EPSOM & EWELL BOROUGH COUNCIL

Epsom & Ewell Green Infrastructure Study

Epsom & Ewell Borough Council

September 2013

Contents

1. Introduction

1.1 This Study has been prepared by the Council in order to inform the preparation of a Borough-wide Green Infrastructure Strategy by bringing together the related issues of the Green Belt, biodiversity and nature conservation, and open spaces. The Study will help to inform Local Plan policy-making, and the drafting of the Borough's Green Infrastructure Strategy and associated Site Allocations and Development Management Policies Documents.

1.2 The main objectives of the study are to bring together existing green infrastructure evidence in Epsom & Ewell, identify gaps in the local plan evidence base and to map the Borough's existing GI assets.

1.3 The study's main recommendation is to create a landscape scale Green Infrastructure Strategy that seeks to protect and enhance a Borough-wide network of green infrastructure that delivers a wide range of benefits including improvements to biodiversity, public access, health and well-being, sports provision, allotments, flood protection and air quality. The study also recommends that the Council prepare a Green Infrastructure Strategy Key Diagram that illustrates how the Borough-wide Green Infrastructure network will function. The Key Diagram will also identify opportunities for new assets and enhancements to existing infrastructure.

1.4 This study will form the key component for the evidence base for the development of the Borough's Green Infrastructure Strategy, which is being progressed as part of the Site Allocations Document. It is anticipated that the Site Allocations Document will ready for submission to the Secretary of State during 2014.

1.5 The Site Allocations sister document, the Development Management Policies Document has recently been the subject of pre-submission consultation. This Policy Document contains a number of new development management policies that seek to maintain and enhance and deliver new development-related Green Infrastructure. The policies contained within that document have been adopted by the Council for development management purposes and are being applied as part of the determination of planning applications, albeit without their full weight.

What is Green Infrastructure?

1.5 Green infrastructure (GI) is a term used to refer to the living network of green spaces, water and other environmental features in both urban and rural areas. It is often used in an urban context to cover benefits provided by wildlife, trees, parks, gardens, road verges, allotments, cemeteries, woodlands, rivers and wetlands.

1.6 The term Green Infrastructure is not restricted to features found with settlements or urban areas. It might just as easily be applied to networks of farmland, public and private open space, woodland, wetlands or other natural features that provide benefits such as flood protection, carbon storage or food production. Within urban and built up areas development related landscaping and planting and components integrated into the design of new buildings such as green and brown roofs, and bat and bird bricks also fall within the broad definition of GI.

1.7 GI maintains critical ecological links between town and country. It supports and protects biodiversity and the functioning of natural systems such as rivers and flood plains and helps reduce the negative impacts of climate change. This is particularly relevant in Epsom & Ewell, where the risk from surface water flooding is high.

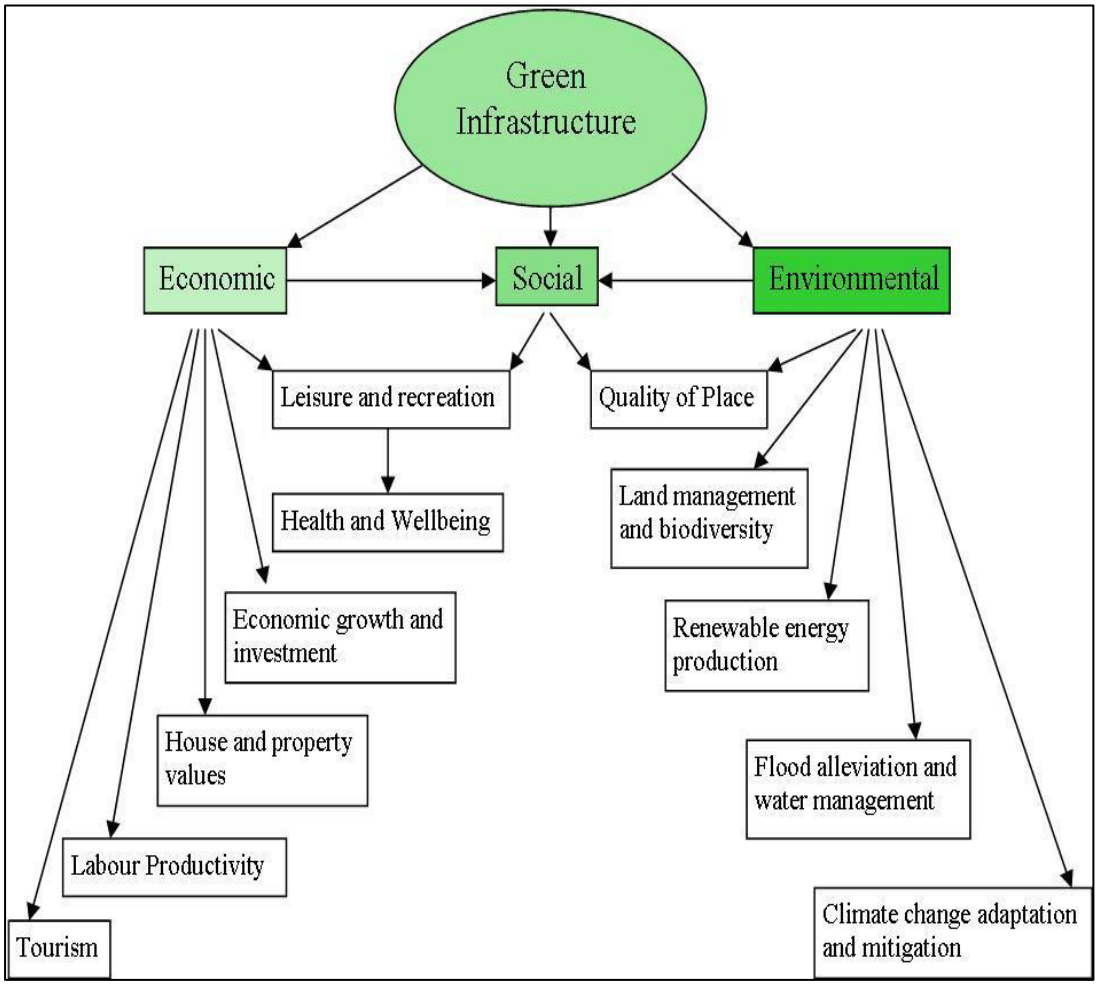
1.8 As a concept, Green Infrastructure is more than just 'green space'. While green space is often viewed as something that is *nice* to have, green infrastructure implies something we *must* have[1]. Protecting and restoring our natural-life support system is a necessity not an amenity. While green space is often viewed as self-sustaining, GI implies that green space and natural systems must be actively protected, managed, and in some cases restored.

1.9 Green infrastructure describes a process that promotes a systematic and strategic approach to land conservation at national, regional, county and local scales, encouraging land use planning and practices that are good for nature and people.

1.10 The benefits of GI go beyond the immediate protection of wildlife and their habitats and include economic, social, environmental, and health and wellbeing factors. Often these benefits can interact with one another resulting in improved social conditions. An example of this is the Borough's special visual character and appearance, which is a pleasant mix of leafy urban townscape, countryside, woodland and down land. This special character and appearance has made the Borough a highly desirable place for people to live. The diagram below outlines some of the main ways in which green infrastructure can impact on the community.

[1] Benedict, A & McMahon, E (2006) *Green Infrastructure: Linking Landscapes and Communities*; Island Press; Washington

Figure 1: The economic, social and environmental benefits of Green Infrastructure



(Source: Green Infrastructure: An Evidence Base for Birmingham, 2010)

1.11 One of the biggest potential threats to our natural and built environments comes from climate change. For example, it is anticipated that our native flora and fauna will be affected by changes in temperature and water availability[2]. The potential impact of climate change will not be limited to our natural environment; it is likely to have a profound effect upon how we live. Planning for and addressing the adverse impacts of climate change is essential for maintaining a healthy, resilient natural environment and ensuring a sustainable future for us all. GI is recognised as one of the most effective tools available in managing environmental risks as a result of climate change.

1.12 A recent report commissioned by DEFRA and Natural England outlines the economic benefits of green infrastructure. In terms of local economic growth, the report shows that green infrastructure can have the following benefits:

[2] DEFRA, 2011

- Inward Investment – increasing attractiveness through investment in high-quality green spaces increases inward investment and property values in proximity.
- Visitor Spending – increasing attractiveness impacts on the number of visitors attracted to, and spending in, the local area.
- Environmental cost-saving – GI provides important regulatory services such as pollution filtration, flood risk reduction and the mitigation of temperature extremes. There is good evidence that GI can therefore reduce damage costs and is often a more cost-effective way to meet environmental targets than mechanical solutions.
- Health improvement – Access to green space has a positive impact on mental health and stress, and the quality of the outdoor environment is an important factor in encouraging daily exercise. These improvements increase productivity.
- Market sales – There has been a recent upsurge in interest in the production of food in urban areas, contributing directly to GDP.
- Employment generation – Developing and maintaining GI provides jobs, and it is estimated that 5% of all the jobs in England are the Green Space sector.[3]

Why have a Green Infrastructure Strategy?

1.13 Green Infrastructure serves as an important counterbalance to grey infrastructure in the urban landscape. GI is widely recognised as providing the environmental foundation that underpins the function, health and character of urban communities[4]. With this in mind, it is important to have a strategy in place to deliver the benefits GI provides in an integrated way, to prevent green assets from becoming neglected and remaining poorly connected fragmented spaces. A GI strategy will imbed the diverse threads of Green Belt, open space and biodiversity policy within our Local Plan under a single heading by taking a landscape scale approach. Such an approach will examine the Borough's GI assets at an extensive scale, rather than a site scale, and will help to form the basis of an integrated Borough-wide GI network.

