



London Borough of Sutton

# Borough Climate Change Adaptation Strategy

April 2011







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# Climate change is by far the greatest challenge to the future social, economic and environmental well-being of the Borough

## 1 The Need for Action

The Council acknowledges that:

- Evidence shows that climate change caused by human activities is already happening and is by far the greatest challenge to the future social, economic and environmental well-being of the Borough;
- Some climate change is unavoidable, including increased exposure to higher temperatures, heat-waves, flooding and drought, so we need to ensure that all new developments and local communities are fully adapted and resilient to future climate impacts;
- Improved spatial planning, layouts and urban designs at the Borough, neighbourhood and building scales are key to creating sustainable communities and high quality places which are adapted to climate change whilst achieving many other benefits for the local economy, the urban environment and quality of life;
- Climate Change is primarily a public health issue and adaptation measures have significant long term potential for delivering improved health outcomes while reducing the economic burden of health provision;
- Creating new blue and green infrastructure links as part of new developments and maximising the role of the Borough's existing open space networks, green corridors, rivers and floodplains is key to achieving a wide range of adaptation objectives;
- Climate change adaptation measures must be fully integrated with other planning objectives, including reducing carbon dioxide emissions, from the earliest stages of project planning and design; and
- Effective community engagement and partnership working with residents, local businesses, developers, utilities, environmental bodies and other local stakeholders lie at the heart of delivering effective adaptation strategies through neighbourhood planning.

Signed by:

Leader of the Council: Cllr .....

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## 2 Sutton's Climate Change Adaptation Vision

### Vision

As part of the Council's 2020 Vision of 'One Planet Living' and promoting the Borough as London's most sustainable suburb, Sutton's Climate Change Adaptation Strategy seeks to ensure that the location, layout and design of all new developments minimise vulnerability of people and property and are fully adapted and resilient to future climate impacts

Sutton's Climate Change Adaptation Strategy seeks to:

- raise awareness and understanding of stakeholders, the local community and businesses within Sutton about climate change issues;
- minimise all sources of flood risk to and from new and existing developments and, where possible, reducing flood risks overall, taking future climate scenarios into account;
- minimise the contribution to the Urban Heat Island effect and exposure to overheating through a range of urban design measures at both the neighbourhood and building scales;
- maximise the benefits of blue and green infrastructure in terms of flood risk management and sustainable urban drainage, mitigating Urban Heat Island effects, public access to open space, biodiversity and habitats and environmental enhancement;
- take account of expected changes in local climatic conditions throughout the lifetime of new developments by incorporating sufficient flexibility of design and layout to enable further adaptation to the future impacts of climate change and other changing economic, environmental or social requirements;
- deliver improvements to public health and healthier lifestyles by enhancing public access to open space, creating opportunities for sustainable transport and minimising the exposure of vulnerable groups to the adverse effects of overheating and air pollution;
- create sustainable, socially cohesive and equitable communities within the Hackbridge sustainable neighbourhood and other community regeneration areas within the Borough which benefit from an attractive and healthy environment; and
- assist the Council in adapting its corporate services to meet the challenges of climate change, particularly in relation to the need for emergency planning, taking the lead role in local flood risk management and ensuring business continuity.

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## 3 Understanding the Challenge

In consultation with external partners and stakeholders, the Council will:

- develop an understanding of the key climate hazards affecting the Borough, including heatwaves and high temperatures, flooding, drought and associated cross-cutting impacts on public health, biodiversity and the local economy based on the latest climate change scenarios available through the UK Climate Impacts Programme (UKCP09);
- identify and map existing vulnerabilities to climate impacts in terms of the potentially adverse health and other consequences on people, property and essential community infrastructure, taking social inequalities, critical thresholds and the extent of resilience into account;
- assess the extent to which existing vulnerabilities are likely to be exposed to the key climate hazards predicted to affect the Borough now and in the future;
- gather baseline information on urban form and land-cover across the Borough as the basis for introducing new planning requirements for the inclusion of green space as part of proposed developments and identifying adaptation opportunities and measures at the area-wide, neighbourhood and building scales;
- work with service providers to ensure that proposed adaptation measures take full account of the disproportionately negative impacts of climate change on vulnerable groups already experiencing poorer wider determinants of health; and
- adopt an evidence-based approach to planning for climate change to ensure that spatial planning strategies, development management policies, masterplans, planning briefs and neighbourhood plans prepared as part of Sutton's Local Development Framework (LDF) are soundly based on an understanding of climate risks and adaptation opportunities, particularly within areas of regeneration and growth.





