

## **Planning for Green Infrastructure in a Changing Climate in London**

### **Introduction**

Climate change is one of the global environmental, social and economic threats that many urban and rural population faces due to natural causes and human activities, including increasing resources consumption and urbanisation. The Fourth Assessment Report of the Intergovernmental Panel on Climate Change (IPCC) reports that the observed increase in global average temperature since the mid-20<sup>th</sup> century is very likely due to the observed increase in anthropogenic greenhouse gas concentration. The United Nations' Millennium Development Goals Report 2007 projected that half of the world's population would live in urban areas at the end of 2008. Population growth and urbanisation are highly related to climate change; it will bring devastating effects on urban populations, including loss of GDP and food security as illustrated in the UN Habitat's Cities and Climate Change: Global Report on Human Settlements 2011.

According to London Plan 2011, the UK is the world's eighth largest emitter of carbon dioxide, and London is responsible for 8.4 % of these emissions (the latest annual estimate is 44.71 million tonnes<sup>4</sup>). London also has the lowest domestic carbon dioxide emissions per person per year, at 2.26 tonnes, and the joint lowest transport emission rate per person, at 1.38 tonnes, of all the UK regions. This is due to the higher use of public transport and the density of development in London. As part of the Climate Change Act 2008 the Government established a target to reduce the UK's greenhouse gas emissions by 80 per cent by 2050 and has proposed carbon budgets as a means to work towards this UK target.

Green infrastructure (GI) is a strategically planned, created, managed, protected network of green multi-functional spaces in built and urban environments. It includes but not limited to parks and gardens, natural and semi-natural urban green spaces, green corridors, playing fields, woodlands, allotments and private gardens. GI helps to conserve and enhance biodiversity, create a sense of space and place, support healthy living by increasing outdoor recreational opportunities for local communities. It also helps to mitigate the effects of climate change and heat island by reducing the incidents and severity of flooding, support healthy ecosystems, and reduce energy usage by regulating the heat in urban spaces. Nature is crucial to prosperity and development, it has to be designed and managed to deliver a wide range of environmental and quality of life benefits for local communities.

The study of the Economics of Ecosystems and Biodiversity by the UN Environmental Programme calls for a wider need to recognise nature's contribution to human livelihoods, health, security, and culture by decision-makers at all levels (local to national and business to citizens). Formulating a socially just, economically competitive and environmentally sustainable society for the current and future generations is essential to improve the long term social and ecological health of cities and towns. The concepts of quality of life, liveability and sustainability are the cores in planning for sustainable growth and development.

The UK planning system seeks to guide appropriate development to the right place and prevent inappropriate development taking place. It aims to secure sustainable development by providing homes, jobs and services that protects and enhances the built and natural environment. Sound planning system is essential to guide future development and use of land in cities, towns and rural areas in the long term public interest. Planning policy is formulated to ensure that land use changes and development would be happened in sustainable and suitable locations, and inappropriate development could be minimised.

### **Objectives**

This paper aims at understanding how to plan for climate change through green infrastructure. The basic objectives of this paper are as follow:

- 1) To analyse paths and policies for future in green infrastructure in response to climate change and formulate sustainable communities in London.
- 2) To provide an interdisciplinary reference for institutions of urban planning and policy making from the perspectives of sustainability

### **Planning System in the UK**

The planning system in the UK is a plan-led and policy based system. It is formulated based on democratic decision-making with public consultation in preparation and the right to challenge and independent scrutiny. It provides a legal framework for reducing the environmental impacts for development and is used for the purpose of remedying past environmental harm or providing environmental enhancements. Planning policy sets out criteria for development and is used to help determine planning applications- what can be built, where, and how buildings are used. It plays a key role in helping to reduce carbon emissions, protect the natural environment and deliver energy security. It is also used to plan strategically, looking at future needs to be addressed, what change is likely to happen and where, and what policies are needed to achieve this. It helps to ensure that development takes place in the public interest, in economically, socially and environmentally sustainable ways. All development in the UK requires planning permission with the exception of some minor development with general permitted development rights. Planning policy exists at the national, regional and local level and will be discussed below:

### **National Planning Policy**

At the UK national level there is a series of Planning Policy Statements (PPSs) (and their predecessors Planning Policy Guidance Notes (PPGs)) are prepared by the Government after public consultation to provide guidance to local authorities and others on planning policy and the operation of the planning system. Both regional and local planning policies have to consider national policy. The PPSs and PPGs most relevant to green infrastructure and climate change are highlighted below.