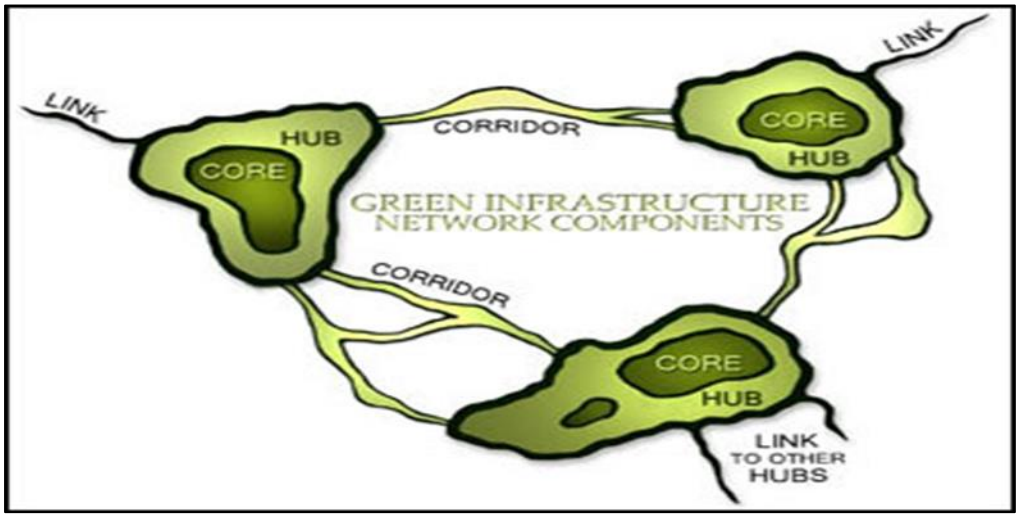
1.14 Green Infrastructure provides a multifunctional network of green spaces and other natural elements that seek to deliver a range of social, environmental and economic benefits. A strategy will set out an integrated approach to the delivery, protection and enhancement of this network. The success of such a strategy depends upon the extent to which individual sites are integrated with each other to form a fully functional green infrastructure multifunctional network.

1.15 For example, Figure 2 below illustrates how green corridors can be used to connect or link areas of green space together. These help to

[3] Sheffield Hallam University, Centre for Regional Economic and Social Research, 2013
[4] CABE, 2011

form a green infrastructure network by acting as 'arteries' providing linkages that people and wildlife can use to move between larger areas of green space.

Figure 2: Components that form a green infrastructure network



(Source: Natural England: 2009)

1.16 A landscape scale approach to GI is beneficial, both to biodiversity and to the human population. Taking this approach to the development and management of GI allows us to create a genuine and integrated network of assets that can help combat the adverse effects of increased urbanisation by providing the following functions:

- Conserving and enhancing biodiversity, including the need to mitigate the potential impacts of new development
- Creating a sense of place and opportunities for greater appreciation of valuable landscapes and cultural heritage
- Increases recreational opportunities, including access to and enjoyment of the countryside and support of healthy living
- Improvement of flood management and sustainable design
- Make positive contributions to combat climate change through adaptation and mitigation of impacts
- Production of food fibre and fuel

1.17 A strategic or landscape approach to green infrastructure planning can ensure that environmental assets of natural and cultural value are integrated with land development, growth management and built infrastructure planning at the earliest stage. This approach enables land management to be more proactive and better integrated with efforts to manage growth and development at all spatial planning levels. GI planning is therefore a key mechanism for protecting and enhancing biodiversity, delivering sustainable communities and improving the quality of life of our residents.

1.18 A Green Infrastructure Strategy for Epsom & Ewell would provide an important vehicle to help deliver the Council's Six Key Priorities as listed in the Corporate Plan 2012-2016:

- Economic Vitality – by improving the attractiveness of the Borough as a retail and business destination
- Sustainability – through mitigating the impacts of climate change and enhancing biodiversity
- Visual Appearance – by improving the visual attractiveness of the Borough by enhancing existing assets and creating new ones
- Quality of Life – by improving attractiveness and providing benefits to health and wellbeing for residents
- Safer and Stronger Communities – by reducing anti-social behaviour and crime and encouraging community cohesion by improving the street scene and visual attractiveness
- Managing Resources – through minimising costs and increasing resource efficiency through environmental improvements

2. Study Objectives

2.1 The objectives of this study are to:

- Bring together existing GI evidence into one matrix/table
- Identify gaps in the existing evidence or areas where further work is needed
- Map the extent of existing GI across the Borough and identify opportunities for improvements to GI in future
- Make a series of recommendations regarding the preparation of a Borough-wide GI Strategy
- Inform future green infrastructure planning
- Inform the preparation of Local Plan policy
- Provide evidence that can be used to support the development management process

2.2 Identification of GI assets allows the Council to monitor these in terms of location, ownership and quality. Within an urban context GI is important in completing the links in our ecological network. Urban green space allows species to move around, within and between towns and the countryside.

2.3 Mapping of GI assets will allow the Council to identify key areas of GI and ways of linking them together to form an effective GI Strategy. It will also constitute a single shared information resource that acts as an atlas, piecing together the different elements of green infrastructure within the Borough.

2.4 The key outputs of this study will therefore be:

- the formulation of a Borough-wide GI Strategy that brings together the diverse range of GI assets in Epsom & Ewell under one heading and seeks to fashion them into a functioning network rather than leaving them as a series of isolated assets
- the formulation of a GI Strategy Key Diagram, illustrating how a Borough-wide GI network will work

3. Policy Context

3.1 National, regional, county and local policies all promote green infrastructure, both in terms of its functions and as an organising concept for delivering smart growth. In numerous strategy and policy documents it is implicitly recognised that there are many policy priorities that may be delivered through GI.

3.2 The National Planning Policy Framework (NPPF) Para 99 states that:

"New development should be planned to avoid increased vulnerability to the range of impacts arising from climate change. When new development is brought forward in areas which are vulnerable, care should be taken to ensure that risks can be managed through suitable adaptation measures, including through the planning of green infrastructure".

This promotes the idea of GI planning as a mechanism to counter the effects of climate change. The NPPF (Para 114) continues:

"Local planning authorities should …set out a strategic approach in their Local Plans, planning positively for the creation, protection, enhancement and management of networks of biodiversity and green infrastructure".

This provides the national planning policy context within which local planning authorities can pursue the preparation and production of their own local GI strategies.

3.3 DEFRA's 2011 *Strategy for England's Wildlife and Ecosystem Services* recognises that the planning system has a key role to play in halting the loss of England's habitats and species and aims to guide conservation efforts in England over the next decade in order to halt overall loss of England's biodiversity by 2020.

3.4 The Natural Environment and Rural Communities (NERC) Act 2006 places a statutory duty on all public authorities to have regard to the purpose of conserving biodiversity. It further states that:

"Conserving biodiversity includes, in relation to a living organism or type of habitat, restoring or enhancing a population or habitat".

Therefore, local planning authorities should not only be seeking to conserve habitats and species, but actively restoring or enhancing them. Adopting a GI strategy is a good way to ensure that this takes place through enhancing green spaces and improving the linkages between them.

3.5 DEFRA's 2011 White Paper, *The Natural Choice: Securing the Value of Nature*, puts further emphasis on the importance of green infrastructure by stating that:

"We should be thinking not of isolated spots of green on a map of England but of a thriving green network linking wildlife sites with farmland, forestry and urban parks and gardens. We will encourage local partnerships to create new Nature Improvement Areas (NIAs) where there are significant opportunities to enhance and reconnect nature".

This provides further evidence of the importance national policy places on the role of a GI network in linking together different GI assets.

3.7 The South East Green Infrastructure Partnership (SEGIP) seeks to use GI to drive economic growth and regeneration and improve public health, wellbeing and quality of life. SEGIP aims to achieve this by:

- establishing green infrastructure as an integral and essential component of sustainable communities
- developing a common understanding of the role and importance of green infrastructure
- helping implement the South East Plan's green infrastructure policy
- providing detailed guidance on how green infrastructure can be delivered through the planning system and local partnerships

This illustrates the value of local green infrastructure strategies as vehicles to foster a shared understanding of the value of GI and their role in helping deliver long-term benefits at a regional level.

3.8 The South East Green Infrastructure Framework (SEGIF) clearly views the "...planning and management of sub-regional networks of multi-functional open space" as integral to its concept of GI provision. Such networks can include:

- Natural and semi-natural urban green spaces – including woodlands, urban forestry, scrub, grasslands (e.g. downlands, commons and meadows), wetlands, open and running water, wastelands and derelict open land and rock areas (e.g. cliffs, quarries and pits).
- Green corridors – including river and canal banks, cycleways, and rights of way.

The Framework refers back to the House of Commons Environmental Audit Committee's conclusion of the need for an 'ecosystems approach' to halt biodiversity loss.

The introduction of local GI strategies can help form and maintain GI networks at a wider sub-regional level through effective planning and management at a landscape scale.

3.9 The Surrey Biodiversity Action Plan (BAP) provides a county-level framework for the protection of species and habitats via a series of Habitat and Species Action Plans. The BAP seeks to raise awareness of the need for biodiversity conservation, monitor progress, and develop effective local partnerships to maintain biodiversity at local and county level. A local green infrastructure strategy can contribute to the delivery of these wider goals by ensuring that habitats are linked together and there is no further fragmentation or loss at a local level. The BAP also provides an important reference point when devising a strategy in terms of highlighting assets of high biodiversity value.

3.10 Epsom & Ewell's Local Biodiversity Action Plan (LBAP) is a more locally focused document which "aims to conserve and enhance habitat types and species of principal importance within the borough of Epsom and Ewell as identified under the UK and Surrey Biodiversity Action Plans". A local GI strategy will be informed by the habitats and species identified and monitored within the LBAP and will play a role in the delivery of its aims by protecting habitats and ensuring they are linked together.

3.11 The Borough's Local Plan, including the Core Strategy and Plan E Epsom Town Centre Area Action Plan, also provides the planning policy context in which a GI strategy will operate at Borough level.

Core Strategy Policy CS4 highlights the importance of open spaces in the Borough, and their protection and enhancement as recreational, amenity and wildlife resources. Core Strategy Policies CS2 and CS3 focus on the protection of the Borough's Green Belt Land and conserving its biodiversity through protection of sites designated for their nature conservation attributes such as SSSIs, Ancient Woodlands and Local Nature Reserves.

Plan E, Epsom Town Centre Area Action Plan, also discusses green infrastructure assets. For example, Policy E9 seeks to ensure that new development delivers biodiversity enhancement through planting and the creation of green corridors, and improvements to the visual attractiveness of public open spaces. A green infrastructure strategy will work well in tandem with this policy to create new green assets and secure the future of existing ones in the town centre. Plan E's opportunity site allocation policies (Policies E14 – E17) also identify site specific biodiversity enhancements across the Town Centre. The

subsequent Upper High Street, Depot Road and Church Street Development Brief[5] sets out the opportunities for new GI network across these opportunity sites that links into the wider GI network within that part of the Town Centre.

