Preparing for a changing climate:

GOOD PRACTICE GUIDANCE FOR LOCAL GOVERNMENT

June 2019

Department for Environment Food & Rural Affairs

Developed in partnership between ADEPT, Defra and the Local Adaptation Advisory Panel

ADEPT

The Association of Directors of Environment, Economy, Planning & Transport

About the Local Adaptation Advisory Panel (LAAP)

The LAAP was formed in 2011 by Defra to act as a forum for dialogue between local government, central government and arms-length delivery bodies. It made a significant contribution to shaping the role of local government in the first and second National Adaptation Programmes (NAPs). The LAAP is a group of 15 members including local authority representatives and partners and government departments. Its key roles are to:

- provide a strategic steer on local government adaptation issues;
- advise on evolving government policy / work programmes to ensure that climate change adaptation is integrated as far as practicable;
- engage with sectoral organisations that have a national adaptation interest to provide mutual support in adaptation delivery, recognising the role that local authorities play across the piece as a cross cutting delivery body; and
- support the delivery of NAP objectives relating to local government.

About the Association of Directors of Environment, Economy, Planning and Transport (ADEPT)

ADEPT represents directors of place from county, unitary, metropolitan and combined authorities along with Local Enterprise Partnerships, Sub-national Transport Bodies and corporate partners drawn from key service sectors. ADEPT members are at the very heart of maximising sustainable growth, delivering the projects that are fundamental to creating more resilient communities, economies and infrastructure. It represents members' interests by proactively engaging central government on emerging policy and issues, responding to consultations and enquiries, and promoting initiatives aimed at influencing government policy.

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Contents

Foreword

The UN Special Report on the Impacts of Global Warming of 1.5°C presents a stark portrait of our options. Humanity is at a crossroads; we can choose to respond positively and bring about the radical changes required to meet the challenges of climate change. To do this we need to both drastically reduce our carbon emissions and build climate resilience into our systems and services.

The focus of this guide is on the steps local authorities can take to boost climate change resilience. Local authorities have significant powers to influence how climate change is experienced in local areas through the decisions they make today. Authorities can address the risks highlighted in the UK Climate Change Risk Assessment (CCRA17) as well as use local data on population, and the latest national climate projection data (UKCP18), to prioritise areas for action.

Decisions around local place shaping can help to protect local populations and local authority services, infrastructure and finances over the coming decades as well as securing new local economic opportunities. For these reasons this agenda must be at the heart of local authority decision making.

This guidance outlines a practical range of adaptation measures that can be taken and implemented by local authorities into corporate plans, policies and performance monitoring systems. The guide provides solutions for councils to support business and industry, and looks at how to protect our critical infrastructure. Furthermore, it provides measures to adopt in land use planning and the built environment, and guidance on how to boost natural capital and build public health, social care and community resilience.

Sharing our skills, knowledge and experience is key to accelerating local authority adaptation action and this guide provides a blueprint for steps that all local authorities can take to deliver on this urgent agenda.

Nigel Riglar
Chair, Local Adaptation Advisory Panel
Director for Environment and Community Services, South Gloucestershire Council
1st Vice President, ADEPT







Who is this guide for?

This guide is designed for a wide range of officers working to implement adaptation within local government – whether that is a combined authority, district council, county council or unitary authority. This includes those responsible for adaptation planning, managing civil contingencies, and contributing to longer term planning, as well as those who want to make their services more resilient.

It is relevant both for organisations that are just starting out on adaptation planning, as well as for those who already work in adaptation, who are looking for new ways to move the agenda forward in their own area. It is also applicable to relevant stakeholders and partners who have a role in working alongside local authorities to progress adaptation in their local areas.

How to use this guide

This guide focuses on preparing for the impacts of climate change, a process known as climate change adaptation. It does not cover approaches to reducing emissions of greenhouse gases, which are the drivers of climate change, often referred to as mitigation.

The guide is designed to assist local government with its work on climate change adaptation. You can use it to find out about the general business case for adapting to climate change, or why it matters in relation to key services and functions provided by local authorities. It also showcases techniques from around the country to provide inspiration for your own approaches.

How this guide was produced

The guide was developed by the LAAP with input from others including the Local Government Association, Core Cities, ADEPT, Defra and NHS England Sustainable Development Unit. It was then independently reviewed and developed by an adaptation specialist.

Introduction

The world's climate is changing. Even if all emissions ceased today, our climate would continue to change as a result of historic emissions. Already, compared to pre-industrial levels, the UK has seen approximately 20cm sea level rise and temperatures are 1 degree higher.

How much our climate changes in the future also depends on the success of global emissions reductions. Therefore, cutting carbon emissions remains the most cost-effective step that local authorities can take, but adaptation needs to be considered alongside, not instead of, mitigation.

The 2015 Paris Agreement of the UN Framework Convention on Climate Change, marked a step change in political ambition, with a globally binding commitment to reduce emissions and keep the world's temperature rises below two degrees, and ideally below one and a half degrees. Even at these temperature rises, the world will experience significant impacts. The temperature rises to date have already profoundly altered human and natural systems, bringing increases in some types of extreme weather, droughts, floods, sea level rise and biodiversity loss, and causing unprecedented risks to vulnerable persons and population (IPCC, 2018). As temperature rises continue these impacts will increase, making the need to both drastically cut emissions and adapt to a changing climate, even more imperative.