- **PPS1: Delivering Sustainable Development (2005)** sets out the Government's overarching planning policies on the delivery of sustainable development through the planning system.
- **PPS1a: Planning and Climate Change – Supplement to PPS1 (2007)** sets out how planning should contribute to reducing carbon emissions to stabilise climate change and adapt to unavoidable changes to our climate.
- **PPS2: Green Belts (2001)** sets out how green belts are designated and their land safeguarded.
- **PPS9: Biodiversity and Geological Conservation (2005)** sets out how planning policies on protection and enhancement of biodiversity and geological conservation.
- **PPG17: Planning for Open Space, Sport and Recreation (2002)** sets out the government priorities and aims for high standard open space provision in the right locations in the preparation of development plans by identifying deficiencies in both open space and sport facilities and to remedy these deficiencies.
- **PPS22: Renewable Energy (2004)** sets out the Government's policies for renewable energy, including the need for local authorities to promote and encourage the development of renewable energy resources.
- **PPS25: Development and Flood Risk (2010)** aims to ensure that flood risk is taken into account at all stages in the planning process.

**The Natural England also sets benchmarks** for ensuring access to places near to where people live in the **Accessible Natural Greenspace Standard (2010)**. These 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 2 kilometres of home
- one accessible 100 hectare site within 5 kilometres of home
- one accessible 500 hectare site within 10 kilometres of home
- one hectare of statutory Local Nature Reserves per thousand population.

### ***Regional Planning Policy***

In London, the Mayor produces the London Plan, the Spatial Development Strategy for London. The plan was first published on 10 February 2004 and has since been amended. The latest version of the London Plan is the replacement plan for Greater London which is adopted on 22<sup>nd</sup> July 2011 by the Greater London Authority. It is the overall strategic plan for London, and it sets out an integrated economic, environmental, transport and social framework for the development to 2031. The London Plan forms part of the development plan for Greater London, London boroughs' local plans (Local Development Framework) have to be generally consistent with the London Plan, and its policies guide decisions on planning applications by councils and the Mayor.

The Mayor's vision is "**Over the years to 2031 – and beyond, London should: excel among global cities – expanding opportunities** for all its people and enterprises, **achieving the highest environmental standards and quality of life** and **leading the world** in its approach to tackling the urban challenges of the 21<sup>st</sup> century, particularly that of climate change." The Mayor's six objectives for the new London Plan are to ensure that London is:

- a. **A city that meets the challenges of economic and population growth** to ensure a sustainable, good and improving quality of life for all Londoners and helps tackle the huge issue of inequality among Londoners, including inequality in health outcomes.
- b. **An internationally competitive and successful city** with a strong and diverse economy and an entrepreneurial spirit that benefits all Londoners and all parts of London; a city which is at the leading edge of innovation and research and which is comfortable with - and makes the most of - its rich heritage and cultural resources.
- c. **A city of diverse, strong, secure and accessible neighbourhoods** to which Londoners feel attached, which provides all of its residents, workers, visitors and students - whatever their origin, background, age or status – with opportunities to realise and express their potential and a high quality environment for individuals to enjoy, live together and thrive.
- d. **A city that delights the senses** and takes care over its buildings and streets, having the best of modern architecture while making the most of London's built heritage and which makes the most of and extends its wealth of open and green spaces and waterways, realising its potential for improving Londoners' health, welfare and development.
- e. **A city that becomes a world leader in improving the environment** locally and globally, taking the lead in tackling climate change, reducing pollution, developing a low carbon economy and consuming fewer resources and using them more effectively.
- f. **A city where it is easy, safe and convenient for everyone to access jobs, opportunities and facilities** with an efficient and effective transport system which actively encourages more walking and cycling and makes better use of the Thames, and supports all the objectives of the London Plan.

