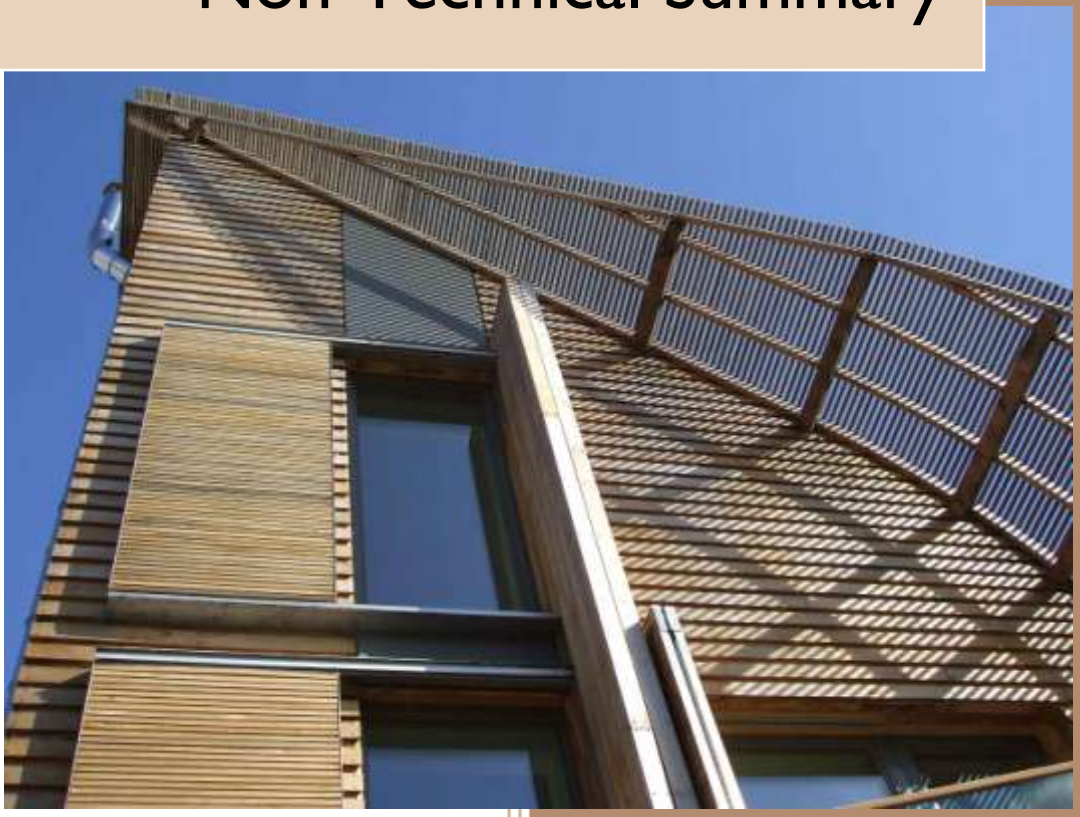
The Mayor of London's Draft Climate Change Adaptation Strategy

Sustainability Appraisal Report

Non-Technical Summary



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Contents

The Non Technical Summary includes the following sections:

This report is a Non-Technical Summary of the Sustainability Appraisal Report of the Mayor of London's draft Climate Change Adaptation Strategy. It sets out an overview of the sustainability appraisal process and its findings. It is intended for the general reader, and although it can be read as a stand-alone document, it is not intended to be a fully comprehensive account of what occurred, or the recommendations made, but a précis of the key elements. It only provides a summary of the appraisal process; more detailed information is available in the main Sustainability Appraisal Report. The non-technical summary also provides details on how to comment on the Sustainability Appraisal Report during the public consultation period on the draft Strategy.

The Sustainability Appraisal Report incorporates the requirements for an Environmental Report under the Environmental Assessment of Plans and Programmes Regulations 2004 No. 1633 which implements the requirements of the European Directive 2001/42/EC, known as the SEA Directive. The preparation of a non-technical summary is a requirement of these regulations.

1. Contents of the draft Climate Change Adaptation Strategy

Background to the Strategy

The draft Climate Change Adaptation Strategy (hereafter called the "draft Strategy") aims to *'assess the consequences of climate change on London and to prepare for the impacts of climate change and extreme weather to protect and enhance the quality of life of Londoners*[1]. It will help the Mayor prepare for the new climate change duties which are part of the Greater London Authority Act, which gained Royal Assent on 23 October 2007.

The Mayor's draft Strategy analyses London's vulnerability to weather related risks and sea level rise, identifies how these risks may be affected by a changing climate over the medium- and long-term, and prioritises key climate risks and opportunities for London. The draft Strategy provides a framework that identifies actions for the Greater London Authority and other stakeholders in responding to these risks, establishing a strategic process to facilitate climate change adaptation over the century, but particularly focusing on the period up to 2031. In addition, the Strategy recommends how London should capitalise on opportunities presented by climate change and become an international exemplar on adaptation.

Table 1: Key terms

Addressing climate change presents two main challenges: a) **Mitigation** – limiting further climate change by reducing greenhouse gas emissions b) **Adaptation** – preparing for the changes that are now inevitable and may increase further if we do not reduce our emissions The Climate Change Adaptation Strategy clearly focuses on the latter of these challenges – what are the consequences of climate change on London and how to prepare for their impacts.

[1] Climate Change Adaptation Strategy for London, Public Consultation Draft, 9 February 2010

Objectives of the Draft Strategy

The draft Strategy has the following objectives:

1. to identify and prioritise the climate risks and opportunities facing London and understand how these change through the century
2. to identify and prioritise the key actions required to prepare London, and to define where responsibility for delivering and facilitating these actions lies
3. to promote and facilitate new development and infrastructure that is located, designed and constructed for the climate it will experience over its design life
4. to improve the resilience of London's existing development and infrastructure to the impacts of climate change
5. to ensure that tried and tested emergency management plans exist for the key risks and are regularly reviewed
6. to encourage and help business, public sector organisations and other institutions prepare for the challenges and opportunities presented by climate change
7. to promote and facilitate the adaptation of the natural environment
8. to raise general awareness and understanding of climate change with Londoners and improve their capacity to respond to changing climate risks
9. to position London as an international leader in tackling climate change.

Contents of the Strategy

The draft Strategy is structured around the following topics:

I. Understanding the climate of the future
- London's future climate
- Mapping adaptation

II. Understanding and managing the impacts
- Flooding

- Drought
- Overheating

III. Assessing the impacts on cross-cutting issues

- Health
- London's Environment
- London's Economy
- Infrastructure

IV. Implementing the strategy

- Roadmap to resilience

The draft Strategy includes three policies covering flooding, drought and overheating (see Table 2), each of which is composed of several elements. There is an overarching vision for flooding, drought and overheating, outlining the Mayor's long-term aspirations in each of these areas. A number of actions are proposed under each policy. Actions are also proposed in relation to the cross-cutting issues.

The 27 actions relating to flooding, drought and overheating are set out in Table 3. Most of the actions in the draft Strategy are intended to be achieved in partnership with other organisations. In addition, the draft Strategy includes seven actions relating to the cross-cutting topics.

Table 2: Policies included in the draft Strategy

Policy 1: Flooding
The Mayor will work with partners to reduce and manage current and future flood risk in London by: • Improving the understanding of flood risk in London and how climate change will alter the risks to improve our ability to manage flood risk. • Reducing flood risk to the most critical assets and vulnerable communities to target the greatest effort on London's most vulnerable assets. • Raising public awareness of flooding and individual and community capacity to cope and recover from a flood to improve London's resilience to flood events.
Policy 2: Drought
The Mayor will work with partners to improve the sustainability of London's water supply and demand balance and make London more robust to drought by: • Taking a strategic view on London's water resources. • Reducing the demand for water in London. • Improving our response to drought.
Policy 3: Overheating
The Mayor will seek to reduce and manage the impact of hot weather on Londoners through working with partners to: • Improve the understanding of overheating risk in London by identifying who and what is affected and where is most at risk. • Manage rising temperatures in London by increasing the amount of greenspace and vegetation in the city. • Reduce the risk of overheating and the need for mechanical cooling in new and existing development and infrastructure. • Ensure London has a robust heatwave plan.

