and subject to the criteria set out in the Directive, aim to achieve good status by 2021 or 2027;
- meet the requirements of Water Framework Directive Protected Areas;

- promote sustainable use of water as a natural resource;
- conserve habitats and species that depend directly on water;
- progressively reduce or phase out the release of individual pollutants or groups of pollutants that present a significant threat to the aquatic environment;
- progressively reduce the pollution of groundwater and prevent or limit the entry of pollutants;
- contribute to mitigating the effects of floods and droughts.

Successful implementation of the WFD will help to protect all elements of the water cycle and enhance the quality of our groundwaters, rivers, lakes, estuaries and seas. As a result of the WFD a number of existing European directives will be replaced. Solihull's WFD targets are detailed within the Humber River Basin Management Plan, which focuses on the pressures facing the water environment in the Humber River Basin District and the actions that will address them. It is the first of a series of six-year planning cycles. There are a number of WFD waterbodies within Solihull's metropolitan area, not including canals, which are classified by the Humber RBMP as of 'moderate' or 'poor' status; the latter referring to the Cuttle Brook. The WFD requires that all waterbodies meet 'good status' by 2015. Where the watercourse is heavily modified (such as the Hatchford/Kinghurst Brook) it should reach 'good potential' status.

### Key GI Issues

- SMBC should allocate blue corridors (to reflect 1 in 100 year floodplain, which will remain undeveloped) and blue regeneration corridors (where redevelopment should ideally be relocated, and the opening up of culverts and enlarging/naturalising of existing engineered channels encouraged).
- No purpose-built storage areas have been identified within the borough of Solihull area<sup>10</sup>. Any natural storage areas used as a means of attenuation of flood waters should be maintained to ensure their efficient operation during a flood event and avoid increasing the risk of flooding to areas downstream.
- Solihull's Strategic Flood Risk Assessment (2008) describes opportunities for de-culverting and restoring natural channels. There is potential for GI projects to undertake such works along the River Cole within the Kingfisher Country Park.
- Surface water run-off and artificial drainage sources are an issue within the urban areas of the borough. Current restrictions on discharge (no more than the existing rate) will not fully compensate for climate change as only a proportion of the Borough will be developed in the next 80 years. Therefore surface run-off should be limited to greenfield rates (i.e. 5litres/second/hectare) regardless of whether the site is brownfield/greenfield in order to fully address climate change issues and mitigate for the majority of the borough which is not to be redeveloped (and will continue to discharge in an uncontrolled fashion).
- A more restrictive discharge rate should be managed sustainably through the use of SuDS systems and methods should be encouraged, particularly above ground features which contribute to GI. Green or living roofs, swales, balancing ponds and wetlands offer multifunctional GI.
- The use of SuDS should be strongly promoted for all developments that require a rebuild of existing surface water systems on a site to improve water quality and create amenity/habitat, in addition to satisfying requirements of water quantity.

<sup>10</sup> Halcrow Group Limited (2008) *Strategic Flood Risk Assessment*

- The design/creation of SuDS should follow best practice guidelines (The SuDS Manual<sup>11</sup>) which promotes the best uses of SuDS to achieve wide ranging benefits, including those which would help the waterbodies in the area meet the requirements of the WFD. The SuDS Manual recommends that in most situations, a minimum of two water 'treatment train' (i.e. different processes) are integrated into the system to get the maximum benefits.
- The retrofitting of SuDS into existing developments should be strongly promoted; this could be realised through the development of a Surface Water Management Plan (as part of the LDF evidence base) and potentially through an incentive scheme.
- A greater commitment should be given to the installation of green roofs, green walls and more vegetation, such as large trees, particularly in heavily urbanised areas of the Borough due to their beneficial effect on managing the urban heat island (UHI) effect in addition to the improvement of habitat, water quality and reduction of flood risk. This commitment could be a future policy which seeks to ensure that at least a percentage of developed space must be vegetated to reduce the effects of UHI and slowdown and reduce the release of surface water from the site.
- The maintenance of Solihull's SuDS will be Council-born in the future.
- As SuDS are standing water bodies which collect water from surface water runoff, they may collect harmful and toxic materials etc which will evidently end up in silt a) this may have a negative impact on biodiversity and b) if toxic silt is removed during dredging as part of SuDS maintenance it will be expensive to dispose of.
- Flood plains should be maintained and enhanced for water storage and green corridors to mitigate for climate change.
- The use of 'designated features' for flood risk management as defined by the Flood and Water Management Act could provide extra protection and sources of income for further development and management of assets that have high biodiversity value.
- Ensure all waterbodies meet 'good status' by 2015 to meet with WDF targets. Where the watercourse is heavily modified (such as the Hatchford/Kinghurst Brook) it should reach 'good potential' status.
- The viability of de-culverting of watercourses must be thoroughly explored by developers and pursued to facilitate watercourse restoration and blue corridor widening wherever appropriate (e.g. culvert running through Hillfield golf course and Hillfield Park, Monkspath could be removed) to reduce the amount of blockage scenarios and associated flooding incidents.
- Existing open watercourse must not be culverted or built over as part of redevelopment; this could result in WFD infringement procedures and heavy fines to the Council. Where culverting is unavoidable, the developer must take all possible steps to open up the watercourse and reinstate the maximum stretch as a natural river with associated floodable areas, where this is feasible within the development and can provide environmental and amenity benefits without posing a health and safety risk.
- Native woodland creation and tree planting have the potential to improve water quality and alleviate/slow the rate of flooding.

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<sup>11</sup> CIRIA (2007) *The SuDS Manual (C697)*

### 3.3 Climate Change

#### Data used:

The UK Climate Projections (UKCP09)

Health effects of climate change in the West Midlands (2010)

England Biodiversity Strategy Climate Change Adaptation Principles:

Conserving biodiversity in a changing climate (2008)

The UK Climate Impacts Programme (UKCIP) provides data and information on our past and future climate; data sets include Observed Climate Data, Marine and Coastal Projections and Climate Change Projections. The probabilistic Climate Change Projections are the result of an innovative modelling approach from the Met Office Hadley Centre climate model HadCM3. The model is one of the few examples using perturbed physics ensembles (PPE) to generate climate projections. The projections also include the results of other IPCC climate models, and are constrained by observations of past climate.

The UKCIP09 projections are presented for three different future scenarios representing High, Medium and Low greenhouse gas emissions. The resulting climate projections are measures of strength of evidence in different future climate change outcomes. Their purpose is to provide climate information designed to aid the strategic planning of climate change adaptation.

In order to establish the likely future climate of Solihull a medium emissions scenario was selected combined with projections covering the area of the West Midlands Region. The projections shown are changes relative to the 1961 – 1990 baseline period which is the conventional period used based on a 30-year average, relating to either climate observations or to model-simulated data. The projections are as follows:

- An increase in annual temperature by between 0.7°C and 2.1°C by the 2020s, 1.2°C and 3.0°C in the 2040s and 2.1°C and 5.0°C in the 2080s.
- No real change in the amount of annual rainfall (the change in annual precipitation is predicted between -4.7% and 5.4% in the 2020s), although there will be a change in the timing of this precipitation.

Warmer, drier summers:

- An increase in summer (JJA) temperatures by between 0.5°C and 2.6°C by the 2020s, and 0.9°C and 3.8°C in the 2040s.
- A change in summer precipitation by between -23.1% and 11.4% in the 2020s.

Warmer, wetter winters:

- An increase in winter (DJF) temperatures by between 0.6°C and 2.1°C by the 2020s, and 0.9°C and 2.8°C in the 2040s.
- A change in winter precipitation by between -2.9% and 14.2% in the 2020s.

#### Impacts of climate change:

1. Extreme weather events
2. Food and water resources
3. Flooding
4. Urban Heat Island
5. Increased Health Issues and Inequalities
6. Impact on biodiversity
7. Carbon storage and sequestration
8. Transport

**1. Extreme weather events**

- The West Midlands will probably experience more flooding and heatwave events in the future.
- Flooding causes loss of property and livelihoods, physical injuries and mental health effects. Mental health is of great concern following flood events with all age groups at risk. Physical health effects are less widespread and are more likely to affect the elderly population.
- High summer mortality will be added to by the effect of heatwaves and again, the elderly and vulnerable are most at risk. High temperatures experienced during heatwaves exacerbate health issues, such as cardiovascular diseases, resulting in an escalation of hospital admissions and mortality. People in urban areas are particularly at risk as a result of the Urban Heat Island effect.

**2. Food and water resources**

- Food is likely to be affected in a variety of ways as a result of climate change. e.g. changes in the growing season, type of crops grown, yields and pests. Flooding may decimate crops and disrupt distribution. Changes in agriculture may be needed to cope with food demands, and climate processes elsewhere in the world could affect the imported food supply.
- Food borne disease incidence is likely to become more common alongside temperature increases, especially during the summer.
- Similarly, water shortage could become a problem due to a simultaneous decrease in summer rainfall and an increase in demand.
- A rise in the incidence of water borne diseases is likely as the climate warms. Cases of food and water borne diseases are underreported; however the projections still provide a good estimate of the magnitude of change in incidence.

**3. Flooding**

- Flooding is likely to increase under climate change as a result of changes in rainfall patterns
- Summer rainfall intensity could increase and cause flash floods
- Heightened levels of winter rainfall could result in more flooding during winter
- Flooding causes a high amount of psychological stress for victims due to damage to personal property and the disruption caused by flooding
- Elderly flood victims are most likely to be affected physically however mental health will be the most important issue
- Likelihoods of flood events such as 1 in a 100 or 1 in a 1000 year events are likely to be downgraded due to climate change, potentially by as much as a 1 in a 50 and 1 in 500 year event respectively.
- More pressure will be put on natural flood defences such as flood plains, wetlands and washlands due to changes in precipitation patterns and extreme weather events. Such impacts have already been demonstrated in various areas across the UK bringing devastating impacts to the natural and built environment.

**4. Urban Heat Island (UHI)**

- The Urban Heat Island effect is capable of causing health issues in city centres. It is likely that it will exacerbate all of the temperature-related health problems and expose vulnerable city centre dwellers to a heightened risk of morbidity or mortality during a heatwave.
- City centre areas will be at higher risk of extreme temperatures during warm weather, which will impact negatively on health.

- Outbreaks of food and water borne diseases may be more common than in rural areas due to the greater population density.
- Pollution episodes in urban areas will exacerbate respiratory problems. In rural areas temperatures will be cooler than in city centres however ozone episodes may be more severe in areas downwind of cities.
- As well as more cases of food and water borne disease there is likely to be a rise in hay fever in rural areas as a result of the higher presence of allergenic pollens.

#### **5. Increased Health Issues and Inequalities**

- All-cause mortality will probably increase during the summer however during winter warmer temperatures are projected to cause a decrease in mortality over the same period. Cardiovascular diseases demonstrate the same pattern.
- Ozone pollution episodes are likely to continue to occur as a result of more warm, sunny weather; during these episodes respiratory diseases can be exacerbated resulting in increased summer mortality and morbidity.
- Hay fever is likely to follow existing trends of increasing incidence and hay fever severity could rise due to the prolonged pollen season and introduction of new allergenic species.
- The relationship between asthma and temperature shows a decrease in hospital admissions during warmer weather, therefore a decrease in temperature-related attacks could occur by the end of the century. On the other hand, the projections do not take into account pollution or allergen concentrations, which are capable of causing a large increase in admissions.
- Chronic obstructive pulmonary disease (COPD) admissions are likely to decrease as a result of reduced periods of cold weather.
- The climatological conditions for diseases transmitted by insects, such as malaria, will become more favourable with climate change in the West Midlands; however malaria is unlikely to re-establish itself in the UK because of the public health response. Tick borne diseases such as Lyme disease could increase, although warnings of tick presence and methods of protection from tick bites could be provided to help prevent this.
- The exposure of people to ultraviolet radiation is likely to increase in the West Midlands due to decreases in cloud cover in summer and changes in behaviour if people decide to spend more time outdoors. The result will be higher incidences of skin cancer, sunburn and cataracts, and possibly a higher incidence of some infectious diseases as a result of immuno-suppression.
- There is a serious risk that climate change will increase health inequalities in the Region. Deprived communities are likely to face greater impacts because they are more likely to be located in city centre areas where the greatest temperature increases are predicted; they have the smallest potential to adapt (e.g. cannot move, afford more expensive food, buy air-cooling systems); generally they are less healthy and therefore would be more susceptible even if exposure was equal.

#### **6. Impact on biodiversity**

- Changes in phenology, which may lead to loss of synchrony between species
- Changes in species abundance and distribution (including arrival and loss of species)
- Changes in community composition
- Changes in ecosystem processes

#### **7. Carbon storage and sequestration**

- Climate change is caused by human activity which has resulted in the rapid release of greenhouse gases (such as CO<sub>2</sub> and methane)



- Globally this has/continues to occur through the burning of fossil fuels, deforestation and increasing pressure on natural resources caused by a growing world population
- In the UK 65% of emissions come from burning fuel to create energy (excluding transport), 21% are from transport, 7% are from agriculture (e.g. nitrous oxide from chemical fertilisers or methane given off by animals and manure) and 4% come from industry (e.g. manufacturing goods)

## 8. Transport

- Solihull is at the heart of the national transport infrastructure. Travel can take place on the ground, on water or in the air, and these modes are both complementary and substitutable in different circumstances. However, the choice of transport mode and fuel has impacts on the emissions of greenhouse gases contributing to climate change.
- High temperatures will have an impact on road surfaces and can also cause expansion of the steel and concrete used in some roads and bridges. Although milder winter temperatures will result in the decreased maintenance required to counteract the effects of low temperatures. Flooding may also cause disruption to all modes of transport. This may have significant impacts on services such as the Airport, NEC and emergency Services, and overall such events are known to have significant and in extreme cases devastating impacts on the local economy.

### Key GI Issues:

#### Extreme weather events

- Green Infrastructure will provide natural air conditioning for urban areas, reducing the need for power consumption for heating and cooling, alongside its contribution towards greenhouse gas absorption and longer-term benefits in managing the impact of climate change.
- By maintaining and increasing green infrastructure in urban areas, in particular trees which can grow to a large size, it will provide significant areas of shade and cooling during warm, sunny weather. A significant increase in green infrastructure is required in urban areas to absorb UV, rainfall and to provide windbreaks. Correct usage of plants could also act to absorb pollutants.

#### Food and water resources

- Food security issues can be addressed by growing food locally and aiming for self sufficiency in local areas. Allotments, community gardening and advice on food growing could be provided for the local population to promote this behaviour

#### Flooding

- Natural flood defences such as flood plains, wetlands and washlands play a significant role in mitigating the flooding of urban areas as outlined in the Governments 'Making Space For Water' report where the Environment Agency has now established national minimum targets for wetland habitat creation so as to ensure that flood management and coastal protection solutions are consistent with biodiversity needs.
- Reforestation in areas upstream of a flood risk area could prevent problems downstream combined with successful sustainable land management.
- Increasing and maintaining canopy cover, green space and soft surfacing reduces and controls run-off, improves absorption rates and provides storage capacity, resulting in less dramatic flood events for urban areas, reducing costs to business and residents.
- Solihull has an ageing tree stock which will therefore be more vulnerable to changes in climate and particularly extreme events.

#### Urban Heat Island

- Increasing green infrastructure in urban areas (in particular large trees) will help to moderate urban temperature extremes to ensure that towns and cities continue to be attractive and comfortable places to live, work, visit and invest
- Green infrastructure is a fundamental building block of new developments in addition to retrofitting our current environments.

### **Increased Health Issues and Inequalities**

- As discussed, green infrastructure will provide significant areas of shade and cooling during heatwaves, absorb UV, rainfall, pollutants and provide windbreaks.
- High quality accessible Green Infrastructure can provide opportunities to develop a more productive workforce for employers through improved health, stress alleviation, and enhancing motivation and retaining motivated people.
- Green Infrastructure will provide a recreation and visitor resource for a more outdoors lifestyle, and helping to divert pressure from landscapes which are sensitive to climate change.

### **Impact on biodiversity**

- Green infrastructure can be used to create a permeable landscape, enabling species to move northwards to new 'climate spaces'

### **Carbon storage and sequestration**

- Biosequestration or carbon sequestration can be achieved through the enhancement and creation of peat bogs, reforestation (however the carbon must not be returned to the atmosphere from burning or rotting when the trees die therefore the trees must grow in perpetuity or the wood from them must itself be sequestered), the modification of agricultural practices to reduce and/or displacing emissions and enhancing carbon removal by both crops and soil. The modification of agricultural practises is likely to be governed by costs; any subsequent reversion to other practises following an initial modification will result in the release of the carbon again.

### **Transport**

- Trees further improve air quality through the absorption of particulates from vehicles emissions and other sources – such that it has been estimated that doubling the tree cover in the West Midlands alone would reduce mortality as a result of poor air quality from particulates by 140 people per year<sup>12</sup>.
- Milder weather may encourage more walking and cycling, whilst this will have an impact on emissions and yield a number of social and health benefits, green infrastructure will be essential in order to minimise the risk of road accidents involving pedestrians and cyclists (which have been shown to be more likely in warmer weather). It may also lead to tourism opportunities, particularly along the parts of the National Cycle Network that pass through the region.

### **Energy**

- The Government's Carbon Plan (HM Government, March 2011) reaffirms support for woodland creation: 'The forestry sector can deliver significant greenhouse gas abatement through carbon sequestration in new woodlands and increased use of timber and wood products, both to store carbon and to substitute for materials with high fossil fuel emissions associated with their production...Government will continue to support woodland creation through Rural Development Programme funding, and the Woodland Carbon Task Force..'. Deciduous trees in particular provide shading during hot summer months, reducing the need for air conditioning, whilst allowing solar gain to buildings during the winter, reducing the need for heating. Research in the USA suggests a per tree saving in carbon emissions for shade and shelter trees as a result reduced building energy use of around 10-11kg per year. The Government's Renewable Heat Initiative (launched March 2011) will provide support for biomass heat generation using wood products.

<sup>12</sup> Stewart, H., Owen S., Donovan R., MacKenzie R., and Hewitt N. (2002) Trees and Sustainable Urban Air Quality. Centre for Ecology and Hydrology, Lancaster University.

### 3.4 Landscape Assets

Data used:

Warwickshire Landscape Guidelines: Arden (Warwickshire County Council)

Countryside Character – West Midlands Volume. Arden Landscape, Character Area 97 (Natural England)

See Figure 3.1: Landscape character, Figure 3.2 Urban Forest

#### Landscape Character

Landscape character is what makes an area unique. It is defined as a distinct, recognisable and consistent pattern of elements, be it natural (soil, landform) and/or human (for example settlement and development) in the landscape that makes one landscape different from another, rather than better or worse<sup>13</sup>. The Landscape Character for Solihull borough is shown on Figure 3.1.

Solihull borough lies within Natural England's National Character Area 97: Arden<sup>14</sup>.

The key characteristics of the Arden countryside are:

- Well-wooded farmland landscape with rolling landform.
- Ancient landscape pattern of small fields, winding lanes and dispersed, isolated hamlets.
- Contrasting patterns of well-hedged, irregular fields and small woodlands interspersed with larger semi-regular fields on former deer parks and estates, and a geometric pattern on former commons.
- Numerous areas of former wood-pasture with large, old, oak trees often associated with heathland remnants.
- Narrow, meandering river valleys with long river meadows.
- North-eastern industrial area based around former Warwickshire coalfield, with distinctive colliery settlements.
- North-western area dominated by urban development and associated urban edge landscapes.