However, the world is currently not on track to meet these targets. Work by Climate Action Tracker, assessing the pledges and targets submitted under the Paris Agreement, currently puts the world on track for around three degrees of warming at the end of this century. In the most recent Intergovernmental Panel on Climate Change (IPCC) report, on the impacts of global warming at 1.5°C, it states that 'global warming is likely to reach 1.5°C between 2030 and 2052 if it continues to increase at the current rate' (IPCC 2018). In order to limit global warming to 1.5°C, global CO_2 emissions must roughly halve by 2030, reaching net zero around 2050. In this context, there is a strong case for both accelerating emissions reductions but also preparing for the impacts of a changing climate.

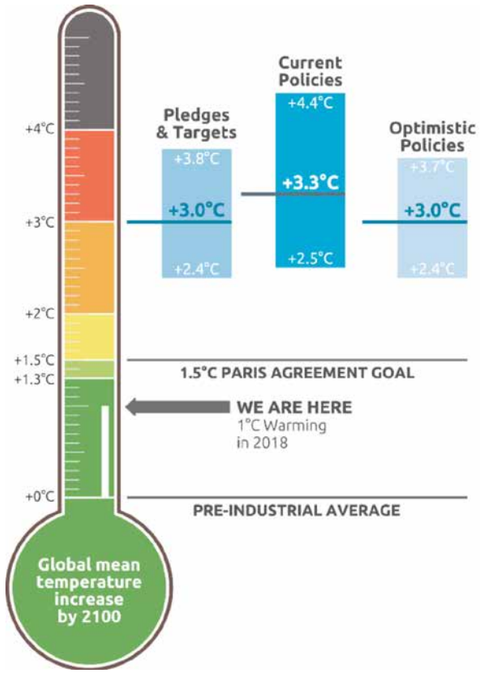

Fig 1. Projections of Global Temperature increase by 2100, Climate Action Tracker, 2018

England's changing climate

England's climate has already changed and will continue to change, as a result of historic emissions. The potential changes for the UK until 2100 are illustrated by the UK Climate Projections 2018 (Met Office, 2018). These show that the UK is projected to see increasing summer temperatures, more extreme weather and rising sea levels.

The updated projections provide the tools to help local government better understand the changes to climate and its risks, and make decisions on that basis. UKCP18 will be followed by high resolution projections (at 2.2km resolution) later in 2019, however the headline results set out a range of possible outcomes over the next century based on different rates of greenhouse gas emissions into the atmosphere. The high emission scenario (which closely parallels the current global emissions trajectory) shows:

- Summer temperatures could be up to 5.4°C hotter by 2070, while winters could be up to 4.2°C warmer.
- The chance of a summer as hot as 2018 is around 50% by 2050.
- Sea levels in London could rise by up to 1.15 metres by 2100.
- Average summer rainfall could decrease by up to 47 per cent by 2070, while there could be up to 35 per cent more precipitation in winter.

Sea levels are also projected to rise over the 21st century and beyond under all emission scenarios – meaning we can expect to see an increase in both the frequency and magnitude of extreme water levels around the UK coastline.

However, the extent of these changes, and their associated impacts, depends on the effectiveness of both emissions reductions and preparing for a future climate. The changes and their impacts will not be felt evenly across the UK, and will depend upon not just physical climate change, but its interactions with our surrounding environment and the extent to which our infrastructure, built environment, social systems, economy and natural environment have been prepared for them.

As previously mentioned, this process of change is commonly called 'adaptation' and refers to the adjustment of systems in response to actual or expected climate or its effects. Adaptation can be incremental, or transformational. Incremental adaptation is an action that maintains the essence and integrity of a system or process at a given scale, whilst transformational adaptation is a process that changes the fundamental attributes of a socioecological system in anticipation of climate change and its impacts. For more reading on the differences, you can read UKCIP's guidance on Transformational Adaptation: What it is, why it matters and what is needed.

England's framework for adaptation to climate change

England's legislative adaptation, and mitigation, framework is primarily set out in the Climate Change Act 2008. The Act places a number of legal requirements on the UK Government and Committee on Climate Change, including to:

- **Assess and report climate change risks** – the UK Government must prepare an assessment of the risks of climate change to the UK before Parliament every five years. The second Climate Change Risk Assessment (CCRA) was published in January 2017. The third CCRA is due in 2022. The Government has formally commissioned the Adaptation Sub-Committee of the Committee on Climate Change (CCC) to deliver the evidence report to support its risk assessment.

- **Prepare a National Programme of Adaptation** – objectives, policies and proposals for addressing these risks. The second National Adaptation Programme (NAP) was published in July 2018 (Defra, 2018) and includes a chapter on local government.

- **Assess progress on implementing the National Programme of Adaptation** – the Committee on Climate Change must report on progress on implementing this programme every two years after a programme is laid.