## 4 Building Adaptive Capacity

### Partnership Working

The Council will:

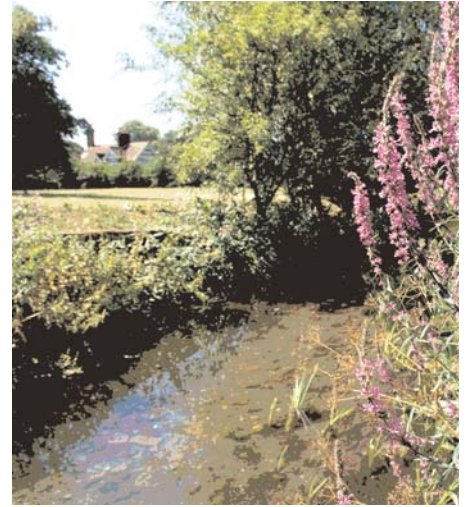
- work with the Greater London Authority, neighbouring Boroughs within the South London Partnership and other sub-regional stakeholders to deliver strategic green and blue infrastructure projects such as the Wandle Valley Regional Park within the context of the Mayor's All London Green Grid;
- as a 'lead local flood authority', work with neighbouring Boroughs, the Environment Agency, the utilities, local businesses and residents to develop an integrated approach to sustainable urban drainage and co-ordinate investment in flood alleviation and other adaptation measures as part of the GLA's 'Drain London' initiative;
- work with developers from the earliest stages of project planning and design, through the Council's pre-application and development management service to ensure that their proposals incorporate appropriate green and blue space adaptation measures based on best practice, including application of the Blue and Green Infrastructure Toolkits;
- work with residents, community groups, environmental networks and businesses, with local knowledge and interest in those parts of the Borough most likely to be affected by future climate impacts, such as areas within Hackbridge adjacent to the River Wandle; and other critical drainage areas; and
- promote joined-up working and information sharing across the Council and external organisations such as the National Health Service in order to co-ordinate the delivery of climate adaptation actions and initiatives by Planning, Environmental Sustainability, Highways, Parks, Emergency Planning, and other departments.

### Community Engagement

The Council will:

- raise awareness of climate change and the need to adapt to its potential impacts within the Borough amongst the local community and other key stakeholders;
- improve stakeholder and community understanding and involvement in planning, delivering and managing green and blue infrastructure in new and existing urban mixed use development, based on positive community involvement techniques;

- lead the response to climate change within the Borough, in order to improve the capacity of residents, partner organisations and their respective communities to adapt their neighbourhoods to changing climate vulnerabilities and risks; and
- enable residents and other local stakeholders to access, interrogate and upload spatial information on climate change risks, vulnerabilities and future adaptation opportunities affecting their neighbourhoods on-line via the Sutton website.



## Decision Making

The Council will:

- strengthen decision-making processes across the Council in order to encourage the effective implementation of climate change adaptation measures having regard to the best available information;
- prepare and implement new planning policies and supplementary guidance to ensure that proposed developments are fully adapted and resilient to future climate impacts in accordance with the adaptation principles set out in this Strategy, the Hackbridge Adaptation Action Plan (AAP) and the Blue and Green Space Toolkits;
- fulfil its statutory duties as a 'lead local flood authority' to establish criteria for the approval and adoption of proposed sustainable urban drainage schemes (SUDS), to determine applications for the demolition or replacement of designated structures with a flood risk management role;
- apply a sequential and risk-based approach to allocating land in development plans, preparing masterplans or development site briefs or to evaluating planning applications based on the extent of the predicted climate hazard, the vulnerability of the proposed use and its likely exposure to the hazard;
- demonstrate in each case that there are no reasonable options available in a lower-risk category, consistent with other sustainable development objectives; and
- ensure that all future policies, projects and procurements by the Council properly consider the impacts on the capacity of the Borough to adapt to climate change.