The Warwickshire Landscape Guidelines: Arden<sup>15</sup> describes the area as former wood pasture and ancient farmlands lying on the eastern side of the Birmingham plateau, between the rivers Tame and Avon in Warwickshire, with a small area in north Worcestershire.

The Arden landscape character area is further divided into seven types, with four of the seven found within Solihull borough:

- Arden Parklands
- Ancient Arden
- Arden Pastures
- Arden River Valleys

The guidelines have identified areas within each landscape type where the structure and character of the landscape are in decline; these areas are identified as 'enhancement zones'. These zones identify where landscape and habitat restoration should be targeted, therefore some of these areas may be important for future GI projects.

<sup>13</sup> Natural England

<sup>14</sup> Warwickshire County Council/Countryside Commission (1993) Warwickshire Landscape Guidelines: Arden

<sup>15</sup> Ibid.

### **Arden Parklands**

This is the predominant landscape type across the borough, mainly through the centre of the borough (north – south). Parkland is a planned estate landscape closely associated with former wood pasture and historic deer parks, such as Berkswell Park. Medium to large fields are bordered by woodland edges, belts of trees and wooded streamlines. Generally the land is flat, and where field patterns have been broken, the landscape can appear open. Other characteristic features area:

- ancient woods with irregular edges plus mixed plantations dating from the 18th and 19th centuries
- remnant deer parks with pollard oaks
- thick roadside hedges, often with bracken.

### **Ancient Arden**

This landscape type is the core of the ancient countryside in Warwickshire. Its overall characteristic feature is small scale farmed landscape with varied, undulating topography characterised by an irregular pattern of fields and narrow winding lanes. Such lanes can be seen around Beck Lane and Shaft Lane. Ancient Arden is found to the east of the borough, incorporating the area around Meriden, and in a smaller area south west of Balsall Common. Other characteristic features are:

- hedgerow and roadside oaks
- field ponds associated with permanent pasture
- many place names ending in ‘Green’ or ‘End’ e.g. Eaves Green, Fen End and Chadwick End.

### **Arden Pasture**

This is found on the glacial drift deposits on the southern edge of the Birmingham plateau. Poor soils have led to small fields with hedge boundaries and wood pasture. The general landscape is enclosed with small fields bordered by mature hedgerow trees, but there are significant suburban influences from the southern edge of Solihull and Dorridge. Other features are:

- gently rolling topography
- mature hedgerow oaks
- network of minor lanes often with ribbon development
- permanent pasture often grazed by horses
- place names ending in ‘Heath’ and ‘Common’ e.g. Hockley Heath and Balsall Common

### **Arden River Valleys**

This character type is the least represented in the borough and is focused around the River Blythe. The Blythe flows north - south through the central Arden parkland area of the borough. The character type extends to the limits of the river’s alluvial flood plain and marginal vegetation area, following the river as it meanders. Other characteristics are:

- grazing meadows, often with areas of wet grassland
- old willow pollards
- curvilinear hedgerows along the edge of the floodplain

Natural England's National Character Area 97: Arden<sup>16</sup> has a number of recommendations for the landscape character of the area; the following are relevant to possible future GI projects:

- The conservation management of woodlands, particularly ancient and semi-natural woodlands, and wood-pasture is important in this area of good tree cover.
- The retention of hedges and hedgerow trees should be addressed, especially in the north-eastern part of the area.
- Planting schemes using native tree species are appropriate for screening urban edges and new residential developments.
- There is scope for the restoration of heathland, especially on roadside verges, and for the active management (notably bracken and scrub clearance) of existing heathlands.
- The restoration of mineral extraction sites is an opportunity to absorb these areas back to the character of the surrounding landscape and to create habitats of wildlife interest.
- There is scope for the restoration and appropriate management of riverside wetland and the conservation of the natural river course and the distinctive floodplain hedge and tree pattern.

### Canals

The Grand Union and Stratford-upon-Avon canals and their associated tow paths and other structures are man-made, engineered features of cultural and historical significance that sets them apart from the character of the adjacent townscape and landscape. The building materials and forms of construction employed contribute to a unique sense of place. Often the canals are bordered by dense belts of trees and/or hedgerows, making them visually distinctive from the landscape or townscape settings which they pass through.

### Urban forest

The urban forest is the term in use for all the trees in our urban environment, whether they are garden, street, park or woodland trees – it refers to the management of all trees within Solihull.

Figure 3.2 shows the recorded urban forestry of Solihull (the data available has its limitations as some of the older data records have not been updated). Trees recorded and shown on plan are both in Council ownership and management (street trees, trees within parks/open spaces, woodlands etc.) and private ownership such as TPO trees, veterans and some of the woodlands. Street trees can define streets, give them character, improve the urban environment and provide linkages in habitat networks.

The plan shows that within the main urban areas of the borough, the tree cover is fairly well distributed. The age, size and how they impact on the environment from the tree cover is not possible to show on plan, and there will be differences in street character depending on the age stock and size.

A significant proportion of the tree cover which contributes to the character of the borough's streets is the large mature trees in front gardens. Streets such as Danford Lane (West Shirley/Blossomfield area) have few street trees, but are very 'leafy'. The fact that there are many large, mature trees in certain areas, and the recognition that they have an important contribution to the character of the street, is reflected in the amount of TPOs in these parts of the borough.

There are 29 known veteran trees within the borough and these are important for biodiversity and local character.

<sup>16</sup> The Countryside Agency (1999) Countryside Character Volume 5: West Midlands. Character area 97: Arden.

## Key GI Issues

- The restoration of minerals extraction sites should return them to their appropriate Arden character to link it back to the surrounding landscape and create wildlife habitats.
- Inappropriate land use/development which does not respond to the rural edge setting is resulting in the suburbanisation of the countryside, GI should seek to address some of these issues.
- Inappropriate planting of non-native and ornamental species within the countryside and urban fringe is a current issue which again could be overcome by the provision of appropriate GI.
- Retaining and maintaining woodland, hedgerows, hedgerow trees, parkland and individual trees of significant landscape character is critical to achieving the GI vision for Solihull.
- Tree cover should be increased through small scale woodland/hedgerow tree planting.
- Major infrastructure such as motorways, trunk roads, and rail is a key issue for Solihull; it often destroys or fails to respond to the landscape pattern and character. The creation of GI along/across these routes could offer a solution.
- Agricultural practices and methods; farm diversification and management of land under agri-environmental schemes has the potential to have both a positive and negative impact on GI.
- The restoration of more natural river profiles and courses is required.
- The restoration of Arden landscape enhancement zones is required.
- Solihull's GI vision will develop 'green street' projects at 'Gateway' sites and green routes (e.g. A34, A41, A425 and adjoining roads), where planting street trees to the ratio of 80 trees per 1km of road, which equates to 1 tree every 12.5m would help to create constant canopy. This will aid in reducing air pollution, create shade, reduce the heat island effect and enhance biodiversity.
- The GI network should ensure that sufficient numbers of street trees are planted each year to establish a good age range of stock and that failing trees or trees long-since removed from the public highway are replaced.
- The urban forest is under pressure from development due to loss/damage to trees during construction.
- The Community Infrastructure Levy should be utilised to maintain and enhance Solihull's urban forest.
- Street trees should be incorporated into urban character assessments to reflect the role of planting in developing a sense of local character/place.
- The enhancement or creation of GI should improve local character within the public realm, particularly at key local centres, providing a sense of place and local distinctiveness.

### 3.5 Food Production Assets

Data used:

SMBC

Agricultural Land Classification

Creating space for food production within and between settlements can increase access to healthy food and provide educational opportunities and reconnect communities with their local environment. It can also assist in mitigating further climate change impacts by reducing the number of food miles.

#### Allotments

There are 19 allotment sites in Solihull covering 21.1 hectares; 8 are Council managed, 6 are Parish Council managed and 5 are Associations. The Green Spaces states there is a shortfall in allotment provision in all areas of the borough. There are currently no community garden schemes operating in the borough.

#### Agricultural land

Agriculture is the main activity in the countryside, and farmers are responsible for managing the land. Solihull's countryside generally consists of good to moderate quality agricultural land (mostly Grade 3) capable of supporting a healthy mixed farming economy. There is an area of Grade 2 in the east of the borough and an area of Grade 4 which follows the River Blythe and also in the south-west. Whilst the intensification of farming methods has led to some removal of hedgerows and the creation of larger fields, the overall character of the landscape has not been severely damaged. The rural community is currently being encouraged to diversify and future land use may also include biofuel planting, flood alleviation, recreation or the establishment of other small businesses.

#### Key GI Issues

- Food security is an issue on the national agenda and it may become a local issue in the future. The impact of climate change on food production requires preparing for change; climate impacts on harvest and subsequently on supply and prices. Food must be produced in an environmentally sustainable way, and at the same time, increase production and productivity to meet the needs of the growing global population. Locally, it will be important to retain the best quality of agricultural land for food production and farm sustainably with improvements in energy efficiency and transport.
- The implementation of a GI network should address shortfall in allotment provision and waiting list within the borough. Allotments should be incorporated into new developments.
- Allotments are a local BAP target and the average site has up to 30% more wildlife diversity than a typical urban park. Sympathetic maintenance regimes should be sought to maximise the benefit of boundary hedgerows and tree belts whilst vacant plots can be managed to increase the growth of wildflowers.
- Allotments are often located adjacent to open space, parks, woodland etc. and so form valuable wildlife corridors. When considering new allotment sites, the Council should identify areas where wildlife connections can be made.
- Community gardens/orchards, local food-growing groups, and land sharing initiatives should be encouraged. Corporate sponsorship of allotments/food production projects/farmers markets may enable the affordability of such initiatives in impoverished areas.
- The Sustainable Schools initiative which seeks to encourage food production in schools in an environmentally sensitive manner should continue to be promoted.

- The growing of traditional crops/varieties to the area/region (opportunities for SME) should be encouraged.

### 3.6 Historic Environment Assets

Data used:

English Heritage

Natural England

Historic Landscape Characterisation (HLC – Warwickshire County Council)

See Figure 4: Historic Environment

#### Historic Landscape Characterisation (HLC)

Historic landscape characterisation is concerned with recognising the many ways in which the present countryside reflects how people have exploited and changed their physical environment, and adapted to it through time. It seeks to identify patterns of change and important relics of past change, and to analyse how and why patterns consistently vary from one place to another. The core premise of historic landscape characterisation and its application in planning and conservation is that relationships between people and their environment are dynamic and ever changing. The key policy issue is how society can influence the direction and pace of future change whilst still maintaining links with the past in a way that enriches the present.

The study area is one third urban, with the majority of the population in the north and the west, and two thirds rural, with green belt and fields in the east. The predominant historic landscape character is Fieldsapes which covers half the borough. These include piecemeal and planned enclosures, with a distinct pattern of planned enclosures of common and heathland south of Balsall Common.

Designed landscape is significant compared to the region, with large golf courses making a notable contribution. Public parks are distributed across the borough; Elmdon Park is the largest park in the borough, it's also an LNR and contains a historic walled garden (a historic environment record entry).

#### Designated features

| Designation                         | Importance | Number                                     |
|-------------------------------------|------------|--|
| Scheduled monuments                 | National   | 16   |
| Registered parks and gardens        | National   | 1  |
| Listed buildings                    | National   | 11 Grade I<br>37 Grade II*<br>325 Grade II |
| Locally listed buildings            | Locally    | 120  |
| Conservation areas                  | Locally    | 20   |
| Historic environment record entries | Locally    | 1370                                       |

Of the sixteen scheduled monuments, there are a seven moated sites and four churchyard crosses. The majority of the monuments are within the rural area, and many are associated with listed buildings.



Castle Bromwich Hall Gardens is the borough's only registered park and garden, which dates from the seventeenth century.

The historic environment record has three sub-divisions — buildings, landscape, and monument; local example entries are: farmhouses, medieval buildings, ridge and furrow, moats, and enclosures. There are a number of entries relating to the airport, such as the Elmdon airfield, nissen huts, battle headquarters and gun emplacements; this reflects the contribution the airport makes to the historic environment of the borough.

The Grand Union and Stratford-upon-Avon canals are significant contributions to the historic environment. Both canals date from the very early 19<sup>th</sup> century and have elements of interest within the borough. Notable interest is the flight of 5 locks at Knowle on the Grand Union Canal.

### **Key GI issues**

- The borough's historic features, e.g. Hob's Moat, Knowle Locks, the River Blythe should be retained and enhanced through the GI network.
- GI should seek to promote local archaeology. Historically important sites should be retained where they are within development sites.
- Education and interpretation of the borough's historic environment should be achieved through GI enhancements.
- The loss of unimproved land must be halted; including the one remaining area of heathland in the west (currently under restoration by Warwickshire Wildlife Trust), and the one area of common north of Catherine-de-Barnes.
- GI should seek to establish links between disjointed patches of woodland across the borough.

## **3.7 Accessible Greenspace Assets**

Data used:

SMBC

English Heritage

Forestry Commission

Woodland Trust

See Figure 5.1: Accessible Greenspace Provision (Neighbourhood Scale), Figure 5.2 Accessible Greenspace (District Scale), Figure 5.3: Accessible Greenspace Provision (County Scale) and Figure 5.4 Accessible Greenspace (Regional Scale) and Figure 5.5: LNR Provision

To assess Solihull's provision of accessible green space for recreation and access, an analysis has been undertaken using Natural England's Accessible Natural Greenspace Standard (ANGSt) and The Woodland Trust's Woodland Access Standards (WASSt).

### **Natural England's Accessible Natural Greenspace Standards (ANGSt)**

The standard provides a benchmark for ensuring that local people have adequate access to a range of green spaces to enable contact with nature and for outdoor recreation.

The standards recommend that people living in towns and cities should have:

- an accessible natural greenspace of at least 2 hectares in size, no more than 300 metres (5 minutes walk) from home
- at least one accessible 20 hectare site within two kilometres of home
- one accessible 100 hectare site within five kilometres of home
- one accessible 500 hectare site within ten kilometres of home

- one hectare of statutory Local Nature Reserves per thousand population
- The standards have some limitations:
- they do not consider population numbers; the sizes of the greenspaces are not based on numbers of potential users.
- they do not consider the quality of the greenspaces; for the purpose of this report, the borough's Green Flag parks are identified on Figures 5.1 and 5.2.
- they do not give information of the function of the greenspace of the greenspace, or whether it is beneficial/important for biodiversity.

It is worth highlighting a further potential limitation of the standards, that of not assessing the 'visual access' to greenspace; rural communities in the east of the borough may have visual access to large areas of greenspace but no physical access. Furthermore whilst the standards have been mapped using provision zones, it is acknowledged that further information is required with respect to actual access points, facilities, interpretation, topography etc. It is not the intention of the GI study to investigate specific access issues at a site-level but rather to gain a strategic overview of provision. However it is acknowledged that access audits will need to be conducted at a site-by-site basis to ensure specific requirements are met (this may be an action of a GI strategy or part of a GI delivery plan). Access audits have been completed for Kingfisher Country Park (including Babb's Mill, Yorks Wood, Cole Bank Park and Meriden Park) (Access2Audits, Jan 2008), Temple Balsall Nature Reserve and Elmdon Manor LNR (both Warwickshire Wildlife Trust reserves by Access2Audits in May 2007). Five council-run parks have 'key access reviews' featured on the [Disabledgo website](#); a further 12 parks are reviewed in the same format on the Council's website, although these have not been confirmed by Disabledgo surveyors.

The greenspace data used to determine Solihull's ANGSt is:

- Publicly accessible natural and semi-natural greenspace
- Parks and gardens
- Amenity greenspace
- Cemeteries and churchyards
- Local nature reserves (LNRs)
- Disused railway

#### **Sub-regional (sites over 500ha) and County scale (sites over 100ha)**

There are no sub-regional (>500ha) sites within the borough; however Sutton Park National Nature Reserve is within 10km of part of the borough (see Figure 5.4). In accordance with the ANGSt standard this provides access for the residents of Castle Bromwich, Smith's Wood and Kingshurst; however car ownership in these wards is low and this may therefore not be an accurate representation.

Kingfisher Country Park and the associated connected greenspace in North Solihull is the only county scale (>100ha) site within Solihull (totalling 189ha). Outside of the borough Hay Wood (104.6ha, Forestry Commission) provides a green space for residents in south Dorridge. Figure 5.3 shows that there is a deficit in the remainder of the borough for the county scale sites. A number of large sites are also close to Solihull but beyond 5km such as Kingsbury Water Park (WCC) and Middleton Lakes (RSPB) in the north-east.

Elmdon Park and Elmdon Manor LNR combined has a total area of 90.4ha, indicating that if there is opportunity to extend by 10ha then the borough will have another site meeting the county scale, which would extend the provide zone to additional parts of the borough not presently covered. There is also a publically-accessible green corridor within Birmingham just west of the border with Solihull which is 90.2ha, this follows the River Cole, the Chinn Brook and ends in Billesley Common, but also extends down the Cole Brook where it enters

Solihull. The public access of the open space network is severed at the northern end of Nethercote Gardens, which prevents the link to the open space as it continues down the Cole Brook and connects to the Colebrook Recreation Ground. There is an opportunity here to establish a link at the border of Solihull and Birmingham to potentially create a further county scale site.

### **District scale (sites of 20ha within 2km of home)**

There are eight accessible sites of 20ha or above within the borough:

- Kingfisher Country Park
- Elmdon Park and Elmdon Manor LNR.
- Malvern and Brueton Parks
- Tudor Grange Park
- Hillfield Park
- Blythe Valley Country Park
- Wagon Lane and Barn Lane Recreation Ground
- Dorridge Park

These sites are all in the west of the borough and predominantly within the urban areas, showing a deficit in the east of the borough, which again raises the question of whether the rural communities in the east are able to enjoy 'visual access' to areas of greenspace equivalent to 20ha. In the south-west of the borough access requirements are met just over the border by Clowes Wood and New Fallings Coppice SSSI and Earlswood Lakes.

In some cases the 2km zone of accessibility to the sites is questionable, as the M42 will certainly have an affect on use of Blythe Valley Country Park, Hillfield Park, and Malvern and Brueton Parks from people east of the motorway.

### **Neighbourhood scale (sites over 2ha within 300m of the home)**

Smaller local sites are very important for all members of the community, particularly as these sites are within walking distance, therefore are valuable for children and young people, the elderly and those without easy access to private or public transport. Being within 300m of green space is key for improving both physical and mental health.

People who live within 500m of accessible green space are 24% more likely to meet recommended levels of physical activity. Reducing the sedentary population by just 1% could reduce UK morbidity and mortality rates valued at £1.44 billion<sup>17</sup>.

The distribution of neighbourhood sites is reasonable throughout the urban areas and larger villages, although there are some notable gaps in provision such as:

- Smiths Wood
- Craig Croft
- South of Olton
- North Silhill/ Elmdon Heath
- Shirley – east of the Stratford Road, around the Blossomfield/Sharmans Cross area
- Dickens Heath – in the north
- Knowle – in the east
- Balsall Common – to the south
- Meriden (south-west)

<sup>17</sup> Defra (2010) *What nature can do for you*

There is no provision at this scale at all in Cheswick Green or Hampton in Arden.

Solihull's Green Spaces Strategy identifies deficiencies in local provision in terms of greenspace and uses of spaces e.g. playgrounds, allotments, playing fields etc. There are deficiencies within every zone as described within the Zone Action Plans.

### Local Nature Reserves

The ANG standards state that there should be 1ha of LNR provision per 1000 of the population. Figure 5.5 shows the provision across the borough by ward, the provision has been calculated using 2007 census data. The plan shows the LNR locations plus where LNRs are a short distance outside the borough.