The Act also allows the Secretary of State to ask certain organisations to report on the current and future predicted effects of climate change on their organisation, and their proposals for adapting to climate change. These are predominantly organisations associated with the operation of key energy and transport infrastructure such as ports, aviation, electricity and gas supply and distribution, and local authorities are not in scope. The approach to the third round of this process was published as part of the NAP and Defra invited organisations to report on a voluntary basis. The reporting aims to support the ongoing integration of climate change risk management into the work of reporting organisations, as well as contributing to national and local governments' understanding of the level of preparedness, and feeding into the Committee on Climate Change's reports to Parliament. As of December 2018, 90 organisations had confirmed their participation in the third Adaptation Reporting Power (ARP) reporting round.

Broader legislative requirements

There are also a number of other areas where adaptation is required through national legislation and guidance, including the Civil Contingencies Act (2004), Flood and Water Management Act (2010), the Town and Country Planning (Local Planning, England) Regulations 2012, the National Planning Policy Framework, and, shortly, accompanying Planning Practice Guidance, the Town and Country Planning (Environmental Impact Assessment) Regulations 2017 and within section 19 (1A) of the Planning and Compulsory Purchase Act 2004, as amended under the Planning Act 2008. The 2011 Localism Act includes a general power of competence, which gives local authorities the legal capacity to do anything that an individual can do that is not specifically prohibited.

The Global Covenant of Mayors on Climate and Energy

At the sub-national level, local government bodies can voluntarily become members of the Global Covenant of Mayors on Climate and Energy, providing a global, common reporting framework on mitigation and adaptation progress. Forty-eight local governments are already signatories to the framework.

In joining, organisations make a political commitment and agree to submit regular reports every two years through one of the registered reporting platforms, such as the Covenant itself, or through the Carbon Disclosure Project (CDP) or International Council for Local Environmental Initiatives (ICLEI).

Private sector

To manage risks effectively, it is important for local authorities to be able to understand the adaptation plans and activities that companies, which operate in their area, have in place. The Task Force on Climate-Related Financial Disclosure (TCFD, 2017) sets guidance for companies on how to assess and disclose their exposure to the physical risks from climate change, with recent work enhancing and standardising how to assess and report physical risk (GCA and EBRD, 2019). It is estimated that two-thirds of the top 500 companies in the UK are planning to disclose their risks from climate change in 2019 under this framework (Carbon Trust, 2019).

The Prudential Regulation Authority (PRA) has recently implemented mandatory reporting for banks, building societies, insurers and reinsurers using the TCFD framework. The PRA published a draft supervisory statement for consultation, with the aim of ensuring that firms take a strategic approach to managing the financial risks arising from climate change (PRA, 2019). The statement is focused on ensuring effective governance, risk management, use of scenario analysis and disclosure.

Climate change risks for England

The climate change risks and opportunities that the UK will experience are most recently set out in the evidence report of the 2017 Climate Change Risk Assessment (ASC, 2016). The key terms (as defined by IPCC, 2014) are:

- **Exposure** – the presence of people and livelihoods, species and ecosystems, environmental functions, services, and resources as well as infrastructure and economic, social, or cultural assets - in places and settings - that could be adversely affected.

- **Hazard** – the potential occurrence of a natural or human-induced physical event or trend that may cause loss of life, injury, or other health impacts, as well as damage and loss to property, infrastructure, livelihoods, service provision, ecosystems and environmental resources.

- **Vulnerability** – the propensity or predisposition to be adversely affected. Vulnerability encompasses a variety of concepts and elements including sensitivity or susceptibility to harm and lack of capacity to cope and adapt.

- **Risk** – the potential for adverse consequences where something of value is at stake and where the occurrence and degree of an outcome is uncertain. In the assessment of climate impacts, the term risk is often used to refer to the potential for adverse consequences of a climate-related hazard on lives, livelihoods, health and well-being, ecosystems and species, economic, social and cultural assets, services (including ecosystem services), and infrastructure.

Climate change risk results from the interaction of vulnerability (of the affected system), its exposure over time (to the hazard), as well as the (climate-related) hazard and the likelihood of its occurrence. Together these form potential risks, and, along with the consequences of these, form impacts as shown in figure 2.