3.12 The Council's emerging Development Management Policies Document also provides policy context for the formulation of a Borough-wide GI strategy. Development Management Policies DM1 – DM7 cover issues such as the protection of Green Belt Land, the protection and enhancement of the Borough's biodiversity and open space assets, and the improvement of linkages in the form of footpaths, cycle and bridleways. This contributes towards the protection of the Borough's GI assets from inappropriate development.

3.13 The Council's forthcoming Site Allocations Document will introduce a Green Infrastructure Strategy utilising a landscape scale approach. This will incorporate the policy aims of the various documents detailed above via the identification, enhancement and maintenance of a network of GI assets across the Borough. The strategy will identify opportunities to strengthen and create new links between areas that provide both wildlife corridors and improved access to open space, the wider countryside and neighbouring areas.

4. Methodology

4.1 This study used a table to list the sources of evidence that could be used in support of the Council's emerging GI strategy. The table puts GI into a hierarchy already identified by the Council which can be seen under the appropriate headings. This quantitative data collection technique allows for mapping of data sets (if required) which would allow for a green infrastructure map to be formulated.

4.2 There are a wide range of data sets which were collected for analysis and the following categories of land use were included in the definition of Green Infrastructure for this study:

- Natural and semi-natural green space (including wetlands)
- Parks and public gardens
- Allotments and cemeteries
- Woodland
- Green Corridors
- Amenity Green Space and outdoor sports facilities
- Domestic Garden land

4.3 The following hierarchy is used to distinguish between areas of green space in relation to the scale that they serve:

[5] This was prepared in support of Plan E Policies E14 and E17G.

- National
- County
- Borough
- Neighbourhood

4.4 Further secondary research was conducted on GI strategies and plans used by other Local Authorities. The aim was to gain an understanding of what a strategy consists of and how the consultation and adoption process is carried out. There was also an opportunity to look at how the Borough would fund a GI strategy. Strategies obtained from other Local Authorities give advice on how to achieve this.

5. Green Infrastructure Evidence in Epsom & Ewell

5.1 Epsom & Ewell covers an area of 3,411 hectares and with a population of 75,102 (2011) is the smallest yet most densely populated District in Surrey. The Borough is fortunate to have a diverse mix of green space ranging from natural/semi-natural areas to parks, gardens and formal recreational facilities. The open spaces and their landscaping provide relief from the density of urban form and contribute to an attractive urban character, appreciated by both residents and visitors.

5.2 The Borough's location on the edge of the countryside is strategically important, with the Green Belt and many green spaces within the built up areas acting as reservoirs for flora and fauna. For the well-being of biodiversity within its boundaries and to maintain a green infrastructure network, it is important for the Borough to avoid development that fragments existing habitats and, where possible, to create links to habitats that are already isolated.

Green Belt Land

5.3 Approximately 42% of the Borough is Green Belt land. One of the principle roles of the Green Belt is to prevent urban sprawl by keeping land permanently open. This objective is of significant importance due to the Borough's proximity to London. The Green Belt also helps to preserve the distinctive character of the Borough, thereby making it essential that the Green Belt's permanence is safeguarded and its quality maintained.

5.4 National and local planning policies seek to safeguard the Green Belt by restricting development within it, except in exceptional circumstances. The National Planning Policy Framework (NPPF) also states that:

"Once Green Belts have been defined, local planning authorities should plan positively to enhance the beneficial use of the Green Belt, such as looking for opportunities to provide access; provide opportunities for outdoor sport and recreation; retain and enhance landscapes, visual amenity and biodiversity; or to improve damaged and derelict land".

This indicates that Green Belt land can be included in a GI strategy as local planning authorities should seek to enhance the beneficial use of Green Belt land, such as improving its accessibility. This is in line with objectives of GI which are to form a multifunctional network. Green Belt land can serve both human and biodiversity needs, and can provide the setting for these two groups to work in harmony with each other. Therefore, it is important that the Council utilise Green Belt land in any future GI strategy.

Areas of Great Landscape Value (AGLVs)

5.5 Part of the Borough has a designation as an Area of Great Landscape Value (AGLV). The landscape quality of the area that covers Walton Downs, which extends into adjoining districts to the south and east, has been identified as being of county-wide significance, and its designation was supported by Surrey County Council. The designation of this area as an AGLV affords it some additional protection against inappropriate development that would weaken the landscape character of the area. The AGLV is close to the Surrey Hills Area of Outstanding Natural Beauty (AONB), the boundary of which is currently under review with a view to potentially including some of the surrounding AGLV areas within it. Unfortunately, Epsom & Ewell's AGLV does not merit inclusion within the AONB as the landscape is not of a contiguous and consistent quality. There is also a possibility that the AGLV designation could be removed following the review of the AONB boundary. The Council still considers this area as important green open space and a valued landscape asset, and its green belt status will ensure it remains protected from inappropriate development.

Identified Green Infrastructure in Epsom & Ewell

5.6 There are many types of green spaces which contribute to the fine grain of green infrastructure. Table 1 below shows the sites that have been identified within the Borough which would be used to form the basis of a Green Infrastructure network.

Table 1: Epsom & Ewell's Green Infrastructure Assets

Type	Number of sites	Location	Comments
SSSI	2	- Epsom Common - Stones Road Pond	Sites of international/national importance
Local Nature Reserve	4	- Horton Country Park - Hogsmill - Epsom Common - Howell Hill	- All 174.5ha of Epsom Common has LNR status.
SNCI	12	- Epsom Common South - Epsom Cemetery - Epsom Golf Course - Epsom Downs West - Horton Country Park - Nonsuch Park - Walton Downs A - Walton Downs B - Pond Wood - Butchers Grove - Howell Hill - Hogsmill River	- Of the remaining non-SSSI portion (54.9ha), a total of 50.5ha has been designated as SNCI.
Ancient Woodland	14	- Butchers Grove - Great Wood - The Wood - Long Grove - Four Acre Wood - Pond Wood - The Grove - Hockleys Grove (i & ii) - The Warren	
Allotments	10	- Barn Elms - Elmstead - Park Avenue West - Kingston Road - West Ewell - Hessle Grove - Stones Road - Alexandra - Epsom Common - Lane End	14.34 hectares across the Borough or 0.22 ha per 1,000 population- this is below recommended local quantity standard of 0.16 ha per 1,000 population.
Cemeteries and Churchyards	5	- Epsom Cemetery - St Mary's Churchyard - St Mary's Cemetery - St Martin's Churchyard - Horton Cemetery	
Formal Parks and Gardens	16	- Bourne Hall Park - Elizabeth Welchman Gardens - Ewell Court - Long Grove Park	

		- Rosebery Park - Mounthill Gardens - Shadbolt Park - Nonsuch Palace and Gardens - The Warren Recreation Ground - Alexandra Recreation Ground - Court Recreation Ground - Gibraltar Recreation Ground - Chessington Road Recreation Ground (Bakers Field) - London Road Recreation Ground - Poole Road Recreation Ground - Auriol Recreation Ground
Agricultural Land & Fields	6	- Horton Farm - Langley Vale Farm - The Downs Farm - Drift Bridge Farm - North Looe Farm - Beeches Farm
Domestic Gardens	Multiple	Numerous Locations
Street Trees	Multiple	Numerous Locations
Highway Land & Railway Lines	Multiple	Numerous Locations
Alleyways and Lanes	Multiple	Numerous Locations

5.7 The key to forming a successful GI strategy will be the extent to which the areas identified above are connected together with as little fragmentation as possible between sites. It is important to investigate the green spaces that are used to link these key areas together.

Sites of Special Scientific Interest (SSSIs)

5.8 Under the Wildlife and Countryside Act 1981 (amended 1985) the Government has a duty to notify as a Site of Special Scientific Interest (SSSI) any land which is assessed as being of special interest by reason of any of its flora, fauna, geological or physiographical features. Legislation has improved first the protection, and more recently the management, of wildlife sites in particular SSSIs.

5.9 The NPPF protects SSSIs as they are recognised as sites of international or national importance. Despite the important contribution designated sites have made, England's wildlife habitats have become increasingly fragmented and isolated, leading to declines in the provision of some ecosystem services, and losses to species

populations[6]. Epsom & Ewell contains two SSSIs which are Epsom Common Local Nature Reserve (LNR) and Stones Road Pond, as detailed below. Epsom Common is designated as both a SSSI and LNR. LNRs are a local designation as explained later.

5.10 Epsom Common (LNR) is owned and managed as a public open space by Epsom & Ewell Borough Council. The site, together with the adjacent Ashtead Common, lies to the south-west of Epsom and north of Ashtead village. The Epsom and Ashtead Commons SSSI as a whole covers an area of 358.4ha, of which approximately 119.6ha occur within Epsom Common (LNR). The site supports a wide diversity of habitat types on the undulating terrain of the London clay. The site carries four nationally rare invertebrates and several others which are uncommon in Surrey. The range of habitats present promotes a rich community of breeding birds. The Council has had a Management Plan in place for Epsom Common (LNR) since 2005. The plan was produced in liaison with a number of organisations and based on a review of site surveys and historical data, and sets out to manage the site with nature conservation as the first priority.

5.11 Stones Road Pond is located within the urban area of Epsom, surrounded by semi-natural vegetation. This large deep pond is an important breeding locality for the Great Crested Newt, and supports one of the largest colonies in the South East of England. There is currently no management plan in place for Stones Road Pond, but this is currently being pursued by the Lower Mole Countryside Management Project.

5.12 The Council have a duty to protect these SSSIs under ownership and strive to work towards DEFRA's Public Service Agreement Target of bringing 90% of priority wildlife habitats sites into a favourable or recovering condition by 2020. Section 28G of The Wildlife and Countryside Act 1981 as amended by The Countryside and Rights of Way Act 2000 places an obligation on all public bodies to further the conservation and enhancement of SSSIs. The Council's most recent Annual Monitoring Report shows that only 13.45ha of dwarf shrub heath-lowland on Epsom Common is classed as unfavourable/recovering, with the remaining area of the two sites classed as favourable.

5.13 Core Strategy Policy CS3 states that SSSIs will be afforded the highest level of protection. Development which harms the scientific interest of these areas will not be permitted. The Borough's two SSSIs are currently identified on the Local Plan proposals map. They will continue to be identified as such forming a senior tier within the Borough's Green Infrastructure asset hierarchy.