Overall, the borough has over 1ha per 1000 population, but this study recognises that the LNRs are not evenly distributed geographically, or that there is sufficient provision in every ward. Indeed, four wards do not have any provision, but in some of these wards the residents do not have far to travel to visit an LNR e.g. Olton ward residents can visit Palmers Rough LNR (Shirley East ward to the south) and Hobs Moat LNR (Lyndon ward to the north).

Kingshurst and Fordbridge ward has 3.46ha per 1000 population which is due to the combination of York's Wood, Babbs Mill and part of Cole Bank LNRs, the latter two of which are within Kingfisher Country Park.

### The Woodland Trust's Woodland Access Standard (WASt)

The Woodland Trust's Woodland Access Standard aspires<sup>18</sup>:

- That no person should live more than 500m from at least one area of accessible woodland of no less than 2ha in size
- That there should also be at least one area of accessible woodland of no less than 20ha within 4km (8km round trip) of people's homes

The Woodland Trust has provided data for Solihull borough and comparison data with Warwickshire and the West Midlands for accessible woodlands. The data shows that Solihull has below average accessible woodland.

| Accessible woodlands                              | Solihull | Warwickshire<br>County Council | Coventry<br>City Council | All West<br>Midlands |
|---|----------|--------------------------------|--------------------------|----------------------|
| % population with access to 2ha+ wood within 500m | 27.46%   | 6.87%                          | 14.08%                   | 15.42%               |
| % population with access to 20ha+ wood within 4km | 7.83%    | 51.56%                         | 63.54%                   | 63.84%               |

### Key GI Issues

- The GI network should address shortfalls in accessible open space in certain areas by identifying provision for 2ha (min) sites in Smiths Wood, Craig Croft, Olton (south), Silhill (north)/Elmdon Heath, Shirley (southeast), Dickens Heath (north) and 20ha (min) sites in Knowle (east), Balsall Common, Meriden (south-west) and Hampton-in-Arden.
- The GI network should refer to the Green Spaces Strategy with regard to typology-shortfalls that could also be met by new green space provision.
- The Council's programme of increasing LNRs should be continued; this programme should take into account Solihull's likely population in 2020.

<sup>18</sup> The Woodland Trust (2010) *Space for People, Targeting action for woodland access*

- Accessible woodland within Solihull borough should be increased.
- Access audits of open spaces should be undertaken to fully address accessibility issues.
- The linear nature of the greenspace within north Solihull makes it vulnerable to be lost through development. If any of this greenspace network were to be severed the borough will lose its only greenspace of county-scale standard.
- The motorway is a considerable barrier. The GI network should investigate opportunities for overcoming this such as the retrofitting/creation of green bridges.

### 3.8 Access and Links

Data used:

SMBC (data sets are not comprehensive<sup>19</sup>)

English Heritage

Forestry Commission

Woodland Trust

SUSTRANS

See Figure 6.1: Greenspace: Access and Links and Figure 6.2 Long Distance Paths

#### Greenspace

Figure 6.1 shows the distribution of greenspace typologies<sup>20</sup>. The plan shows the distribution of the different typologies highlighting the differences in provision and notable areas of absence of certain greenspace types across the borough. There are notable absences in greenspace in areas such as Tidbury Green, Cheswick Green, and east Shirley/Blossomfield area.

The green corridors are the railway lines, rivers and canals; these cross the borough in a general north–south direction, highlighting an absence in an east–west corridor. There is a notable amount of outdoor sports facilities; some of the sites are large in comparison with other greenspace types. The majority of these are member’s golf courses and so are not generally accessible.

SMBC’s Green Spaces Strategy has set targets and zone action plans to address shortfalls in various green space types.

#### Access

There are 131 miles (211km) of recorded public rights of way (PROW) in the borough, the majority of which are in the rural parts (see Figure 6.1 and 6.2). There is an urban network of ROW that is not currently recorded, nor is the extent of the network known; aims within SMBC’s Rights of Way Improvement Plan are to remedy this. Nearly all of the routes are public footpaths; there are only 7 miles (11km) of public bridleway, which equates to 5%, considerably lower than the national average of 17%<sup>21</sup>.

There are seven long distance paths across the borough; they have connections with the local network of footpaths and with each other on occasions:

<sup>19</sup> SMBC Green Spaces Strategy 2005; the GIS data only (not report text) has been updated 2010. It is not the intention of this Green Infrastructure Study to review the Green Spaces Strategy.

<sup>20</sup> PPG17: *Planning for open space, sport and recreation*. Open space typologies with the exception of accessible countryside in urban fringe areas, and civic spaces, including civic and market squares, and other hard surfaced areas designed for pedestrians; SMBC does not have mapped data for these typologies.

<sup>21</sup> SMBC (2007) Rights of Way Improvement Plan

- Cole Valley Way — a 7 mile linear route along the River Cole and entirely within Kingfisher Country Park. It has connection to the Grand Union Canal Walk and the Solihull Way.
- Grand Union Canal Walk — is on the canal towpath and offers footpath link from London to Birmingham (145 miles in total). The route within Solihull begins to the east of Knowle, passing through Catherine-de-Barnes, Elmdon, Olton and west through Birmingham's suburbs. It links to the Solihull Way and the Cole Valley Way.
- Heart of England Way — is a rural route north-south in the east of the borough, covering 101 miles in total. It travels through the Arden countryside and Berkswell, passing close to Balsall Common and Meriden. It has a connection with the Coventry Way, north of Meriden.
- Solihull Way — (20 miles) starts at Earlswood Lakes (just beyond the borough boundary) and runs north to Castle Bromwich. It passes through mostly suburban areas and has links with the Grand Union Canal Walk and the Cole Valley Way. Although the leaflet detailing this walk is current out of print, a copy is available to download on Solihull MBC's website.
- Stratford Upon Avon Canal Walk — is a towpath walk linking the River Avon in the south to the Worcester & Birmingham Canal at King's Norton, totalling 26miles.
- Millennium Way — is a 100mile long distance path across the centre of England. A 13 mile section of the way runs through Solihull. Entering the borough at Hockley Heath the Way runs across to Meriden before continuing out of the borough, southeast of Balsall Common. Smaller circular walks have been planned along the route to include different stages of the Millennium Way making it accessible to those looking for shorter, more local walks.
- Coventry Way – a 40 mile circular walk which enters the east edge of Solihull, passing near Meriden and Balsall Common. It is a well used long distance route with associated short walks running from it. A booklet is available which describes all of the walks in detail including wildlife notes, written by local ecologist Ian Tanner, and brief interest/history notes. Details of bus routes and bus stops are given, together with suitable car parking places.

In terms of cycling, Solihull has a number of cycle routes proposed in the north – Chelmsley Wood, Kingshurst, and Smiths Wood. One aim is that they will connect with National Cycle Route 53, which is complete in two sections (along Catherine-de-Barnes Lane and in Sheldon Country Park/Marston Green) e.g. along the Kingshurst Brook within the recently extended Kingfisher Country Park. The majority of Route 53 (Birmingham to Coventry) is proposed; part of the approved section will use the disused railway south of Balsall Common.

### **Key GI Issues**

- The provision and distribution of greenspace types throughout the borough needs continued monitoring and updating. Shortfalls should be addressed where necessary and the quality improved where existing.
- The North Solihull regeneration project should ensure greenspace, access and links are considered holistically, and that links beyond the regeneration zone are connected to.
- The below national average provision of bridleways needs to be addressed.
- Well designed streets and public spaces should encourage walking and cycling and have the power to make our environment a safer one by reducing vehicle speeds and use.
- There is a lack of public transport for access to countryside and its associated network of footpaths.

- Accessibility issues for the disabled and those with mobility issues are relatively unknown and should be considered.
- The urban footpath network needs to be mapped and links to countryside footpaths established. These routes should be promoted.
- East – west cycling/walking links and connections are absent in the borough. The GI network should seek to establish new links.
- The motorway is a considerable barrier. The GI network should investigate opportunities for overcoming this such as the retrofitting/creation of green bridges.
- GI should enable the delivery of sustainable and equal access to services, linking people to housing/shops/schools/places of work/green space. Opportunities to connect site by rights of way should be maximised in order to create green corridors for species movement in addition to providing public access, important both in terms of health and well-being as well as generating and sustaining interest for general education as well as specific site support.
- Stratford up-on-Avon Canal towpath renewals are required at the following locations: Between bridges 17 (Salter Street Bridge) and 18 (Warings Green Bridge); Between bridges 19 (Bluebell Bridge) and 20 (Dyers Lane Bridge); At bridges 19 (Bluebell Bridge) Warings Green to Bluebell Cider House; At bridge 22 (Rotherhams Oak Bridge); Between bridges 22 (Rotherhams Oak Bridge) and 23 (Ashford Lane Bridge); Between bridges 24 (Saddlerswell Lane Bridge) and 25 (Stratford Road Bridge).
- Stratford up-on-Avon Canal access improvements are required at the following locations: Bridge 7 (Solihull High Street Bridge) – south side: hand rails, improve ramp; Bridge 19 (Bluebell Bridge) - south side: new steps, ramp, hand rails; Bridge 23 (Ashford Lane Bridge) - north side: new steps, ramps, handrails; Bridge 24 (Saddlerswell Lane Bridge) – new steps, ramps, handrails.
- Grand Union Canal access improvements are required at the following locations: Bridge 78 (Hampton Lane) Catherine De Barnes to link National Cycle Route 53 to towpath; Bridge 80 (Rowood Drive) Elmdon Heath.
- Grand Union Canal towpath renewals are required at the following locations: Bridge 78 (damson road Bridge) Elmdon Heath; Bridge 83 (Castle Lane Bridge) to Bridge 82 (Dove House Lane) Olton

## 4.0 Green Infrastructure services and function assessment

### 4.1 Ecosystem Services

Data used:

Ecorecord 2010

English Heritage

HBA 2009 Phase 1 data

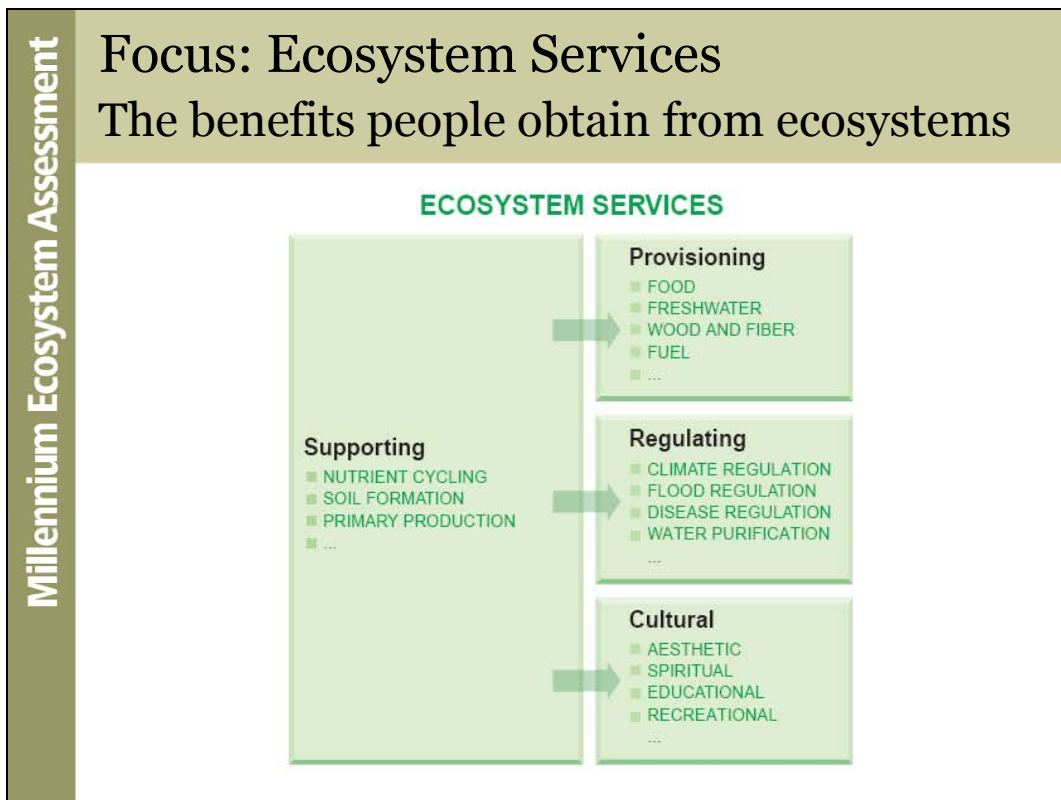
Natural England

NAEI 2009

SMBC

See Figure 7.1: Ecosystem Services – provisioning services (products), Figure 7.2: Ecosystem Services – Regulating Services (regulation of natural processes) and Figure 7.3: Ecosystem Services – cultural

Our wealth as a nation and our individual well-being depend critically upon the environment. It provides us with the food, water and air that are essential for life and with the minerals and raw minerals for our industry and consumption. Less obviously, it provides the processes that purify air and water, and which sequester or break down wastes. It is also in our environment where we find recreation, health and solace, and in which our culture finds its roots and sense of place. Scientists refer to these services that our environment provides as 'ecosystem services,' recognising that it is the interaction between the living and physical elements that deliver these necessities<sup>22</sup>.



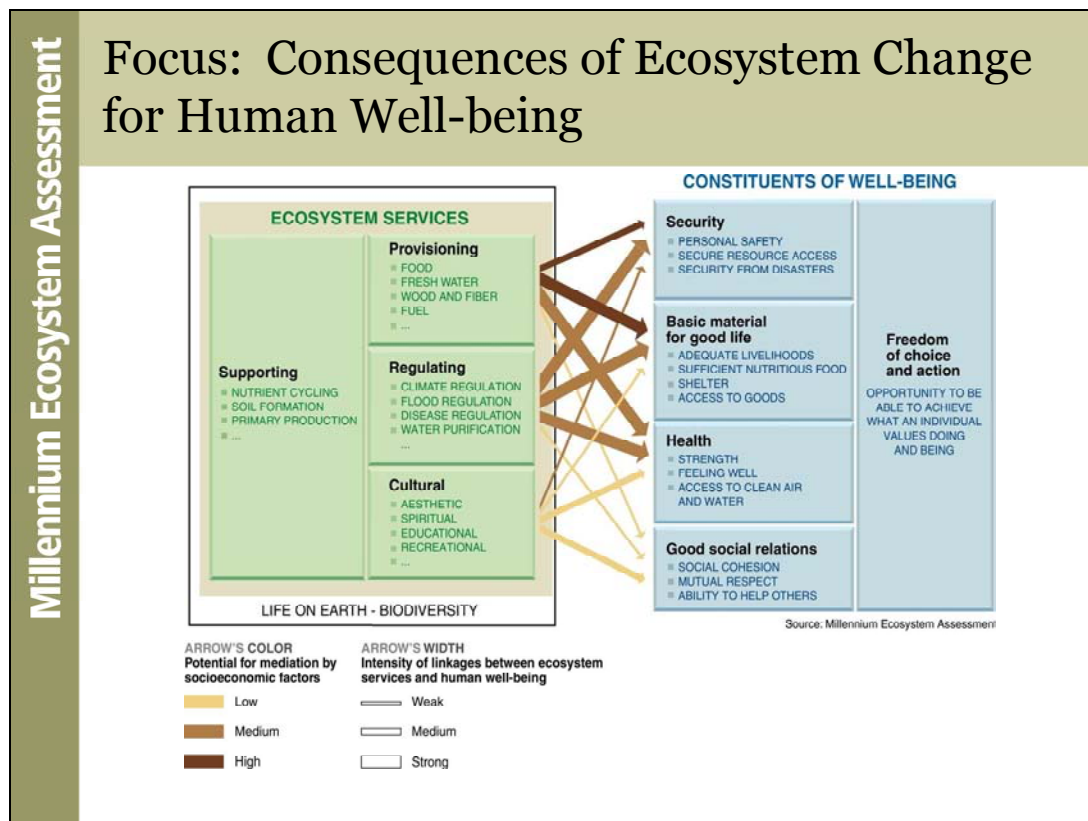
© 2005 Millennium Ecosystem Assessment

<sup>22</sup> UK National Ecosystem (2011) The National Ecosystem: Synthesis of the Key Findings. UNEP-WCMC, Cambridge.



As people seek many services from ecosystems, we therefore perceive the condition of an ecosystem in relation to its ability to provide desired services for public benefit. Measuring the value of all the benefits we derive from ecosystems is hugely challenging, with the consequence that ecosystem services have been consistently undervalued in economic analysis and decision making.

From 2001 to 2005, the Millennium Ecosystem Assessment (MA) assessed the consequences of ecosystem change for human well-being and the scientific basis for action needed to enhance the conservation and sustainable use of those systems. The MA involved the work of more than 1,360 experts worldwide; their findings provide a state-of-the-art scientific appraisal of the condition and trends in the world's ecosystems and the services they provide (such as clean water, food, forest products, flood control, and natural resources) and the options to restore, conserve or enhance the sustainable use of ecosystems. The MA identified the provision of ecosystem services and their relation to human well-being as follows:



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Humans have modified ecosystems more in the last 50 years than in any comparable period. Land use and habitat change often results in simplification of the ecosystem to increase the economic value of one ecosystem service, usually provisioning services such as food production. Extensive modifications, such as conversion to intensive agricultural land, can alter ecosystems and reduce their capacity to provide a broad range of services. This may have an impact on ecosystem services over a geographical scale wider than that of the original modification. Through examining a large body of existing information (the first comprehensive audit of the status of Earth's natural capital) the MA found that approximately 60% (15 out of 24) of the ecosystem services evaluated (including 70% of regulating and

cultural services) are being degraded or used unsustainably. If current trends continue, there is likely to be further rapid degradation of ecosystem services in the 21st century. Although some economic benefits have resulted from ecosystem modification, degradation of ecosystem services has increased poverty for some, with fewer benefits from degraded ecosystems available to current and future generations. Damage to ecosystem services poses environmental risks, such as flooding or water pollution, which may have to be replaced by expensive engineered human services. However, some services such as climate regulation may be irreplaceable. The MA also identified the drivers of change:

The ultimate conclusion of the MA findings is that human actions are depleting Earth's natural capital, putting such strain on the environment that the ability of the planet's ecosystems to sustain future generations can no longer be taken for granted. At the same time, the assessment shows that with appropriate actions it is possible to reverse the degradation of many ecosystem services over the next 50 years, but the changes in policy and practice required are substantial and not currently underway.