It includes a number of important policies related to climate change and green infrastructure in the London Plan, including:

**Policy 2.4: The 2012 Games and their legacy** sets out the Mayor's long term vision for the Olympic Park and surrounding areas embed exemplary design and environmental quality including attention to the response to climate change and provision of exemplary energy, water conservation and waste management

- **Policy 2.18: Green infrastructure: the network of open and green spaces** sets out the Mayor's commitment to work with all relevant strategic partners to protect, promote, expand and manage the extent and quality of, and access to, London's network of green infrastructure
- **Policy 5.1: Climate change mitigation** seeks to achieve an overall reduction in London's carbon dioxide emissions of 60 per cent (below 1990 levels) by 2025
- **Policy 5.2: Minimising carbon dioxide emissions** requires development to make the fullest contribution to minimising carbon dioxide emissions in accordance with the energy hierarchy
- **Policy 5.3: Sustainable design and construction** sets out to promote and protect biodiversity and green infrastructure
- **Policy 5.9: Overheating and cooling** seeks to reduce the impact of the urban heat island effect in London and encourages the design of places and spaces to avoid overheating and excessive heat generation, and to reduce overheating due to the impacts of climate change and the urban heat island effect on an area wide basis
- **Policy 5.10: Urban greening** seeks to promote and support urban greening, such as new planting in the public realm (including streets, squares and plazas) and multi-functional green infrastructure, to contribute to the adaptation to, and reduction of, the effects of climate change. It also seeks to increase the amount of surface area greened in the Central Activities Zone by at least 5% by 2030, and a further 5% by 2050
- **Policy 5.11: Green roofs and development site environs** sets out major development proposals should be designed to include roof, wall and site planting, especially green roofs and walls where feasible, to deliver as many of the following objectives as possible:
  - a. adaptation to climate change (i.e. aiding cooling);
  - b. sustainable urban drainage;
  - c. mitigation of climate change (i.e. aiding energy efficiency);
  - d. enhancement of biodiversity;
  - e. accessible roof space;
  - f. improvements to appearance and resilience of the building;
  - g. growing food
- **Policy 5.12: Flood risk management** seeks to work with all relevant agencies including the Environment Agency to address current and future flood issues and minimise risks in a sustainable and cost effective way, such as providing flood storage/conveyance or setting development back from rivers
- **Policy 5.13: Sustainable drainage** seeks to utilise sustainable urban drainage systems (SUDS) unless there are practical reasons for not doing so, and should aim to achieve Greenfield run-off rates and ensure that surface water run-off is managed as close to its source as possible
- **Policy 5.14: Water quality and wastewater infrastructure** seeks to work in partnership with the boroughs, appropriate agencies within London and adjoining local planning authorities to ensure London has adequate and appropriate wastewater infrastructure to meet the requirements placed upon it by population growth and climate change
- **Policy 7.15: Reducing noise and enhancing soundscapes** seeks to reduce noise and support the Mayor's Ambient Noise Strategy and Open Space Strategy

The London Plan Monitoring Framework related to green infrastructure is mentioned below and the indicators will be reported on the London Plan Annual Monitoring Report to review how effective the policies are and consider if they need to be reviewed and replaced.

- Maximise the proportion of development taking place on previously developed land. Maintain at least 96 % of new residential development to be on previously developed land
- Minimise the loss of open space- no net loss of open space designated for protection in LDFs due to new development

- Loss of garden land to residential development - No more than 120 residential units to be developed on garden land/year
- Protection of biodiversity habitat- No net loss of designated Sites of Importance for Nature Conservation
- Reduce carbon dioxide emissions through new development
- For strategic developments achieve zero carbon in residential development by 2016 and zero carbon in all development by 2019
- Improve London's Blue Ribbon Network: Restore 15km of rivers 2009–2015

Apart from the London Plan, the Mayor of London also prepared following guidance in providing new ecological network and safeguarding existing green infrastructure. These are: **Providing for Children and Young People's Play and Informal Recreation Supplementary Planning Guidance (SPG)** provides guidance to London Boroughs on providing for the play and recreation needs of children and young people under the age of 18 and the use of benchmark standards in the preparation of Play Strategies and in the implementation of Policy 3D.13 as set out in the London Plan (consolidated with Alterations since 2004).