Table 3: Actions included in the draft Strategy

Flooding
To improve our ability to predict and manage flood risk, further work is required to understand surface water flood risk and how climate change will increase all forms of flood risk:
Action 1: The Mayor will work with the Environment Agency, Boroughs and other partners to improve the mapping of who and what is at flood risk from all sources of flooding today, and to predict future flood risk for all flood sources.
Action 2: The Drain London Forum will develop a surface water management plan for London which identifies and prioritises areas at risk and develops more detailed plans for the priority areas.
Action 3: The Drain London Forum will create an online data portal to allow flood risk management partners to more effectively share information and data analysis.
Action 4: The Drain London Forum will create a flood incident reporting system that is adopted throughout London to improve our understanding of flood risk today.
Action 5: The Mayor will work with boroughs through the Association of London Borough Planning Officers and the Local Resilience Forums to ensure that flood risk management is integrated across borough boundaries and within borough teams.
In order to prioritise flood risk management actions we need to identify the most vulnerable communities and assets:
Action 6: The Mayor will work with the Environment Agency, London Resilience and the London Climate Change Partnership to identify and prioritise critical infrastructure and vulnerable communities at flood risk.
Action 7: To reduce the risk of local surface water flooding, the Mayor will work with TfL, London Boroughs and Thames Water to review their drain and gully maintenance programme, particularly in high risk areas.
We will seek to raise individual and community level awareness of flooding and the capacity to cope and recover from a flood:
Action 8: The Mayor will work with the Environment Agency to increase the number of Londoners signing up to the Floodline Warning Direct scheme and to raise awareness of the measures that individuals and communities can undertake to reduce the risks and manage the consequences of flooding.
Action 9: The Drain London Forum will identify 2 communities at significant flood risk and work with them to develop bespoke community flood plans to build their capacity to manage flood risk.
Drought
We need to take a strategic view on London's water resources:
Action 10: The Mayor will publish and regularly review a London Water Strategy that presents a London-specific view of managing water resources, with the goal of improved water management – both the water we want (such as drinking water) and the water we don't (such as sewage and floodwater in the wrong place).

Action 11: The London Water Group will undertake a study to define 'water neutrality' in London and explore how strategic scale water efficiency measures could make London more resilient to drought and long-term changes in water resources.

Action 12: The Mayor will lobby the water utility regulator (OfWat) to encourage and enable the water companies to deliver greater household water efficiency savings and greater investment in London's water infrastructure.

London must reduce the amount of water it consumes, both to reduce our impact on the environment of our demands for water and to improve our resilience to drought:

Action 13: The Mayor will work with the Boroughs (through the Home Energy Efficiency Programme) to improve the energy and water efficiency of up to 1.2 million homes across London by 2015 and with businesses and the GLA estate managers to improve the energy and water efficiency of public and commercial buildings in London (through the Green 500, Building Energy Efficiency Programme and the Mayor's Green Procurement Code).

In order to improve our response to droughts:

Action 14: The Mayor recommends that the London Resilience Partnership should review the need for a London-specific Drought Plan.

Overheating

To improve the understanding of overheating risk and target priority areas:

Action 15: The Mayor will work with partners to undertake a feasibility study into creating and maintaining a network of weather stations across London to improve our understanding of London's microclimate and the impact of urban greening measures on managing temperatures.

Action 16: The Mayor will work with the SCORCHIO and LUCID projects to improve our understanding of how climate change will affect summer temperatures in the future and to identify and prioritise areas of overheating risk and risk management options.

We believe that by increasing greenspace and vegetation cover in the city we can manage and offset rising temperatures (and manage flood risk) :

Action 17: The Mayor will work with partners to enhance 1,000ha of green space by 2012 to offset the urban heat island effect, manage flood risk and provide biodiversity corridors through the city.

Action 18: The Mayor will work with partners to increase green cover in central London by 5% by 2030 and a further 5% by 2050 to manage temperatures in the hottest part of London.

Action 19: The Mayor will work with partners to increase tree cover across London by 5% (from 20 to 25%) by 2025.

Action 20: The Mayor will work with partners to enable the delivery of 100,000m2 of new green roofs by 2012 (from 2008-09 baseline).

To reduce the risk of overheating and the need for mechanical cooling in new and existing development and infrastructure:

Action 21: The Mayor and the Chartered Institution of Building Services Engineers will publish design guidance for architects and developers to reduce the risk of overheating, and encourage its use through the revised London Plan.

Action 22: The Mayor has proposed a new 'cooling hierarchy' policy in the draft replacement London Plan to require developers to reduce potential overheating and the need for mechanical cooling

Action 23: The London Development Agency will work with the Boroughs to map the opportunities for decentralised energy (power, heat and cooling) and with business through a range of energy efficiency programmes.

Action 24: The London Climate Change Partnership will work with a social housing landlord to undertake a demonstration project to retrofit a social housing development to reduce risk of overheating using passive measures.

Action 25: The Mayor will work with partners to assess and promote 'cool roof technology' (highly reflective, well insulated roofs) in London to reduce demand for mechanical cooling.

We want to ensure London has a robust heatwave plan and that Londoners know what to do during a heatwave to stay cool and save energy:

Action 26: The Mayor recommends that London Resilience Partnership should assess the benefits of having 'heatwave refuges' (publicly accessible cooled buildings) that can be used to provide temporary shelter during heatwaves.

Action 27: The Mayor will review the lessons learned from developing the community flood plans (see Action 9) to determine how best to encourage and enable a community level response to heatwaves.

Cross-cutting actions:

Health

Action 28: The London Climate Change Partnership will work with the London Regional Public Health Group to undertake a London-specific assessment of the impacts and opportunities of climate change on London's health services. The study will provide recommendations to the health sector on the priority risks and opportunities.

Action 29: The Mayor will work with the Regional Public Health Group, NHS London and the London Primary Care Trusts to ensure that climate risks are addressed in their refurbishment programme and commissioning of health services.

Environment

Action 30: The Mayor will work with the Environment Agency and other partners to restore 15kms of London's rivers by 2015 through the London Rivers Action Plan.

Economy

Action 31: The Mayor will engage with business organisations and other key stakeholders to consider how to raise awareness of the need to integrate climate risks and opportunities into their routine risk management and planning and whether there is further practical assistance that can be given to businesses in London, including SMEs.

Action 32: The Mayor will work with the insurance sector in calling for Government to amend building regulations to require buildings being rebuilt or renovated to be climate resilient.

Infrastructure

Action 33: TfL will undertake a climate risk assessment of their assets and operations and develop prioritised action plans for key climate risks.

Action 34: The Mayor believes that London should have a resilient energy supply and will work with the Distribution Network Operator and the energy retailers to ensure that the distribution infrastructure is resilient to climate impacts and that energy suppliers can meet seasonal variations in demand.

2. The Sustainability Appraisal Approach

Overview of the approach adopted

The draft Strategy was assessed for its potential impact on sustainability – wider environmental, economic and social effects – using a process known as Sustainability Appraisal.

The approach undertaken during the Sustainability Appraisal followed Government guidance, but was adapted to suit the particular situation of the draft Strategy. To meet the requirements of the Greater London Authority, a Health Impact Assessment and Strategic Environmental Assessment were integrated into the Sustainability Appraisal process.

The Mayor is also required to consider the impacts of any of his strategies on equality of opportunity. This is taken into account through an Equalities Impact Assessment. In this case, the Equalities Impact Assessment was undertaken in-house by the Greater London Authority and not integrated into the Sustainability Appraisal.