## 5 Key Deliverables

The Council will:

- continue to participate in the EU GRaBS Project (Green and Blue Space Adaptation for Urban Areas and Eco Towns) <http://grabs-eu.org/> project up to September 2011, sharing knowledge and expertise from municipalities and academic institutions across Europe to assist in implementing the objectives of **Sutton's Climate Change Adaptation Strategy**;
- develop and implement a **Climate Change Community Engagement Strategy** in order to raise awareness and understanding of climate change and the need to adapt to its potential impacts, with a particular focus on the role of green and blue infrastructure;
- take forward the work undertaken on preparing the **Climate Change Risks and Vulnerabilities Assessment Tool** with the University of Manchester to create a map-based, interactive climate change impacts portal on the Sutton website to enable local residents to access spatial information on climate change risks and adaptation opportunities affecting their neighbourhoods;
- develop innovative approaches for identifying flood risk management solutions as part of proposals for the redevelopment of flood risk areas and establish Borough criteria for the adoption and maintenance of sustainable urban drainage measures (SUDS), based on the Council's **blue infrastructure toolkit for Hackbridge**;
- develop innovative approaches for and maximising the multi-functional role of green infrastructure and wider open space networks or 'green grid', in mitigating a range of climate impacts including exposure to high temperatures and the urban heat island effect, based on the Council's **green infrastructure toolkit for Hackbridge**;
- introduce **minimum planning standards for integrating green infrastructure** as part of built development in Sutton based on an understanding of existing green space coverage across the Borough and 'green space factor' classifications previously introduced elsewhere across Europe; and
- prepare a **Climate Change Adaptation Action Plan (AAP) for the Hackbridge sustainable neighbourhood** based on application of the blue and green infrastructure toolkits and the adaptation principles set out in this Strategy;

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- ensure that that all planning documents prepared as part of **Sutton's Local Development Framework**, including the Hackbridge Supplementary Planning Document (SPD) and the Climate Change SPD are soundly based on green and blue space adaptation principles set out in this Strategy;
  - ensure that green and blue space adaptation principles are integrated within **other Council strategies** as appropriate, including the Sustainable Community Strategy, the updated One Planet Living Strategy, Emergency Plan, NI188 on 'Planning to Adapt to Climate Change', Surface Water Management Plan, Local Biodiversity Action Plan and the Local Implementation Plan (Transport); and
  - keep the Borough Climate Change Adaptation Strategy, Area Action Plans and planning policies under regular **review**, keeping abreast of new knowledge about climate change and learning from experience.





## 6 Adaptation Principles

The Council will work with developers and their designers to promote the following adaptation measures at the area-wide, neighbourhood and building scales to ensure that the location, layout and design of all new developments create high quality places which minimise vulnerability and are fully adapted and resilient to future climate impacts.

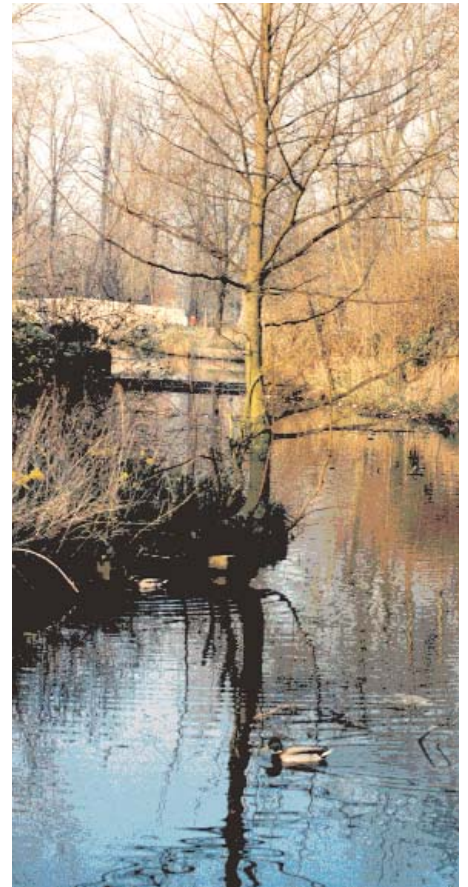
### Exposure to High Temperatures and Urban Heat Island Effects