[6] Lawton, J (2010) *Making Space for Nature: A Review of England's Wildlife Sites and Ecological Network*, Report to DEFRA

Local Nature Reserves (LNRs)

5.14 Local Nature Reserves (LNRs) serve a wide variety of important roles for both wildlife and people within the Borough which include:

- increasing people's awareness and enjoyment of their natural environment
- providing an ideal environment for everyone to learn about and study nature
- helping to build relationships with national and local nature conservation organisations and local people
- protecting wildlife habitats and natural features
- providing a great opportunity for people to become involved in managing their local environment
- offering a positive use for land which they would prefer was left undeveloped
- making it possible to apply bye-laws which can help in managing and protecting the site[7]

5.15 The Borough contains four LNRs: Horton Country Park, Howell Hill, The Hogsmill and Epsom Common (LNR). Horton Country Park is 400 acres in size and its recorded history goes back to medieval times. The Country Park holds many wildlife treasures, such as bluebell woods and the Green Woodpecker; the symbol of Horton Country Park. Horton Country Park supports a diverse mosaic of habitats that include ancient and recently-planted woodlands, scrub and hedgerows, semi-natural and improved grasslands and open water habitats. There are also smaller areas of wetland and old orchards. Around 350 vascular plant species have been recorded, along with approximately 40 invertebrates (mainly butterflies and moths), over 100 birds and 13 mammals. However, there has been no systematic recording of many groups and the current lists should be regarded as incomplete.

5.16 Howell Hill LNR is situated in the East of the Borough and is also designated a Site of Nature Conservation Importance (SNCI). It is managed by Surrey Wildlife Trust. The site shows a great deal of variety for such a small area, combining grassland, scrub and woodland. Some 260 kinds of flowering plants have been recorded; more than 20 different kinds of butterfly and 50 different bird species have been sighted at the reserve.

5.17 The Hogsmill LNR is situated in the Northern half of the Borough and comprises two open spaces, the Hogsmill Open Space and the Bonesgate Open Space. The combination of open grassy rides and woodland copses provide habitat for a range of mammal, bird and insect species, and its importance has been recognised and protected

[7] Natural England

through its formal designation as a Local Nature Reserve and Site of Nature Conservation Importance (SNCI).

5.18 Epsom Common LNR is also designated as a SSSI, as detailed in the SSSI section above.

Sites of Nature Conservation Importance (SNCIs)

5.19 SNCIs do not have statutory status, but do receive protection through the planning system. The identification of SNCIs is an on-going process including monitoring and review which is undertaken by the Surrey Local Sites Partnership, comprised of Surrey County Council and Surrey Wildlife Trust, with support from the Surrey districts and boroughs. SNCIs are designated under criteria developed by Surrey Wildlife Trust. These criteria are based on a measure of habitat or species value for a site; for example the presence of a population of a protected species or the presence of a priority habitat.

5.20 There are currently 12 SNCI sites in the Borough at various locations, some of which are part of wider areas of green space, including those identified under other designations such as Local Nature Reserves. The Council is currently working with the Surrey Local Sites Partnership to review its SNCIs, which may result in the identification of additional sites. It is anticipated that any new sites will be identified on the Local Plan proposals map and form part of our green infrastructure asset network.

Ancient Woodland, Trees and Hedgerows

5.21 Ancient woodlands in Britain are those which have been continuously wooded for a minimum of three to four hundred years (since at least the year 1600). They are frequently very diverse and will often contain rare or unusual species. Ancient woodlands provide provisioning services including timber and water supply; biodiversity; cultural services including recreation, landscape and cultural heritage; regulating services such as carbon storage, flood management, noise reduction, and help to improve water, soil and air quality. The Borough contains 14 areas of ancient woodland.

5.22 The Borough also has many fine examples of veteran and ancient trees. Veteran trees are those in the mature stage of life with important wildlife and habitat features such as hollowing or associated decay, fungi, holes, wounds and large dead branches[8]. Ancient trees include those in the ancient or final stage of life, those that are old relative to others of the same species, and trees of biological, aesthetical or cultural interest due to their age[9]. Many of the Borough's trees are protected by Tree Preservation Orders, which make it an offence to cut

[8] ancienttreehunt.org.uk
[9] Ibid

down, uproot, prune, lop or damage the tree in question without first obtaining the Council's consent.

5.23 Woodlands, trees and hedgerows make an important contribution to the nature conservation interest and landscape quality of the Borough and the Council considers that large numbers of trees in the Borough are a great asset that should be maintained and enhanced.

Street Trees

5.24 Urban trees are an important GI asset and have numerous benefits. Street trees provide an important role in biodiversity and can support a variety of wildlife in some of the harshest locations in an urban area. They make a highly visible contribution to the Borough's special visual character and appearance. They also play a role in offsetting carbon emissions by converting carbon dioxide into stored carbon, as well as helping to reduce temperatures and provide cleaner air. Trees can save as much as 10% of annual energy consumption around buildings through moderating the local climate, help mitigate against flood risk and filter harmful pollutants from the air[10]. Street trees can also contribute to improved health and wellbeing, and can help reduce crime as improvements to street setting through their introduction encourages pedestrian use and a sense of community among residents by making streets appear more pleasant and less threatening.

5.25 There are approximately 6,000 trees on highway verges in Epsom & Ewell, and currently around 200 trees are planted annually along highways. These include veteran trees and may form the edges of some of the Borough's ancient woodland parcels. The Council are currently in the process of selecting a definitive master list of species highly suitable for street planting. The list will be based on research into performance factors such as tolerance of urban condition, pavement damage, form, longevity, pruning tolerance, availability, biodiversity and subsidence risk. Policy E9 of Plan E: Epsom Town Centre Area Action Plan seeks to improve the character, appearance and attractiveness of the Town Centre via a system of biodiversity enhancements, particularly new planting and the creation of green corridors. Street trees are a valuable GI asset to the Borough and will need to continue to be protected and enhanced as part of a GI strategy.

Allotments

5.26 The status of allotments fall within the definition of GI set out by Natural England. Allotment gardening has provided the landless poor with the opportunity to grow their own food to feed their families for over 150 years. The Allotment Act of 1987 requires local authorities to provide allotments if there is a demand.

[10] treesforcities.org

5.27 Allotment gardeners themselves have cited fresh air and exercise as their main reason for having an allotment, with access to fresh food a close second. They are also concerned about the use, or overuse, of chemicals in commercial growing, particularly food produced in other countries where controls do not seem as rigorous as in Britain. It is estimated that up to 241,560 tons of food is capable of being grown on the UK's 330,000 existing allotment plots. The food producing potential of allotment sites could become increasingly important in terms of taking action to mitigate the adverse impacts of climate change and reducing the carbon footprint generated by importing and transporting food.

5.28 In general terms, allotment gardening has increased in popularity recently and it has been estimated that there could now be up to 100,000 people on waiting lists in England, and many believe that the recent economic downturn will cause this to increase further, particularly as the cost of transporting food increases. Nationally waiting lists for allotments are long and demand continues to grow.

5.29 There are 10 different allotment sites within the Borough covering an area of 14.27 ha, three of which are self-managed. The sites are fairly evenly distributed around the residential areas of the Borough, serving the majority of the urban area surrounding Epsom town centre, Ewell and Stoneleigh. Currently the Borough's allotment sites will be able to accommodate demand for plots once these have been allocated to those on waiting lists; however, there are two sites at Barn Elms, Worcester Park and Elmstead, Ewell where current demand outweighs the number of vacant plots available. A new allotment site is being provided at the West Park development in the Hospital Cluster, which will provide additional plots for residents as part of this major redevelopment.

Cemeteries and Churchyards

5.30 Cemeteries and churchyards can make a valuable contribution towards meeting local open space needs, and although in many cases they represent a relatively minor resource in terms of land, they are able to provide areas of nature conservation importance via unimproved grasslands and various other habitats. They also act as a useful resource for the local community with wildlife flourishing in small areas of mown grass, wildflower meadows, exotic shrubs and hedges for local species which creates a positive ambience for visitors, local congregations, and the bereaved. Furthermore, cemeteries and churchyards provide a wider scope of benefits to the local area including ecological, structural and landscape, "sense of place" and cultural heritage value.

5.31 There are three cemeteries and two churchyards in the Borough, providing an important role as burial grounds and gardens of

remembrance. These sites are also important cultural assets and may have health and psychological benefits to local residents. Of the Borough's sites, 3 are either fully or partially closed and are somewhat overgrown. This may mean enhancements to quality and accessibility are needed in terms of encouraging their use as local amenities and to support biodiversity.

Parks and Formal Gardens

5.32 These open spaces provide opportunities for meeting a wide variety of informal recreation and community needs. They also contribute towards making a sense of place for the local community; providing ecological and education benefits; helping to address issues of social inclusion , and providing structural and landscaping benefits to the local area.

5.33 There are 16 areas within Epsom & Ewell that fall into this category of GI, which includes the various recreation grounds found around the Borough. Many of these are listed as protected fields by Fields in Trust, as shown in Table 2 below. King George V Fields were established between 1936 and 1965 across the UK to "preserve and safeguard the land for the public benefit", whilst Queen Elizabeth II Fields aimed to protect outdoor recreational spaces to create a grassroots legacy from the Queen's Diamond Jubilee and the London Olympic and Paralympic Games in 2012. Covenanted Fields are those which Fields in Trust holds covenant over land.

Table 2: Protected Fields in Epsom & Ewell

Site	Location	Protection Status
Auriol Park Recreation Ground	Salisbury Road KT4 7DP	King George V Fields
Ewell Court	Poole Road KT19 9SS	King George V Fields
Long Grove Park	Long Grove Road KT19 8TE	King George V Fields
Chessington Road Recreation Ground	Chessington Road KT18 5BY	Queen Elizabeth II Fields
Rosebery Park	Ashley Road KT18 5AW	Queen Elizabeth II Fields
Court Recreation Ground	Pound Lane KT19 8SF	Queen Elizabeth II Fields
Gibraltar Recreation Ground	West Street KT17 1XN	Queen Elizabeth II Fields
Alexandra Rec	Alexandra Road KT17 5BY	Queen Elizabeth II Fields
The Warren	Off Vale Close KT18 6HP	Queen Elizabeth II Fields
Shadbolt Park	Salisbury Road KT4 7BU	Queen Elizabeth II Fields
Schnadhorst Memorial Ground	Frances Road KT18 7QN	Covenanted Fields
Gibraltar	West Street KT17 1XU	Covenanted Fields

5.34 Parks and formal gardens provide a valuable community resource and are important open spaces in urban areas. For example, Rosebery Park and Mounthill Gardens provide essential green spaces within Epsom Town Centre which are heavily frequented by residents and those employed there, as well as students from the UCA. Parks are also essential spaces for outdoor recreation and sports provision, thereby providing health benefits to residents. The Borough's parks and gardens are maintained by the voluntary Friends of Epsom & Ewell Parks group in conjunction with the Council.