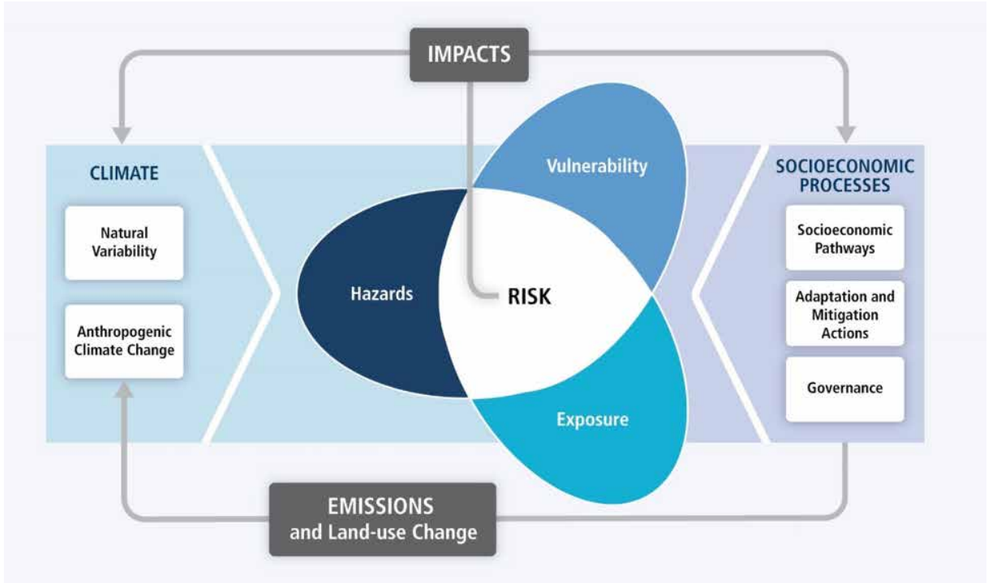

Fig 2. Core concepts of climate change risk. Source: IPCC, AR5, (2014)

The second UK Climate Change Risk Assessment (2017) identified 56 risks and opportunities facing the UK. Each of the risks or opportunities were given an 'urgency' score, which identifies where more action is needed in the next five years to ensure the UK manages risks effectively to the end of the century. The assessment identified six priority areas due to the need for additional, coordinated steps:

Fig 3: Priority areas of climate change risks. Source: ASC, 2016

A fuller overview of the risks, is set out below:

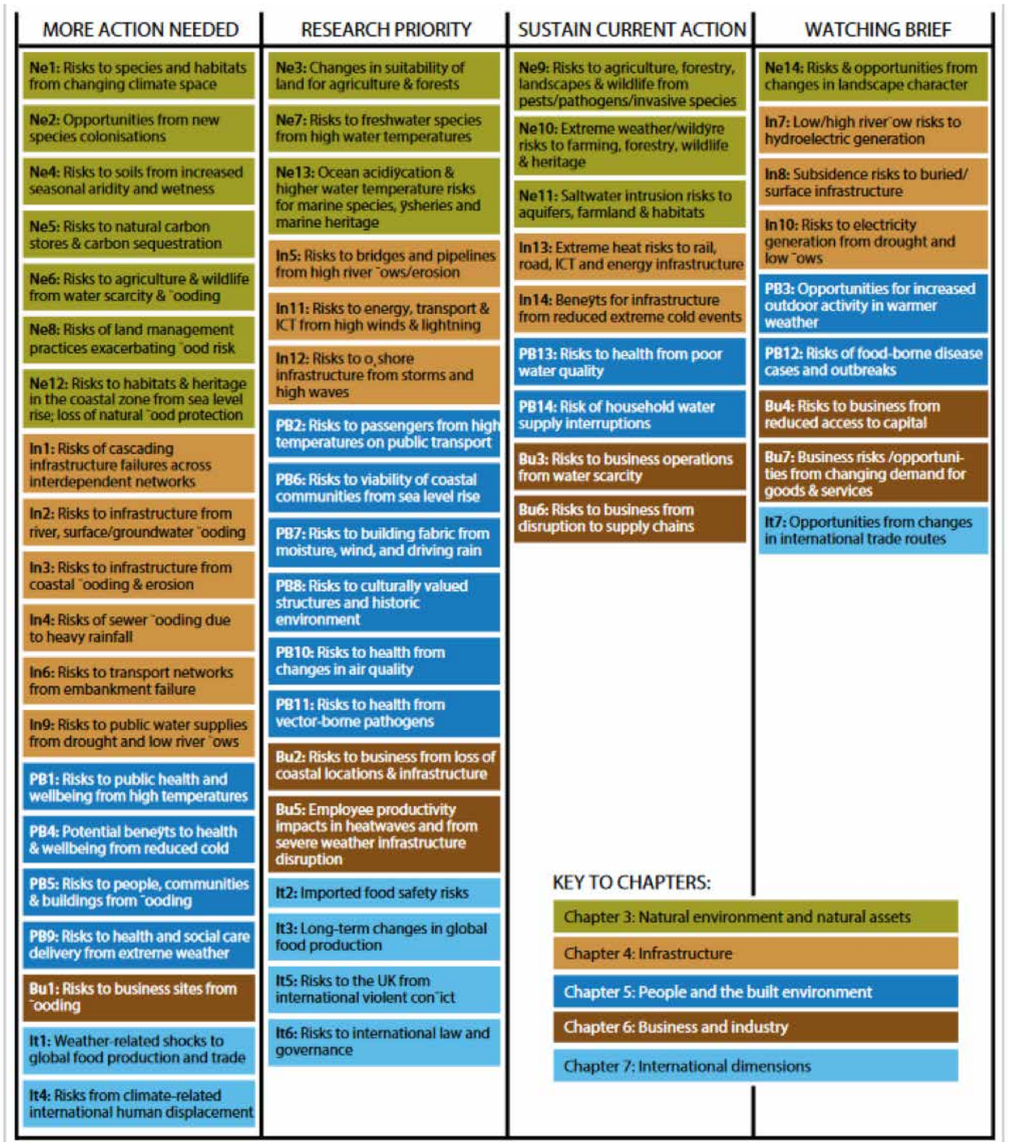

Fig 4. Urgency of risks and opportunities identified in CCRA2. Source: ASC, 2016

Why local government should adapt to climate change

Local government is under significant demands to reduce spending, at the same time as facing rising demands for its services. In view of these shorter-term pressures, it can be easy for organisations to shift a focus away from longer-term objectives. However, adaptation underpins many core local government activities:

- **Achieving strategic objectives** – in most cases, ensuring projects, plans and processes are resilient to climate change strengthens the ability to achieve their original objectives over the long-term, helping local authorities achieve a wide range of other plans and ambitions. For example, screening public regeneration plans for climate risks can make them more attractive to inward investors, whilst ensuring buildings have adequate heating and cooling supports workforce productivity.