The Greater London Authority now usually undertakes Integrated Impact Assessments as part of developing mayoral strategies which integrate all the above forms of assessment into one, but as development of the Strategy and its appraisal were initiated before this practice became established it is being referred to as a Sustainability Appraisal (which incorporates Health Impact Assessment and Strategic Environmental Assessment).

The Greater London Authority commissioned Collingwood Environmental Planning, in association with Centre for Research in Environment and Health, in August 2006 to undertake the Sustainability Appraisal of the draft Strategy. The earlier scoping stage of the appraisal was undertaken in-house by the Greater London Authority, which concluded with consultation on a scoping report.

Sustainability appraisal stages and tasks

The Sustainability Appraisal of the draft Strategy was undertaken alongside the developing draft Strategy, in five main stages:

1. Setting the context and objectives, establishing the baseline and deciding the scope
2. Developing and refining options and assessing effects
3. Preparing the Sustainability Appraisal Report
4. Consultation on the draft Strategy and Sustainability Appraisal Report
5. Monitoring implementation of the Strategy

So far, the Sustainability Appraisal has reached the end of the fourth stage.

One of the first tasks undertaken as part of the appraisal was to analyse and describe the current and likely future environmental, social and economic situation in London, where relevant to the scope and potential effects of the draft Strategy. This, combined with a review of other relevant policies, plans, programmes and strategies, assisted in the identification of sustainability issues faced by London, and existing objectives and targets set at national or regional levels. A summary of this context information is included in Section 3, below. The issues and targets identified fed into the appraisal process.

Sustainability Appraisal objectives

The Sustainability Appraisal objectives sought to address all aspects of a healthy environment, society and economy. They were developed through initial discussions at a scoping workshop, with key statutory stakeholders, the London Health Commission and the London Sustainable Development Commission, and consultation with interested parties. The objectives provided a structure to describe, assess and compare the potential

sustainability effects of the draft Strategy. The final Sustainability Appraisal framework was made up of 14 Sustainability Appraisal objectives which were structured into six broad topics (see Table 4) and included Sustainability Appraisal criteria or questions under each objective to help appraise them.

Table 4: Sustainability Appraisal Objectives

Sustainability Appraisal Objectives
People and health
1. Governance To deliver objectives transparently and effectively over the long-term, focussing on outcomes and informed by good evidence
2. Education and Awareness To maximise the education and awareness levels of the population in order to empower individuals to take responsibility
3. Health and Well Being To maximise the health and well being of the population and reduce inequalities in health
4. Equality and Diversity To ensure equitable outcomes for all communities and to celebrate the unique ethnic and cultural diversity of London's citizens as London's key strength
5. Safety and Security To have a place where everyone feels at ease and is able to enjoy life and to enhance community safety
Place
6. Liveability and Place To create and sustain liveable, mixed use physical and social environments that promote long-term social cohesion, sustainable lifestyles and a sense of place
7. Accessibility and Availability To maximise accessibility to key services and amenities and to increase the proportion of journeys made by public transport, walking and cycling
8. Landscape, Historic and Cultural Environment To enhance and protect the landscape and built and cultural environment, including buildings, townscape and the public realm
9. Biodiversity To conserve and enhance natural and semi-natural habitats and wildlife
10. Air Quality To improve both indoor and outdoor air quality
Climate Change
11. Climate Change 11i) To mitigate the causes of climate change 11ii) To adapt to the effects of climate change
Water management
12. Water Quality and Quantity 12 i) To improve the quality of surface waters and groundwater 12 ii) To improve the security of supply and to achieve the prudent management and efficient use of water resources
Waste Management and Resource Use
13. Waste Management and Resource Use To minimise the production of waste across all sectors in line with the waste hierarchy and minimise the use of non-renewable materials
Economy
14. Economy To develop the economy in ways which meets society's present and future needs

The appraisal of the draft Strategy

To help promote positive sustainability outcomes, there was a continuous exchange of advice and comment between the appraisal process and the Greater London Authority team who were preparing the draft Strategy.

The Sustainability Appraisal adopted a variety of approaches to consider the sustainability implications of different elements of the draft Strategy. This included reviewing and providing commentaries at key stages. The Sustainability Appraisal also assessed the overall and cumulative effects of the draft Strategy.

Network or causal chain analysis, was used as a mechanism for tracing the impacts of a changing climate on London, in relation to flooding, drought and overheating. This was useful in identifying potential cumulative effects of climate change on sensitive receptors (such as the elderly or other vulnerable people). Causal chain analysis was also used to trace the links between elements of the draft Strategy and likely effects, and for identifying cause and effect pathways. This was undertaken with input from a stakeholder workshop focussing on health issues.

The Sustainability Appraisal considered alternatives including an assessment of the likely future "business as usual" scenario, setting out the sustainability effects of future climate change in London, without a Climate Change Adaptation Strategy. This was useful in assessing whether the draft Strategy will make a significant difference to the sustainability of London, over and above what will happen anyway. Also considered was an alternative Strategy which was assumed to incorporate a greater level of adaptation: seeking to minimise the potential negative sustainability effects and maximise the positive effects of the predicted climatic changes in London.

The appraisal also considered the effects of the policies and actions proposed under flooding, drought and overheating as well as the cross-cutting actions.

Potentially significant adverse and positive effects were identified during the appraisal, and recommendations were made to mitigate these effects where appropriate. The types of enhancement and mitigation identified included:

- Changes to wording of specific policies or actions, e.g. to strengthen the requirements or to make them clearer.
- Recommendations for additional policy text or actions where specific omissions were felt to exist.
- Providing more detail on how a policy or action will be implemented or extending the scope of the draft Strategy.
- Having particular regard to vulnerable groups or other sensitive receptors and how effects on them could be avoided or reduced.

Sustainability Appraisal Report

The Sustainability Appraisal Report sets out the findings of the appraisal process and provides information on the sustainability implications of implementing the draft Strategy. It is one of the key outputs from the appraisal process and must be made available for consultation at the same time as a draft plan, in this case the proposed draft Strategy. It is also required that a non-technical summary of the report is produced, which is this report.

3. The Sustainability Context

Background

This section presents a summary of the background information relating to London's environmental, social and economic context used in the Sustainability Appraisal of the draft Strategy. This provided the contextual information and evidence base to support the appraisal process.

The information was structured into six broad topics, by grouping the 14 Sustainability Appraisal objectives (see Section 2), together with a section on cross-cutting issues. These topics were specifically selected for the purposes of the Sustainability Appraisal of the draft Strategy, as they provide a simplified structure for presenting the relevant contextual information. The information was selected to inform the appraisal of the potential sustainability effects of the draft Strategy and therefore some topics contained more information than others.

In addition, key potential future trends over the medium-term and long-term were identified, based on existing trends and knowledge of existing and proposed policies, strategies, initiatives or regulation changes in relation to specific issues. It was considered important to understand effects relevant to the timescale of the draft Strategy (over the century, but particularly focuses on the period up to 2031) and the long timescales over which climate change impacts will occur and need to be planned for.

The topics under which the sustainability context was structured, and how they relate to the Sustainability Appraisal objectives, are set out in Table 5.

Table 5: Coverage of sustainability topics

People and Health
- Governance
- Education and Awareness
- Health and Well Being
- Equality and Diversity
- Safety and Security

Place and quality of surroundings
- Liveability and Place
- Accessibility and Availability
- Landscape, Historic and Cultural Environment
- Biodiversity
- Air Quality

Climate Change
- Climate Change

Water management
- Water Quality and Water Resources

Waste and Resources
- Waste Management and Resource Use

Economy
- Economy

Cross-cutting issues

Policy context

In order to help appraise the draft Strategy against the Sustainability Appraisal objectives, it was also important to understand the policy context. A review of relevant policies, plans, programmes and strategies covering the sustainability topics (set out in Table 5) was undertaken, which helped identify key sustainability issues, as well as existing targets, policies and actions, under each topic.