- maximising the role of green infrastructure, such as new planting within the public realm as part of wider open space networks, in urban cooling and in achieving additional benefits for public health, flood risk management, recreation, sustainable transport and biodiversity, by creating linked networks of well-irrigated open spaces or 'green grid', including parks, wildlife corridors, communal and private gardens and green roofs/ walls;
- maximising the role of blue infrastructure, including river corridors, natural floodplains, ponds, SUDS measures and other water features, in urban cooling and achieving additional benefits for flood risk management, public health, recreation, sustainable transport and biodiversity;
- minimising overheating and contribution to the Urban Heat Island effect at the neighbourhood scale by incorporating green roofs or walls, tree planting, reducing the ratio between the height and spacing of buildings and using light coloured materials to increase the surface reflectivity of large surface areas such as roads, car parks and paving;
- minimising overheating and avoid the need for mechanical cooling at the building scale through promoting energy efficient designs, natural cooling measures such as green roofs or walls, shading, courtyards, passive ventilation measures. and using light coloured materials to increase the surface reflectivity of roofs and walls;
- using building layouts, orientations, planting and advanced glazing systems to reduce solar heat gain;
- using thermal storage or mass to absorb heat during hot periods so that it can dissipate in cooler periods;
- using groundwater cooling measures using aquifers or surface water as part of SUDS measures;
- selecting species as part of planting schemes which are resilient to the higher summer temperatures expected to occur as a result of climate change;
- prioritising risk management options based on the best available understanding of how climate change will affect summer temperatures in the future, areas most at risk of overheating within the Borough and adverse health impacts likely to be experienced by vulnerable groups.

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## Flood Risk

- avoiding or minimising all sources of flood risk to people and property by locating essential community infrastructure and more vulnerable forms of development, including housing, away from areas at higher risk of fluvial or surface water flooding in line with the 'sequential approach' and vulnerability classifications set out in Government guidance;
  - applying the sequential approach within development sites in order to direct the most vulnerable forms of development to parts of the site at lowest flood risk, through the use of the Council's Blue Space Toolkit to match the vulnerability of the proposed use to flood risk and take account the extent of the potential hazard arising from modelled flood depths and flow velocities;
  - ensuring that all development proposals incorporate appropriate sustainable urban drainage (SUDS) measures to minimise and slow the rate of runoff including green roofs, rainwater harvesting, permeable surfaces, flood pathways, filter strips, swales, detention basins, ponds, infiltration beds, stormwater wetlands, retention of mature trees and soft landscaping, while maximising their ecological and amenity benefits;
  - working with neighbouring Boroughs, the Environment Agency, the utilities, local businesses and residents to co-ordinate investment in flood alleviation and flood storage measures as part of an integrated approach to sustainable urban drainage, including provision of temporary water storage capacity to reduce peak flows during flood events;
  - maximising the flood storage role of rivers, natural floodplains, ponds, aquifers and other water features;
  - restoring culverted or confined watercourses to their natural state;
  - providing space for rivers and watercourses by protecting natural floodplains where possible, creating areas that flood to compensate for any loss of floodplain and direct floodwater away from homes;
  - providing space for rainfall by creating areas that slow and store rainwater out of the floodplain to reduce surface water runoff rates to at least equivalent of greenfield rates;
  - creating linked green infrastructure networks of open space or 'green grid' (see above) to promote natural drainage patterns and minimise runoff;
  - creating space for amenity by locating play and recreation areas in areas designed to flood;
  - ensuring that any residual risks can be safely managed through a range of flood resistance and resilience measures to deal with a range of potential flood depths; and
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- prioritising flood risk management options based on the best available understanding of, areas most at risk of fluvial, surface water, sewer and groundwater flooding within the Borough, based on Environment Agency modelling data, the location of critical drainage areas identified through the Surface Water Management Plan and the distribution of more vulnerable groups within the population.