Strategic Open Space

5.35 Some of the larger open spaces within the Borough are considered to have a widespread rather than simply local significance. They have an important strategic role in separating distinct areas of the Borough, acting as a buffer to any adverse impacts caused by new development, maintaining and enhancing the visual character and appearance of the Borough, and in helping define urban structure. These two areas are designated as 'Strategic Open Spaces' in the adopted Local Plan. The two Strategic Open Spaces are:

- **Nonsuch Park** is located between Ewell and Cheam, south east of the A24 London Road and north east of the A240 Ewell By-Pass. The Park is owned by Surrey County Council and is managed in partnership with the Borough Council and the London Borough of Sutton. The Park comprises about 250 acres of mature parkland and formal gardens around Nonsuch Mansion House. There are a number of other buildings of varying age and uses in the immediate vicinity of the Mansion House and three residential 'lodges' elsewhere in the Park. It is the largest strategic open space in the Borough and is also a SNCI. It contains formal parkland of considerable ecological, archaeological and historic interest. The Park also contains the remains of Nonsuch Palace and its associated Banqueting House, which are designated as a Scheduled Ancient monument. The Park is highly valued as a strategic open space that serves both nearby residents and visitors from beyond the Borough's boundary.

- **The Hogsmill River** has a similar role to Nonsuch Park, but a large proportion of its area is a SNCI (one of 13 in the Borough), due to its local amenity and recreational value and importance as a green corridor, as well as having Local Nature Reserve status. The site as a whole covers an area of 38.3ha. Although the area involved is relatively small, it represents an important resource of undeveloped land in what is otherwise an urban area. The River Hogsmill catchment drains a significant area of South West London and as such this particular GI asset makes a significant contribution towards managing local flood risk. The area includes the Bonesgate River, which runs along the Borough's boundary with the Royal Borough of

Kingston upon Thames, thus providing a green link between the two Local Authorities. This strategic open space also incorporates other community recreational facilities such as the Old Salesian's Sports Ground at the Eastern end of the Hogsmill River, the Poole Road Recreation Ground and West Ewell allotments. The Hogsmill Strategic Open Space is a significant green infrastructure asset for the Borough's western residential areas.

Domestic Garden Land

5.36 It is estimated that nationally around 22.7 million households (87% of homes) have access to a garden[11]. Gardens cover up to a quarter of the land surface in our towns and cities (a total area of 432,924 hectares) and contain about 3 million ponds and 28.7 million trees, almost a quarter of all trees outside woodlands. They support a wide range of plants and animals and support ecosystem processes such as pollination and organic matter recycling in soils. One study identified 2,673 different species in a medium-sized garden[12].

5.37 Domestic gardens are defined as the private spaces adjacent to or surrounding residential dwellings, which may variously include lawns, ornamental and vegetable plots, ponds, paths, patios, and temporary buildings such as sheds and greenhouses. Although these domestic gardens can be individually small, cumulatively they make a substantial contribution to urban green space.

5.38 Despite the potential size of the resource, domestic gardens are rarely included in estimates of the extent of green space, most likely due to a lack of reliable information and because by their very nature these areas tend to lie outside the immediate control (and hence management requirements) of local government and other administrative authorities[13].

5.39 Garden land can play an important role in maintaining and enhancing the health and wellbeing of our communities as it is a ready source of accessible open space for residents. Gardens also provide habitat for wildlife within the urban area, and as a form of managed green space, can contribute significantly to mitigating flood risk and improve localised air cooling. There is strong evidence to suggest that key domestic gardens should be included within the forthcoming GI strategy. This is because at particular locations they serve an important role in linking green space together within the Borough, their layout creating a network connecting other GI assets. An example of this can be seen in Figure 4 below.

[11] DEFRA, 2011
[12] DEFRA, 2011
[13] Gaston, K. *et al.* (2005) *Urban domestic gardens (IV): the extent of the resource and its associated features*; Department of Animal and Plant Sciences; University of Sheffield

5.40 In recent years, a modest number of domestic garden sites have come forward across the Borough as sources of housing land supply. Nationally this has become a sensitive issue that has coined the term “garden grabbing”. In response the government has introduced new guidance within the National Planning Policy Framework that seeks to protect domestic garden land from inappropriate development. This guidance provides a degree of flexibility and local control for local planning authorities by giving them freedom to decide whether domestic gardens are appropriate sites for future housing on a case-by-case basis. In the past, the redevelopment of domestic garden land has made a modest contribution towards meeting housing demand. A unilateral moratorium on the redevelopment of all domestic garden sites for housing could impinge on our ability to meet our housing targets within the existing urban area. In the future we may therefore need to look beyond the existing urban area for new sources of housing land supply.

Figure 4: Map showing example of key domestic gardens in West Ewell

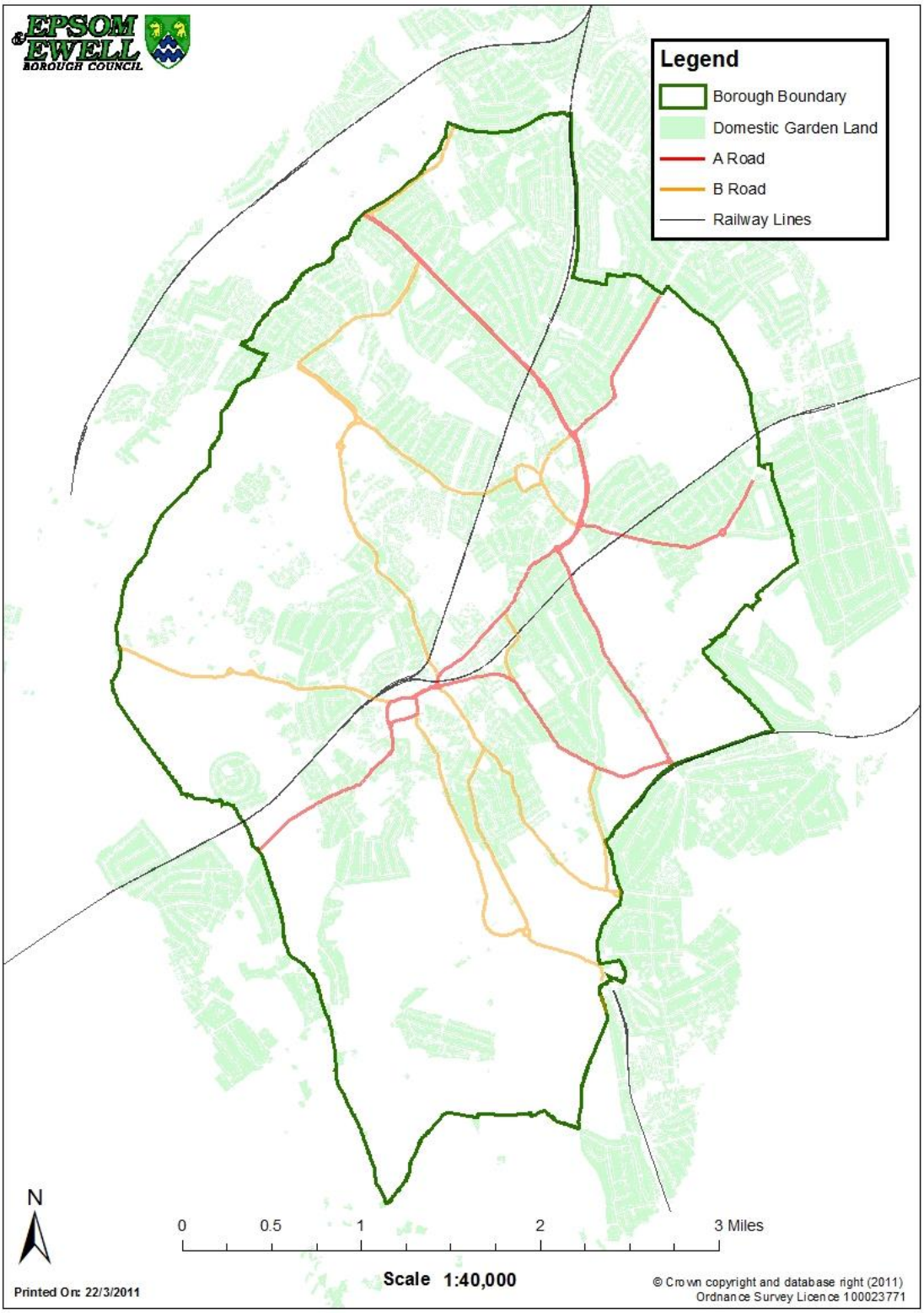
5.41 Figure 4 illustrates the importance of domestic gardens in linking different areas of green space together. The map shows a variety of green spaces including an allotment, recreational grounds, the Hogsmill LNR and various other open spaces. In this example, domestic garden land forms important green linkages between more

formally designated areas of green space. These corridors, or more accurately swathes of inter-links not only provide habitats for species but also routes along which they can move through the urban area. The map also illustrates how linking GI assets together at a neighbourhood scale through the inclusion of key areas of domestic garden land results in a decreased level of fragmentation between important GI assets.

5.42 Epsom & Ewell contains around 1840.5ha of garden land, largely situated in the northern and central areas of the Borough, as illustrated in Figure 5 below. Collectively these form a significant GI asset and their incorporation into a GI Strategy is considered desirable, both in terms of ensuring a landscape scale approach to GI and the benefits such a large swathe of garden land can bring, such as green linkages, urban cooling, flood risk mitigation and wildlife habitat provision.

5.43 In addition to identifying domestic gardens as GI assets the Council could seek to introduce a series of Article 4 Directions on key areas of the Borough removing Permitted Development Rights in rear gardens. This would seek to ensure that domestic gardens were retained as green open spaces where plants and animals could thrive. Such an approach would allow the Council to intervene in circumstances when residents sought to pave over or erect new buildings through the Permitted Development regime. Alternatively, a policy could be introduced restricting development in those gardens located in areas identified as providing key links between larger areas of open space. The Council could take a less intrusive approach by promoting the benefits of maintaining domestic gardens as green open spaces through a positive education campaign.