The review focused at the London level, as well as those at a national level which were relevant particularly relevant to climate change adaptation.

Key messages from the review were integrated into the description of the current and likely future situation in the main Sustainability Appraisal Report, a summary of which is included below.

The current and likely future situation

People and Health

The health of Londoners has improved in recent years and is likely to continue improving. However, there are considerable inequalities in many aspects of life in London, affecting particular groups and areas more than others, inequalities which are likely to persist and could increase[2]. Over the longer term, the health of Londoners may be affected by the impacts of a changing climate, for example flooding and overheating, which are expected to increase in the capital[3]. This could have a disproportionate impact on vulnerable groups. However, warmer winters may reduce the number of deaths due to extreme cold.

Place and quality of surroundings

London has extensive natural amenities, including parks, canals and rivers and private green space such as gardens, as well as a rich and diverse architectural heritage. Development in London has put pressure on London's natural environment[4], reducing water quality, biodiversity and air quality, although water quality has improved in recent years[5]. Climate change is projected to increase pressure on London's environment in the long term[6], which could have negative effects on the health of Londoners[7]. In addition, noise disturbance is an issue in London which is likely to increase over time due to projected increases in overall population and population density.

Climate change

London is responsible for 8% of all UK greenhouse gas emissions (based on data from 2006[8]). The amount of energy consumed per person has risen significantly in recent years[9] and the population is projected to increase by almost 7% to 2026[10]. Based on existing trends London's overall greenhouse gas emissions may continue to rise, even if emissions per person fall.

Climate change is predicted to lead to significant challenges for London, both in terms of direct impacts on infrastructure and services, and in terms of the indirect effect it will have on factors such as the availability of water, and extreme weather events and flooding[11]. Climate change is also likely to increase the average temperature and frequency of heat waves.

Given the focus of the draft Strategy, an understanding of predicted future climate change impacts was very important for the appraisal. More information is included on this

[2] London Health Commission, 2007, Health in London Looking back looking forward report: 2006/07 review of trends, progress and opportunities
[3] UK Climate Projections 2009 (UKCP09) Key Findings: http://ukclimateprojections.defra.gov.uk/content/view/515/499/
[4] Greater London Authority (2007) Greener London – The Mayor's State of the Environment Report for London
[5] Ibid
[6] UKCIP (2009) Key Findings for London http://ukclimateprojections.defra.gov.uk/content/view/2148/528/
[7] Air quality, urban heat island
[8] Greater London Authority (2006) London Energy and Greenhouse Gas Inventory (LEGGI)
[9] Greater London Authority, 2004, A Green Light to Clean Power – the Mayor's Energy Strategy.
[10] Greater London Authority (2008) The London Plan, (consolidated with alternations since 2004)
[11] UKCIP (2009) Key Findings for London

in the "Likely situation in the future" section below.

Water management

Pressure on London's water resources is increasing. During a dry year there is an estimated shortfall of 200 million litres a day, which is, even with planned water efficiency measures, expected to increase over the longer term[12]. Climate change and an increasing population are expected to add to pressure on water supply and water resources. A considerable amount of water is lost from London's water supply network on a daily basis, although this is likely to decrease as water companies in London repair and replace damaged pipes.

Flooding in London can occur from one of several sources or a combination of sources: tidal flooding, river flooding, localised or surface water flooding, groundwater and sewer flooding[13]. Flooding can have negative impacts on human health, wellbeing and infrastructure. Climate change is predicted to increase the risk of all types of flooding in London[14].

Waste and Resources

London has high rates of waste generation and a lack of facilities to deal with it. This means that the capital has severe difficulties in meeting European and UK targets for reducing and recycling waste. London currently sends the majority of its municipal waste to landfill and plans to increase the amount disposed of by incineration[15]. The projected increase in London's population is likely to increase the overall amount of waste produced.

Treating waste water and sewage produces sewage sludge, the production of which is likely to increase with the projected increase in the population of London. The Mayor's Waste Strategy seeks to encourage the development of anaerobic digestion plants which could turn sewage sludge into a material suitable for agricultural and horticultural use[16].

Economy

London has, despite the current downturn, a thriving economy. However, the city's residents do not benefit equally from the success of the economy. London has the highest rate of child poverty in Great Britain and only 71% of its working age population is in employment[17] (although this figure may now be lower due to the ongoing economic downturn).

Specific features of the London economy include a concentration of relatively high skill jobs, meaning those with low qualifications face higher risks of exclusion than elsewhere,

[12] Environment Agency (2006) 'Planning for a better London'
[13] See Draft Regional Flood Risk Appraisal (June 2007) Chapter 2 'Overview of flood risk to London' Available:
[14] London Resilience (2007) 'London flood resilience strategic plan'

[15] Greater London Authority (2003) Rethinking Rubbish in London – The Mayor's Municipal Waste Management Strategy
[16] Greater London Authority (2003) Rethinking Rubbish in London – The Mayor's Municipal Waste Management Strategy
[17] Mayor's economic development strategy

and that the high levels of earnings mean that housing costs are very high, especially for those on low incomes[18].

London's waterways and water bodies make a contribution to the city's economic success, providing opportunities for tourism, leisure, recreation and transport of people and freight. Flood risks are likely to increase due to further development in areas at risk of flooding and due to climate change impacts. This is likely to increase the negative economic costs associated with flooding, disrupting businesses, transport, supply routes and also impacting on the physical and mental well-being of those affected.

Cross-cutting issues

The population of London is projected to increase by 6.6% to 2026, and to meet this growth the London Plan includes a target of 30,500 new homes per year[19,20]. This population increase will also need the associated public and social infrastructure, transport, education, health-care, green spaces etc, and will place increasing demand on London's resources, including water.

Climate change is another cross-cutting issue that will affect all aspects of life in London, and may impact particularly on flooding, the reliability of water supply, London's transport infrastructure and overheating. The impact of higher temperatures on air quality may also have negative health and quality of life impacts.

Key problems and opportunities identified

Drawing on the review of other policies, plans, programmes and strategies as well as the baseline data, key existing sustainability problems and opportunities in London for the Sustainability Appraisal and the draft Strategy to consider were identified. This report focuses on summarising the main problems (see Table 6).

Table 6: Key existing sustainability problems in London

People and health
• The complex governance structure and legislation controlling the various services impacted by climate change and potential overlaps and relationships of the Climate Change Adaptation Strategy with other plans and strategies. • Potential negative effects of climate change related issues such as flooding, drought, heat-waves and poor air quality. These can impact particularly on certain deprived and other vulnerable households. • Lack of public awareness regarding the appropriate response to extreme climate related events (heat-waves, droughts, floods) as well as incremental responses, such as retrofitting homes to be more resilient to climate change effects.
Place and quality of surroundings
• The relative proportion or form of transport used in London might be affected by significant climatic effects, potentially reducing accessibility and local air quality. • Existing transport infrastructure and the public areas such as parks and open spaces may be unsuited to future climate conditions, particularly increased rainfall, temperature and extreme weather events. • Climate change may impact negatively upon biodiversity and green spaces. • Poor air quality is likely to be exacerbated by increasing average temperatures, and exposure to air pollutants may increase as people modify behaviour in warmer weather.
Climate Change
• The implications of increased population, economic growth and development in London are likely to cause an overall increase in energy use and emissions of greenhouse gases, even if per person energy use and emissions fall. • Population growth will require new development, for housing, infrastructure, businesses and services. Given pressure on land for development this could mean that more people and property is at risk of flooding. • More frequent droughts, floods and extreme weather events are predicted. • There is potential for some "solutions" to climate change effects to increase energy use and carbon dioxide emissions e.g. increased installation and use of air conditioning which in the long term will increase climate change.
Water management
• London's water shortage in dry years and over abstraction of existing water resources such as rivers and groundwater has a negative effect on the water environment. • Potential social and environmental effects of developing new water resources like reservoirs. • London's increasing population and decaying water infrastructure including leaky pipes and drainage and sewerage systems is unable to cope. • Higher levels of leakage, challenges and barriers to fixing leaks (e.g. disruption caused by digging up roads) and issues associated with potential reduction in water pressure in our pipes to reduce leakage. • Rising per person water use, exacerbated by increase in

[18] Greater London Authority (2005) Sustaining Success, the London Economic Development Strategy

[19] Greater London Authority (2008) The London Plan, (consolidated with alternations since 2004)

[20] The London Plan: Spatial Development Strategy for Great London (GLA 2009) is currently out for consultation. It includes revised population projections of a 16.5% increase by 2031, and a target of 33,380 additional homes per year in the capital.

single person households and lack of incentives and understanding to change behaviours.
- Poor (but improving) biological and chemical quality of London's water bodies. Diffuse and aesthetic pollution caused by sewer misconnections and combined sewer overflows and effects on biodiversity and amenity value of watercourses.
- Risk of flooding from all sources and potential impacts on health, well being, infrastructure.
- The effects of climate change and increasing population in all the above.