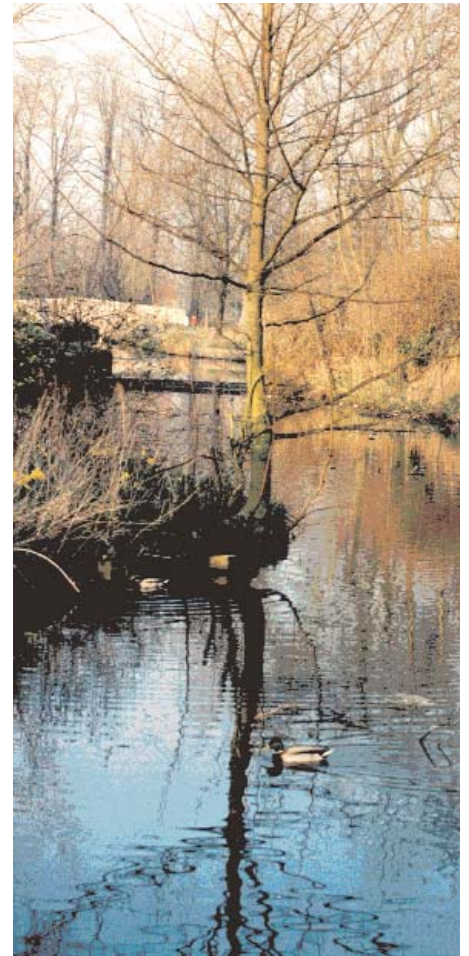
### Water Resources and Drought

- maximising the flood storage role of rivers, natural floodplains, ponds, aquifers and other water features to ensure sufficient water supplies during summer while reducing the potential for flooding downstream during heavy rainfall;
- requiring developers to achieve higher standards of water efficiency in new residential developments;
- promoting the re-use of reclaimed and recycled water (grey water recycling) for non-drinking uses such as toilet flushing and irrigation;
- promoting the benefits of sustainable urban drainage systems (SUDS) (see above) for groundwater recharge, this increasing soil moisture levels for vegetation, sustaining evaporative cooling and reducing flood risks;
- use of low water use planting to create public and private landscapes that can greatly reduce demand for irrigation and are more resilient to higher summer temperatures; and
- ensuring that surface water run-off is directed back to the watercourse rather than to the foul water drainage system.

### Biodiversity

- incorporating local biodiversity objectives into the planning, delivery and management of green infrastructure measures both at the building/ neighbourhood scale and as part of wider open space networks in order to protect wildlife corridors, enhance species diversity and retain habitats;
- creating micro-climatic variation and ecologically resilient landscapes through varied topology to help species respond to changes in temperature and increase the chance that species will be able to migrate locally into newly favourable habitat;
- establishing linked ecological networks through habitat protection, restoration and creation;
- retaining existing trees and habitats, protecting local wildlife sites and providing every opportunity to improve their integrity in order to protect and increase biodiversity;

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- reducing other sources of harm to wildlife habitats and species not linked to climate in order to help natural systems maintain their biodiversity in the face of climate change;
  - using amenity open spaces to enhance biodiversity, using a range of landscape types to encourage the establishment of native plant species which will provide food and habitats for fauna, including insects, small mammals and bird species;
  - selecting drought-resistant and/ or non-native plant species with care, ensuring that potentially adverse impacts on native fauna and mitigating high summer temperatures are limited;
  - creating new wildlife havens and reducing human impact on wildlife habitats through the use of green 'buffers' to separate proposed development from sensitive sites, protecting them not only from disturbance but also from changes to water quality or hydrological patterns;
  - incorporating local biodiversity objectives into the planning, delivery and management of blue infrastructure measures, including river restoration, flood storage and SUDS schemes; and
  - making space for the natural development of rivers in order to increase the potential for wildlife to naturally adapt to future climate change.