Figure 5: Map of Garden Land in the Borough



Green Infrastructure Assets and Transport Corridors

5.44 The natural areas at the edges of the nation's strategic road and railway networks cover approximately 60,000 hectares. It is suggested that improved management of these green corridors could connect and

enhance fragmented habitats. Within the Borough, the north-south railway lines provide a good example of how transported related GI assets can function as wildlife highways; there is evidence that the Victoria-bound railway line is actively used by badgers and foxes to move between larger areas of green open space.

There are also other corridors that could contribute to the GI network such as alleyways, public rights of way and cycle ways. These green corridors seek "to provide opportunities for walking, cycling and horse riding whether for leisure purposes or travel and opportunities for wildlife migration"[14].

6. Other forms of Green Infrastructure

Green Roofs, Brown Roofs and Green Walls

6.1 These are examples of the type of innovative alternative forms of GI that developers could be encouraged to incorporate into the design of new developments. These GI assets not only provide opportunities for biodiversity enhancement but also serve as components of sustainable building design that can contribute towards carbon reduction, for example through improved insulation or improving water capture and storage.

6.2 Green roofs are a good example of this type of alternative GI. They can provide a number of economic benefits which include savings on energy costs as a result of their insulation effects on properties during both winter and summer. There is strong evidence that demonstrates that they can extend roof life by up to 60 years, which has the potential to result in savings in building maintenance, drainage and waste disposal[15].

6.3 There are a variety of green roofs available on the market that can be used in different circumstances on buildings to achieve a specific purpose. Generally green roofs can be categorised into two main types:

- **Intensive** green roofs have a deep growing medium which allows trees and shrubs to grow. They are generally quite costly and need extra structure in the building design;

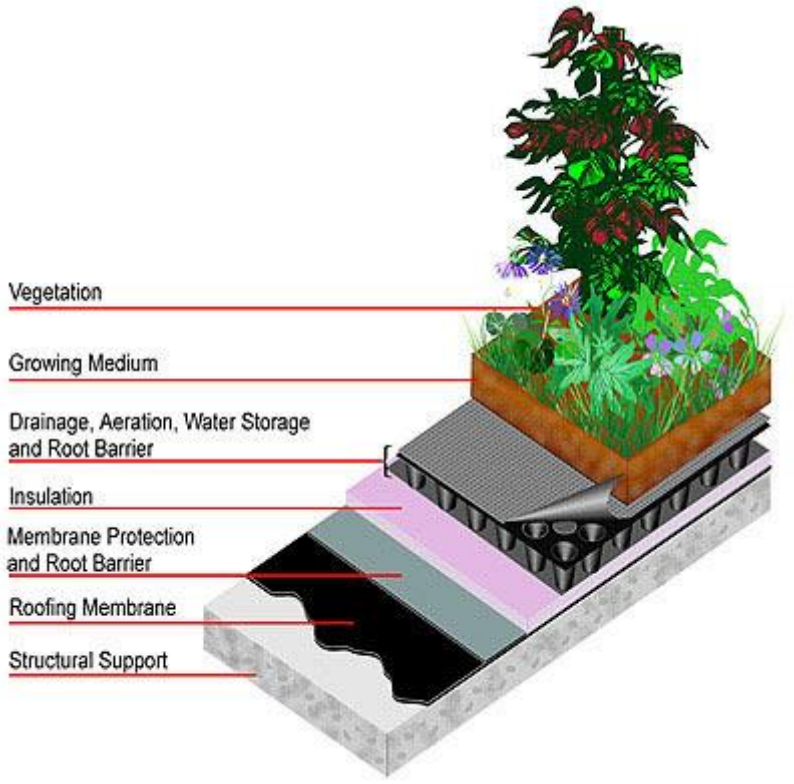
- **Extensive** green roofs have a thinner growing medium, require less maintenance and are usually less costly. On these green roofs, sedum mats can be rolled out on a roof membrane about 2cm thick, or the roofs can be covered in 7cm of crushed brick and then plugged with sedum plants. These roofs could be used to improve

[14] EEBC (2006) *Audit of Open Space, Sport and Recreation Facilities and Assessment of Local Needs*; A Report by PMP
[15] livingroofs.org

biodiversity if left to colonise naturally to recreate the conditions on a disused brownfield site; hence they are known as brown roofs.

6.4 Brown roofs are similar to green roofs as they share comparable construction methods and provide many of the same benefits. However, the overriding aim of a brown roof is to encourage biodiversity whether by maximising the number of species living on the rooftop or by providing a habitat for a specific species. Brown roofs have a flexible design allowing them to be tailored to meet the requirements of clients or to meet specific sustainability requirements, and they can be retrofitted to existing buildings. Brown roofs often require a lower level of maintenance than equivalent green roofs as they emphasise evolution over design[16]. Due to their flexibility and low maintenance costs, it is highly likely that brown roofs would be an appropriate form of alternative GI that could be utilised in Epsom & Ewell.

Figure 6: A diagram of a green roof system



(Source: Greenspec.co.uk/construction: 2010)

6.5 Green walls are formed when a wall is concealed by vegetation. This GI mechanism has been proven to cool the microclimate and create cooling benefits within buildings, reducing the need for air conditioning. The vegetation on green walls usually includes climbing plants, such as ivy, but in recent years, more contemporary architecture and the use of steel cables enables other plants to be used. Good design of green walls ensures that the structure of the wall is unharmed. Climbers have

[16] brownroofs.co.uk

been shown to be effective in trapping dust and pollutants and additionally, can reduce noise pollution by creating an extra layer of insulation. Unlike trees, they take up little vertical space which does not restrict air circulation within a canyon yet still provides a suitable habitat for some wildlife[17].

6.6 An example of a green wall can be found in the neighbouring London Borough of Sutton, unveiled in 2011 in Sutton town centre. The wall was built in partnership between the London Borough of Sutton, Wilkinsons and Transport for London at a reported cost of £151,000. The wall brings environmental benefits such as providing biodiversity, air purification, lowering heat, rain water harvesting and reducing smog, and contains 16 different plant species. The wall is also credited with economic benefits such as enhancing property value, providing insulation and fire resistance, as well as protecting the building from weathering. A similar scheme could be pursued in Epsom & Ewell if partners could be found and funding secured.

Sustainable Drainage Systems (SuDS)

6.7 Approaches to manage surface water that take account of water quantity (flooding), water quality (pollution) and amenity issues are collectively referred to as Sustainable Drainage Systems (SuDS). SuDS attempt to mimic nature and typically manage rainfall close to where it falls. They are also designed to slow water down before it enters streams, rivers and other watercourses. They can be used to provide water storage areas, and allow water to soak into the ground or evaporate either from surface water or via vegetation (evapotranspiration).

6.8 The introduction and retro-fitting of SuDS can provide a multitude of benefits including the minimisation of flood risk and improved water quality management, amenity and biodiversity, and recreation, education and community benefits[18]. This form of GI has already been incorporated into larger housing developments in the Borough at the St Ebbas and West Park sites within the Hospital Cluster, with the introduction of balancing ponds and the creation of a new wetland area at West Park. The Epsom & Ewell Surface Water Management Plan and Sustainable Design Supplementary Planning Document encourage the introduction of SuDS on new developments and therefore they should continue to be utilised where possible.

7. Bordering Authorities: A Comparison with Epsom & Ewell

7.1 As part of *An Analysis of Accessible Natural Greenspace Provision in the South East*, a study conducted by Natural England and the Forestry Commission in 2007, all local authorities in the South East were subject

[17] Livingroofs.org, 2010; May, E (2010) *Green Infrastructure: An evidence base for Birmingham*
[18] susdrain.org

to an appraisal of their provision of greenspace for local residents. This was based on the Accessible Natural Greenspace Standard (ANGSt) requirements, which states:

- That no person should live more than 300m from their nearest area of natural greenspace of at least 2ha in size
- That there should be at least one accessible 20ha site within 2km of home
- That there should be one accessible 100ha site within 5km of home
- That there should be one accessible 500ha site within 10km of home

The results of this appraisal relating to Epsom & Ewell and its bordering Surrey authorities are listed in Table 3 below.

Table 3: An analysis of neighbouring Boroughs' performance against ANGSt requirements

	Epsom & Ewell	Elmbridge	Reigate & Banstead	Tandridge	Mole Valley
No. of households	29,276	53,685	54,309	32,792	35,164
Percentage of households within 300m of 2ha+ site	23%	22%	31%	21%	30%
Percentage of households within 2km of 2ha+ site	99%	64%	83%	81%	87%
Percentage of households within 5km of 100ha+ site	100%	94%	91%	54%	97%
Percentage of households within 10km of a 500ha+ site	88%	79%	20%	0%	99%
Percentage of households meeting all ANGSt requirements	21%	18%	6%	0%	29%
Percentage of households meeting none of ANGSt requirements	0%	0%	7%	12%	1%
Percentage of households served only by linear green space	0%	0%	0%	0%	0%

(Source: An Analysis of Accessible Natural Greenspace Provision in the South East, 2007)

7.2 Table 3 above shows that Epsom & Ewell performs well by having no households that meet none of the ANGSt requirements. In contrast, neighbouring Surrey authorities Reigate & Banstead and Tandridge

perform poorly in terms of accessible greenspace provision in terms of the percentage of households meeting ANGSt requirements.

Furthermore, Epsom & Ewell has the highest proportion of households with access to a 2ha+ site within 5km. In comparison to neighbouring Surrey authorities it performs better across the wider spectrum of criteria. This may be due to the Borough's small size and high population density. This may also explain why the study also highlights the Borough as an area that contains two sites which fall within the most pressured 5% of sites in the South-East due to population pressure.