The UK National Ecosystem Assessment (UK NEA) was carried out between mid-2009 and early 2011 as part of the Living With Environmental Change Partnership. It involved over 500 natural scientists, economists, social scientists and other stakeholders from government, academic, NGO and private sector institutions. The UK NEA recognises the four categories of ecosystem service but also incorporates post-MA advances, especially for the economic valuation of ecosystems services and focuses on 'final ecosystem services' developed to

avoid the double counting of services which are part of a suite of primary processes, including supporting services<sup>23</sup>

### Existing policy and legislation

Ecosystem services are not explicitly protected by EU legislation; however, directives do provide protection for some aspects. For example, the EU Habitats and Wild Birds Directives protect the status of the species and habitats listed in their annexes. Any damage to the status of these species or habitats may result in financial liability under the Environmental Liabilities Directive. Achieving good ecological status under the Water Framework Directive requires all the inputs and demands made on a river system to be managed to ensure good ecological status or potential of the water body. Protection of biodiversity has also been integrated into EU thematic strategies. At a national level the Sustainable Development Strategy (2005) identified a strategic approach to natural resource protection and environmental enhancement as one of four priority areas for the government. Current conservation policies focus primarily on individual components of ecosystems, such as species at risk, often in small pockets of high-value habitat. It is recognised that future policy will need to consider whole ecosystems that are at risk, taking action over larger areas of habitat to enhance ecosystem services. The first UK NEA (2011) marks a key milestone in this approach. The key messages from the UK NEA (2011) are:

Key messages:

- **The natural world, its biodiversity and its constituent ecosystems are critically important to our well-being and economic prosperity, but are consistently undervalued in conventional economic analyses and decision making.** Ecosystems and the services they deliver underpin our very existence. We depend on them to produce our food, regulate water supplies and climate, and breakdown waste products. We also value them in less obvious ways: contact with nature gives pleasure, provides recreation and is known to have a positive impact on long-term health and happiness.
- **Ecosystems and ecosystem services, and the ways people benefit from them, have changed markedly in the past 60 years, driven by changes in society.** During the second half of the 20th Century, the UK's population grew by roughly a quarter to nearly 62 million, living standards greatly increased and technological developments and globalisation had major effects on behaviour and consumption patterns. The production of food from agriculture increased dramatically, but many other ecosystem services, particularly those related to air, water and soil quality, declined.
- **The UK's ecosystems are currently delivering some services well, but others are still in long-term decline.** Of the range of services delivered in the UK by eight broad aquatic and terrestrial habitat types and their constituent biodiversity, about 30% have been assessed as currently declining. Many others are in a reduced or degraded state, including marine fisheries, wild species diversity and some of the services provided by soils. Reductions in ecosystem services are associated with declines in habitat extent or condition and changes in biodiversity, although the exact relationship between biodiversity and the ecosystem services it underpins is still incompletely understood.
- **The UK population will continue to grow, and its demands and expectations continue to evolve. This is likely to increase pressures on ecosystem services in a future where climate change will have an accelerating impact both here and in the world at large.** The UK's population is predicted to grow by nearly 10 million in the next 20 years. Climate change is expected to lead to more frequent severe

<sup>23</sup> UK National Ecosystem Assessment (2011) The UK National Ecosystem Assessment: Synthesis of the Key Findings. UNEP-WCMC, Cambridge.

weather events and alter rainfall patterns, with implications for agriculture, flood control and many other services. One major challenge is sustainable intensification of agriculture: increasing food production while decreasing the environmental footprint.

- **Actions taken and decisions made now will have consequences far into the future for ecosystems, ecosystem services and human well-being. It is important that these are understood, so that we can make the best possible choices, not just for society now but also for future generations.** Contemporary economic and participatory techniques allow us to estimate values for a wide range of ecosystem services. Applying these to scenarios of plausible futures shows that allowing decisions to be guided by market prices alone forgoes opportunities for major enhancements in ecosystem services, with negative consequences for social well-being. Recognising the value of ecosystem services more fully would allow the UK to move towards a more sustainable future, in which the benefits of ecosystem services are better realised and more equitably distributed.
- **A move to sustainable development will require an appropriate mixture of regulations, technology, financial investment and education, as well as changes in individual and societal behaviour and adoption of a more integrated, rather than conventional sectoral, approach to ecosystem management.** This will need the involvement of a range of different actors – government, the private sector, voluntary organisations and civil society at large – in processes that are open and transparent enough to facilitate dialogue and collaboration and allow necessary trade-offs to be understood and agreed on when making decisions.

The findings of both the MA and UK NEA demonstrate that functioning ecosystems are an integral part of life on earth and are therefore a vital part of Green Infrastructure; mapping different assets in relation to the ecosystem services they provide will initiate the process of assessing both the health and the value of Solihull's ecosystems. These maps should not be interpreted in isolation as spatial data is unavailable for many services whilst other services are unquantifiable. It is also important to consider the temporal context of ecosystems. Figures 8.1 – 8.3 display assets in terms of three of the four types of ecosystem services (where spatial data was made available), details of which are given in the table below:

| TYPE OF SERVICE   | Example               | Data available /mapped   |
|---|-----------------------|--|
| <b>Provisioning services (products):</b>                      | Food                  | <i>Productive landscapes: allotments</i>                           |
|   | Timber                | <i>Woodlands</i>   |
|   | Woodfuel              | <i>Woodlands</i>   |
|   | Fresh water           | <i>Running and standing water</i>                                  |
|   | Biodiversity          | <i>High - low biodiversity value (based on HBA Phase One data)</i> |
|   | Genetic resources     | <i>No spatial data</i>   |
|   | Biochemicals          | <i>No spatial data</i>   |
|   | Natural medicines     | <i>No spatial data</i>   |
|   | Pharmaceuticals       | <i>No spatial data</i>   |
| <b>Regulating services (regulation of natural processes):</b> | Air quality           | <i>NAEI 2009</i>   |
|   | Climate               | <i>No spatial data at borough scale</i>                            |
|   | Flooding Erosion      | <i>Floodzones – 1:100, 1:1000 yr</i>                               |
|   | Water purification    | <i>No spatial data</i>   |
|   | Disease/Pest control  | <i>No spatial data</i>   |
|   | Pollination           | <i>No spatial data</i>   |
| <b>Cultural Services (non-material)</b>                       | Spiritual enrichment  | <i>No spatial data</i>   |
|   | Cognitive development | <i>No spatial data</i>   |

|  |                     |  |
|--|---------------------|--|
| <b>anthropomorphic benefits)</b>   | Recreation          | <i>Green Space Strategy data</i>         |
|  | Aesthetic enjoyment | <i>Street Trees, TPOs, veteran trees</i> |
| <b>Supporting Services (operations required for all other ecosystem services):</b> | Soil formation      | <i>No spatial data</i>                   |
|  | Photosynthesis      | <i>No spatial data</i>                   |
|  | Primary production  | <i>No spatial data</i>                   |
|  | Nutrient cycling    | <i>No spatial data</i>                   |
|  | Water cycling       | <i>No spatial data</i>                   |

## Provisioning Services

### See Figure 7.1

Nationally: Key findings from the UK NEA (2011):

- *Over the last 60 years, production from owned and managed resources has grown, but production from wild resources has declined. Policy, technology and market forces have all played a role, but policy has had the greatest impact. Its goal has sometimes been to maximise production (e.g. Common Agricultural Policy) and sometimes been to prevent overexploitation (e.g. Common Fisheries Policy). Some policies, such as agri-environment schemes, have aimed to reduce the environmental impacts of production.*
- *It is unlikely that declines in environmental quality have reduced agricultural production levels, but overexploitation has harmed marine fish populations and some game species.*
- *Over the last decade, the UK has produced more food per year from crops than at any other time in history. The area of land under crops increased in England from 3 million hectares (ha) in 1940 to 4.2 million ha in 2009, but crop areas declined in other regions of the UK: in Wales, for example, there was a 66% decrease over the same time period. The area of wheat trebled in England between 1940 and 2000, while crops such as oats, flax, turnips and vetches declined. Increases in the cropped area were driven by financial returns to farmers, partially derived from the Common Agricultural Policy and partially from the market. The changes were facilitated by technologies such as more effective pesticides, mechanisation, varietal improvement and increased fertiliser use. Large increases in the productivity of all crops occurred between 1940 and 2008, as exemplified by average UK wheat yields which increased from 2.5 tonnes/hectare (t/ha) to 8 t/ha.*
- *Livestock productivity has increased, while animal numbers have fluctuated over time. Average milk yields increased from 3,500 litres/cow/year in 1960 to 7,000 litres/cow/year by 2009, and the average dressed carcass weight for steers increased from 267 kg in 1980 to 316 kg in 2003. These productivity gains have been accomplished through enhanced breeding and improved feeding regimes. Numbers of beef cattle peaked at 1.9 million in 1999, dairy cattle at 3.4 million in 1980 and sheep numbers peaked at 45 million in 2000. Numbers have fallen since these times. In 2009, the UK dairy herd comprised 1.8 million dairy cattle, while the national sheep flock was 33 million in 2008. Sheep numbers have fluctuated according to levels of financial support, while numbers of dairy cattle have been affected by market conditions for milk. There has been a large increase in numbers of broiler chickens, largely due to the changed consumption patterns of UK consumers.*
- *The provision of food from marine fisheries is lower now than at any time in the last century. Landings into UK ports were around 1.2 million tonnes in 1948 and declined slightly to just over 1 million tonnes in 1970. The total weight of landings has declined steadily since that time and, in 2008, landings were only 538,000 tonnes. Large declines have been recorded in demersal species, and smaller declines in pelagic species. Pressure from fishing has reduced the size of fish stocks<sup>1</sup>; the development*

*of new technology for finding and harvesting fish has enabled fishers to maintain higher catch rates and exploit new grounds. Production from aquaculture has increased over the last 20 years, especially in Scotland. In 1988, Scotland produced 18 tonnes of salmon from aquaculture, but by 2008, this had increased seven-fold to 128 tonnes.*

- *Some game species have shown major declines in numbers, while other have become more abundant and widespread. There were declines in the bags of red grouse and partridges between 1940 and 2009, but bags of pheasant increased. Changes in the management of farmland had a major impact on partridge numbers. Deer are now more widespread than during the 1940s, and harvests have not shown any evidence of decline. After 1970, the numbers of wild caught salmon fell in Scotland to a low of less than 100,000 fish in 2006. Yet, in 2007, there was suggestion of an upturn when 91,053 salmon were caught by rod and line, which was the third largest catch by that method since 1952. Catches in England and Wales also declined from 1988, and, in 2006, less than 40,000 fish were caught by all methods. Capture at sea and estuarine netting have been largely responsible for declining numbers of spawning salmon.*
- *Overall provision of timber has increased over the last 40 years, but major increases in softwood harvests mask declines in the harvest of hardwoods. The production of softwoods in the UK has increased steadily over the last 40 years. The total harvest of softwood was 8.6 million cubic metres (m<sup>3</sup>) in 2008, compared with less than 400,000 m<sup>3</sup> of hardwood. Typically, around 60% of the softwood harvest is derived from Scotland. The increased harvest of softwood reflects the levels of deliberate and extensive planting that began on the national forest estate in the early part of the 20<sup>th</sup> Century. These were driven by policy needs and, later in the century, were reinforced by financial aid to landowners. The different trends in softwood and hardwood reflect the fact that softwoods are derived from plantation forests, while most hardwoods are derived from managed semi-natural woodlands.*
- *The total area of land used for peat extraction fell from 14,980 ha in 1994 to 10,690 ha in 2009. At a Great Britain scale, 1.6 million m<sup>3</sup> of peat were sold in 1999 and 760,000 m<sup>3</sup> in 2008.*
- *The amount of water taken from ecosystems by the public water supply in the UK declined between 1990 and 2009. In 1990, 20 billion litres/day were taken by the public water supply in the UK. By 2008, this had declined to about 17 billion litres/day. The greatest declines occurred in England and Wales, with hardly any declines occurring in Scotland and Northern Ireland. Total levels of abstractions in England and Wales stayed more or less constant between 1995 and 2007. In Scotland, abstractions decreased between 2002–2003 and 2007–2008 by 4.5% to 2,387 mega litres/day in 2007–2008. Leakage was approximately 41% in Scotland in 2007–2008, but only 16% in England and Wales – down from 23% in the late 1990s. Decreased leakage in England and Wales is related to the privatisation of water supply and its associated legislative requirements. Water demand has decreased due to reduced demand from heavy industry.*

### **Borough analysis**

- *As Solihull is predominantly rural borough, it could be postulated that its landscape is therefore fairly productive. Data is available for some GI assets such as biodiversity, allotments, woodlands and fresh water. Whilst this data indicates where these assets are it does not indicate condition/quality of these assets or provide us with a suggestion of exactly what products, or goods, are currently being derived from these assets. Some of the land may be out of production and in environmental stewardship schemes.*
- *Another consideration is the level of human interaction required in order for a good to be provided; some goods will come straight from the natural world without the*

intervention of humans; whilst others (such as timber which also requires human skills and technology) requires some input of manufactured or other human capital.

- As this is the first investigation into this topic at a borough level it is acknowledged that other assets may have been missed or may be identified as methodology/research in this area develops.

## Regulating Services

### See Figure 7.2

Nationally: Key findings from the UK NEA (2011):

- *The regulating services provided by ecosystems are extremely diverse. Their status and trends, drivers and consequences of change, effective management, and knowledge gaps differ greatly. There are differences even among indicators within individual regulating services, as can be observed, for example, with the various components of water quality including acidity, pollutants and sediment. The services are, therefore, reported independently although relevant interactions (particularly between air, soil and water quality regulation) are noted.*
- *Ecosystems regulate climate by: i) providing sources or sinks of greenhouse gases (affecting global warming) and sources of aerosols (affecting temperature and cloud formation); and ii) their physical characteristics which can regulate local and regional climate. The UK has large amounts of carbon 'locked up' in its forests, peatlands and soils (114 megatonnes Carbon (Mt C) in vegetation;  $9,838 \pm 2,463$  Mt C in soils). Projected changes in emissions (under a 'business as usual' scenario) from the land use and forestry sector over the next ten years could switch this sector from being a net sink of carbon dioxide to a source. The effects of a failure in climate regulation services globally would be particularly pronounced in urban areas, and would exacerbate climate stress for large numbers of people. There are a wide range of sustainable management options to improve climate regulation services, which would also benefit other ecosystem services. Our main knowledge gaps concern the effects of land use management (rather than land use change) on greenhouse gas emissions and removals, and the quantification of the climate regulation provided by urban, coastal and marine ecosystems around the UK.*
- *The capacity to regulate water, nutrient, pollutant and sediment transfer from the land surface continues to be compromised by soil degradation and contributes to fluvial flood risk. The ability of the soft landforms of the UK coast to regulate erosion (17% currently eroding) and mitigate flood and storm damage is threatened by sea-level rise, changes in the frequency and severity of storms, and low sediment availability. Assessment of the current and future delivery of hazard regulation is limited by our knowledge of coast and upland condition; our understanding of rates and pathways of recovery from degradation; and the need to quantitatively understand the effects of extreme events.*
- *Ecosystems regulate pests and diseases, but this service is under threat. Agricultural intensification, human population growth, accidental introduction of pest and pathogen organisms and land and wildlife management are currently important drivers of disease and pest incidence. Changes in climate are likely to become more important over the next few decades, as recently witnessed for vector-borne diseases. For example, relatively innocuous weeds at the base of the arable food web have declined due to the more frequent use of broader spectrum herbicides, with likely impacts on wider biodiversity. The inadvertent import of fungal plant pathogens via live plant material is arguably one of the most significant loopholes in terms of biosecurity. Understanding how to better manage ecosystems to control pests and pathogens requires detailed longitudinal field studies to describe host-pest and host-pathogen interactions and to understand how these alter in response to environmental changes.*

- *Both managed pollinators (honey bees) and wild pollinators (primarily non-managed bees and hoverflies) have been in severe decline for the past 30 years and it is very likely that this trend will continue. Twenty percent of the UK cropped area comprises pollinator-dependent crops, and a high proportion of wild flowering plants depend on insect pollination for reproduction. However, the overall extent of pollination limitation in crops and wildflowers has not been quantified in the UK. The value of pollinators to UK agriculture is conservatively estimated to be £430 million per annum. There are multiple drivers of pollinator loss including loss of semi-natural habitat, the introduction of pathogens, inappropriate use of agrochemicals and climate change.*
- *Noise, particularly unwanted sound, can have a negative effect on human well-being and certain bird species, but can be regulated by ecosystems. Actual spatial measurements of noise are very limited, but national models consistently suggest that noise and visual intrusion has increased as urbanisation, including road traffic, has increased. Ecosystems adjacent to roads (created by tree planting and the use of soil bunds) can reduce some of the effects of road traffic noise. Sounds produced and moderated by ecosystems can also be considered as a cultural service: some natural sounds, such as bird song, are considered positively. However, noise is considered a 'disservice'.*
- *Soil quality is linked to almost all other regulating services (e.g. nutrient cycling, biomass production, water quality, climate regulation, pollination, etc.) through the soil's capacity to buffer, filter and transform. Soil quality in all UK NEA Broad Habitats has been degraded by human actions over the last 50 years, primarily by atmospheric pollution and inappropriate management practices. Ecosystems are involved in regulating soil quality at all scales. If soil quality is degraded, then soils' capacity to buffer, filter and transform chemical substances is reduced. The trends indicate that recovery from, and remediation of, both diffuse and point source pollution is in progress. There is insufficient and speculative knowledge regarding the recovery of soils under a changing climate; uppermost among these are the competing explanations for the changes in, and vulnerability of, UK's soil carbon stocks and the role of soil in purifying water resources.*
- *Ecosystems can have positive effects on air quality, primarily through interception, deposition and removal of pollutants. However, if the rate of deposition of pollutants exceeds critical thresholds, there may be adverse effects on a range of other ecosystem services. Emissions to the atmosphere from ecosystems can also directly and indirectly degrade air quality. Although there have been significant improvements in UK air quality over recent decades, current concentrations and deposition rates still exceed thresholds for effects on human health, crop and forest production, and biodiversity over significant areas of the country. The national improvements in air quality are primarily due to reduced anthropogenic emissions from the transport and energy sectors. In contrast, the main drivers of changes in the ecosystem service of air quality regulation over recent decades are likely to have been those changes in land use and management which influence deposition and emission of pollutants. It is likely that there are local benefits of tree planting for air quality in urban areas and close to point sources of pollution; these benefits have been quantified for individual air pollutants. However, the overall national benefits of ecosystem regulation for air quality, and for its health and ecological impacts, are very uncertain.*
- *Since the 1980s, water quality has improved in the uplands because lower atmospheric pollution levels in these areas enable terrestrial ecosystems to buffer lakes and streams against acidification and nitrate leaching. In the lowlands, water quality improvements have largely been driven by better control of point source pollution, rather than improved ecosystem regulation of diffuse pollutants. Widespread increases in upland dissolved organic carbon concentrations have had negative consequences for water treatment, but appear linked to soil recovery from acidification. The key regulating service of pollutant dilution by water flow is*



*maximised by land management that increases infiltration rates; this also reduces phosphorous, sediment and faecal pollutant losses via overland flow. However, these ecosystem services are likely to be degraded in the future by more extreme droughts and high flows due to climate change.*

- *While there are a number of synergies between regulating services (e.g. tree planting can improve air quality, reduce noise and sequester carbon for climate regulation), there are also a number of trade-offs (e.g. improvements in soil buffering of water quality as a result of decreased acid deposition may cause more carbon to be released from upland soils).*

### **Borough analysis**

- Spatial data was available for air quality, but not for climate, flooding erosion, water purification, disease/pest control, pollination, pollution. Some of these topics are discussed at other points within the study.
- Woodlands and street trees have been mapped as assets which provide some regulatory services. It should be noted that the street trees data is not comprehensive and is constantly being updated and therefore does not represent every street tree within the borough. In addition there may be many trees within private gardens which have a regulatory function, however currently there is no dataset by which these can be shown.
- As this is the first investigation into this topic at a borough level it is acknowledged that other assets may have been missed or may be identified as methodology/research in this area develops.