Waste Management and Resource Use

- London's low recycling rate, dependence on declining landfill capacity inside and outside of London, and lack of facilities to deal with waste in London means that the capital has numerous challenges to overcome in order to meet European and UK targets for reducing waste to landfill and increasing waste recycled.
- Higher average temperatures and heatwaves may require more frequent waste collection, or modified collection and waste storage facilities.
- Increased frequency and intensity of rainfall may exacerbate problems associated with pollution from landfill sites and other waste facilities.

Economy

- Deprivation, unemployment and economic inequality are all important issues in London.
- Local impacts of climate change may disrupt businesses (either directly or due to infrastructure damage), with a knock on effect on London's economy.
- Due to London's global connectivity and role, climate change impacts elsewhere in the world may have significant impacts on the economy of London.
- The costs of insuring homes, buildings and infrastructure may become a major issue due to increased frequency and severity of storms, floods and other extreme events.
- Flooding and water shortages can have significant economic consequences by disrupting businesses, transport, supply routes etc.

Cross-cutting

- The rise in population will increase the pressure on water resources and drainage and sewerage infrastructure. There will also be an increase in the numbers of people living in flood risk areas. These will also be exacerbated by climate change.

Likely situation in the future

Drawing on the analysis of the sustainability context, predictions were made about the likely situation in the future in the absence of the draft Strategy. The findings are summarised in Table 7.

In addition, building on information in the sustainability context, and in particular predicted future climate conditions based on modelling by the UK Climate Impacts Programme[21], a summary of likely climatic changes in London was developed for two time periods: the medium-term (2020 – 2030) and the long-term (2050 and beyond), to support the appraisal. It provided information on climatic changes in relation to:

- Flooding
- Drought
- Overheating; and
- Other climatic factors.

Much of this information is also included in the draft Strategy and the main Sustainability Appraisal Report, and as a result only a brief summary is provided.

Table 7: Summary of likely future situation

Key trends	How the current conditions may change
People and health	
Positive change in some of the determinants of health.	Overall health is likely to improve. Existing health and other inequalities likely to continue, and could worsen.
Reduced winter deaths due to cold, however hotter summers may have negative health effects.	Warmer winters may reduce the number of people dying due to extreme cold. However hotter summers, and heatwaves may have negative health effects.
Increased ill-health due to poor air quality.	Air pollution is likely to increase due to changing weather patterns as well as population changes.
Increased frequency and severity of floods and increased development flood risk areas.	Disproportionate negative effects of flooding on vulnerable groups, potentially increasing health inequalities.
Place and quality of surroundings	
Overall population increase and a trend towards higher population densities.	More noise pollution and disturbance. Increase in air pollution due to increased need to travel and increased car journeys.
Increased levels of built development to meet housing and employment growth goals.	Increased pressure on existing land-uses, including greenspaces, habitats, areas of biodiversity value, and sport / play spaces.
Heatwaves, the urban heat island effect and other impacts of climate change.	Adverse effects on the liveability of London, open spaces and transport infrastructure. Flooding and storms may also lead to disruption of life in London.
Climate Change	
Warmer drier summers	Reduced reliability of water resources, restricted supply, more frequent drought actions, and environmental/ amenity impacts. Urban heat island effect.
Warmer wetter winters	Increased risk of all types of flooding, reduced number of winter deaths attributable to cold.
Higher frequency and severity of storms and rainfall	Increased risk of all types of flooding. Increased risk of combined sewer overflows.

[21] See: http://ukclimateprojections.defra.gov.uk/

Key trends	How the current conditions may change
	Disruption and damage to property and infrastructure.
Rising sea levels and more frequent and significant tidal surges	Risk to tidal flooding effecting large areas of London. Potentially significant damage and disruption.
Implementation of the Climate Change Act and London Climate Change Strategy, as well as other initiatives and programmes.	Potential decline in per person energy use and carbon dioxide emissions. However, overall energy consumption and emissions could rise due to increases in population and economic development.
Water Management	
Implementation of water regulations, especially the Water Framework Directive.	Improvements in the ecological quality of London' waterways. Could be undermined by the effects of a changing climate.
Introduction of measures to encourage water use efficiency (e.g. Code for Sustainable Homes).	May help reduce London's water deficit by reducing per-capita usage. However, overall water demand may rise due to increases in population and economic development.
Development of new water resources.	In the long-term (at least 20 years) may help reduce London's water deficit by increasing supply.
Replacement and repairs to water supply infrastructure.	Reduced leakage and thus water lost during supply.
Effects of a changing climate	See Climate Change topic for more detail.
Waste and resources	
Waste management and recycling targets, and campaigns to encourage behaviour change.	Decrease in waste generation and increase in recycling and composting levels. However, overall waste generation may rise due to increases in population and economic development.
Economy	
London to continue to have a strong and dynamic economy	Existing extensive economic inequalities likely to continue and to increase over time.
The effects of current economic downturn to continue for a number of years.	Likely to exacerbate economic inequalities, and restrict investment in new development and projects.
Increased levels of housing and other built development.	Likely to lead to developments encroaching further into areas at risk of flooding.
Climate change impacts, especially increased incidence and severity of floods.	Significant negative economic; social and health effects. Disruption to transport networks and other infrastructure. Damage to homes and businesses.
Cross-cutting	
Population increases	Relates to all topics. Increased resource use, waste generation, and exposure to all climate risks.
Increased housing and other built development.	More development, infrastructure and homes in areas at risk of flooding.
Climate change effects	Will affect all aspects of life in London. See Climate Change topic for more detail.

4. Appraisal of the Draft Climate Change Adaptation Strategy

Introduction

The Sustainability Appraisal assessed various elements of the draft Strategy, including the visions, policies and actions it contains, as well as the draft Strategy overall. In addition, broad alternatives to the strategy were considered. The findings of these assessments are summarised in this, and the following section.

Timescales and context

The appraisal of the draft Strategy presented particular challenges due to the nature of the issue it is seeking to address, i.e. climate change. The timescales associated with the predicted effects of climate change are potentially long-term (for example, current predictions by the UK Climate Change Impacts Programme seek to understand changes up until 2100).

As a first step in the appraisal the likely sustainability effects of climate change on London in the future were summarised over two time periods: the medium-term (2020s) and the long-term (2050 and beyond).

Another challenge was that climate change is a wide ranging issue, and a large number of existing and planned initiatives, policies, plans, programmes and strategies are or will also be seeking to address various aspects of adaptation. The likely influence of these existing and planned adaptation activities was also considered.

The likely effects on the Sustainability objectives (see Section 2) of the identified climate changes, taking into account other existing and planned adaptation activities were then identified.

This appraisal of the future climate and existing adaptation activities in London was important as it enabled the Sustainability Appraisal to understand to what extent the policies and actions included in the draft Strategy are likely to help London avoid the negative or maximise the positive impacts of climate change (which is the aim of adaptation).