# Green Infrastructure in L.B. Sutton

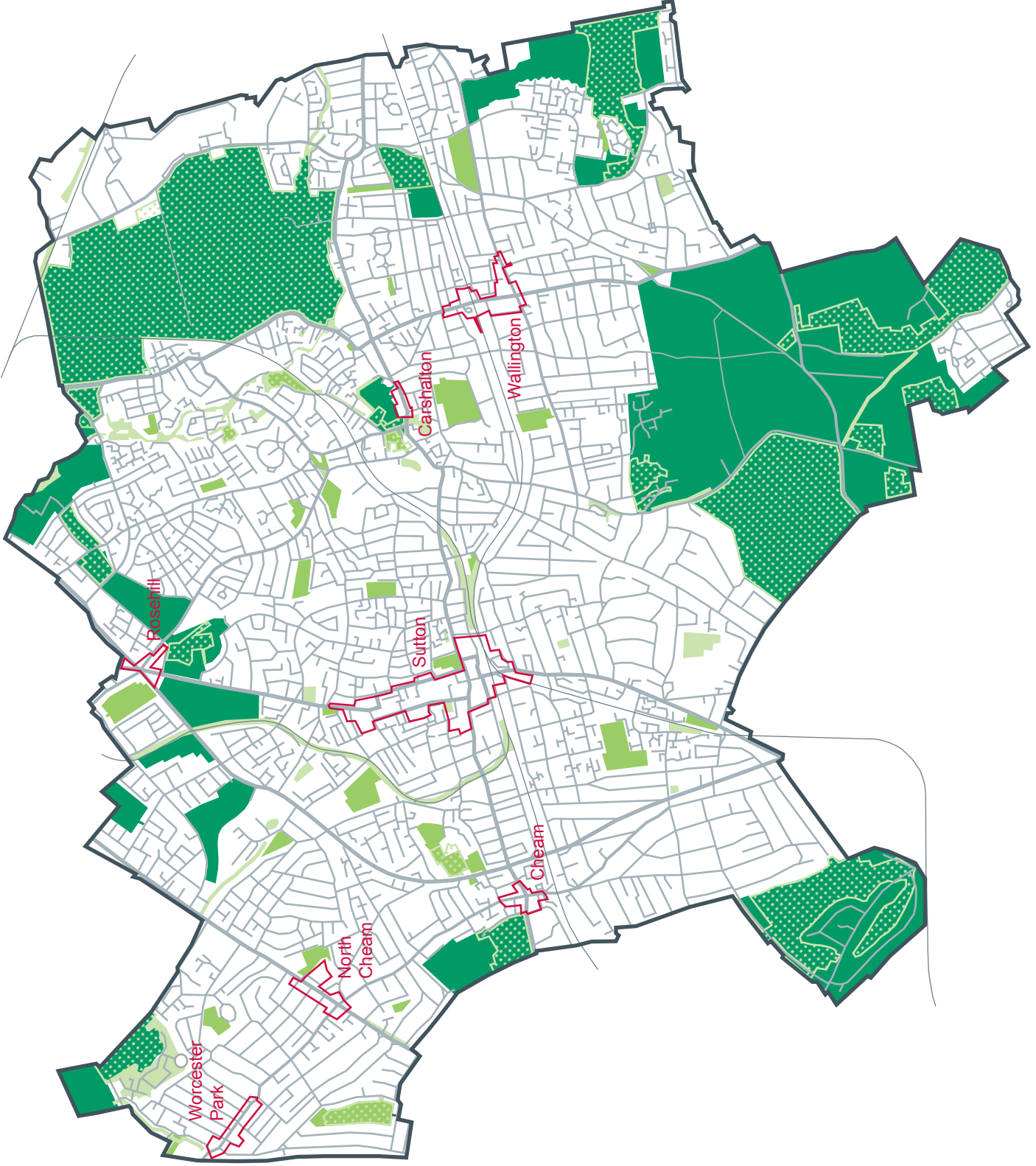
- Strategic Open Land
- Open Space
- Site of Importance for Nature Conservation (SINC)
- SINC on Strategic Open Land
- SINC on Open Space
- Town Centres