### **Cultural Services**

#### **See Figure 7.3**

Nationally: Key findings of the UK NEA (2011):

- *Ecosystem cultural services are the environmental settings that give rise to the cultural goods and benefits that people obtain from ecosystems. Over millennia these environmental settings have been co-produced by the constant interactions between humans and nature. They are inscribed with not only natural features but also the legacies of past and current societies, technologies, and cultures. The continual change in these settings involves a range of complex cultural practices, such as the development of institutions, the application of capital, and human processes involving memories, emotions, the senses, and aesthetic appreciation.*
- *There are many environmental settings where people interact with nature including the domestic garden, informal green and blue spaces, formal green/blue spaces, the nearby and wider countryside and national landscapes. People's engagement with environmental settings is contingent, context specific, fluid and mutable. Frameworks of interpretation and social practices associated with the production and uses of environmental settings are dynamic: meanings, values and behaviours change over time in response to economic, technological, social, political and cultural drivers. Change can be rapid and far-reaching in its implications. One particularly noticeable characteristic of UK cultural practice, however, is the depth and breadth of engagement with nature and wildlife.*
- *Ecosystem cultural services make a significant contribution to achieving people's key needs. In the 21st Century the cultural life of the UK is diverse and dynamic. Yet encounters with the natural world maintain their fascination for very substantial numbers of people, as reflected for example, in the membership of a very wide range of civil society organizations embracing landscape and nature interests, the numbers of people who use urban parks and green-spaces on a daily basis, and the massive popularity of gardening across the UK. Daily contact with nature is part, still, of being human. This is illustrated by the Human-Scale Development Matrix (H-SDM)*

developed by Manfred Max Neef, which indicates how both existence needs (being, having, doing, interacting) and value needs (subsistence, protection, affection, understanding, participation, creation, leisure, identity and freedom) can be met through nature. Evidence suggests that contemporary consumption practices are not satisfying our human needs adequately. Happiness research in economics, and policy-political initiatives to measure levels of happiness among populations reflects statistical evidence that, although people are far better off in material terms than they have ever been, rates of depression, mental illness, obesity and family breakdown are also increasing.

- *The discipline of ecolinguistics appeared in the 1990s. It brought together research from a number of academic disciplines interested in the ways in which scientific, professional, amateur and popular knowledge about the natural world was constructed; how different media shaped the environmental messages being communicated, and the politicisation of environmental issues associated with the rise of non-governmental organisations and pressure groups from the late 1960s. Whether humankind is regarded as a part of nature or as separate from it continues to be a fault line between different philosophical, moral, ethical and communicative traditions. One distinctive feature of language relating to the environment appears to be that reference to agency is avoided and there is a strong tendency not to identify who did what when discussing environmental change. This is achieved in a number of ways, such as using the passive rather than active voice or omitting the grammatical subject and using the object instead, for example, the habitat was destroyed rather than the developer destroyed the habitat. Thus there is frequently a choice of syntax that obscures agency and, thereby, responsibility for negative changes in environmental conditions.*
- *Since 1945 there have been some significant changes in people's interactions with environmental settings. The growth of urban settlements means that more people have a set of local environmental settings with urban characteristics. At the same time, however, increased mobility has allowed more people to travel longer distances nationally and internationally to environmental settings for tourism and recreation purposes. In more local environmental settings data limits the interpretations of changes in domestic gardens. Marked changes did occur, however, in certain countryside settings of the UK during the second half of the last century especially those in and around large urban areas, although the characteristics of other environmental settings have remained more static. Declines in numbers and/or the quality of certain local/green blue spaces, such as playing fields, allotments and parks in deprived areas, have occurred over past decades but have been arrested in the last few years.*
- *Since 1945 a large number of protection schemes instigated by UK and European Union government have been implemented to conserve certain socially and culturally significant environmental settings. National Parks, National and Local Nature Reserves, Sites of Special Scientific Interest, Special Protection Areas (SPAs), Ramsar sites, Local Nature Reserves (LNRs) and land owned by bodies such as The National Trust all play a role in managing cultural services in specific landscapes and local places.*
- *A driver of people's changing relationships with environmental settings has been associated with a desire for self-determination, responsibility and security (of self and environment). This has led to a small but increasing number of people making new productive connections to environmental settings. This includes an increasing demand for allotment gardening, increasing membership of community farms, and whilst many people relocate to rural environments for amenity reasons, more people are doing so to run smallholdings or to engage in other forms of 'pro-environmental' lifestyle*

- *Environmental settings have been one of the most enduringly popular locations for recreation, leisure and tourism. They offer generic opportunities to walk, run or cycle; specific opportunities only available in a few habitats, to ski, swim or sail, for example; and unique settings that offer opportunities to achieve specific benefits, related for example to seeing particular fauna and flora, or being able to climb particular crags. Three quarters of the population in England consider local greenspace to be a very important part of the local environment, and 50% visit it at least once a week. Access to environmental settings for recreation, leisure and tourism is highly differentiated, throughout the UK. A number of measures have been implemented to address this including Natural England's Accessible Natural Greenspace Standard (ANGSt), which provides a set of benchmarks for ensuring access to places near to where people live. Recent legislative changes have contributed to improving access to some settings, with the Countryside and Rights of Way Act 2000 providing access to uplands, downs and commons and the Marine and Coastal Access Act 2009 promising to do the same for access to the coast. Economic studies have highlighted the benefits and monetary value that arise from being able to access environmental settings for recreation, leisure and tourism. Secondary analysis conducted for UK NEA of the English Leisure Visits Survey 2005 estimated that the total recreational value of the 4 billion visits to different habitats generated a value of between £2.2 and £3 billion per annum. A national park designation can raise house prices in proximate locations.*
- *Environmental settings can contribute to a wide range of health goods often by providing places where people can undertake physical activity and interact with nature. Levels of interaction/engagement of 'green space' have been linked with longevity and decreased risk of mental ill-health, and that vitamin D obtained from sunshine whilst being in environmental settings plays a role in long-term health. The presence of urban nature has been associated with improved cognitive functioning, aesthetic inspiration and reduced levels of crime and aggression as well providing an outdoor classroom. 'Green exercise', defined as any physical activity taking place in the presence of nature, is predicted to lead to positive health outcomes, as well as promoting ecological knowledge, fostering social bonds and influencing behavioural choices.*
- *Open green space and access to nature is important for children. The quality of their environmental exposure is inextricably linked to their wellbeing. Children's relationship with nature is a fundamental part of their development, allowing opportunities for self-discovery and natural environmental experience. The outdoor environment is perceived as a social space which influences their choice of informal play activities and promotes healthy personal development. Nature allows unstructured play, generating a sense of freedom, independence and inner strength which children can draw upon when experiencing future incidents of stress.*
- *Through their differing heritages, every environmental setting is capable of being interpreted as possessing a distinctive sense of place which can contribute to a range of human value needs. The intricacies and contingent nature of the relationship between needs, environmental settings and the past creates analytical challenges but is fundamental to understanding heritage goods. There is a very diverse range of heritage goods that are linked to ecosystem services, ranging in scale and ease of identification from perceived national landscapes through territorially demarcated National Trust land to the subtle and personal historical meanings people may attach to some urban commons. Environmental settings also function as a generator of a vast range of local identities based around a more local and everyday sense of heritage. Heritage goods, therefore, can be a source of community empowerment as well as potential conflict between different interests and can contribute to a sense of identity, place, freedom and understanding.*

- *The complex emotional and personalised characteristics of heritage goods mean that identifying their value to society is problematic. Indeed, a recent survey identified that almost every feature in an environmental setting will connote personal memories and attachments for someone. Despite the highly personal and context-specific nature of heritage, it is widely felt that it should be preserved to be passed on to future generations, as a means of providing both children and adults with an understanding of their history and identity. In addition, several million people across the UK actively support a wide range of civil society organizations dedicated to conserving and enhancing particular landscapes and places, wildlife and habitats through membership fees and, to a lesser extent, volunteering their time.*
- *Environmental settings are valuable surroundings for outdoor learning where engaging with nature can lead to enhanced connectedness to nature and increased ecological knowledge. Ecological knowledge has been defined as 'accumulated knowledge about nature' and can be acquired through contact with different natural environments, directly or indirectly. The economic value of ecological knowledge, generated formally in schools and less formally elsewhere, is considered to be substantial. However, there are significant complexities associated with estimating this economic value, with a recent study undertaken as part of UK NEA using an investment in human capital approach to investigate the value of ecological learning experiences of children in the formal educational system. Benefits of this investment in ecological knowledge include a possible boost in lifetime earnings as well as possibly enhanced quality of life through more productive use of leisure opportunities. Whilst this approach may be appropriate for ecological knowledge acquired in school it is difficult to ascribe a gain in knowledge to a specific trip or location. The approach to the latter therefore involved examining travel costs and resource costs in order to estimate investment costs over and above those involved in gaining knowledge in a classroom situation.*
- *Environmental settings play a positive role in religious practice and faith but more general evidence on their spiritual and religious role is limited. Religious and spiritual goods are clearly linked to our existence need for being, but the extent to which religious encounters with specific environmental settings are synergistic satisfiers for value needs such as participation and identity resides in the character and qualities of belief. The importance of ecosystems in religious terms had almost certainly increased in the post-war period in Britain, notwithstanding secularisation and the decline of conventional religious observance. There has, apparently, been an increase in the incidence of both pilgrimage and of religious retreats although it is extremely difficult to identify any quantitative measures of this trend. It is extremely hard to pin-point evidence of particular landscapes or ecosystems being conducive to religious experiences. The configuration of Marine and Coastal Habitats which appear to contribute to spiritual/religious experiences at the holy islands of Iona, Lindisfarne and Bardsey have to be seen in the context of other highly popular sites of pilgrimage that are inland and not characterised by dramatic landscape/ecological characteristics, such as Walsingham in North Norfolk.*
- *New evidence gathered as part of the UK NEA indicates that people clearly benefit from a range of environmental settings proximate to their homes and that the presence of certain settings can increase residential house prices. A new hedonic price analysis shows that the house market in England reveals substantial amenity value attached to a number of habitats, designations, private gardens and local environmental amenities. In particular, protected areas (National Parks, National Trust land and metropolitan green belt), local environmental settings (domestic gardens, local green spaces, rivers) and several habitats (such as woodland, farmland and freshwater) are a statistically significant factor in explaining higher house prices. A new well-being survey analysis also reveals that respondents who visit non-countryside green spaces such as urban parks at least once a month, and*

*those who spend time in their own gardens at least once a week, have higher life satisfaction than those who do not. Survey respondents who used domestic gardens and local green spaces at least once a month also showed better self-reported health, measured by physical functioning and emotional well-being, compared to those who do not.*

- *There are knowledge gaps related to ecosystem cultural services, specifically in data collection and the uneven monitoring of change in different environmental settings. An ecosystem services approach to understanding culture-nature interactions is a relatively new perspective and consequently many key sources of social, economic and environmental data are not designed to examine key aspects of cultural services and goods. Recent initiatives, such as the Countryside Quality Counts analysis and the new Master Map digital inventories, are leading to improvements, but a lot remains to be done, particularly to provide consistent data suitable for economic analyses. Further research is required, particularly longitudinal studies, to understand the social and physiological processes involved in people acquiring mental and physical health benefits from engagement with environmental settings and nature so that management of environmental settings for long term behaviour change can be more effective. Further studies are needed to examine people's exercise habits and understand what proportion of exercise is a direct consequence of the provision of green spaces. A key knowledge gap regarding education and ecological knowledge goods concerns the processes by which adults acquire ecological knowledge, their participation in nature-based educational activities and how knowledge acquisition is influenced by engagement with environmental settings as a form of cultural service. For religious and spiritual goods the knowledge gaps are particularly notable. There is a marked lack of evidence on the numbers of people for whom religious/spiritual experience and wellbeing is related to experiences of nature. We do not know how many people in Britain go on pilgrimage or make retreats or for whom contact with nature is an intrinsic part of their religious/spiritual lives. There is also limited evidence on detailed wildlife viewing figures for species other than birds, benefits of TV and radio programmes about nature, nature-based art markets (paintings, arts and crafts, photography), social cohesion and neighbourhood benefits associated with nature and non-use values of environmental settings at a national scale not already reflected in legacies.*
- *Addressing these knowledge gaps will require the regular and consistent collection of quantitative data at the national scale. Many of the gaps, however, require an understanding of the complex ways individuals and groups of people engage with environmental settings, the cultural goods/benefits that may arise and the inequalities associated with cultural goods/benefits. Recent guidance published by Defra emphasises that the cultural goods linked to ecosystem services cannot just be understood in monetary terms but in future their shared and non-monetary value will need to be understood using a range of participatory and deliberative techniques such as multi-criteria analysis that require the use of both quantitative and qualitative methods.*

### **Borough analysis**

- Most assets which contribute to cultural services cannot be mapped spatially, however the study has identified assets which form part of the historic environment or are accessible for recreation and aesthetic enjoyment, including TPOs (trees assessed for their amenity value), veteran trees, sites of historic importance, historic environment assets, natural and semi-natural urban green spaces (including woodlands) and waterways/watercourses which may also hold spiritual values.

## Supporting Services Nationally: Key findings of the UK NEA (2011):

- *Supporting services underpin the delivery of all other ecosystem services. Therefore, understanding their response to key drivers, such as climate change, land use and nutrient enrichment, is vital for the sustainable management of the UK's land and water resource. Supporting services include the ecological status of soil and water, and processes that drive the formation of soils, cycling of nutrients and fixation of carbon by plants. These are all strongly interrelated and, in many cases, underpinned by a vast array of physical, chemical and biological interactions. Our understanding of the ways that these interactions influence supporting services, and of the relative contribution of biological, chemical and physical factors, is generally limited.*
- *The soils of the UK are diverse and relatively young as most of Britain was under ice or peri-glacial conditions until 10–15,000 years ago. Soils form slowly, but can be quickly degraded and lost<sup>1</sup>. Soil formation rates in the UK are 0.04–0.08 mm per year for mineral soils, which is less than 1 cm per century, although there is still a lack of data with which to formulate a truly accurate picture. In actively growing bogs of good habitat status, peat formation is approximately 0.8 mm/yr, which is equivalent to a carbon accumulation rate of 0.5 tonnes carbon/hectare/year (t C/ha/yr). However, the average is probably closer to 0.1 t C/ha/yr given that many peatlands are not of good status. Threats to soil formation include organic matter loss due to climate warming, inundation of coastal soils due to sea-level rise, erosion and compaction caused by intensive agriculture, and soil-sealing due to urbanisation. There are many consequences of loss of soil for supporting, regulating and provisioning services.*
- *The last 50 years have witnessed substantial changes in the nutrient status and pH of waters and soils, with likely consequences for the delivery of both regulating and provisioning services. One of the most dramatic trends in nutrient cycling has been the enrichment of terrestrial and aquatic habitats with nitrogen due to the use of nitrogen fertilisers to increase food production. This has resulted in substantial changes in plant productivity, plant species diversity and composition, and an accelerated rate of nitrogen cycling. Another major change in soils and waters is the recent decrease in acidity of surface soils and acid-sensitive waters due to a substantial decline in sulphate deposition and an increase in rainfall pH since the late 1970s.*
- *Recent evidence suggests that there may have been a widespread decline in the availability of phosphorus across terrestrial and aquatic systems over the last decade. Across UK terrestrial systems, extractable phosphorus in soils has apparently declined by an average of 25% between 1998 and 2007. The reasons for this are not understood and require further investigation. There is evidence of decreasing phosphate concentrations in rivers across the UK which is linked to a reduction in the application of phosphorus fertiliser to land.*
- *Spatial variation in rainfall and runoff is exceptionally high across the UK and few general trends in precipitation and annual runoff have been identified. However, a change in rainfall seasonality has been observed, with wet winters being more common in the last 30 years. A gradual increase in annual average evaporation loss from 500 mm to 550 mm during the period 1980 to 2005 has been observed. This probably reflects an increase in average temperatures across the UK of around 1.0 °C over the last 30–40 years.*
- *There is significant inter- and between-year variation in terrestrial primary production that is driven primarily by weather patterns, such as those which occurred during the summer drought of 2003. There is mounting evidence that climate change will impact on primary production and community composition across all UK habitats, but there is an even greater risk of dramatic changes occurring as a result of extreme weather events. Changes in primary production resulting from climate change will have significant implications for provisioning and regulating services.*

- *In agricultural and forestry systems, improvements in land management have had a major impact on primary production due to nutrient input, technological developments and genetic selection<sup>1</sup>. This is reflected in a ten-fold increase in yields in some agricultural systems over the last century. In semi-natural systems, atmospheric nitrogen deposition has increased primary productivity. In lakes, streams and coastal waters, nutrient inputs of nitrogen and phosphorus from sewage and fertiliser runoff have caused major increases in primary production, in some cases eliminating seasonal patterns and causing undesirable hypoxia.*
- *In general, there is much uncertainty about the mechanisms that underpin supporting services, and our knowledge of how these services will be affected by current and future drivers, including climate change, is limited. However, it is clear that the mechanisms that underpin supporting services vary greatly across habitats, and the effects of key drivers, such as climate change, land use and nitrogen deposition, will impact on supporting services differently across UK habitats. Research is urgently needed to develop sustainable options for the management of UK supporting services and the regulating and provisioning services that they underpin.*

### **Borough analysis**

- Supporting services enable the other ecosystems services to be delivered. It is difficult to produce meaningful maps which show all the assets which enable processes such as soil formation, photosynthesis and nutrient or water cycling. Should data become available to illustrate local changes in nutrient levels, soil erosion etc. these should be incorporated into future GI/ecosystem assessments.

### **Key GI Issues**

- Ecosystem assessment is a relatively new concept; global systems were assessed in 2000 and England's ecosystems are currently under assessment (2010). The data presented in this report are not intended to represent a fully-developed ecosystem assessment of the borough; they do however indicate assets which are likely to provide one or more services to the residents of Solihull.
- An ecosystem assessment of the borough/sub-region/region would be useful in terms of quantifying the benefits of the natural environment.
- Datasets that might assist in such an assessment should be identified.
- The six Wildlife Trusts in the West Midlands are currently supporting a project hosted by the Birmingham and Black Country Wildlife Trust, to evaluate the ecosystem services provided by a suite of habitats that exist within GI in the West Midlands.

## 4.2 Local Character

Data used:  
 English Heritage  
 Natural England  
 SMBC

See Figure 8: Local Character

Solihull's 'local character' is a contribution of a number of different elements, all of which together provide the function of place-making — the landscape setting, cultural heritage, and a high quality living environment (neighbourhoods, streets and parks). Green Infrastructure can help to develop design criteria in response of landscape character and sense of place, celebrate the landscape, history and features specific to Solihull, all of which makes Solihull an attractive place to live, work and visit.

The following benefits are delivered by the local character GI function<sup>24</sup>:

- Place-making — making Solihull an attractive place to live work and visit
- Sense of place and identity
- Provide enhanced landscape setting, and relate development to landscape character, place and context
- Opportunities for habitat enhancement and creation
- Community involvement and participation, interpretation and education

### Key GI Issues

- Poor quality/inappropriate developments/infrastructure currently erode the borough's landscape character and diminish its sense of place. Standards for GI accessibility, quantity and quality should be set early in the planning process – within site briefs.
- Green infrastructure should be managed to reflect local character and sense of place wherever possible, through planting appropriate species, sensitive design of built infrastructure, and appropriate interpretation of natural and cultural heritage features.
- Heritage trails to highlight the borough's natural and built heritage should be developed.
- Solihull's cultural heritage features should be protected and promoted; providing interpretation of key features for the benefit and education of local communities and visitors to the borough.
- Long distance walking routes should be promoted as good ways to experience the borough's local character. Way markers/interpretation of the Arden landscape can be included at salient points.
- Masterplanning of new developments should be informed by the environmental opportunities and constraints on the site and its environs. Full appreciation of the natural environment and what it contributes to the local character must to be considered.