The appraisal of the future climate and existing adaptation activities in London also formed the basis for the "business as usual" alternative, as it set out what is expected to happen even if the Mayor decided not to develop a climate change adaptation strategy.

Appraisal of alternatives

The purpose of appraising alternatives as part of Sustainability Appraisal is to ensure that the final strategy is the most sustainable. If the most sustainable option is not selected the rationale behind this decision should be justified. There may be other reasons why the most sustainable strategy is not able to be taken forward.

Given the timescale over which the Strategy is expected to operate (the rest of the century, but particularly focuses on the period up to 2031) it may also be reasonable to expect certain actions to be included in a first version of the Strategy, and for other actions to come forward at a later date. This could be as a result of follow-up work to better understand the impacts or increasing risks of climate change impacts over time, for example.

The potential sustainability effects of two broad strategic alternatives were examined as part of the appraisal in addition to the draft Strategy:

- **Business as usual (BAU) alternative** – this alternative represents the future situation without the draft Strategy, but considering the influence of other existing and planned adaptation policies, plans, strategies and initiatives
- **Draft Strategy** – the draft Strategy as currently proposed, and in particular as expressed through the current set of visions, policies and actions included in the

draft Strategy, provides a comparison for the other alternatives.

- **"Draft Strategy Plus" alternative** – this alternative builds on the current draft Strategy, but incorporates a greater level of adaptation which seeks to minimise the potential negative sustainability effects and maximise the positive effects of the predicted climatic changes across London.

The overall appraisal of *the Business as Usual alternative* concluded that the projected climatic changes are predicted to have generally negative effects on the sustainability objectives, and in some cases these could be of major significance. The potential negative effects were generally predicted to increase in the long-term, due to the increasingly significant projected climate change impacts. In many cases these potential effects are considered to be uncertain, especially those predicted in the long-term.

Compared with the *Business as Usual alternative*, overall the draft Strategy was predicted to have some sustainability benefits especially in relation to overheating - however it is recognised that this is a first, and necessary, step in the development of London's adaptation strategy and in the future any updates will have the potential to have more significant positive sustainability effects. In addition, the process of developing the draft Strategy has also raised the awareness of adaptation within the GLA group and had wider benefits by influencing the policies in other mayoral strategies and plans. The *draft Strategy Plus alternative* illustrates how the current draft Strategy could be built on to incorporate a greater level of adaptation to further minimise the potential negative sustainability effects and maximise the positive effects of the predicted climatic changes in London and provide a clearer "roadmap" of the actions required in the future. The *draft Strategy Plus alternative* helped to identify possible mitigation and enhancement recommendations relevant to the draft Strategy (see Section 5).

Draft Strategy objectives

The objectives of the draft Strategy and the Sustainability Appraisal objectives were tested against one another to help identify any conflicts and synergies between them. The results showed that they were generally compatible, with no significant potential conflicts identified. The appraisal therefore only recommended some limited changes to the wording of the draft Strategy's objectives.

Appraisal of policies and actions

The appraisal of the draft Strategy policies and actions was divided into two key stages. First the appraisal identified the effects of the policies and actions in the draft Strategy in isolation. Second the influence of these predicted effects on the overall sustainability effects of climate change was assessed. For more explanation, see the "Timescales and context" section, above.

This section summarises the key findings of the detailed appraisal of the draft Strategy policies and actions. The draft Strategy includes three policies covering flooding, drought and overheating. A number of actions are proposed to help deliver each policy. There are also a number of cross-cutting actions. The policies and actions are listed in Table 2 and Table 3. The appraisal considered each policy and set of actions together, although comments and recommendations were also made on specific aspects of the policies or actions, where appropriate.

Summary matrices illustrating the findings of the appraisal of the policies and actions for flooding, drought and overheating over the medium and long-term are included below in Table 8, Table 9, and Table 10. These show whether a negative or positive sustainability effect was predicted to arise from the policy and actions against each of the Sustainability Appraisal objectives (Table 4) and if the effect is likely to be of minor or major significance.

These tables show that the policies and actions on their own are generally predicted to have positive sustainability effects both in the medium-term and long-term, although these are considered likely to be relatively minor in their significance. A very small number of potentially negative effects were predicted.

Potential **positive sustainability effects** identified included:

Flooding: encouraging organisations with responsibility for flood risk management to work together; increasing knowledge and information on flooding risks in London; raising awareness of flooding; and reducing and managing flood risks.

Drought: increasing knowledge and awareness of appropriate responses to drought; increased resilience; and reduced impacts on the built and natural environment.

Overheating: increasing understanding of overheating; increasing access to green spaces; improving air quality; new habitat creation; and reducing flood risks.

Potential **negative sustainability effects** identified included:

Flooding: increasing construction activity, noise disturbance, increased energy and resource use as well as waste generation; changes to London's townscape.

Drought: increasing costs and disruption associated with some water supply and demand management measures.

Overheating: no negative effects predicted.

Table 8: Summary of the appraisal for flooding

Flooding	**Sustainability Appraisal Objectives**													
	1. Governance	2. Education and Awareness	3. Health and Well-being	4. Equality and Diversity	5. Safety and Security	6. Liveability and Place	7 Accessibility and Availability	8. Landscape, Historic and Cultural Environment	9. Biodiversity	10. Air Quality	11. Climate Change[22]	12. Water Quality and Water Resources[23]	13. Waste Management	14. Economy
Impacts of climate change in London (predicted effects of climate change on sustainability without the draft Strategy but with existing / planned adaptation i.e. Business as usual alternative)														
Medium-term (2020s)	+	+/++	-	-	-/0	-/0	-	-/0	-?	0?	- -/+	-? -?	-	-
Long-term (2050+)	+	++?	--?	-/--?	--?	-/--?	--?	-/--?	--?	-?	--? -?	--? --?	-?	--?
Impacts of the Draft Strategy in isolation (predicted effects on sustainability of the draft Strategy as an initial framework for adaptation)														
Medium-term (2020s)	+/++	+	0/+	0/+	+	-/+	0/+	-/+	-/+	0	-/0 +	+ 0/+?	0/-/+	0/+
Long-term (2050+)	+?	0/+	0/+	0/+	0/+	-/+	0/+	-/+	-/+?	0	- +	+ 0/+?	0/-/+	+
Impacts of climate change in London with the draft Strategy (predicted effects of climate change on sustainability with the draft Strategy and existing / planned adaptation)														
Medium-term (2020s)	+/++	+/++	-	-	0/+	-/0	-	-/0	-?	0?	- +/0	-? -?	-	-
Long-term (2050+)	+/++?	++?	--?	-/--?	--?	-/--?	--?	-/--?	--?	-?	--? -/0	--? --?	-?	--?
Impacts of climate change in London with the "Draft Strategy Plus" (predicted effects of climate change on sustainability with the "draft Strategy Plus" and existing / planned adaptation)														
Medium-term (2020s)	+/++	+/++	-/0	-/0	0/+	-/0	-	-/0	-?	0?	- +	-? -?	-	-/0
Long-term (2050+)	+/++?	++?	-/--?	-/--?	-/--?	-/--?	--?	-/--?	--?	-?	--? +/-	--? --?	-?	-/--?

Key to effects: Major positive: ++ Minor positive: + Neutral: 0 Minor negative: - Major negative: -- Uncertain:? Mixed: -/+

[22] Objective split between (11.1) mitigation and (11.2) adaptation to Climate Change.
[23] Objective split between (12.1) water quality and (12.2) water resources.