- **Reducing impacts on service demand and delivery** – adapting to climate change ensures/ allows assets and activities to continue performing as our climate continues to change.

- **Reduced financial costs** – although individual actions need careful evaluation, many studies show that adaptation action is generally cheaper, and more effective over time than the costs incurred responding to the impacts over time. Similarly, local authorities can endure significant short-term costs from the impacts of extreme weather. For example, in the aftermath of a flood event, there may be costs for highway and building repairs, temporary accommodation, mental health and social care support, and insurance excesses. Proactive adaptation is a key part of ensuring local authorities continue providing value for money to the taxpayer.

- **Meeting statutory requirements** – in some areas of local government, adaptation is a statutory requirement. These differ by organisation but generally include planning, flood risk management, public health and Environmental Impact Assessment. The need for statutory requirements is kept under regular review by the UK Government.

- **Delivering co-benefits** – through careful planning, adaptation actions can deliver multiple wider benefits to projects or activities such as improving health and wellbeing, property values, skills and employment, reducing emissions and supporting biodiversity.

The local government role in adaptation

Local government has a significant role to play in ensuring effective adaptation across all areas identified in the UK Climate Change Risk Assessment and the National Adaptation Programme – whether by providing local leadership, adapting the services they deliver, or through working collaboratively with others in their local area to achieve broader goals.

This guidance outlines a range of actions that can be taken in relation to six key areas:

- corporate plans, policies and performance;
- business and industry;
- natural capital;
- infrastructure;
- land use planning and the built environment; and
- public health, social care and community resilience.

It is important for local government to implement adaptation actions within the range of services it delivers across all six areas, though the emphasis will vary between organisations based on individual context. Each section outlines the strategic rationale for local government action, and relevant statutory drivers. It also includes illustrative adaptation activities, drawn from best practice all over the world. To help readers benchmark and compare against their own organisation, the illustrative adaptation activities have been separated into two broad categories – 'initial adaptation' and 'maturing adaptation':

- **Initial adaptation** – the typical activities undertaken by a local authority just starting work in this space, such as collecting impacts of past weather, or identifying key contacts across organisations. They represent the basic level of action required by local authorities to meet statutory commitments, or to take the initial steps towards ensuring their area is adapting to the most significant and relevant climate risks and seizing opportunities.

- **Maturing adaptation** – the typical activities undertaken by local authorities with a more developed adaptation approach. They represent the types of activities needed for an in-depth understanding of risks, and an informed, robust approach to managing climate risk that is embedded across the organisation.

Each illustrative activity contains links to relevant examples or guidance to help organisations take action across both stages, and will be updated periodically to include new practices and examples. The activities are drawn from a range of best practice approaches in use in local government. However, the right approach for a local authority will vary based on political priorities, resources, capacity and skills, and experienced or projected impacts. As such, the activities are not a step-by-step guide for adaptation to be followed in sequence, or to be implemented as a comprehensive adaptation strategy. Instead, they should be viewed as a library of actions, which local authorities can use to compare against their own organisations, and to help them prioritise and plan their adaptation activities to support development of a comprehensive adaptation approach.

Corporate plans, policies and performance

Strategic context

Adaptation is a strategic long-term matter for local authorities, which should be considered alongside other economic, social and environmental policy issues. Managing climate risks can support a council to achieve its vision for an area and corporate objectives, for example, by ensuring infrastructure continues to contribute to wider economic performance, minimising revenue costs (e.g. by offsetting increased demand for cooling), or minimising risks of disruption to supply chains. Managing climate risk effectively can contribute to ensuring these are achieved.

Effective corporate adaptation approaches ensure climate impacts, and their ability to impact on a council's strategic objectives, are well understood by chief executives, leaders and decision makers, with appropriate levels of political support and human and financial resources in place to address them. It should also ensure that the council has clear plans in place to manage risks within relevant strategic processes, policies and plans, and provide feedback loops so that senior managers and decision makers understand how the organisation and area are progressing, and where more work is needed.

Ideally, climate risks, adaptation plans and progress should be published so that taxpayers understand how the approach is ensuring services and activities are resilient to climate change, adding value to their delivery over the long term. Such strong approaches enable local authorities to minimise the overall financial, economic or reputational impacts on their local areas from extreme weather and climate change.