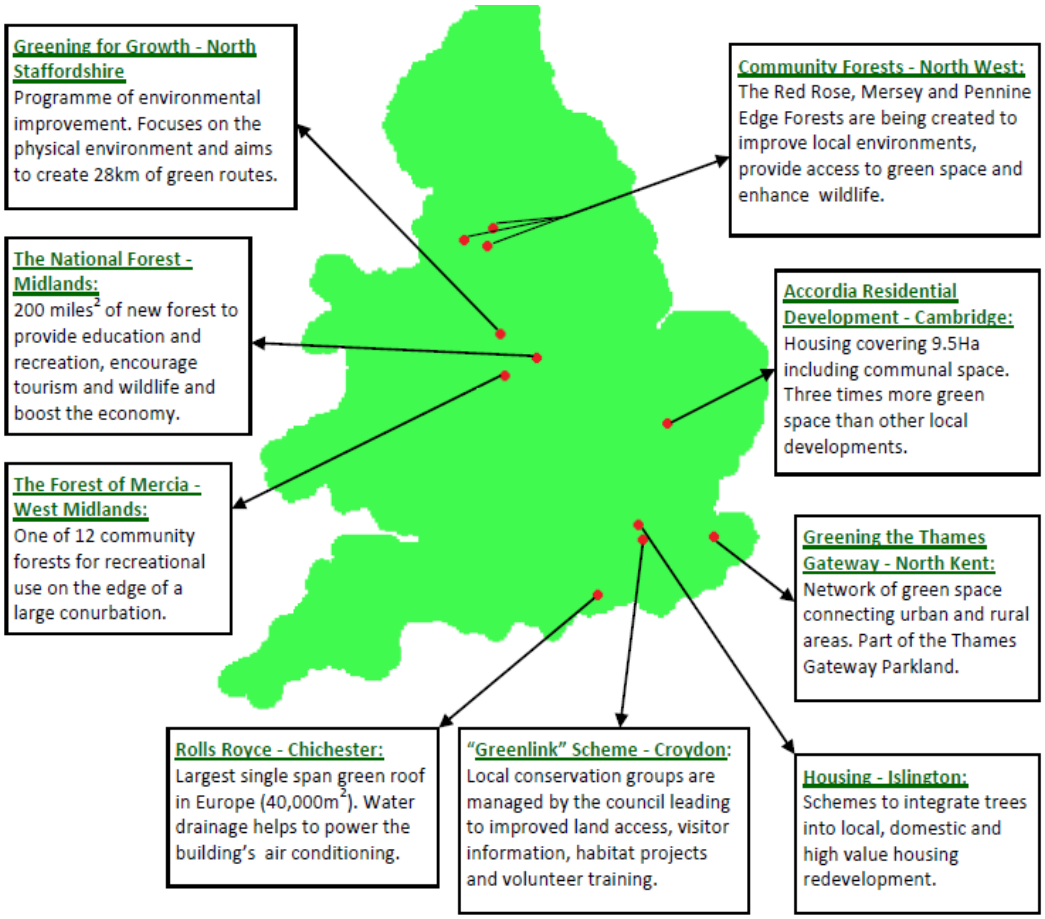
7.3 In order to link the Borough's GI Strategy to a wider landscape scale, the Council could look at opportunities to improve green linkages beyond its boundaries. There are areas of green space and green belt land that cross administrative boundaries and will require some form of joint working between local authorities and other public bodies to maintain and improve them. There are certain green spaces that have joint management arrangements in place such as the Nonsuch Park/Cheam Park open space in partnership with the London Borough of Sutton, and the Epsom and Ashtead Commons that lie between Epsom & Ewell and Mole Valley.

7.4 Further joint working could improve accessibility and linkages between our own GI assets and those in neighbouring authorities. In planning terms, this could be accomplished by joint working arrangements set up via the Duty to Cooperate, which requires Local Planning Authorities to work together on policies that address "larger than local" issues. For example, the Council could seek to foster improved working with the Royal Borough of Kingston upon Thames to manage the Bonesgate River, which runs along the Borough boundary and forms an important link between three of Kingston's Local Nature Reserves. Similarly, the Council could discuss improving the accessibility of the Green Belt land to the south that straddles the boundary between Epsom & Ewell and Reigate & Banstead.

8. Other Green Infrastructure Strategies

8.1 A number of GI strategy and asset management projects are already underway across the country. A range of these projects are summarised in Figure 6 below. These demonstrate the range of GI assets and how they can be used to a variety of national indicators and objectives.

Figure 6: Green Infrastructure Strategies across England



8.2 An example of an alternative approach to managing GI assets at a landscape scale can be found by using a methodology which seeks to establish the quantitative valuation of the benefits that GI assets bring to an area; namely, attaching a specific monetary valuation to individual assets which can then be translated to the development process. This involves the use of a valuation toolkit to calculate the economic benefits of investment in specific forms of green infrastructure, which could form the basis for highlighting areas in need of improvement such as tree types, e.g. certain tree species planted would serve to mitigate health issues within a certain area. This methodology could also put a value on GI by calculating the amount of carbon and pollution stored and absorbed.

8.3 A green infrastructure valuation toolkit was used in the regeneration proposals for the Liverpool Knowledge Quarter, a strategic employment site. This found that investment in GI as part of the scheme would amount to a value of between £29.3 million and £45.7 million through increased employment benefits, property value uplift and climate change adaptation benefits. Using a GI valuation toolkit also has disadvantages however, as the calculations used to obtain a monetary valuation of specific GI assets can often be based on assumptions or

averages that do not take into account local or changing economic circumstances.

8.4 The Thames to Downs Link serves as a good example of how GI assets (specifically green open spaces) can be linked together to form a strategic network. This is a route linking two National Trails: the Thames Path at Kingston and the North Downs Way near Westhumble, along a green corridor via the Hogsmill River and through Maldon Manor, Horton Country Park, the Commons of Epsom and Ashstead, and Mickleham Downs.

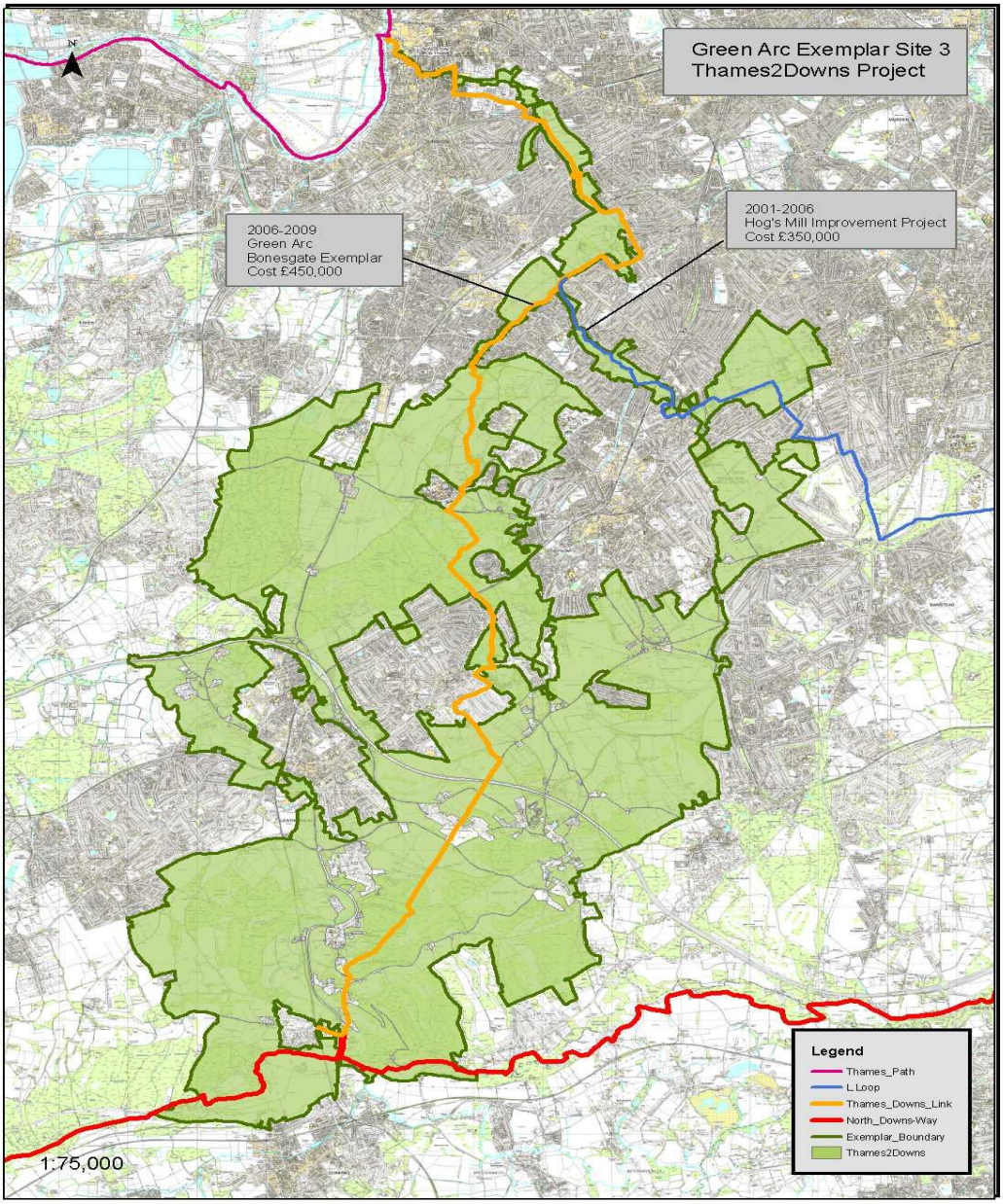
8.5 The Thames to Downs Link project aims to deliver the following benefits:

- Potential biodiversity and public access benefits from a landscape scale project area centred around the Thames to Downs Link (Spinal Route)
- Links a large number of designated sites and the countryside in between
- Builds on existing projects and partnerships
- Working in partnerships and linking projects can attract significant external funding

8.6 This strategy is a good example of how our own emerging GI Strategy would fit into the wider landscape scale context, illustrating the importance of a localised GI Strategy in maintaining and enhancing linkages over a much wider strategic area. This is illustrated in Figure 7 below, which also highlights the Hogsmill and Bonesgate improvement projects where enhancements have contributed to linkages being strengthened beyond the boundaries of Epsom & Ewell.

8.7 Although the Thames to Downs Link is a strategy based at a much larger scale, the Council could take a similar approach as a means of linking designated areas of conservation importance together *within* its own boundaries, as well as forming linkages to the other GI assets bordering the Borough.

Figure 7: Map of the Thames to Downs Link



(Source: Surrey County Council, Lower Mole Project)

9. Funding Opportunities

9.1 There are a number of possible funding sources available for securing and enhancing our GI asset network. Funding could come from a range of government departments and public agencies. Funding from these sources could be justified on the delivery of wider policy objectives, such as meeting housing need and ensuring the health and well-being of communities, through the provision of GI.