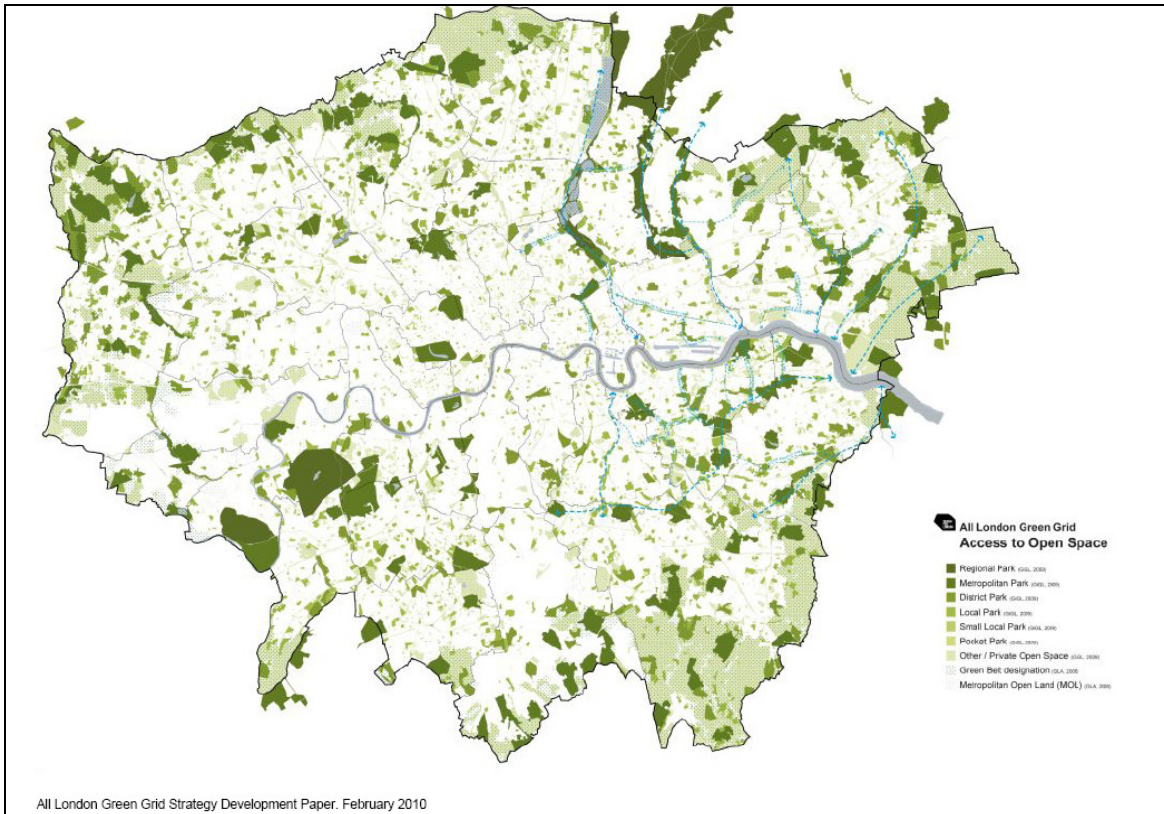
**East London Green Grid SPG (2006)** seeks to improve East London's provision of open space and provide a range of formal and informal recreational uses and landscapes, promoting healthy living and amplifying the public enjoyment of the outdoors. It also helps East London adapt to climate change by reducing flood risk and enhancing surface water management. The project aims are to create, improve, manage and maintain high quality green infrastructure for people and wildlife.

**Mayors Street Tree Programme** The RE:LEAF programme: London Trees and woodlands to help the capital combat the effects of climate change. The Mayor of London is committed to funding a programme to plant 10,000 additional new street trees by March 2012 as part of this goal to make London a greener city. The aim is to plant 250 trees on average in the 40 priority areas that would most benefit from the social, economic and environmental improvements that new street trees provide. It is committed to increasing London's tree cover from 20-25% by 2025, by planting an extra 2 million trees - equating to one tree for every Londoner.

**Living Roofs and Wall, Technical Report supporting London Plan Policy (2008)** reviews all the technical data available for a range of benefits provided by green roofs and green walls in reducing the urban heat island, thermal performance, storm water attenuation, biodiversity and amenity. It also reviewed city policies elsewhere in the world.