Guide to adaptation activity

	Area of activity	Initial adaptation	Maturing adaptation	Examples & Guidance
1.1	Resources, training and capacity building	• Identify existing officers within local authority responsible for adaptation in key services (e.g. planning, emergency planning, flood risk management) and provide support to enhance their knowledge	• Assign appropriate resources and build capacity, knowledge and understanding to support action	• TRIOSS Adaptive Capacity Assessments
1.2	Policy, plans and mainstreaming action	• Integrate adaptation measures in statutory plans, strategies and functions, ensuring that all legal requirements are met. This includes meeting national legislation and guidance as specified on page 8 covering planning, flood risk management and civil contingencies. • Appoint a political leader/ councillor with responsibility for adaptation • Conduct a gap analysis of current activity to identify further actions which could be undertaken	• Ensure adaptation and climate resilience measures are considered systematically across other policies and plans • Implement a dedicated adaptation plan or strategy designed to address the key climate risks for an area. Ensure actions are SMART, with clear owners and resources. • Ensure a lead member is identified to champion climate adaptation and take ownership of relevant issues shared across political leadership. • Maximise the synergies with other agenda, such as health improvement or carbon reduction • Consider the role of management systems (e.g. ISO14001) in supporting adaptation efforts	• London Resilience Strategy • ISO14090 (forthcoming) Adaptation to climate change -- Principles, requirements and guidelines • ISO14092 (forthcoming) requirement & guidance of adaptation planning for organizations including local governments and communities
1.3	Strategic risk management	• Need for / failure of adaptation on the strategic risk register, with assessments of financial and reputational consequences	• Regular review and discussion of the risks at political and senior management levels	
1.4	Risk and vulnerability assessment	• Compile a local climate impacts profile by gathering data on impacts of past weather events • Undertake a local climate change risk assessment for most vulnerable services such as education or social care • Include weather risks and associated impacts (such as flooding or overheating in corporate risk register	• Undertake a climate change risk assessment for the area and services, and publish them online • Implement requirements for climate risk and vulnerability assessment for all capital investments	• ISO14091 – Climate risk and vulnerability assessment • CCC (2017) Second UK Climate Change Risk Assessment • UKCP18 – climate analysis tool. UKCP18 information
1.5	Monitoring and evaluation	• Report progress in key statutory areas, such as flood risk management and Local Plans at a corporate level (e.g. to management team)	• Include climate resilience and adaptation indicators in relevant plans and strategies • Sign up to the Global Covenant of Mayors voluntary reporting framework • Publicly report on progress implementing plans and strategies for adaptation • Ensure a feedback loop from emergency responses into longer term planning and delivery	• Global Covenant of Mayors • Newcastle Scrutiny Review of Extreme Events
1.6	Investment screening	• Map longer-term decisions and investments across service areas to determine opportunities to build in resilience	• Proactively engage with stakeholders for investment to reduce climate risks	
1.7	Partnership working	• Identify key contacts in other organisations and begin to understand shared priorities for climate resilience in key statutory areas • Collaborative working through local government networks and other key partners, such as third sector, health and emergency services, to increase efforts to embed adaptation	• Co-fund a partnership to support co-ordinated action across sectors and an area	• Northumbria Integrated Drainage Partnership • Manchester Climate Change Agency • London Climate Change Partnership
1.8	Procurement	• Embed contractual requirements for climate resilience or adaptation into key contracts and services, particularly for those provided by local businesses, to stimulate private sector adaptation	• Audit critical supply chains for climate change exposure and vulnerability, prioritise risks and act on them	• New Anglia Local Enterprise Partnership Supply Chain Risk Mapping Tool

Business & industry

Strategic context

Climate hazards and their impacts can present a serious threat to businesses and industry, with climate potentially providing risks to sites, supply chains, productivity and therefore overall economic output. Whilst local authorities have a duty to promote business continuity under the Civil Contingencies Act (2004), building business' resilience in turn contributes to a more stable supply of business rates, and therefore local authority income.

Local businesses can also be key suppliers to local authorities, which, in turn, can affect service delivery and contract reliability. This is more likely following the Public Services (Social Value) Act 2013, which requires local authorities to consider how they can secure greater economic, social and environmental benefits from their area as part of the procurement process.

This is particularly important for small and medium-sized enterprises (SMEs) – they make up 99% of the UK economy (FSB, 2019), but are particularly vulnerable because they are likely to be underinsured, and they have limited financial reserves to fund recovery. Indirect impacts can be particularly high as their localised sales and supply networks are likely to be impacted by flooding (Kingston University, 2015).

Therefore, local authorities should adopt a strategic approach, working with local enterprise partnerships (LEPs) to minimise risks to existing businesses, and ensure that new economic development approaches adequately account for climate change risks. These approaches should cover a wide range of activities, including engaging with businesses to understand their risks and build resilience, as well as wider supply chains, distribution networks, and markets.

Adapting to climate change also offers the potential to provide benefits to businesses, which operate in the 'adaptation economy'. These companies provide products and services that support others to adapt to climate change, such as architectural services, cooling and ventilation services or flood protection measures. Experimental data from the UK Government identified that in 2009/10 the sales value for adaptation and resilience to climate change was £11.3bn, with 32% relating to construction (BIS, 2010).