<sup>24</sup> Natural England (2009) Green Infrastructure Guidance



## 4.3 Quality of Life

Data used:  
Indices of Multiple Deprivation  
Department of Health

### Indices of Multiple Deprivation See Figure 9.1: Indices of Multiple Deprivation

Indices of Deprivation are an important tool for identifying the most disadvantaged areas in England<sup>25</sup>. Figure 9.1 maps the borough's deprivation; the indices are a combination of the following elements:

- Income deprivation
- Employment deprivation
- Health deprivation and disability
- Education, skills and training
- Barriers to housing and services
- Living environment deprivation
- Crime

### Borough analysis

- Overall, deprivation levels for the borough are low<sup>26</sup>. The borough has above average percentage (for England) of the least deprived residents, with 4 SOAs<sup>27</sup> in the top 1%.
- 8% of Solihull is in the most deprived 10% of England (10 SOAs).
- Areas within Smiths Wood, Chelmsley Wood, and Kingshurst and Fordbridge wards are within the most deprived 10% of England. They are above 5% of the most deprived but below 10% of most deprived in terms of education, skills, employment and income (IMD 2004).
- Areas within Smiths Wood, Chelmsley Wood, Kingshurst and Fordbridge, Lyndon and Shirley East wards are above 11% but below 30% of the most deprived in England.
- Smiths Wood is in the most deprived 5% in terms of crime within England (IMD 2004).
- The majority of the North Solihull Regeneration Zone is in the most deprived 10% in terms of education, skills and training.
- Accessible greenspace has been plotted onto the plan to ascertain if there is any link to access to greenspace and deprivation. But the plans shows that the most deprived areas in the north are well served by accessible open space.

<sup>25</sup> DCLG (2008) *The English Indices of Deprivation 2007*

<sup>26</sup> APHO and Department of Health (2010) *Health Profile Solihull updated 28 July 2010*

<sup>27</sup> Super Output Areas (SOAs) are small scale measures of deprivation. DCLG (2008) *The English Indices of Deprivation 2007*

## Health

There have been a number of studies undertaken and reports produced stating the links between health, the environment and access to green space.

Greenspace Scotland has undertaken research and produced a report<sup>28</sup> on the links between greenspace and health and has found the following:

- The evidence indicates a positive relationship between greenspace and general health and wellbeing. The studies do not, however, explain the mechanisms by which greenspace has a positive effect on population health, nor do they demonstrate whether different types of greenspace have a greater or lesser impact on health in urban environments.
- The evidence indicates that people who use greenspaces regularly are more likely to take exercises, and those who use greenspaces most regularly usually live nearby. A recent study found that people who lived furthest from public parks were 27% more likely to be overweight or obese compared to people who lived closest to parks<sup>29</sup>.
- The attractiveness or quality of greenspace is an important determination of greenspace use. Evidence indicates that greenspace is most valuable as a resource for physical activity when used by high volumes of people: therefore spaces need to be accessible, of sufficient size, and connected to residential areas. Access to safe greenspaces is particularly important for children and young people.
- Studies consistently show a relationship between levels of stress and access to urban greenspaces. The more time people spend in outdoor greenspaces, the less stressed they feel, regardless of age, gender, and socio-economic status.
- Many studies undertaken in the UK have explored the public attitudes towards greenspaces and the environment. There are widely shared beliefs that greenspaces improve quality of life. The opportunities offered by greenspaces to be in contact with nature, to have fresh air, to be outdoors, to be close to plants and animals, are generally seen to have a profound impact on wellness and well-being, including mental health.
- Greenspaces are seen to promote positive emotional experiences. The “de-stressing” capacity of greenspaces, their role as an escape from the dirt, stress, noise and visual hardness of urban settings and their restorative capacity are the most valued aspects.
- Parks and greenspaces are one of the few remaining spaces that are available to all, and neutral spaces where people from different communities and backgrounds come together. Surveys show that individuals and families undertake a wide of activities in greenspaces. Greenspaces are frequently noted as places of attachment and affection for individuals and communities, and as a distinct feature of localities.

The survival of older people increases where there is more space for walking near their home, with nearby parks and tree-lined streets. Prevalence rates for diseases such as diabetes, cancer, migraine/severe headaches and depression are lower in living environments with more green space within a one kilometre radius and mental health may be particularly affected by the amount of local green space.<sup>30</sup> Health inequalities related to

<sup>28</sup> Greenspace Scotland (2008) *The links between greenspace and health: a critical literature review. Executive summary*

<sup>29</sup> E. Coombs, A. Jones, & M. Hillsdon (in press) *Objectively measured green space access, green space use, physical activity and overweight.*

<sup>30</sup> Maas J, Verheij RA, de Vries S, Spreeuwenberg P, Schellevis FG & Groenewegen PP (2009) *Morbidity is related to a green living environment.* Journal of Epidemiology and Community

income deprivation in all-cause mortality and mortality from circulatory diseases were lower in populations living in the greenest areas.<sup>31</sup>

There are also other indisputable facts: blood pressure tends to decrease when people are in more natural surroundings; physical activity releases endorphins which in turn help fight depression; people in hospital with views of greenspace have been shown to recover more quickly and with fewer drugs than those with no such views.

The links between activity in green spaces, improved health and cost savings can be demonstrated by an example; BTCV's Green Gym programme, between 2005 – 2009 had estimated cost savings<sup>32</sup>:

- to the health service of £1,359,453 (based on life cost averted savings)
- cost-benefit ratio of 1:2.55, so that, for every £1 invested in Green Gym Infrastructure, £2.55 has been saved in the treatment of inactivity.

Natural England has discussed links between the natural environment and healthy lives<sup>33</sup>. Some of the key findings are:

- People who lived furthest from public parks were 27 per cent more likely to be overweight or obese.
- Children able to play in natural green space gained 2.5 kilos less per year than children who didn't have such opportunities.
- 1,300 extra deaths occur each year in the UK amongst lower income groups in areas where the provision of green space is poor.
- For every £1 spend on establishing healthy walking schemes the NHS could save £7.18p in the cost of treating conditions such as heart disease, stroke and diabetes.
- If every household in England were provided with good access to quality green space it could save an estimated £2.1 billion in health care costs.

### **Borough analysis**

- People in Solihull live longer than the national average. However, there are inequalities within the borough; life expectancy for men living in the most deprived areas live 8 years less than men living in the least deprived areas, similarly it is 6 years for women.
- Over the last 10 years, rates of death from all causes have fallen and are below the national average for England.
- There are areas within Smiths Wood, Chelmsley Wood, and Kingshurst and Fordbridge which are in the most deprived 10% in England in terms of health and disability.
- There is one area in Olton which is in 20% of the most deprived, and areas within Lyndon, Shirley East and Shirley west wards which are in 30% of the most deprived in term of health in England.

<sup>31</sup> Mitchell R and Popham F (2008) *Effect of exposure to natural environment on health inequalities: An observational population study*. The Lancet 372 (9650):1655 – 1660.

<sup>32</sup> BTCV (February 2010) *Cost-effective health*

<sup>33</sup> Natural England (2009) *Our Natural Health Service. The role of the natural environment in maintaining healthy lives*

## Child Well-being

### See Figure 9.2: Child Well-Being

Child well-being is represented by how children are doing in a number of different aspects of their lives. The age range used is generally 0 to 16 or 18 if in full time education. Figure 9.2 maps the borough's child well-being, based on the following aspects<sup>34</sup>:

- Material well-being
- Health
- Education
- Housing
- Crime
- Environment
- Children in need

### Borough analysis

- Solihull has 39.1% of LSOAs in the least deprived 20% in England in terms of child well-being. Areas such as Balsall Common, Knowle, Dorridge and central Solihull are within this top 20%.
- Solihull has 9% of LSOAs in the most deprived 20% in England in terms of child well-being. Areas such as Smiths Wood, Chelmsley Wood, Kingshurst and Fordbridge, and Lyndon wards.
- The results for the individual aspects of the Well-being Index are generally similar in all but for the environment, which is significantly different (see Figure 9.3 Child Well-being focussing on the environment alone).
- There are a number of areas in the least deprived 10% in the country for Child Well-being Index which are also in the most deprived 10% in terms of Child well-being focussing on the environment alone. Some of these areas coincide with shortfalls in the neighbourhood accessible open space, recreation grounds, sports and play provision.

## Local Quality (measured by Solihull's Vitality Index)

### Figure 9.4: Vitality Index

The Vitality Index as shown in Figure 9.4 differs from the Indices of Deprivation (IMD) and the Child Well-being in that it is based on the relative value within the borough. The index is calculated using a number of aspects:

- Income
- Health
- Unemployment
- Education
- Crime

The index scores from 0 best to 1 worst, and this Index correlates well to the IMD and the Child Well-being, with the same areas of the borough scoring well or badly in each. Whilst the Vitality Index may be shown relative to national values, comparison with other authorities will not be possible. The VI differs from the IMD in that it is timely and frequent thereby affording the opportunity to flag important questions giving the possibility to react quickly. The data shown is the first draft of the VI (produced for consultation which has since been

<sup>34</sup> DCLG (2009) Local index of child well-being

approved) and includes data from the recession which is absent from the IMD. A formal approach will be adopted by Jan 2011 and updated every quarter. In the absence of the Places Survey the VI is essentially intended to provide a mechanism for monitoring whether the themes of the Sustainable Communities Strategy are being addressed.

### **Borough analysis**

- The vitality index shows that Areas such as Balsall Common, Knowle, Dorridge, central Solihull and parts of the Blythe have the highest vitality or well-being within the borough.
- Smiths Wood, Kingshurst, Fordbridge and Chelmsley Wood have low vitality in relation to the rest of the borough.
- Other areas which are also lower in vitality include Olton, Lyndon, Elmdon and Shirley South.

### **Noise**

#### **See Figure 9.5: Noise**

Noise can come from many sources, especially roads and highways. Noise can have a significant effect on the environment and on the quality of life experienced by individuals and communities. There is also emerging evidence it also directly affects health, particularly cardiovascular impacts. In the UK, 43% of people feel noise affects their private home life.

Solihull has several corridors where noise levels are high, notably along the motorways, major roads (A45, A34 and A41), the railway lines and the airport. There are also numerous local roads which stand out to a lesser degree on Figure 9.4. The map clearly shows that there are several areas within the borough's countryside where noise levels are very low; some of these coincide with the long distance walks, which will provide open access to these quiet areas.

Through the effective management and control of environmental, neighbour and neighbourhood noise within the context of Government policy on sustainable development:

Government policy on sustainable development has the following noise policy aims<sup>35</sup>:

- avoid significant adverse impacts on health and quality of life;
- mitigate and minimise adverse impacts on health and quality of life; and
- where possible, contribute to the improvement of health and quality of life.

Green Infrastructure can make a contribution to reducing the adverse effects from environmental noise. Trees can play an important role in deadening unwanted noise; sound waves are absorbed by a tree's leaves, branches, and twigs. Greenery provides 'white noise' reducing the effects of man-made sounds. Sound travels differently over various kinds of surfaces; hard surfaces reflect virtually all incident sound whereas soft surfaces absorb sound. The growing medium tends to block lower sound frequencies whilst the plants block higher frequencies. Properly placed screens of trees and shrubs significantly decrease noise pollution along busy thoroughfares and intersections.

Trees reduce perception of noise is by creating a visual barrier between the source and the hearer. It has been suggested that people are less conscious of noise if they cannot see the source. Published results on the effectiveness of tree and shrub barriers vary enormously, however, in some instances noise can be reduced by 6dB over a distance of 30 metres where planting is particularly dense<sup>36</sup>.

<sup>35</sup> Defra (2010) *Noise Policy Statement for England*

<sup>36</sup> Huddart, L. (1990) *The use of vegetation for traffic noise screening. (Department for Transport)*

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## Key GI Issues

- New developments which provide/design-in public open spaces and opportunities for active recreation, play should be encouraged.
- The need for the provision of GI is supported by the outcomes of the Council's new Children and Young People's Plan for Solihull 2010 – 2013 consultation (January 2010) which highlighted that children want: time to play, things to do and places to go (for children and young people of all ages); the opportunity to grow their own food; opportunities for exercise, clubs where children cycle to school together, and safe routes for walking, including cycle lanes; want parks and playgrounds where they feel safe to play and have equipment for disabled children to join in; children identified the importance of caring for the environment – suggesting that conservation volunteering opportunities will be of interest, junior ranger schemes etc. and provision of local accessible open space easily reached by children and young people on their own or with their peers was a particular issue in the rural parts of the borough.
- The delivery of a GI network should include provision for social spaces, seating and places for interaction; spaces for events and opportunities for social inclusion.
- The quality design of spaces and environments is required to facilitate natural surveillance, involve communities and reduce crime.
- The quality, quantity and connectivity of local greenspace should be increased to encourage usage (being within 300m of green space is key for improving both physical and mental health).
- The quality and provision of and access to open space in the most deprived wards – Chelmsley Wood, Smiths Wood, and Kingshurst and Fordbridge needs to be addressed as a priority. Poor quality environments can limit economic investment and reduce community aspirations.
- The North Solihull regeneration project is important in contributing to the improvement in people's lives and reducing the inequalities within the borough.
- The benefits of diverse natural environment for physical and mental health should be promoted. Degraded environments affect the physical and mental health and well-being of current and future generations.
- Allotment provision should be increased to enable local food growing and healthy lifestyles.
- Walking and cycling should be promoted through the provision of improved accessible green spaces and attractive, tree lined streets. Initiatives such as Walking for Health initiative supported by Natural England should be promoted.
- Car ownership in the north of the borough is below national average, therefore the provision and access to sustainable/public transport is particularly important in this area. This should include good quality, safe footpaths and cycleways.
- The numbers of people using the countryside and green spaces should be increased by publicising local and long distance foot paths.
- 'Green routes' beyond development site boundaries should be established to allow for walking and cycling as means of travel.
- Street trees and urban tree planting should be used to reduce ambient noise, improve air quality and mitigate for the effects of climate change, in addition to contributing to local distinctiveness and sense of place, which in turn leads to psychological well-being.
- Planting/earthworks should be used to help reduce the effects of noise along major transport routes. Street trees should be planted along key routes such as the

Stratford Road (A34), Warwick Road (A41), Chester Road (A452) and Coventry Road (A45).

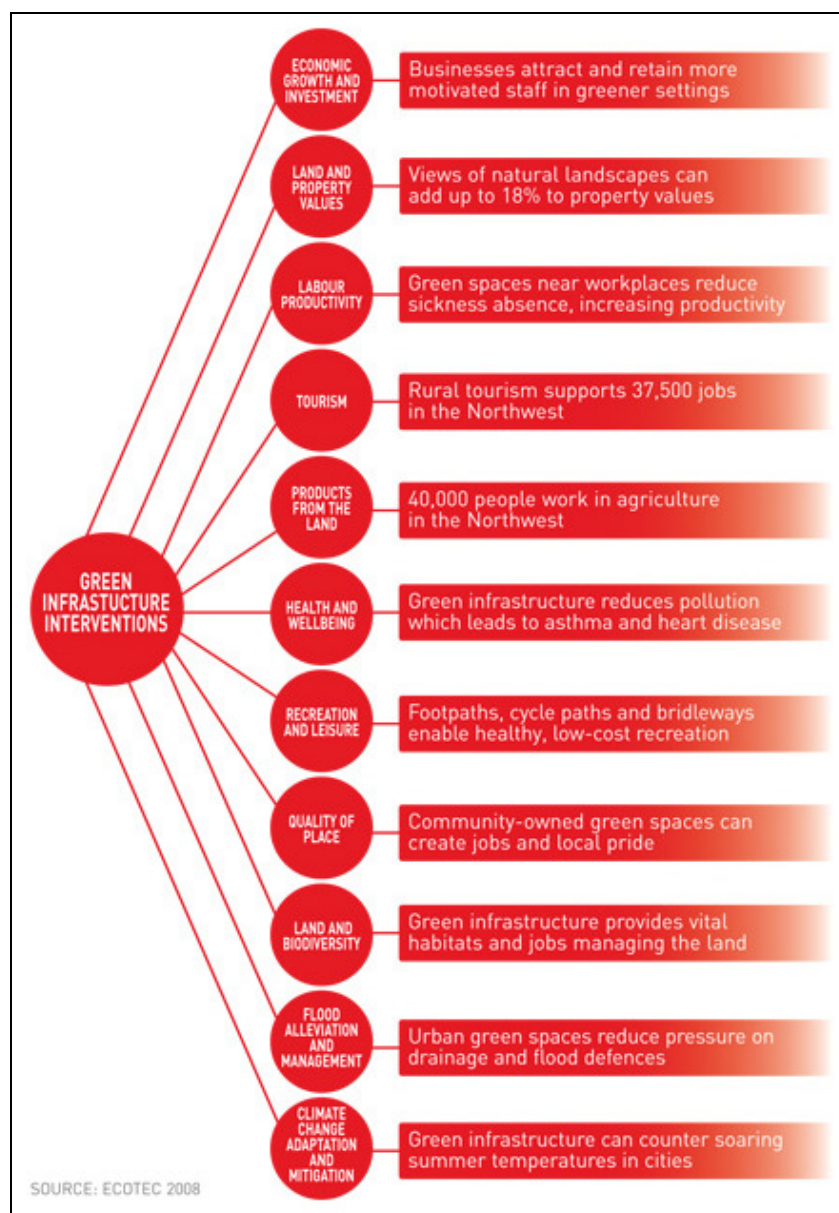
- Significant belts of trees should be planted (where space allows) close to the areas most affected by noise e.g. the motorways.
- Land uses close to areas most badly affected by noise should be carefully considered.

## 4.4 Economy

Green Infrastructure delivers a number of benefits directly and indirectly to the economy; GI can save money and make money. GI contributes to the local economy, therefore should be considered a critical infrastructure. It needs to be planned, managed and invested in at different spatial scales as with any other critical infrastructure. Ultimately, GI contributes not only to the local economy, but to the regional, national and international economies.

Applying economic thinking to the use of biodiversity and ecosystem services can help clarify two critical points: why prosperity and poverty reduction depend on maintaining the flow of benefits from ecosystems; and why successful environmental protection needs to be grounded in sound economics, including explicit recognition, efficient allocation, and fair distribution of the costs and benefits of conservation and sustainable use of natural resources<sup>37</sup>.

Green infrastructure delivers 11 themed benefits<sup>38</sup> for a multitude of stakeholders:



<sup>37</sup> TEEB (2010) *The Economics of Ecosystems and Biodiversity: Mainstreaming the Economics of Nature: A synthesis of the approach, conclusions and recommendations of TEEB.*

<sup>38</sup> NENW (2008) *Economic Value of Green Infrastructure*



The links between protecting the quality and value of the environment to society should be recognised as an economic driver, enabling economic recovery and promoting a strong growing economy. Greenspace can help to promote tourism and create a favourable image of place to encourage inward investment and improve recruitment and retention of staff<sup>39</sup>. A strong and sustainable green economy needs to be supported to be resilient to climate change<sup>40</sup>. Society's increasing pressure on the environment is damaging ecosystems and the valuable services that underpin our economic, social and personal well-being.