9.2 Multifunctional green infrastructure can be secured via a number of different funding streams. Traditionally local authorities have themselves funded the delivery of new GI assets through their own

capital improvements programmes. However, local authority budget allocations combined with the absence of a statutory duty for GI provision or management limits the potential of this approach alone to secure the design, implementation and management of high quality green infrastructure.

9.3 Green infrastructure can be invested in as part of schemes based on wider economic improvements. For example, the funding associated with major transport schemes can be used to invest in forms of GI such as verges, landscaping, street trees and improvements to drainage and flood risk mitigation. This is particularly relevant to identified highways schemes in Epsom & Ewell such as the Epsom Town Centre improvements and the Kiln Lane Link. Similarly the Local Enterprise Partnership (LEP) has a Growing Places Fund that could be utilised to invest in GI as part of the wider improvements to Epsom Town Centre identified in Plan E.

9.4 There are a variety of funds available for each type of GI through the Council's own revenue streams. For example, there is an allocation of £14,500 of funds available for improvements to Epsom Cemetery. Funds for GI can be earmarked from the Council's core budget and Local Nature Reserves. Resources for management of the Hogsmill and Bones Gate Open Spaces are likely to be available from sources such as The Countryside Agency "Doorstep Green" project (Hogsmill) 25 year funding, Woodland Grant Scheme, Environment Agency, Local Nature Reserve status and Heritage Lottery Funding.

9.5 There is also the possibility of allocating funds for GI from the Community Infrastructure Levy (CIL) as well as from Section 106 Agreements for individual sites. The CIL is a charge on new developments that will raise funds that "can be used to support development by funding infrastructure that the council, local community and neighbourhoods want"[19]. This mechanism will bring opportunity for GI to be protected and enhanced where needed in terms of priority within the local area. This is in line with the Government's definition of CIL, stating that "development can be unlocked and made sustainable by the provision of very different types of infrastructure, such as… play areas, parks and other green spaces"[20].

9.5 The CIL will facilitate assessment of how "environmental and green infrastructure will be delivered effectively in support of new homes"[21]. This approach demonstrates that there are promising signs for the enhancement of GI as new development will place it at the heart of the designing process to meet the needs of the community. The CIL will help to achieve sustainable development for a growing community by ensuring that adequate local GI facilities are made available. Therefore

[19] Planning Advisory Service, 2011
[20] DCLG, 2008
[21] DCLG, 2008

this falls in line with one of the principles of GI, that "it should be planned and protected before development"[22].

9.6 All of these funding streams will need to be harnessed in combination with each other as they are unlikely to be able to fund sufficient investment in GI as isolated sources. Successful investment in GI is important in terms of raising the Borough's profile as an attractive destination in which to live and work in line with the vision in the Council's Corporate Plan.

10. Findings & Recommendations

10.1 Green Infrastructure can provide a range of benefits to an area when it functions as an interconnected network of assets. The formulation of a Green Infrastructure Strategy for Epsom & Ewell will ensure that this occurs and will help to target investment in several identified opportunity areas. The benefits of green infrastructure are multiple, including economic, health and wellbeing, visual character and appearance, climate change mitigation, biodiversity and nature conservation. The adoption of a Green Infrastructure Strategy will help to create and cement a multifunctional network of GI assets and prevent further fragmentation of the landscape.

10.2 Fragmented landscapes reduce biodiversity and present challenges to management. Agricultural improvement, urban development and other changes have left many habitats in the South East highly fragmented. This places a limit on some species' ability to disperse and can have a negative effect on the diversity of species supported by these habitats. With this in mind, the establishment of a Green Infrastructure Strategy in the Borough is an important means of reducing habitat fragmentation through the introduction of linkages between the various green spaces and other GI assets both within the Borough and beyond.

10.3 When forming a GI Strategy the Council must look at the green space contained within the Borough in terms of the degree of importance and the role it plays in providing neighbouring local authorities with access to green space. Movement of wildlife between areas and the role GI plays in helping to decrease fragmentation between areas of green space is of particular importance, but human needs are also a high priority. The difficulty when forming a GI Strategy is how the needs of these two groups can be balanced so that an approach is adopted which allows for the requirements of both groups to work in harmony.

10.4 Having used the criteria of Natural England, this study looks at the Borough at a landscape scale. It allowed for identification of key areas that are of particular importance to the Borough and neighbouring districts. For example, Epsom & Ewell is in close proximity to London

[22] Benedict, A & McMahon, E (2006) *Green Infrastructure: Linking Landscapes and Communities*; Island Press; Washington

and borders Greater London, and green space to the north of the Borough, most notably Nonsuch Park, directly serves the needs of residents in the neighbouring London Borough of Sutton. This approach should be carried forward in the production of a Borough-wide Green Infrastructure Strategy.

10.5 Identification of areas of high GI importance is particularly relevant to this study as it allows for identification of areas which are fragmented. There is evidence to suggest that the more urban an area, the more dependant per m^2 people rely on GI, as escalating densities lead to people becoming increasingly cut off from the natural environment. A GI key diagram could therefore give an area analysis of particularly important GI in urban areas. There are techniques available to urban areas such as pocket parks, which provide relief for the urban population as well as serving other benefits such as climate change mitigation and improved biodiversity.

10.6 This study categorises green spaces in the Borough into their relevant types and used a hierarchy to distinguish between the scales at which they function. Although they were put into a hierarchy, it is the collective input of its GI assets that is important to the Borough and this can only be addressed by looking at GI in Epsom & Ewell on a landscape scale. The study identified that domestic gardens play a vital role in providing green space to the Borough. In certain areas their degree of importance escalates, as they provide corridors for wildlife to move between. For example, in West Ewell there are large tracts of domestic garden space that prevent fragmentation between neighbouring GI assets.

10.7 In terms of new development, the Council's emerging Development Management Policies Document contains policies relating to the protection and enhancement of biodiversity, trees and hedgerows and open spaces. GI must reflect local need and the specific character, opportunities and constraints presented by individual sites, taking into account population forecasts and proximity to existing green infrastructure. There can never be a 'one size fits all' approach to GI.

10.8 Although we can categorise certain areas of green space, its role can change. The importance of green space changes depending on its location and the role it plays within that area in terms of contributing to the network. The degree to which each piece of green space is relied upon to connect the GI network together is therefore the determining factor in its importance to a GI strategy. For instance, if an area of green space was to be taken away, would the GI network become fragmented due to the loss of that particular space? The Council's emerging Development Management Policies Document and forthcoming Site Allocations Document will seek to minimise losses and protect and enhance important green spaces to prevent any fragmentation of a GI network. A Green Infrastructure Strategy will be

included in the Site Allocations Document to show key GI assets and identify opportunity sites for potential enhancement.

10.9 Green spaces, and the network of links between these green spaces, are not only crucial for the people of Epsom & Ewell and surrounding areas, but are also important for the economy and environment. Green infrastructure can deliver multiple benefits, providing room for recreation and relaxation, giving the community a chance to explore and enjoy their environment, and increasing their level of exercise all in close proximity to their homes. These opportunities deliver many physical and mental health benefits.

10.10 GI provides and links habitats that support wildlife, thereby making our biodiversity more robust, which has particular relevance to combatting the challenges of climate change. GI plays an important role in moderating the effects of climate change by attenuating flood waters and delivering carbon sequestration.

10.11 A GI strategy in Epsom & Ewell would serve a number of advantages. It would enhance the understanding of GI assets and its objectives are closely linked to governmental sustainable development objectives for environmental, social and economic strategies and policies.

10.12 The following recommendations are made to enable the Council to successfully deliver, maintain and enhance the green infrastructure within the Borough:

- Expanded, well-managed and better connected GI networks will deliver enhancements for wildlife, contributing to national BAP (2020) targets and allowing species to respond and adapt to climate change. The most effective way to conserve and enhance regional biodiversity using GI is to create an ecological network that extends and links existing areas of high biodiversity value, facilitating the colonisation of new areas in response to new opportunities or changing conditions.
- Access needs to be enhanced to areas of green space with particular focus on urban parts of the Borough. One scheme that has worked in other parts of the country is the creation of pocket parks. They can be as small as 0.04 ha, but can make a valuable contribution to the protection and conservation of the surrounding landscape, heritage and wildlife. Any available space can become a pocket park; all that is needed is political will and grassroots support.
- As with most areas in the South East, green space in the Borough is facing considerable development pressure. Therefore, policies must be robust to protect against this. The Council should consider and integrate biodiversity conservation throughout all their policies and strategies. Cross-departmental consultation, ecological expertise and the support of a wide range of partners will be crucial in achieving this.

- A GI approach must be embedded into Epsom and Ewell's Local Plan even if GI policy is adopted as a Supplementary Planning Document (SPD). Therefore, the Council should include policies that address aspects of GI within the Local Plan wherever possible.
- The Council needs to implement a strategy which integrates the different typologies of GI together.
- In urban parts of the Borough and where new development is planned, a sufficient proportion of land must remain as green open space (as local green infrastructure) which is carefully designed to function ecologically as well as recreationally (or whatever its primary designated purpose), so as to supply essential connectivity into the surrounding countryside, and itself present some minimum standard intrinsically as wildlife habitat.
- For the most part, Epsom Common (LNR) forms a continuous swathe of land contiguous with Ashtead Common and Newton Wood. However, the Common is somewhat fragmented within its southern portion. Any further fragmentation or losses of land would reduce the nature conservation value and the Council should therefore seek to prevent this.
- There is a need to investigate the quantity of green space within the Borough to see whether it has been undergoing sustained losses. This could be achieved through comparison of data with use of historic maps that identify areas of green space.
- Domestic back gardens should be incorporated into the Borough's GI strategy. All domestic garden land within the Borough would need to be part of the strategy, but specific strategically important areas could be highlighted and the Council could seek to protect these from inappropriate development, possibly through Article 4 Directions.
- GI provision can be further enhanced by acquiring land through Compulsory Purchase Orders or via Section 106 agreements as well as identifying green space within the Borough for further improvement and management through the Community Infrastructure Levy (CIL).
- It is recommended that the protection of Green Belt land within the Borough continues into the future. Although there is an increasing pressure to develop on such land for new housing allocation, the Borough has a character which is shaped by its Green Belt land and the removal of such land would prove detrimental to this and to the health and well-being of residents and wildlife, as well as increasing the likelihood of the fragmentation of sites. Removal of the Green Belt could lead to unpredicted consequences in the future.