Guide to adaptation activity

	Area of activity	Initial adaptation	Maturing adaptation	Examples & Guidance
2.1	Economic development	• Outline the relationship between climate change risks and opportunities and economic prosperity in Strategic Economic Plans	• Work with LEPs to screen new enterprise zones, risks to major businesses, enterprise zones and inward investments for climate resilience using future flood risk mapping and other hazards • Assess quality of adaptation requirements in European Regional Development Fund (ERDF) applications and embed requirements in Local Growth Fund or Regional Growth Fund projects	• Assessing climate risks and opportunities for growth sites - Cheshire and Warrington Local Enterprise Partnership
2.2	Evidence development	• Identify critical at-risk businesses and infrastructure (Gross value added and employee numbers)	• Quantify the indirect risks to the economy	• Flood Footprint in Lower Don Valley, Sheffield, SESAME project
2.3	Awareness raising, advice and support	• Provide basic information on climate change adaptation to businesses online, including local flood risk • Promote sign up to the Environment Agency's flood warning service • Promote business continuity across the local area as required under the Civil Contingencies Act • Raise awareness of relevant climate risks with local businesses through local business groups	• Promote adaptation through existing business support activities, including training business advisers on climate risks and how businesses can adapt. • Develop dedicated programmes of resilience/adaptation support for businesses in flood risk areas	• Environment Agency Flood Warning Services • BSI – Adapting to Climate Change using your Business Continuity System • IEMA (2013) Climate Change Adaptation – Building the Business Case • Kent County Council Steps to Environmental Management scheme
2.4	Business opportunities	• Communicate key benefits to businesses from climate change (e.g. reduced heating demand, growth in business/ new opportunities)	• Put in place plans and activities to support and develop key sectors associated with adaptation	

Natural capital and green infrastructure

Strategic context

Natural capital assets (the stocks of geology, soils, air, water and living things) are a net contributor to economic growth, with their goods and services underpinning many social and economic functions, such as food production, materials and resources for construction, tourism, health and well-being, and better quality of life. Despite this, nature and biodiversity are in significant decline in England, with insufficient progress on many targets (JNCC, 2019).

Wildlife and natural systems are shaped by the climate and so are sensitive to changes. The 25 Year Environment Plan outlines that climate change is one of the most significant long-term risks to our natural environment. A warmer climate will only be able to support a richer and more diverse wildlife than we have in the UK if there is enough habitat in the right area and in good ecological condition to colonise – this depends on the extent to which woodlands, grasslands and heathlands are ecologically degraded (AECOM, 2015). If our rivers, lakes and estuaries are polluted, then species will find it harder to adapt. Climate change could, therefore, act as an additional pressure and accelerate species loss.

Nature can also play an important role in adapting our built environment, with nature-based solutions providing urban cooling and flood management as well as a range of other benefits for health, biodiversity, and the attractiveness of places. Green infrastructure is also potentially vulnerable to climate change; for example, a shortage of water could diminish the quality of green spaces and their ability to function as adaptation solutions.

Section 40 of the Natural Environment and Rural Communities Act (2006) places a duty on all public authorities in England and Wales to have regard, in the exercise of their functions, to the purpose of conserving biodiversity. The 2019 Spring Statement went further, with the Government announcing that it will soon mandate that all new development in England is required to deliver net gains in biodiversity (GOV.UK, 2019).

Local authorities can help ensure that natural capital assets in their area and the benefits and services provided by them are protected, valued and used sustainably to deliver a net gain in local natural capital. They also have a role in helping ecosystems adapt, providing new habitats that allow nature to migrate.

Guide to adaptation activity

	Area of activity	Initial adaptation	Maturing adaptation	Examples & Guidance
3.1	Evidence development	• Identify where natural capital assets are within the local area	• Assess risks to natural capital assets and put in place robust protection strategies • Review habitat vulnerability using Natural England's National Biodiversity Climate Change Vulnerability Model • Identify priority locations for nature-based adaptation interventions	• Natural England and CEH maps of natural capital • Natural England's National Biodiversity Climate Change Vulnerability Model • London Green Infrastructure Focus Map • London Tree Canopy Cover Map
3.2	Policy development	• Review local biodiversity action plans and species action plans to develop actions for particular species' vulnerable to future climate	• Develop a dedicated plan (in conjunction with others) to mitigate these risks • Catchment-wide GI strategy and natural capital investment strategy with requirement for developer contribution, and identify, other investment mechanisms	• London Environment Strategy Green Infrastructure Chapter
3.3	Collaboration	• Use natural capital accounting approaches to monetise benefits of assets and build a shared picture of local value • Engage key partners such as the Environment Agency, Natural England and local nature partnerships to develop adaptation actions for natural capital	• Engage wider partners (such as NHS, schools and universities) on adaptation priorities for natural capital to align actions and activities	• London Sustainable Drainage Action Plan
3.4	Biodiversity and habitat protection and development	• Ensure biodiversity net-gain proposals in new development are screened to ensure they are suitable under future climate scenarios • Integrate adaptation principles into nature improvement areas	• Create integrated habitat networks that provide space for species and habitats to respond to shifts in changes to climate (wildlife corridors) • Review common land / open spaces and agricultural land intercropping of trees / shrubs to protect against extreme weather events	• Biodiversity Net Gain – Good Practice Principles for Development • Greater Manchester Spatial Framework (Draft)
3.5	Green infrastructure and forestry	• Fund and implement a tree planting policy (protect existing species) • Use green infrastructure to providing shading and cooling for buildings or to protect walking and cycling routes	• Ensure selection of tree species and planting regime takes into account future climate	• RHS Gardening in a Future Climate