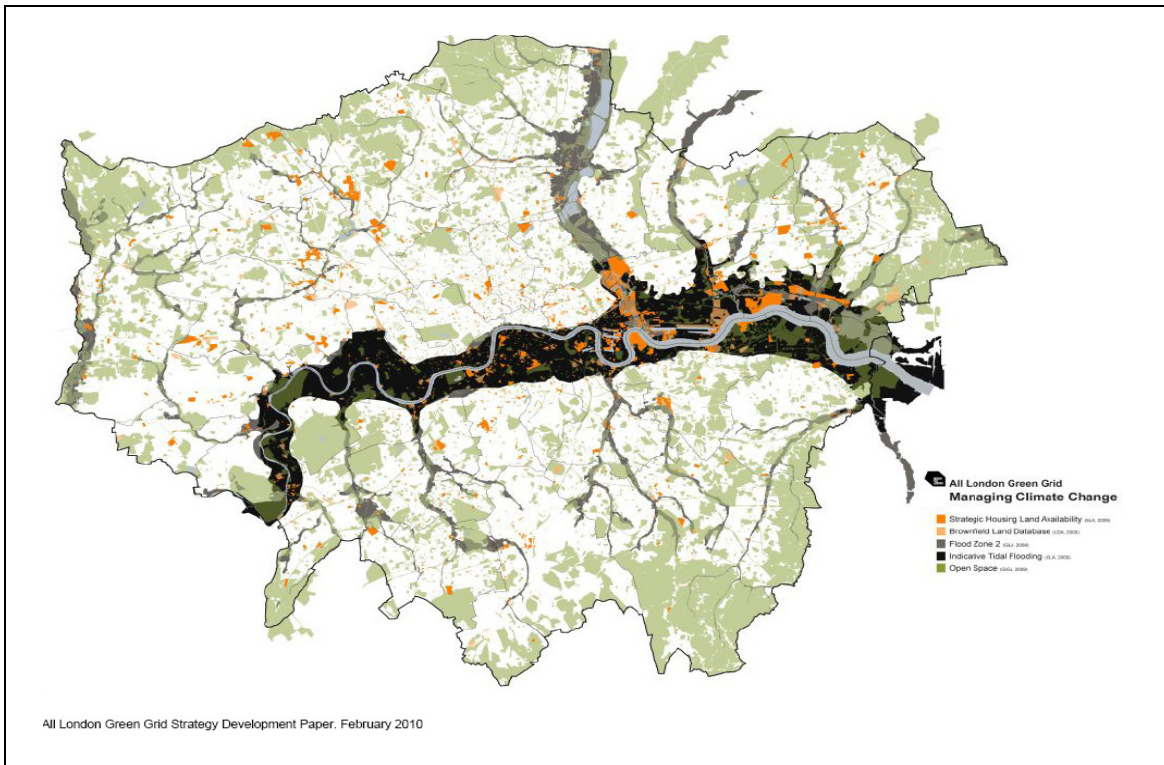
**All London Green Grid Strategy Development Paper (2011)** The London Development Agency and Design for London have taken into account the changing policy context, lessons learned from the East London Green Grid project and the practicalities of a London-wide roll out. It sets out a process by which the ALGG can be developed and implemented. It recommends ALGG objectives, a governance framework, potential sub-areas and associated delivery mechanisms.

According to the Mayor's Biodiversity Strategy (2002), London is a remarkably green city. Two-thirds of London's land area is occupied by green spaces and water. Of this, about a third is private gardens, a third parks or in sports use and a further third is other wildlife habitats, such as grasslands, woodlands and rivers. These green spaces support a tremendous variety of plants and animals. The diversity of London's wildlife is illustrated by the fact that over 1500 species of flowering plants and 300 types of birds have been seen here in recent years. Figure 1 shows the open space designation in London and figure 2 demonstrates how green infrastructure could help to manage climate change.



**Figure 1 – Access to Open Space in London**

Source: All London Green Grid Strategy Development Paper, 2010



**Figure 2 – Managing Climate Change through Green Infrastructure in London**

Source: All London Green Grid Strategy Development Paper, 2010

### ***Local planning policy – Local Development Framework***

The Planning and Compulsory Purchase Act 2004 introduced a system of plan making known as the Local Development Framework (LDF) in England. The LDF is a portfolio of planning documents, prepared by the local planning authorities, which collectively will deliver the planning strategy in the Councils. LDF documents that are prepared in a formal way which includes consultation with the public and independent testing at a public examination presided over by an inspector appointed by the government. When adopted the council's decisions on planning applications are made in accordance with the content of the Development Plan Documents (DPD)