Table 9: Summary of the appraisal for drought

Drought	Sustainability Appraisal Objectives													
	1. Governance	2. Education and Awareness	3. Health and Well-being	4. Equality and Diversity	5. Safety and Security	6. Liveability and Place	7. Accessibility and Availability	8. Landscape, Historic and Cultural Environment	9. Biodiversity	10. Air Quality	11. Climate Change[24]	12. Water Quality and Water Resources[25]	13. Waste Management	14. Economy
Impacts of climate change in London (predicted effects of climate change on sustainability without the draft Strategy but with existing / planned adaptation i.e. Business as usual alternative)														
Medium-term (2020s)	+	+/++	-	-	-/0	-/0	-	-/0	-/+	-/0	- -	-/+ -	-/0	-
Long-term (2050+)	+?	++?	-?	-/--?	-?	-?	-?	-/--?	-/--?	-?	-/--? --/+?	-? --?	-?	-?
Impacts of the Draft Strategy in isolation (predicted effects on sustainability of the draft Strategy as an initial framework for adaptation)														
Medium-term (2020s)	0/+	+	0/+	-/+?	+	0/+	0/+	0/+	0/+	0/+	0/+ +	0/+ 0/+	0	-/+?
Long-term (2050+)	0?	+?	0/+?	-/+?	+?	0/+?	0/+?	0/+?	0/+?	0/+?	0/+? +	0/+ 0/+	0	+?
Impacts of climate change in London with the draft Strategy (predicted effects of climate change on sustainability with the draft Strategy and existing / planned adaptation)														
Medium-term (2020s)	+	++	-	-	-/0	-/0	-	-/0	-/+	-/0	- 0/-	-/+ -	-/0	-
Long-term (2050+)	+?	++?	-?	-/--?	-?	-?	-/0?	-/--?	-/--?	-?	-/--? -/+?	-? --?	-?	-?
Impacts of climate change in London with the "Draft Strategy Plus" (predicted effects of climate change on sustainability with the "draft Strategy Plus" and existing / planned adaptation)														
Medium-term (2020s)	+	++	-	-	-/0	-/0	-	-/0	-/+	-/0	- -/0	-/+ -	-/0	-
Long-term (2050+)	+?	++?	-?	-?	-?	-?	-/0?	-?	-?	-?	-/--? -/++?	-? -?	-?	-?
Key to effects: Major positive: ++ Minor positive: + Neutral: 0 Minor negative: - Major negative: -- Uncertain:? Mixed: -/+														

Table 10: Summary of the appraisal for overheating

Overheating	Sustainability Appraisal Objectives													
	1. Governance	2. Education and Awareness	3. Health and Well-being	4. Equality and Diversity	5. Safety and Security	6. Liveability and Place	7. Accessibility and Availability	8. Landscape, Historic and Cultural Environment	9. Biodiversity	10. Air Quality	11. Climate Change[24]	12. Water Quality and Water Resources[25]	13. Waste Management	14. Economy
Impacts of climate change in London (predicted effects of climate change on sustainability without the draft Strategy but with existing / planned adaptation i.e. Business as usual alternative)														
Medium-term (2020s)	+?	-/+	--/+	-/+	-?	-/+	-/+	-/0	-?	--	-/+ 0/+	- -	-/0	-?
Long-term (2050+)	+?	-	--/+?	--/+?	-?	-?	--/+?	-?	--?	--?	--/+? -?	-? -?	-?	-?
Impacts of the Draft Strategy in isolation (predicted effects on sustainability of the draft Strategy as an initial framework for adaptation)														
Medium-term (2020s)	+	0/+	+	0/+	0	+	0/+	0/+	+/++	+	0/+ +/++	0/+ 0/+	0	0/+
Long-term (2050+)	+?	+	+	0/+	0	+	0/+	0/+	+/++	+	0/+ +/++	0/+ 0/+	0	0/+
Impacts of climate change in London with the draft Strategy (predicted effects of climate change on sustainability with the draft Strategy and existing / planned adaptation)														
Medium-term (2020s)	+	0/+	-/+	-/+	-?	0/+	-/+	-/+	-/+?	--	-/+ +	- -?	-/0	-?
Long-term (2050+)	+?	-/+	--/+?	--/+?	-?	-/+?	--/+?	-/+?	--/+?	--?	--/+? -/+?	- -?	-?	-?
Impacts of climate change in London with the "Draft Strategy Plus" (predicted effects of climate change on sustainability with the "draft Strategy Plus" and existing / planned adaptation)														
Medium-term (2020s)	+/++	+	-/+	-/+	-/+?	+	-/+	-/++	-/++	--/-	-/+ +	- -	-/0	-?
Long-term (2050+)	+/++?	+?	-/+?	-/+?	-/+?	-/+?	-/+?	-/++?	-/++?	--/-?	--/+? -/++?	-? -?	-?	-?
Key to effects: Major positive: ++ Minor positive: + Neutral: 0 Minor negative: - Major negative: -- Uncertain:? Mixed: -/+														

[24] Objective split between (11.1) mitigation and (11.2) adaptation to Climate Change.
[25] Objective split between (12.1) water quality and (12.2) water resources.

However, as indicated in the tables, while the policies and actions on their own are likely to have positive sustainability effects, in many cases they are not predicted to have a significant influence on the impacts of climate change in London overall, in particular in the long-term. This is indicated by the large number of significant negative effects predicted to arise from climate change, even once the alleviating affect of the draft Strategy's policies and actions are taken into account. As mentioned above, it is recognised that this draft Strategy represents a first, and necessary, step in the development of London's adaptation response and future updates may have more significant positive sustainability effects. A full description of the sustainability effects and how they were identified is included in the main Sustainability Appraisal report.

5. Summary of the Overall Sustainability Effects of the Draft Climate Change Adaptation Strategy

Introduction

This section provides a summary of the most significant potential sustainability effects, both positive and negative, which were predicted to arise from the implementation of the draft Strategy taken as a whole.

Summary of potential overall sustainability effects of the draft Strategy

This is the first Climate Change Adaptation Strategy for London, and as a result contains many actions which are preparatory in nature: setting out who should be involved in adaptation, identifying where and what new information and research is needed, and setting out priorities.

Overall the draft Strategy as a standalone document has the potential to have a number of positive sustainability effects, although these are generally expected to be of minor significance. However, in the context of the potential sustainability effects of climate change in the medium and long-term there are underlying reasons why the draft Strategy is unlikely to have major influence on reducing the negative effects and increasing the positive effects overall, including:

- In the context of climate change impacts, and the influence of existing and planned adaptation actions (in other strategies and initiatives), the additional actions the draft Strategy proposes are relatively minor in several areas. However, it is recognised that the process of developing the draft Strategy has also raised the awareness of adaptation within the GLA group and had wider benefits beyond the draft Strategy itself by influencing the policies in other mayoral strategies and plans.
- The Mayor of London has relatively limited powers in relation to many issues that need to be addressed.
- As the first version of the Strategy, many of the actions are preparing the background for potential future actions, and setting out priorities and responsibilities, so in themselves they will not have significant sustainability effects.

Many of the potential effects identified could become more significant in the long-term as actions intended to help prepare for other actions and encourage partnership initiatives in the current draft Strategy help deliver more direct and specific adaptation actions in the future.

Overall the key potential **positive effects** identified included:

- Improved governance of adaptation in London through the focus of a number of policies and actions on encouraging or facilitating collaborative working, communication and improved information
- Increased knowledge and awareness of climate change impacts, and responses.
- Long-term reductions in the negative impact of some of the effects of climate change in London.
- Increased green space and street trees benefitting visual amenity and biodiversity as well as overheating and flooding.

Overall limited **negative effects** are predicted, however those identified included:

- Measures to manage flood risk, may include the construction of defences for example, which could have impacts on biodiversity, visual amenity and the landscape / townscape of London.
- Measures to balance supply and demand for water (e.g. through leakage reduction, metering and retrofitting efficiency measures) may lead to increased costs which could disproportionately affect vulnerable groups.