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Not to Scale



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# Blue Infrastructure in L.B. Sutton

Zone 2

**Medium Probability**

(land with an annual probability of river flooding of between 1 in 100 and 1 in 1000)



Zone 3a

**High Probability**

(land with an annual probability of river flooding of greater than 1 in 100)



Zone 3b

**Functional Floodplain**

(land with an annual probability of river flooding of greater than 1 in 20 or greater and where water has to flow or be stored in times of flood)



Main Rivers



Town Centres



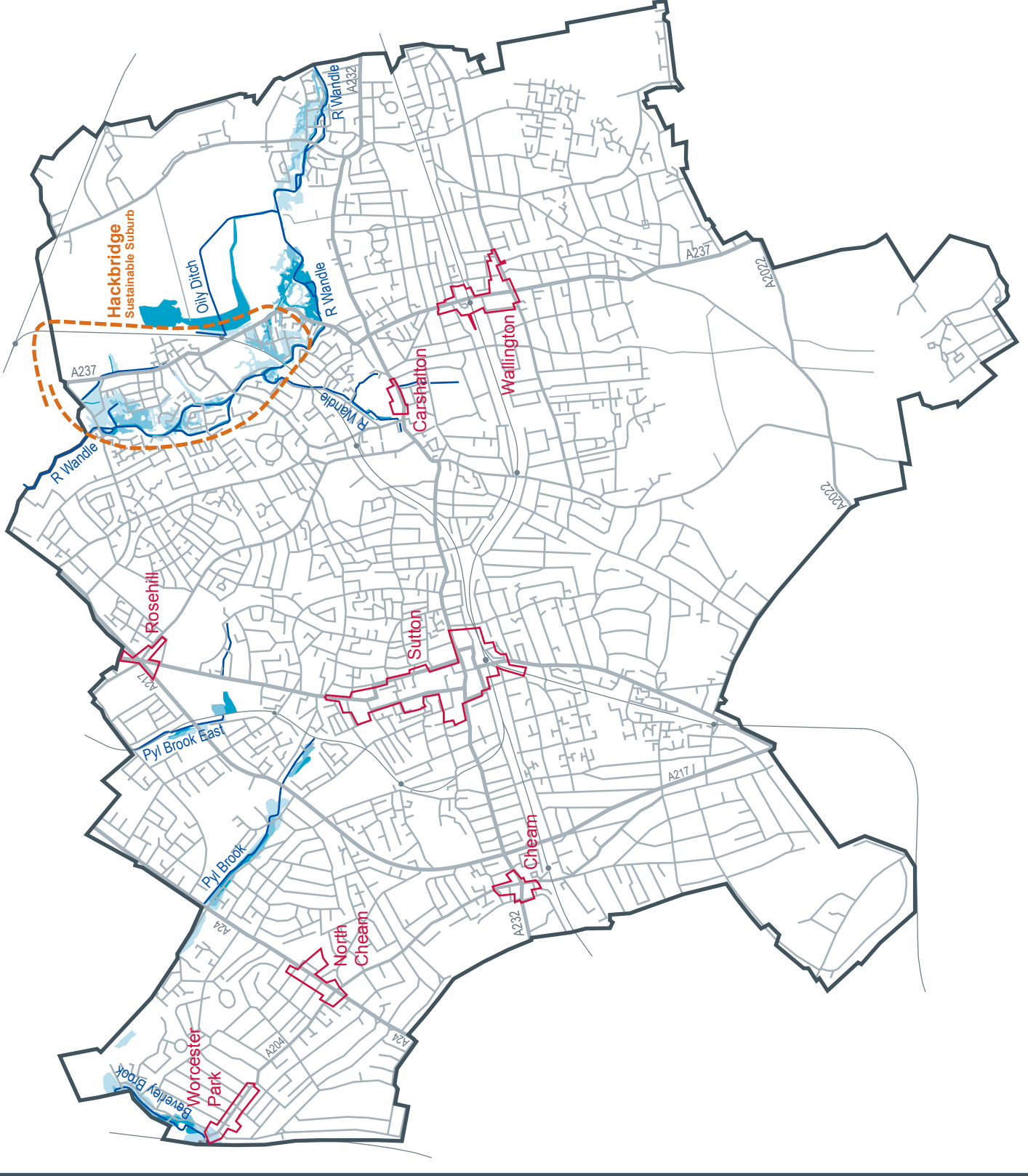
**Source 1:** Strategic Flood Risk Assessment (SFRA) draft 'Level 1 Report' prepared on behalf of the London Boroughs of Sutton, Wandsworth, Merton and Croydon (June 2008)  
**Source 2:** Updated EA Wandle Modelling Data (August 2010)