**Figure 3 – Map of London Borough of Lewisham, London and the United Kingdom**

Source: London Borough of Lewisham

There are 33 local planning authorities in London and are responsible for running most local services in their areas. The London Borough of Lewisham is in south-east London and forms part of Inner London and the Thames Gateway which is considered the largest regeneration project in Europe. The Thames Gateway is London's major focus for regeneration over the coming years with 120,000 new homes expected to be built and 180,000 new jobs created. Lewisham plans to strike a balance between development targets and environmental quality, the idea of green infrastructure have emerged nationwide to support the growth of more sustainable communities in the future. Following this important development, the LDF is in general conformity with the London strategic and local policies, such as the London Plan, the East London Green Grid Framework SPG. Where there is a difference between the policies in the London Plan and the boroughs adopted development plan, the most recent plan takes precedence.

### **Lewisham's Core Strategy**

The Lewisham's Core Strategy was adopted on 26 June 2011 sets out the long term spatial vision for the borough, covering a 15 year period from the date of adoption. The Core Strategy includes a strategic vision, objectives and spatial strategy for the borough as well as core policies and strategic site allocations to achieve the objectives. It also includes a monitoring and implementation framework. The Core Strategy reflects the spatial aspirations of the Lewisham's Sustainable Community Strategy (SCS) that has been prepared by Lewisham's Local Strategic Partnership and is a document which sets out how the vision and priorities for Lewisham will be achieved. The Lewisham LDF has regard to the SCS and ensures that spatial requirements arising from that strategy are addressed. The local development documents of the LDF are in effect the spatial interpretation of the SCS. The following objectives are related to planning for climate change and green infrastructure in Lewisham.

**Core Strategy Objective 5: Climate Change**

Seek to support environmental protection and enhancement including establishing ecological networks

**Core Strategy Objective 6: Flood Risk reduction and water management** seeks to protect the borough from the risk of flooding and reduces the effect of flooding

**Core Strategy Objective 7: Open spaces and environmental assets** seeks to protect and capitalise the environmental, ecological and biodiversity features of Lewisham to promote health and well-being

**Core Strategy Objective 10: Protect and enhance Lewisham's character** seeks to protect Lewisham's distinctive local character through sensitive and appropriate design in local rivers and landscape.

The Core Strategy establishes the Council's planning policies in green infrastructure and climate change. In formulating these, background work is undertaken to underpin the policies and documents. This supporting information will work as an evidence base for policy formation. Many of these documents and studies are produced either by or for the Council, and some may be produced by or for other organisations. The main evidence base documents commissioned by the Council associated with green infrastructure and climate change are as follow:

- **Lewisham Leisure and Open Space Study** provides an overarching review of open space in the borough. It provides an assessment of public open space, its characteristics and designations, as defined in Planning Policy Guidance 17 Planning for Open Spaces, Sport and Recreation (PPG17)
- **Ravensbourne River Corridor Improvement Plan** assesses the river environment from Catford to the River Thames at Deptford and identifies how development and local initiatives can enhance its quality. The plan provides the evidence for policies set out in the Lewisham LDF Core Strategy as well as guidance to residents, developers, designers, planners and others. This plan is an action from the Environment Agency's Thames Catchment Flood Management Plan to successfully manage flood risk.

Based on figures from the Department for Energy and Climate Change (DECC) (2010), the total CO<sub>2</sub> emission for Lewisham between 2005 and 2008 are reducing annually and the per capital reduction rate is at 10.9% (4.1 per capital emissions (t) in 2008). The total carbon emission in Lewisham is 1,080,000 tonnes and contributed 2.37% of London's total CO<sub>2</sub> emissions. The Lewisham Renewables Evidence Base Study (LREBS) demonstrated that the carbon reduction policy has a significant role to play in bringing about overall reductions in borough emissions. Given projected population, employment growth and new development within the borough will contribute to the build up of greenhouse gases in the atmosphere, influencing the determinants of climate change.