Summary of potential cumulative effects

There are different types of cumulative effects, but of particular concern for this Sustainability Appraisal were firstly; the total effects of different policies or actions in the draft Strategy on a single 'receptor' (this could be a certain group within the population or people living in a particular area, for example); and secondly; the cumulative effects of the Mayor's draft Strategy in combination with other plans and strategies.

Due to the nature of the actions in the current draft Strategy limited cumulative effects are predicted. The combined effects of a number of actions seeking to improve the level of knowledge of climate impacts in London and gather appropriate and accurate information to help understand climate risks may have a cumulative impact on the awareness and understanding of adaptation in London, and what action is required. Also, the draft Strategy seeks to play a key role in encouraging collaborative and partnership working to understand and address specific issues and risks. This is predicted to have a cumulative impact on the governance of climate change adaptation in London.

However, climate change in London in the medium-term and particularly the long-term has the potential for very significant cumulative effects. These cumulative effects may impact certain groups or receptors disproportionally. For example, climate change impacts on flooding, overheating and drought leading to cumulative negative effects on vulnerable communities in particular in relation to health and wellbeing and equalities. In addition, habitats and biodiversity in London may be significantly negatively affected by the cumulative effects of drought and overheating.

The draft Strategy may help to avoid or mitigate some of the cumulative effects of climate change. However, the majority of actions included in the draft Strategy are preparatory in nature, for example seeking to improve understanding and identify which key actors should be involved. As a result the influence of the draft Strategy in addressing key cumulative effects of climate change in London is expected to be relatively limited although it is an important first step in an ongoing process.

The draft Strategy is intended to encourage new and complement existing plans and strategies developed by other organisations, as well as promoting the implementation of targets and actions included in existing Mayoral strategies. The effects of the draft Strategy are therefore likely to be 'in combination' or cumulative with the influence, outcomes and actions included in these other plans and strategies. Other key policies, plans and legislative requirements closely linked to the draft Strategy, include: the London Plan and the draft replacement London Plan; the Mayor's draft Water Strategy; the Mayor's Manifesto "London's Great Outdoors"; the Mayor's Air Quality Strategy; the Mayor's Climate Change Mitigation and Energy Strategy; the London Rivers Action Plan; the draft Flood and Water Management Bill; the Code for Sustainable Homes; and water company Water Resources Management Plans.

The activities of the following organisations, and many others, will also complement / support the implementation of the draft Strategy:

- London-wide and East London Green Grid Partnerships
- London Boroughs
- Environment Agency
- Drain London Forum
- London Climate Change Partnership
- Transport for London
- London Water Group
- London Resilience
- London Boroughs and the Association of London Borough Planning Officers.

Recommendations for mitigation and enhancement

The Sustainability Appraisal made various recommendations for enhancing potential effects of the draft Strategy and mitigating potential negative effects. Specific mitigation and enhancement measures were identified, many of which are in the form of recommendations for amendments and additions to the current draft Strategy including changes to the existing policies and actions and suggestions for new ones.

The following general comments summarise the overall improvements to the draft Strategy that were identified:

- Consideration of the format of the draft Strategy, and whether re-packaging as two documents may improve it: a long-term strategic vision and policy document; and, a separate adaptation action framework with specific actions
- The inclusion of text, policies and actions to address all aspects of adaptation
- The inclusion of greater detail, and specific actions to respond to potential opportunities from climate change
- The inclusion of text setting out how the draft Strategy relates to other Mayoral plans and strategies
- The inclusion of details on the particular needs of vulnerable groups or other sensitive receptors
- The inclusion of text setting out which actions are new and which are existing or ongoing commitments
- The inclusion of further details on how progress in implementing the Strategy will be monitored and what indicators and targets will be used to measure progress against the delivery of the draft Strategy's objectives and details on how frequently the Strategy will be reviewed.

Difference that the Sustainability Appraisal has made

The Sustainability Appraisal has made numerous recommendations for changes during the various iterations of the draft Strategy. This has resulted in changes to several aspects of the draft Strategy, including the consideration of an appropriate typology for adaptation actions, modifications to the Strategy's objectives, as well as specific policies and actions. However, the Greater London Authority has not been able to take on board all the Sustainability Appraisal's recommendations. This is partly because of the Greater London Authority's desire to prioritise a limited set of actions in the first version of the Strategy.

6. Implementation and Next Steps

Implementation and monitoring

Monitoring the significant sustainability effects of implementing the draft Strategy is an important part of the Sustainability Appraisal process. It will be used to monitor performance of the Strategy against the Sustainability Appraisal objectives. Where unacceptable effects are identified through monitoring this should lead to the appropriate action to resolve it by the Mayor of London or other organisations.

The draft Strategy does not currently include proposals on how it will be monitored or what indicators will be used. It is therefore recommended that details on how and by whom the Strategy itself will be monitored should be included in the final version.

Key indicators proposed to monitor the effects of implementing the draft Strategy include:

- relevant indicators included in the London State of the Environment Report 2007, such as the number of properties flooded per annum, average water consumption per person / household
- other relevant indicators monitored by the Greater London Authority, such as the number of housing development completions
- indicators monitored by other organisations, including the Environment Agency water companies and Ofwat, such as level of leakage and proportion of existing properties on water meters, and from health authorities related to the health effects of heatwaves for example.

However, in many cases, the data is not London specific, e.g. the information on levels of leakage of Thames Water is provided at the water company region level. The lack of London specific data for monitoring the effects of the draft Strategy has been found to be one of the key gaps. In addition, some potential gaps in the indicators available to monitor the effects of the draft Strategy were identified, including:

- Number of people suffering illness / number of deaths caused by flooding and by overheating.
- Economic costs of flooding and heatwaves in London.
- Water use in new residential developments and within different areas in London and by different groups of the population.
- Household awareness of water consumption.
- Amount of water reclaimed for non-potable sources in new development.
- Number / proportion of new residential development schemes incorporating sustainable drainage systems.
- New habitats created / improved habitats through flood schemes and sustainable drainage systems.

In addition, an indicator(s) to monitor tariff arrangements and financial effects on different sections of the London community is likely to be needed.

Next steps

The key next steps and outputs from the draft Strategy and Sustainability Appraisal processes should be as follows:

- Three months of public consultation to enable representations to be made following the publication of the draft Strategy and Sustainability Appraisal Report (9 February 2010)
- Amendments to the consultation version of the Climate Change Adaptation Strategy in light of consultation responses received
- Sustainability Appraisal of any significant changes, leading to either revisions to the Sustainability Appraisal Report, or if changes are minor a supplementary note to the Sustainability Appraisal Report
- Adoption of the final version of the Strategy by the Mayor (likely to be autumn 2010)

- Sustainability Appraisal Post Adoption Statement – prepared by the Mayor of London to notify the public that the Strategy has been adopted. This will include information on the main issues raised during consultation on the strategy and sustainability appraisal and how these were taken into account in developing the final strategy, details on monitoring and other information required as part of the sustainability appraisal
- Ongoing monitoring and review of the Strategy and monitoring of the sustainability effects.

How to Comment on the Sustainability Appraisal Report

Public consultation on the draft Climate Change Adaptation Strategy and the Sustainability Appraisal Report runs from **09 February 2010** for 3 months.

All the comments must be received by **5pm on 09 May 2010**.

Comments can be provided by:

Post: London Climate Change Adaptation
Post Point 19
Freepost LON15799
City Hall
The Queen's Walk
London
SE1 2BR

Email: adaptation@london.gov.uk

Web: http://www.london.gov.uk/climatechange/strategy where copies of this Non-Technical Summary of the SA and the main SA Report can be downloaded along with the draft Climate Change Adaptation Strategy.

When you comment please include:

- Your full name
- Full postal address
- Your email address
- Where possible, the pages, section titles and paragraph numbers (and/or appendix numbers) of the Sustainability Appraisal Report your comments / concerns relate to; and
- Any suggested detailed amendments to the Sustainability Appraisal Report to reflect your comments / concerns and any amendments to the preferred options you think should be made as a result.