Recent estimates of the value and losses of the natural environment to society include:

|  |   |
|--|---|
| Business and the economy                 | <ul style="list-style-type: none"> <li>• An estimate of the total value of natural resources to the UK economy was over £15bn in 2007.</li> <li>• It is estimated that 60% of the natural services that we depend on are in decline due to poor management or over use (Millennium Ecosystem Assessment)</li> <li>• The world is losing 50 Billion Euros of natural services from biodiversity loss each year. (TEEB Interim Report)</li> </ul>   |
| Health and wellbeing                     | <ul style="list-style-type: none"> <li>• Recent estimates suggest that air pollution reduces life expectancy over the UK population by an average of 6 months at a social cost of £15 billion per year</li> <li>• If every household in England were provided with good access to quality green space it could save an estimated £2.1 billion per year in health care costs</li> <li>• Air pollution reduces life expectancy over the UK population by an average of 6 months at a social cost of £15 billion per annum.</li> </ul> |
| Places and transport                     | <ul style="list-style-type: none"> <li>• On the Humber, increased flood protection worth over £400k per year has been achieved by converting 170 hectares of land to intertidal habitats</li> </ul>   |
| Climate change mitigation and adaptation | <ul style="list-style-type: none"> <li>• The annual value of carbon sequestration from UK woodlands is estimated to be £770 million. Creating 10,000ha of woodland each year for 15 years could absorb up to 50m tonnes of CO<sup>2</sup> between now and 2050.</li> <li>• 580 million tonnes of carbon are stored in England's peat soils</li> </ul>   |
| International development                | <ul style="list-style-type: none"> <li>• Globally, more than 1.3 billion people depend on fisheries, forests and agriculture for employment and more than 1 billion rely on fish as their sole source of protein</li> </ul>   |

Source:Defra

The Environment Agency recently looked at the useful function that river valleys serve in Birmingham, calculating that any areas of green space floodplain in the city had an approximate value of £23,500 per hectare for their flood management purposes alone. So for every hectare that is allowed to be developed in green space that is floodplain, there will eventually be a bill to the public purse of £23,500. This study was specific to Birmingham

<sup>39</sup> Alan Barber (2005) *Green Future: A Study of the Management of Multifunctional Urban Green Spaces in England*

<sup>40</sup> Defra (2010) *Structural Reform Plan*

however we would expect a similar value would be calculated for Solihull given its characteristics and location<sup>41</sup>.

Good quality greenspace enhances property prices, and adds value to the surrounding property, commercial and residential, consequently increasing tax yield to maintain public services. The uplift in property values is just one element in a wider economic transformation but it is of considerable interest because it reveals where consumer demand is high. It serves as an indication of the type of communities people find desirable and want to live in.

Figures from CABE show that property values increase near green spaces, with houses close to parks averaging 8% higher prices than similar properties further away. Green infrastructure investment can therefore offer higher returns for the property sector. Higher property values in themselves are also believed to improve an area's image. Greener cities attract more visitors, bringing with them retail and leisure spending and providing job and rental opportunities<sup>42</sup>.

The allure of Solihull is reflected by average house prices which were £84,814 above the average price within the West Midlands in June 2010. Predictably wards such as Meriden, Knowle, Dorridge, Hockley Heath, and St Alphege are 105-120% more than the West Midlands average. These wards also scored highly against the vitality index and were the least deprived as measured by the IMD. Wards such as Smith's Wood, Kingshurst, Fordbridge and Chelmsley Wood (which were amongst the most deprived in England as measured by the IMD) were also 41-45% under the West Midlands average property value in June 2010.

|                         | Jun-09   | Jun-10   | Change  | Change % | Relative to WM | Relative to Solihull |
|-------------------------|----------|----------|---------|----------|----------------|----------------------|
| <b>West Midlands</b>    | £172,967 | £183,770 | £10,803 | 6.2%     |                |                      |
| <b>Solihull</b>         | £241,777 | £268,584 | £26,807 | 11.1%    |                |                      |
| Castle Bromwich         | £151,064 | £187,512 | £36,448 | 24.1%    | 2%             | -30%                 |
| Smith's Wood            | £92,576  | £105,038 | £12,462 | 13.5%    | -43%           | -61%                 |
| Kingshurst & Fordbridge | £109,224 | £108,183 | £-1,041 | -1.0%    | -41%           | -60%                 |
| Chelmsley Wood          | £95,275  | £101,702 | £6,427  | 6.7%     | -45%           | -62%                 |
| Bickenhill              | £266,121 | £284,271 | £18,150 | 6.8%     | 55%            | 6%                   |
| Olton                   | £248,995 | £281,264 | £32,269 | 13.0%    | 53%            | 5%                   |
| Lyndon                  | £158,805 | £178,547 | £19,742 | 12.4%    | -3%            | -34%                 |
| Elmdon                  | £183,252 | £203,814 | £20,562 | 11.2%    | 11%            | -24%                 |
| Silhill                 | £294,091 | £350,051 | £55,960 | 19.0%    | 90%            | 30%                  |
| Shirley West            | £167,592 | £180,756 | £13,164 | 7.9%     | -2%            | -33%                 |
| Shirley East            | £218,465 | £230,582 | £12,117 | 5.5%     | 25%            | -14%                 |
| Shirley South           | £194,152 | £227,807 | £33,655 | 17.3%    | 24%            | -15%                 |
| St Alphege              | £368,745 | £400,283 | £31,538 | 8.6%     | 118%           | 49%                  |
| Blythe                  | £226,120 | £267,725 | £41,605 | 18.4%    | 46%            | 0%                   |
| Dorridge & HH           | £383,663 | £404,142 | £20,479 | 5.3%     | 120%           | 50%                  |
| Knowle                  | £354,265 | £386,223 | £31,958 | 9.0%     | 110%           | 44%                  |
| Meriden                 | £377,446 | £377,484 | £38     | 0.0%     | 105%           | 41%                  |

Source: Hometrack (sales and valuations)

<sup>41</sup> EA (May 2011) Draft GI Study consultation response

<sup>42</sup> CABE (2005) *Does money grow on trees?*

The property values and presence of greenspace may at first appear contradictory as North Solihull has a high ratio of greenspace in relation to the rest of the borough. However, crucially the key to creating a desirable place to live is not only the presence of greenspace but its quality and the contribution it makes in creating a sense of place and local distinctiveness which has perhaps been better achieved in other parts of the borough. Good quality parks, gardens and civic spaces (GI assets) will be well-used, safer and are a vital business and marketing tool in attracting companies/services and in turn employees and customers to a location. Solihull should invest in and capitalise upon its GI assets to create safer, healthier, stronger and more prosperous communities.

### **Street trees and urban forestry**

A major part of Solihull's local character is the mature street trees and the resulting 'leafy' character.

The economic benefits of urban trees<sup>43</sup>:

- Have the potential to increase residential and commercial property values by between 7% to 15%
- Improve the environmental performance of buildings and therefore the economic performance through reducing heating and cooling costs
- Can provide mature landscapes that confer a premium for development sites
- Assist the appreciation of property values proportionate to their scale as they grow larger
- Creating a positive perception for prospective purchasers of property
- Enhance the prospects of securing planning permission
- Improve health in the urban population, thus reducing healthcare costs
- Provide a potential long term renewable energy resource

One example of the economic benefit of street trees is in Canberra, Australia. The local authority has enhanced urban quality of life by planting 400,000 trees. Besides making the city greener, the trees are expected to regulate the microclimate, reduce pollution and thereby improve urban air quality, reduce energy costs for air conditioning as well as store and sequester carbon. Combined, these benefits are expected to amount to the equivalent of US\$ 20–67 million for the period 2008– 2012 in terms of the value generated or savings incurred to the city<sup>44</sup>.

New York's Parks and Recreation Department has quantified the value of the city's trees in economic terms. New York City's street trees provide an annual benefit of about \$122 million. For every dollar spent on a street tree in the city, New York receives \$5.60 worth of benefits, including shade, improved air quality by absorbing pollutants, and impact on local property values.

London's street trees have been estimated to be worth £6.4 billion, with most trees worth £8,000 – £12,000.

<sup>43</sup> Trees and Design Action Group (2008) *NO TREES, NO FUTURE Trees in the urban realm*

<sup>44</sup> Brack, C.L. (2002) *Pollution mitigation and carbon sequestration by an urban forest.*

**Key GI Issues**

- Solihull's 'leafy character' should be maintained. The borough's tree stock should be maintained and enhanced, ensuring a diverse population of trees of mixed age and species. The Urban Forestry Strategy should be supported to contribute to national and regional targets regarding tree cover in Britain.
- Solihull's high quality environment should be maintained and enhanced by investing in the management of existing and development of additional quality greenspace to support inward investment and regeneration, which is fundamental in closing the gap of inequality.
- The quality of green spaces, character of streets and quality of urban forestry in the borough's regeneration zone needs to be improved.
- The value of Solihull's trees should be calculated, by using the CAVAT (Capital Asset Value for Amenity Trees) system, to put a monetary value on Solihull's 'leafy character'. This could help in retaining trees through the planning system, and in calculating commuted sums for developments to contribute to local character and urban GI.
- Street enhancement schemes such as the Stratford Road and Warwick Road schemes should facilitate 'urban greening' and ensure that sufficient room is allowed for within the footways to enable street tree planting of suitable size (an ultimate growing height).
- Education is required within the business sector, developers and the Council regarding the true economic value of GI.

## 4.5 Community development and education

The 'CLERE' model for multifunctional urban greenspace<sup>45</sup> includes community development and education as one of the five functions of greenspace. This function can be extended to rural greenspace for the purpose of this GI study, as many non-urban sites provide opportunities for community development and education.

In terms of the different ways in which greenspace enables this function, the following are examples:

- Volunteering/countryside volunteers; different groups with interests such as canals, conservation, rivers, wildlife and walking not only help manage these spaces but also ensure that traditional/habitat management skills are passed on
- Venues for community events (integrating all residents irrespective of age, gender, ethnicity, religious belief or sexual orientation)
- Venues for play and recreation (to aid child development, improve social skills and personal development)
- Enabling family and intergenerational mixing
- Creating partnerships with business and voluntary groups
- The development of 'Friends of' groups
- Allotments
- Forest Schools
- Enabling sociable transport routes.
- 

GreenSpace's Community Networking Project (2003) estimated that there were approximately 4000 community-based organisations associated with greenspace in the UK, with total membership of over half a million. The report estimates that the annual economic value of the work of community groups in parks and green space across the UK ranges somewhere between £17 and £35 million. 'Friends of' groups can be valuable to parks in the following ways, they can:

- Promote the park
- Undertake or help with conservation tasks
- Organise community events
- Fundraise
- Contribute to park management and future improvements

The networks of greenspaces both urban and rural are linked to the Sustainable Communities Strategy and are vital to delivering some of the Strategies targets. Two of the cross cutting issues of the Strategy are cohesion and social inclusion, both of which are addressed by the function of greenspace discussed here.

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<sup>45</sup> Alan Barber (2005) *Green Future: A Study of the Management of Multifunctional Urban Green Spaces in England*

### **Key GI Issues**

- In Solihull there are a 4 'Friends of' groups — Kingfisher Country Park, Elmdon Park, Knowle Park, and Dorridge Park. SMBC is working with local people to form the Hillfield Park Support Group.
- The Council should continue to support the Forest Schools initiative, encourage positive use of the borough's woodlands and open spaces.
- The Solihull MBC's events team, LNR officer and Park Rangers organise an extensive range of activities and events within the borough's parks, open spaces and civic spaces. Support and resources for these activities need to be committed.
- The Local Nature Reserves have open access and include interpretation and information boards. The LNR network should continue to be maintained and improved to perform a number of functions, including education and community development.

## 5.0 Solihull's existing Green Infrastructure and projects

**Case Study 1: Kingfisher Country Park** – was inaugurated in 1985 as Project Kingfisher being formally declared Kingfisher Country Park in July, 2004. It is a joint project sponsored by both Birmingham City Council and Solihull MBC together with Natural England, The Environment Agency, Warwickshire Wildlife Trust and the Wildlife Trust for Birmingham and the Black Country. The project covers an 11km stretch of the River Cole running from the Coventry Road (A45) at Small Heath as far as the M6 at Chelmsley Wood and was extended in 2010 to include the Hatchford Brook in Solihull. Its overall aim is to care for the valley of the River Cole, improving it both for people and wildlife.

**Case Study 2: CycleSolihull** – is a volunteer-led community initiative to encourage more people to cycle in Solihull. The group produce a range of route leaflets to encourage people to explore their local area by bike and provide regular opportunities for people to ride together along these routes. The routes often utilise quiet country lanes and the canal towpath.

**Case Study 3: Strollers and Striders** – provide health walks within the borough and is part of the national 'Walking the Way to Health' Initiative. The walks take place in local town centres, woodlands and parks.

**Case Study 4: Solihull Discovery Walks** – is a walking group set up to enjoy natural and local history, and to enable well-being. The group organises walks in the countryside, local woods, historic villages, and the canals. This group fully utilises the community and education function of the borough's GI. In 2010 the group donated tools and two barn owl boxes to Solihull Conservation Volunteers which were installed in Dickens Heath Country Park.

**Case Study 5: Conservation/Friends of/Community volunteer groups** – There are two weekly volunteer groups which the Council supports in managing their land: Birmingham and Solihull Midweek Conservation Volunteers and Solihull Conservation Volunteers. SCV is a registered charity, carrying out practical conservation tasks at weekends to protect and restore wildlife habitats in and around the Solihull area. Birmingham and Solihull Midweek Conservation Volunteers are a multi-talented, varied group of mixed intellectual and racial origin who work in most parts of the West Midlands and are affiliated to the British Trust for Conservation Volunteers. The Council also support a network of Tree Wardens who work in partnership with BTCV and the Tree Council to gather information on trees, provide advice to local communities and encourage tree planting projects. Solihull also support a growing number of Environmental Champions. The aim of the champions is to be the local 'eyes and ears' in the borough, who as volunteers help in a variety of tidy up days, spring cleans and general graffiti removal. WWT have established local volunteer groups at Brueton Park, Clowes Wood and New Fallings Coppice SSSI, Elmdon Manor, Temple Balsall and Priory Fields. They are currently developing a youth engagement project at Tudor Grange Park.

**Case Study 6: LNR designations** – The Council are currently working through a 5 year LNR designation programme which aims to address the need to designate further LNRs within the borough as identified in the Nature Conservation Strategy, the adopted Solihull UDP proposal, the Green Spaces Strategy and the North Solihull Strategic Framework. The requirement for further LNRs is also supported by this report.

**Case Study 7: HBA and WSP partnership** – The Council is a partner in the Warwickshire, Coventry and Solihull Habitat Biodiversity Audit (HBA), managed by the Warwickshire Wildlife Trust, which surveys all habitats throughout the sub-region on a rolling programme. In 2008 it was recognised by the European Committee of Regions as best practice for monitoring biodiversity. The sub-regional Wildlife Sites Partnership (WSP) reviews/monitors Local Wildlife Sites in Solihull. Locally important habitats and species that need to be included in Local Biodiversity Action Plans and progress on their protection can be identified

more readily with Borough-wide data on species and habitats. The habitat information enables an accurate assessment of the land use change, which assists strategic decision making in relation to the natural environment. It is also vital for the development of the LDF and in determining planning applications. The information, augmented by species and site data identify meaningful indicators of progress towards a more sustainable Borough.

**Case Study 8: LBAP partnership** – Solihull is one of the 59 organisations and individuals within the sub-region that support the LBAP partnership and one of the 40 members of the Steering group who meet twice a year to discuss matters referred to them by the LBAP coordinator. The partnership is chaired by the Warwickshire Wildlife Trust and was formed in 2001 to develop the Warwickshire, Coventry & Solihull Local Biodiversity Action Plan. Solihull assists the LBAP coordinator with reporting on the progress of the actions proposed in the individual action plans and is currently involved in local opportunity mapping to identify areas suitable in delivering both the LBAP targets and Landscapes for Living objectives.

**Case Study 9: Eco-schools** – is an international program of environmental and sustainable developmental education for schools. The aim of Eco-Schools is to raise students' awareness of sustainable development issues. The Eco-Schools Green Flag, is awarded to schools with high achievement, is a recognised and respected eco-label for environmental education and performance.

There are a number of different focuses a school can take within the eco-school framework, such as energy and water; local well-being; and buildings and grounds (including habitat and biodiversity), so although it is worth discussing eco-schools as a potential GI deliverer, we do not have qualitative data on what the Solihull schools are actively contributing.

Currently there are 73 schools in Solihull involved in the Eco-schools initiative, which is 78% of all schools. There are 5 schools where the Green Flag has been awarded.

**Case Study 10: Forest Schools** – allow children to become comfortable with an outdoor approach to education and play whilst in familiar surroundings. It is delivered in a number of different venues in Solihull – 9 public woodlands or parks, 4 private woodlands, and 9 school sites. Forty-six percent of primary schools and one secondary school participate regularly i.e. most weeks of the academic year in Forest School in Solihull, other provision is during school holidays or weekends. The children and young people (CYP) involved range in ages from 3 to 16. In 2009-10 2,037 CYP participated in 1300 sessions across the borough.

**Case Study 11: Green Flag Parks** – In 2009/2010 Solihull was awarded seven Green Flags for our parks: Malvern and Brueton Park, Elmdon Park, Shirley Park, Knowle Park, Lavender Hall Park, Dorridge Park and Meriden Park. Green Flags are awarded by Keep Britain Tidy the flags are seen as the gold standard for public spaces that are welcoming, safe and well maintained. It is also seen as a way of encouraging others to achieve high environmental standards and setting a benchmark of excellence in recreational green areas. Solihull has been invited to become a pilot authority for a new Green Flag pilot scheme which will award Councils for maintenance and management across all its green spaces.

**Case Study 12: Woodland Management Programme** – Solihull's Woodland Management Programme covers 26 public woodlands and includes works such as tree thinning, footpath and access provision which are undertaken by contractors and voluntary groups in line with management plans. The programme receives the support of the Forestry Commission, Natural England and Warwickshire Wildlife Trust. Solihull's Woodland Management Programme also includes promotion of woodland management, crafts and appreciation through the annual Oaks and Shires event which is held in a different woodland each year and entails educational activities with local schools during the week and a family open day at the weekend.

**Case Study 13: Park Rangers** – Events and community involvement in parks and open spaces are managed by the Park Ranger Service, which has been in operation since 2002.



The service consists of a head ranger, 3 park rangers and 6 assistant rangers. They act as ambassadors of the parks and ensure that quality and standards are maintained and facilities enhanced. The Rangers carry out lots of sessions and events with schools, after school clubs and volunteer groups with the aim to educate and encourage conservation.

**Case Study 14: Junior Park Rangers** – The Junior Park Rangers services was funded by the Safer Stronger Communities Fund. It began as a pilot scheme for 12 months in 2007 as a service to enable children and young people in the north of the borough to have a say in the environment in which they live. The success of the pilot has now expanded to the south of the borough.

**Case Study 15: Playbuilder Project** – The Council is one of 43 local authorities chosen by the government to become a Playbuilder authority and were granted £1.1m for the project which aims to transform 27 play spaces across the borough. Working from the Children's Plan and Fair Play programme our project aims to support play throughout childhood; create more high quality places to play; help children play safely; make public space more child-friendly and continue to sustain and embed play locally. The scheme includes community and charity led projects which will provide innovative, stimulating equipment and landscaping that will encourage physically active play, for 8-13 year olds. Six playgrounds were completed in year 1 (2009: Colebrook Recreation Ground, Dorridge Park, Elmdon Heath Recreation Ground, Kingshurst Park, Marston Green Park and Tudor Grange Park). Sites for development in 2010 include: Babb's Mill Park, Bluebell Recreation Ground, Brookside Recreation Ground, Chadwick End Park, Elmdon Coppice, Hillfield Park, Beechcroft Open Space, Knowle Park, Malvern Park and Olton Jubilee Park.