The carbon reduction policies set out in the Core Strategy Policy 7 and Policy 8 are necessary in response to the challenging national and local targets by implementing the principles of 'avoidance, mitigation and adaptation'. These will support the implementation of the Mayor's Climate Change Action Plan targeting stabilising London's CO<sub>2</sub> emissions at 60% below 1990 levels by 2025 and the London Plan SPG on Sustainable Design and Construction (or any subsequent document) by ensuring development contributes to reducing carbon emissions from design, construction to occupation phases.



The Council will continue to protect all open space from inappropriate development, designate and protect sites for nature conservation importance, provide open space and nature conservation areas where there are deficiencies through on site and off site provision in new development. Core Strategy Policy 12: Open space and environmental assets helps to maintain and enhance the quality, usability, safety and accessibility of all Metropolitan Open Land (MOL), Sites of Importance for Nature Conservation (SINC), public open spaces, urban green space and green corridors and provide opportunities for people to experience and enjoy the natural habitats, species and landscapes. Green infrastructure protects and connects natural habitats, provides for essential flows with ecological 'stepping stones' and corridors, reduces barriers such as pollutant sources and altered water regimes.

The Lewisham Leisure and Open Space Study (LLOSS) has undertaken an assessment of public open space, its characteristics and designations as defined in the PPG17: Planning for Open Space, Sport and Recreation in the borough. It identified the quantity, quality and access of the current open space's catchment and deficiency areas for the Core Strategy. It also set the provision standard and its standard application based on various open space typologies and population projections, including parks and gardens, natural and semi-natural greenspace, outdoor sports facilities, amenity green spaces, provision for children and young people, allotments, cemeteries and churchyards. LLOSS found that per 1,000 populations, Lewisham has 1.41 ha of open space per person. With population growth, to maintain this level in 2026, there would be a requirement for an additional 63.55ha of open space across the borough. Due to limited land and development pressures in Lewisham, an inner London Borough, Core Strategy Policy 12 is considered to be realistic and deliverable by emphasising the need for improving existing open space, and to create on site open space within new development, where possible. If not, off site provision or S106 contributions (planning obligations) will be sought to improve quality, accessibility and quantity, particularly in open space deficiency areas.

The protection of ecology and enhancement of biodiversity is important due to the limited open space and other natural resources within the borough, and because of potential impacts to biodiversity from climate change and high density development. Whilst there are a number important biodiversity habitats to protect in the borough, the projected growth and density of development means that substantial area of new habitat are unlikely to be created. However, on-site measures or a contribution in lieu can help to compensate the impact of new development. Lewisham's Biodiversity Action Plan provides further details. The provisions of Policy 12 are also required in order to help implement the UK and London Biodiversity Action Plans. For example, living roofs and walls help to ameliorate the effects of climate change by providing a habitat for biodiversity. Eight developments involving living roofs were also granted planning permission in the monitoring year 2009-10. The Council has experienced no substantial losses of public open space since 2004. The Core Strategy Policies relevant to climate change and green infrastructure are listed below:

- **Core Strategy Policy 7: Climate change and adapting to the effects** - adopts a partnership approach to implement the principles of 'avoidance, mitigation and adaptation' to reduce Lewisham's CO<sub>2</sub> emissions.
- **Core Strategy Policy 8: Sustainable design and construction and energy efficiency** -prioritises the reduction of the environmental impact of all new developments
- **Core Strategy Policy 10: Managing and reducing the risk of flooding** - seeks to secure sustainable urban drainage and living roofs/walls
- **Core Strategy Policy 11: River and waterways network** - requires Development adjacent to rivers and the waterway network should contribute to their special character by improving the urban design quality and natural ability of the rivers and waterways to function, the vitality of the river frontages, and improving access to the foreshore and naturalising flood defences

- **Core Strategy Policy 12: Open space and environmental assets** recognises the strategic importance of the natural environment and to help mitigate against climate change the Council will conserve nature, green the public realm and provide opportunities for sport, recreation, leisure and well-being.

**The following Lewisham Unitary Development Plan (2004) policies are saved beyond 29<sup>th</sup> June 2011 and not superseded by the Lewisham LDF Core Strategy.**

- **URB 13 Trees** seeks to maintain, protect and increase the numbers and quality of trees in the Borough, make Tree Preservation Orders wherever necessary and require developers, as a condition of planning permission, to retain existing trees and to plant appropriate new ones where this is appropriate and practicable
- **OS 7 Other Open Space** resists inappropriate development on the areas of Public Open Space (POS) or Urban Green Space (UGS)
- **OS 16 World Heritage Site Buffer Zone** gives special consideration to developments within the declared World Heritage Site Buffer Zone.
- **HSG 7 Gardens** requires all new dwellings the provision of a readily accessible, secure, private and useable external space.