April 2011

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## Glossary

<b>AAP</b>	Adaptation Action Plan
<b>Adaptation Measures</b>	Changing our behaviour, institutional arrangements or economic activity to respond to either direct or indirect consequences of climate change. There are two key types of measure: policy measures and operational measures.
<b>Blue infrastructure</b>	Open bodies of water such as rivers, lakes, urban canals and ponds.
<b>Building Adaptive Capacity</b>	Adopting new, or strengthening existing policies which will lead to the incorporation of climate change adaptation responses in urban developments, and putting in place new, or strengthening existing, operational measures that will lead to climate change adaptation responses
<b>Climate</b>	Climate refers to the average weather experienced in a region over a long period, typically 30 years. This includes not just temperature, but also wind and rainfall patterns. The climate of the earth is not static, and has changed many times in the past in response to a variety of natural causes
<b>Essential Community (Social) Infrastructure</b>	Including education; health and social care facilities; leisure facilities; childrens' services; community services including community halls; meeting places; places of worship; youth services and libraries; police facilities and other emergency services. For the purposes of identifying "more vulnerable forms essential community infrastructure" account should be taken of Table D.2 of the Government's Revised Planning Policy Statement 25 (PPS25) which states that police stations which are not required to be operational during flooding are considered 'less vulnerable' land uses, which means they could be located in higher flood risk areas.
<b>Exposure</b>	The degree to which a vulnerable element is exposed to the climate hazard in question.
<b>Floodplain</b>	Low-lying area adjacent to a watercourse and prone to flooding.
<b>GRaBS Project</b>	Green and Blue Space Adaptation for Urban Areas and Eco-towns.
<b>Green infrastructure</b>	A strategically planned and managed network of green spaces and other environmental features vital to the sustainability of any urban area e.g. parks and gardens, green roofs, woodland.
<b>Green roof</b>	A roof purposely covered in vegetation to reduce and treat water run-off.
<b>Urban Heat Island (UHI)</b>	The zone of slightly increased air temperatures that occur in association with a large urban area, owing to the absorption and storage of solar radiation by the urban fabric and the heat generated by the city's industries, buildings, traffic, etc. This can cause a marked reduction in the number of air frosts experienced annually in the city centre.

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<b>Neighbourhood</b>	A localised community within a larger urban area.
<b>Resilience</b>	The ability of the community, services, area or infrastructure to withstand the consequences of an incident.
<b>Risk</b>	Climate change risk comprises of three elements (i) Hazard: the extent and probability of the climate change event (ii) Exposure: the degree to which elements at risk may come into contact with the hazard; and (iii) the vulnerability of the elements at risk.
<b>Stakeholders</b>	Networks of public, private, community and non-governmental organisations and individuals, both internal and external to the Council, who can contribute to the process of planning and implementing adaptation responses.
<b>Surface run-off</b>	The water that travels over the soil surface to the nearest surface stream; runoff of a drainage basin that has not passed beneath the surface since precipitation
<b>Sustainable Urban Drainage Systems (SUDS)</b>	Measures to manage to deal with excesses of water by imitating natural drainage patterns.
<b>Vulnerability</b>	The inherent susceptibility of an individual, population group, community, service or element of community infrastructure to damage or harm.

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