**Case Study 16: Earlswood Wildlife Partnership** – This project was recently established to enhance the biodiversity of Earlswood (on the border of Solihull) for the benefit of wildlife and the residents of Earlswood and the surrounding area. The partnership consists of Warwickshire Wildlife Trust, British Waterways and the local community. The group will carry out activities such as wildlife surveys, habitat management, workshops, guided walks and a locally targeted Wildlife Gardening Scheme. Warwickshire Wildlife Trust have also been successful with their bid for £30,900 to the Heritage Lottery Fund to create a new Earlswood Heritage Project. The project, which will focus around three sites: Clowes Wood SSSI, Earlswood Moathouse and Earlswood Lakes, will engage young people in the natural physical heritage of the three sites and will run for a year.

**Case Study 17: Connect2Kenilworth Project** – The C2K project involves the creation of a new sustainable transport route linking the town of Kenilworth with the Warwick university campus, and via the Kenilworth Greenway to Burton Green and on to Berkswell Station in Solihull. The £1m scheme involves the creation of 10km of traffic free cycling and walking route and includes a new cycling and pedestrian bridge on the Greenway where it crosses the A429 Coventry Road. It features in the University of Warwick Master Plan for expansion of the campus and its green travel plan. The scheme is one of 79 Sustrans Connect2 schemes nationally being constructed with a £50m Big Lottery Fund Living Landmarks grant and local match funding, and once completed will form part of the National Cycle Network. The scheme is very high profile within the town and the university, and, following those sections already built, there is a great deal of expectation for its completion by 2012 at the latest. Full details of the scheme can be found at [www.connect2kenilworth.org.uk](http://www.connect2kenilworth.org.uk).

## 5.1 Existing GI projects adjacent to Solihull borough

### Tame Valley Wetland Project (Warwickshire Wildlife Trust Landscapes for Living initiative)

In 2005, the Warwickshire Wildlife Trust set up the Tame Valley Wetlands Partnership (TVWP) to deliver large area conservation throughout the Tame Valley. The partnership area covers 1,850 hectares, 342 hectares of which is valuable wetland habitat, historically neglected and polluted. The Tame Valley is a regionally important area of semi-natural habitat. Gravel extraction along the Tame Valley has left a series of wetlands with better potential for connectivity than other wetland sites in the county. The River Tame corridor has the potential to link habitats between the River Trent in the North and Birmingham and the River Cole in the south. The wetlands and associated habitats have suffered habitat loss and intensification of neighbouring land uses over the last 50 years. The Tame Valley Wetlands Partnership (TVWP) has been developed by Warwickshire Wildlife Trust because of the recognised regional importance of the Tame Valley and the opportunities presented by the Water Framework Directive (WFD) and Environmental Stewardship Schemes. The Partnership will aim to enhance the biodiversity and socio-economic value of the Tame Valley and increase habitat connectivity across Staffordshire, Warwickshire and Birmingham. This will be achieved by enhancing, restoring and creating new wetlands, whilst engaging with partners, organisations, landowners and the local community, establishing the Tame Valley as a large area for conservation and part of a 'Living Landscape'.

#### Vision & Aims

The Vision of the Partnership is:

*A wetland landscape rich in wildlife and accessible to all, throughout the Tame Valley*

By working with a range of partners, organisations, landowners and the local community the Partnership will aim to:

- Enhance the Tame Valley for the benefit of wildlife, adopting a landscape-scale approach to conservation in order to protect habitats and species in a changing world affected by climate change, working to fulfil the Landscapes for Living vision.
- Enhance the Tame Valley for the benefit of people, through education, engagement and the promotion of sustainable tourism, access and land management in order to improve social and economic wellbeing.
- Integrate the TVWP Strategy into local, regional and national strategies and to promote the TVWP in order to raise the profile of, and secure continued funding for, the Tame Valley.

#### Objectives

##### 1. Environmental Objectives

- Target practical habitat creation and link and improve management of existing habitats, in order that a diverse and robust mosaic of priority BAP habitats will be established, managed and enhanced. The mosaic will comprise wet woodland, reedbed, floodplain grassland, ponds and hedgerow.
- Protect, improve and connect local populations of local and national priority wetland BAP species. These will include water vole, otter, bats, white-clawed crayfish, great crested newt, grass snake, bittern, snipe, lapwing and barn owl.
- Create and improve in-stream habitats in the Tame and its tributaries, and where possible work towards reconnecting the river to areas of its floodplain to create new wetland habitats and aid flood control.
- Survey and monitor key species and habitat change along the Tame Valley in order to monitor the health of the landscape and the effectiveness of TVWP projects.

- To help develop a large-scale, long-term strategy and partnership of targeted control towards invasive non-native species on the Tame and (initially) its tributaries, working with landowners and the public.
2. Socio-Economic Objectives
- Promote greater appreciation of the economical and environmental value of floodplains.
  - Promote the Tame Valley and its wildlife through positive engagement and education in schools, colleges, community / interest groups, and local businesses, and by creating interpretation and literature for the public, using a variety of media and techniques.
  - Promote, encourage and support the development and enjoyment of responsible and sustainable wildlife tourism, sensitive recreation and appropriate public access within the Tame Valley, working towards the development of a 'Tame Walkway'.
  - Promote sympathetic, sustainable land management throughout the Tame Valley by providing advice and support to landowners on agri-environment schemes and by signposting to other funding opportunities.
  - Increase the Partnership's status in the local community by developing a communication plan to promote the Tame Valley and to raise the profile of achievements.
3. Strategic Objectives
- Integrate the aims of the TVWP Strategy with LBAP targets and the Core Strategies, Development Frameworks and Climate Change Strategies of the Local Authorities within the Tame Valley.
  - Integrate the TVWP Strategy with the Regional Strategies for the West Midlands.
  - Integrate the Water Framework Directive, the Environment Agency River Basin Management Plan (via involvement in the River Basin Liaison Panel) and the TVWP Strategy.
  - Develop a funding strategy to support and continue the Partnership and its objectives (for example by integrating the TVWP Strategy into Section 106 spending policies).
  - Increase recognition and promote the designation of the Tame Valley as a strategic regionally important wildlife corridor.

## 6.0 Opportunities and Constraints

### *Opportunities:*

**Landscape for Living: Arden project** – The historic Forest of Arden landscape, a mosaic of ancient small fields, mature hedges and small woods has been identified as a future Landscapes for Living project which will aim to retaining pastoral agricultural management, restoring flower rich grassland, encouraging sympathetic woodland, hedgerow and pond management more wildlife will be attracted to this special landscape. The Council will seek to support and enable the establishment of this initiative which is also identified as an Arden landscape enhancement zone.

**LBAP local biodiversity opportunity mapping** - Solihull is currently involved in local opportunity mapping to identify areas suitable for delivering LBAP habitat targets. Once existing habitats (with anecdotal evidence of quality) and areas with the potential for habitat creation have been identified, it is intended that projects can be put forward and funding opportunities identified to ensure that the LBAP targets are delivered.

**Woodland Opportunity Mapping** - The Regional Forestry Framework (RFF) for the West Midlands was launched in October 2004 ([www.growingourfuture.org](http://www.growingourfuture.org)). A key output was the production of a Woodland Opportunities Map (WOM) (version 2 was produced in March 07). The WOM builds on existing codes of practice such as the UK Forestry Standard and England Woodland Grant Scheme conditions and aims to: assist landowners and managers in making decisions about how their proposals fit into the wider regional aspirations of the RFF, save time spent developing possibly inappropriate proposals and indicate where further information and advice may be needed, help focus activity on areas of maximum public benefit in creating and managing woodlands in the region, and assist the FC and other funding bodies regionally in making decisions about proposals to create and manage woodlands (via future regional scoring). The WOM comprises 6 maps: 2 priority maps (woodland creation and ancient woodland landscapes and restoration areas) and 4 theme (landscape, biodiversity, cultural heritage and access) maps. These maps support the GI vision for Solihull and should assist in its delivery by highlighting funding priorities and the importance of future woodland projects strategically.

**North Solihull Regeneration Project** – the North Solihull Regeneration project presents multiple opportunities for addressing GI needs through the provision of high quality accessible green spaces and linkages which:

- are locally distinctive
- create a positive sense of place
- facilitate community cohesion
- offer education and development opportunities through natural play
- improve health and economic wellbeing
- enable climate change adaptation

**North Solihull Outdoor Gym** – is an objective of the North Solihull Strategic Framework (NSSF) which seeks to create an asset that will improve the quality of life for the residents of Smiths Wood, Kingshurst and Chelmsley Wood. This outdoor gym is a strategy to realise the full recreational value of the green space in North Solihull, whereby all open space forms a park network, for the current and future community. The NS Partnership envisaged that the outdoor gym concept will form an integral part of the implementation of the green space strategy and delivery of an enhanced green infrastructure.

**Babbs Mill water quality improvement project** - A Babb's Mill Lake, Babb's Mill Park & Local Nature Reserve water quality & restoration plan is currently in development. This aims

to identify the causes and symptoms of the problems and pressures, under take a risk assessment/duty of care exercise; identify national/local policy/legislation, current resources and management activities, establish a restoration strategy, identify cost implications, funding opportunities in addition to partners and stakeholders. It will also seek to develop a communication strategy and monitoring programme.

**Biofuel project** – A ‘Wood-fuel Feasibility study for Solihull Metropolitan Borough Council Woodlands was completed in February 2010’. The second phase of works will entail assessing the market opportunities and economic supply chains for wood based products to drive the sustainable management of SMBC woodlands being mindful of constraints including maintaining amenity value, biodiversity, public safety, landscape character and local distinctiveness. The study should be informed by current best practice and involve liaison with relevant organisations including statutory bodies and NGOs. The assessment should include an evaluation of any potential opportunities for delivery via social enterprise or similar and any potential contributions to wider goals such as supporting the regeneration of North Solihull, narrowing the gap of inequality, and the provision of employment, training and volunteering opportunities.

**Towpath and Cycle Improvements Scheme** – Currently under development between British Waterways and SMBC, this scheme will aim to identify improvements to the canal towpath to facilitate increased use by cyclists. This opportunity could certainly be identified as a future GI initiative.

**Canal Improvements** – There are opportunities for biodiversity enhancements along the canals, through engineering works such as soft bank creation, to the provision of bat and bird boxes, to the creation of SuDS and water quality improvements.

**Historic Environment** – To date none of the case studies presented has had a particular focus on the Historic Environment. Future GI project should seek to integrate and take account of the historic environment.

**Agricultural Landscape Character** – The agricultural landscape character classifications indicate poor quality soils (grade 4) which may present appropriate conditions for habitat creation/enhancement. In addition good quality (grade 2) soils are present in the east of the borough and should be set aside for production rather than development as these are the best quality soils found within the borough. **Strategic transport improvements** – In addition to addressing sustainable transport issues and improving public health and well-being by creating opportunities to exercise by walk/cycling to destinations, strategic transport improvements also present the opportunity to create additional GI assets through the provision of tree-lined streets which will additionally add to the local character, develop a sense of place and deliver ecosystem services. There are a number of strategic routes in the pipeline for development such as the A34 and A41 schemes, in addition to proposed cycleways in the north and through the centre of the borough. These schemes should aspire to include appropriate tree planting at recommended ratio of 80 trees per 1km of road (1 tree every 12.5m) to create constant canopy wherever possible. This would aid in reducing air pollution, create shade, reduce the heat island effect and enhance biodiversity.

### **Constraints:**

**Birmingham Airport** – The Civil Aviation Authority have produced guidance, CAP 772: Birdstrike Risk Management for Aerodromes, to assist aerodromes in addressing the Convention on International Civil Aviation (1944) provisions (these include standards and recommended practices (SARPs) that address the risk of a birdstrike and the potential increase of the birdstrike risk due to the presence or development of bird-attractant features on, or in the vicinity of, an aerodrome (which is taken to mean land or water within 13 km of the aerodrome reference point). CAP 772 has implications for the delivery of GI, particularly

habitat creation and landscape restoration as there is conflict with species recommendations of the Warwickshire Landscape Guidelines: Arden (many of which are berry bearing). A pragmatic approach should be taken to the application of both guidelines to ensure that the local distinctiveness of the borough is not degraded and opportunities for habitat enhancements within the borough are realised without compromising air safety.

**Motorway** – The M42 constitutes a major physical barrier for both people and wildlife wishing to travel from east to west or west to east. The motorway itself could become a north-south link if planted appropriately, however projects to overcome this east-west barrier should be seen as the priority.

Inspiration should be taken from:



**Bell Common Tunnel, M25 Epping Forest** which was constructed between June 1981 and January 1984. The cut-and-cover tunnel was built at a cost of £300,000, the 4.1 mile section costing £29.1 million. It assisted in mitigating the community, landscape and ecological severance caused by running the M25 through Epping Forest. There is a cricket pitch on the roof of the tunnel which also gives access to Epping Forest for cyclists, pedestrians and equestrians.



**Green Bridge, Mile End Road in East London** which was developed as part of a major regeneration programme and forms a crucial link in a 3km linear park connecting open spaces dissected by roads and railways. As well as providing safe and uninterrupted pedestrian access from one green space to another, the 25m wide bridge carries the park itself across the four-lane highway. Perimeter shrub planting along the edges of the bridge combined with 30 trees supported on the main deck and abutments in custom-designed tree pits make the structure an integral part of the linear park. The bridge provides a 6m wide central pathway and cycleway with two 7m wide landscaped strips either side and railings set back 2m from the edge to prevent possible acts of vandalism directed at the roadway below. It is aligned diagonally across the road below it to minimise impact on properties along the north side of the road. The bridge abutments were designed to incorporate shops providing rental income covering much of the park's running costs.



**The Weymouth Relief Road** is a new 7Km highway linking the A354 Manor Roundabout near Radipole to the A354 at the top of Ridgeway Hill. The scheme will result in improvements to the existing Littlemoor Road; the provision of a Park and Ride facility, new pedestrian, cyclist and equestrian facilities, and the removal of part of the existing A354. The also scheme includes extensive measures to mitigate the impacts of the new road on the existing environment. These include the creation of an Environmental Mitigation Area (EMA), the construction of badger and otter tunnels, green bridges, environmental barriers, earthworks rounding and sustainable drainage systems

### ***Opportunities and/or constraints:***

**High Speed 2 Rail Link** – High Speed 2 project which is investigating the feasibility and business case for a new high speed rail line between London and the West Midlands. A comprehensive Environmental Impact Assessment (EIA) has not yet been undertaken; therefore the impacts of the proposed route on biodiversity have not yet been assessed.

It is known that a number of important sites for biodiversity within Solihull lie directly within or adjacent to the proposed route. These wildlife sites include nationally important Sites of Special Scientific Interest (SSSI), Local Nature Reserves (LNR), Local Wildlife Sites (LWS) and ancient woodlands. However the full impact of the route on biodiversity cannot be determined until the full Environmental Impact Assessment has been undertaken including the cumulative impact of habitat loss and fragmentation. It is likely that the link will have an adverse impact on biodiversity and the delivery of Solihull's GI vision. The Council must seek to ensure that the GI vision is not compromised and that comprehensive mitigation is undertaken where appropriate. Depending on the delivery of HS2, the rail link has the potential to offer a north-south GI connection outside of the GI vision.

**Development** - Green infrastructure needs to be delivered as an integral component in all development and regeneration. The Council must work with housing developers, regeneration partnerships and other interested parties to plan, design and deliver green infrastructure that provides multiple benefits for people and wildlife. If GI is not designed in to new development and other infrastructure improvements, habitats may become more fragmented/lost, the borough will be ill-equipped to adapt to climate change and the needs of the borough's residents will not be met in terms of open space requirements, recreation/play facilities, local food-growing opportunities, access to sustainable forms of transport and the inequalities that exist within the borough may be further exacerbated.

## 7.0 Solihull's Green Infrastructure Vision

Solihull's Green Infrastructure Vision is detailed in Figure 12.

Solihull's GI Vision includes the surveying, maintenance, enhancement and monitoring of:

- Existing accessible green spaces
- Existing green and blue links
- Existing habitats identified as high and medium biodiversity habitats
- Existing sites of local geodiversity value
- The 1:1000 flood zone (to create recreation opportunities and biodiversity enhancements in addition to addressing flooding issues)

Solihull's GI Vision includes the creation of:

- Accessible green spaces (2ha (min) sites required in Smiths Wood, Craig Croft, Olton (south), Silhill (north)/Elmdon Heath, Shirley (southeast), Dickens Heath (north) and 20ha (min) sites required in Knowle (east), Balsall Common, Meriden (south-west) and Hampton-in-Arden).
- Arden landscape enhancement zones projects
- Mineral enhancement/restoration zones
- Biodiversity enhancement and restoration zones - The Warwickshire, Coventry and Solihull NIA: Green Connections - Completing the Jigsaw Project
- New green links
- New LNRs (sites required in Castle Bromwich, Olton, Silhill, Shirley east and Shirley West and increased provision required in Smith's Wood, Knowle and Blythe)
- A Solihull heritage trail
- Local character enhancement areas
- Major street tree planting schemes
- New cycle routes
- Additional green flag parks
- Additional green space typologies as identified in the Green Spaces Strategy

### **Vision:**

Solihull will have an integrated, well-designed and diverse Green Infrastructure network throughout and extending beyond the borough, which will contribute to the quality of life of new and existing communities and help to create a positive sense of place for people who live and work here, while helping to protect and promote the Borough's rich cultural heritage.

Solihull's Green Infrastructure will be valued for its contribution to the local economy and its capability of providing essential ecosystem services.

Solihull's Green Infrastructure should be a showcase for well-designed and sustainable communities, one which reduces inequalities, actively encourages healthy living, cultural awareness and sustainable travel whilst delivering a robust, biodiversity-rich natural environment, resilient to an ever changing environment.

Green Infrastructure benefits can deliver many of the aspirations of the Solihull Sustainable Communities Strategy.



## 7.1 Achieving the Vision – strategic objectives/next steps

Within the context of the Vision as expressed above, the following key strategic objectives are proposed which will form the backbone for developing and delivering future GI in the borough and beyond:

► **Strategic Objective 1** – Develop the GI Vision for the borough through production of a GI Strategy which will identify a series of strategic implementation projects designed to fill the gaps in terms of the physical networking, the quality and the functionality of assets.

► **Strategic Objective 2** – Develop a Delivery Plan for the Green Infrastructure Strategy which enables the growth and development of the Strategy and its effective implementation through the LDF and other mechanisms (including cross boundary, joint GI partnership projects with neighbouring authorities/other partners) over the next ten years, which provides details of all Green Infrastructure projects contributing in the borough towards the future growth and evolution of the borough and sub region's GI to promote and deliver landscape-scale benefits. This should identify funding sources, such as the Heritage Lottery Fund, Natural England, DEFRA, EU etc. Links with community groups will be essential to realise specific projects.

► **Strategic Objective 3** - Develop a series of Green Infrastructure site briefs (constraints and considerations) to outline what is required by new development in specific areas of the borough in terms of strategic GI.

► **Strategic Objective 4** – Support the growth and development of the Landscapes for Living network in Warwickshire, Coventry and Solihull - advocating the initiation of the Arden LFL project.

► **Strategic Objective 5** – Ensure the Strategic Integration of Solihull's Green Infrastructure Strategy into relevant strategies and Initiatives (e.g. neighbourhood planning and the localism agenda) impacting upon the borough, including the Local Development Framework.

## Solihull's Green Infrastructure Study



Produced by Solihull Landscape Architecture and Ecology