### **Planning Obligations in planning for green infrastructure**

The LDF Planning Obligations Supplementary Planning Document (SPD) provides greater transparency and openness in the way planning obligations are agreed with developers. It also provides additional information to implement the policies in the development plan and will be a material consideration in determining planning applications within the borough. It provides specific guidance on circumstances when obligations will be secured

### **Core Strategy Policies Monitoring and Review**

The Council publishes the Annual Monitoring Report (AMR) annually in December to provide a summary of all development and land use within the borough. These help to understand

- What impact local development document policies are having on other targets set at national, regional or local level?
- Whether any policies need to be amended or replaced because they are not working as intended or are not achieving sustainable development objectives?
- What action needs to be taken if policies need to be amended or replaced?

The current AMR indicators related to green infrastructure are:

- No. of approved developments which incorporate SUDS
- Inappropriate development on open space
- % of eligible open spaces managed to Green Flag award standard
- No. of living roofs/walls
- No. of new allotments
- Changes in areas of biodiversity importance

### **Exemplary Green Infrastructure in Lewisham**

Open space in Lewisham is one of the borough's greatest assets. From the large expanses of Blackheath in the north to Beckenham Place Park in the south, to the many medium sized and smaller parks between, the range of open space is widely used and greatly appreciated by all Lewisham's residents. Lewisham has a varied portfolio of parks and other green spaces. These are spaces in which people can enjoy a range of activities and escape the stresses of modern city life.

In 2010-11, 12 in Lewisham have been awarded "Green Flag Awards", the national standard for parks and green spaces in England and Wales began in 1996, including Ladywell Fields and Cornmill Gardens, which is higher than any other South London Boroughs in 2010. Two "Green Pennants Awards" are also received to recognise high quality green spaces managed by voluntary and community groups.

Ladywell Fields is a district park elongated to the River Ravensoburne in Ladywell. It contains a park keeper's office and a lively cafe, skate boarding area, tennis courts, lovely mature trees and a nature reserve full of wildlife. The park has seen a lot of improvements in the last two years mainly due to the EU funded Quercus project. The project created a new naturalised river channel, meandering through the northern section, back waters, areas of marginal river side vegetation and areas of meadow have been created. The nature reserve has been improved with better infrastructure and greater public access. The water link rangers also increase the community and school involvement in the park.

Cornmill Gardens is an open space for Lewisham Town Centre, providing residents' access to the River Ravensborne, which has been released from its concrete walls. The new river banks were planted with a selection of native plants and trees, and there are signs of naturally occurring native plants establishing themselves. Cornmill Gardens opened in 2007, and along with its well-manicured lawns and children's play area provides residents with direct access to the Ravensbourne, which has been released from its concrete walls. Since it opened Cornmill Gardens has won a number of national design and landscaping awards including: Best New Public Space, London Planning Awards 2008, Best Streetscape Project, Horticulture Week Landscape and Amenity Awards 2007 Waterways, Local Government News' Street Design Awards 2008 and the Civic Trust Awards 2008.

### **Conclusion**

The full effects of climate change are expected to intensify in cities such as London over the coming decades. The risks of flooding, unseasonal temperatures, the urban heat island effect and limited water resources all affect our quality of life. Planning for a sustainable, liveable and healthy natural and built environment needs strong political will and cultural change to make it happen. Where green infrastructure is deficient in terms of quality, quantity, accessibility and tranquility, plans, programmes and policies can propose provision through landscape management and other improvements. It highlights the importance of the natural environment in decisions about spatial planning, emphasising its role in promoting life support functions by providing network of natural ecosystems. These improvements to biodiversity and the natural environment can increase opportunities for wildlife activity and recreation, contributing to climate change adaptation and a better quality of life. It is high time for decision-makers and stakeholders to develop ways to cut greenhouse emissions by planning for the natural environment in response to climate change.

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<http://www.lewisham.gov.uk/myservices/planning/policy/LDF/evidence-base/Pages/LDF-evidence-base-environment.aspx>