Infrastructure

Strategic context

Infrastructure underpins the achievement of many wider aims and objectives of local authorities, and its failure causes much wider economic, social and environmental disruption. Local authorities have a clear remit for, and interest in, co-ordinating development in their local areas, given that infrastructure such as energy, water, transport and communications underpin the economic, social and environmental activity in local places. They also have a role in direct delivery, particularly in relation to local highways and transport, broadband and telecoms, food growing and waste management.

As such, it is important that local authorities play an active role in working with infrastructure providers to minimise climate risks to existing assets in their local area, as well as ensuring any new infrastructure appropriately accounts for climate change over the lifetime of the asset.

Emergency planners already understand locations of critical infrastructure, in particular power, water and transport, in their areas. They should also understand their vulnerabilities to extreme weather events, and how the latter may impact on the ability of infrastructure to function.

There are also important interdependencies between sectors, for example with services like transport and water increasingly reliant on electricity and communications technology. Climate change could increase the threat of disruptive events such as flooding or heatwaves, with potential knock-on impacts across dependent infrastructure. Local resilience teams can support providers and local communities to prepare for disruption and increase resilience.

Guide to adaptation activity

	Area of activity	Initial adaptation	Maturing adaptation	Examples & Guidance
4.1	Evidence development and risk assessment	• Identify and understand critical and local infrastructure • Review Adaptation Reporting Power reports of local organisations to understand key infrastructure issues	• Conduct detailed modelling and analysis to better understand future risks from a variety of hazards • Use impact chains	• RESIN Impact Chain editor and guidance
4.2	Climate proofing of infrastructure	• Use green infrastructure and other nature-based solutions to provide resilience (flooding alleviation, shading, cooling)	• Screen new or changing infrastructure with long lifetimes or decisions that are hard to reverse (e.g. siting) for climate risks (e.g. bridges) • Work with infrastructure owners and operators to develop proposals for retrofitting at-risk infrastructure • Produce supplementary guidance to support screening	
4.3	In-house assets and activity	• Reviewing materials and approaches to highway maintenance to ensure they are resilient • Develop a local authority asset register to support recovery efforts after an extreme weather event • Review the extent to which service delivery depends on critical infrastructure	• Require sustainable drainage in highways network retrofit • Ensure cost-effective adaptation in new roads infrastructure (e.g. oversizing of culverts)	
4.4	Infrastructure interdependencies	• Engage with infrastructure providers as part of Adaptation Reporting Power Process to understand impact on local authority infrastructure assets and develop plans to reduce risks • Work across infrastructure providers and agencies to understand interdependent risks	• Engage with the Infrastructure Operators Adaptation Forum to understand national level risks and how they could apply locally • Facilitate coordinated action	• Northern Gas Networks Adaptation Reporting Power Report 2015 • London Resilience (2013) Anytown framework for mapping interdependencies

Land use planning and the built environment

Strategic context

Effective land use policy and a high-quality built environment make significant contributions to placemaking – ensuring local places are great places to live, work and do business.

In relation to planning, section 19 (1A) of the Planning and Compulsory Purchase Act, as amended under the Planning Act 2008, local authorities are required to reduce future climate risks through the planning system. The National Planning Policy Framework (MHCLG, 2019) requires local authorities to ensure local plans contribute to climate adaptation. In this context, developers need to consider potential climate risks to development and minimise the potential for proposed projects to lock in future risk.

Failure to adapt the built environment to the range of climate risks will undermine the long-term viability of places. Whilst it is important to ensure new development is resilient, there is also a need to address risks to existing building stock since 80% of it will continue to exist in 2050. Building retrofit programmes should be designed to consider adaptive interventions, ideally alongside energy efficiency or other types of upgrades and improvements.

Under the Flood and Water Management Act (2010), local authorities have a key role in working alongside the Environment Agency and water companies to reduce flood risk in their areas. The Act requires local authorities to prepare Local Flood Risk Management Strategies and a register of structures or features which are likely to have a significant effect on a flood risk in the area.

Modifying the built environment presents a significant opportunity to manage many climate risks that interact or relate to wider risks to society, business and industry, and the natural environment. Retrofitting nature-based solutions (such as green roofs and walls) is a good example. Effective siting can provide health benefits, support biodiversity, improve air quality and reduce carbon emissions as well as help manage flood risk and excess heat.

Guide to adaptation activity

	Area of activity	Initial adaptation	Maturing adaptation	Examples & Guidance
5.1	Planning policy	• Include policies in local plans, growth plans, and spatial frameworks, related to climate risks for the area • Provide an evidence base for developers, to support development of adaptation policies as part of local plans (e.g. through Strategic Flood Risk Assessments, and Water Cycle Studies) • Ensure new development is located and designed in accordance with sequential and exception tests set out in National Planning Policy Framework • Prepare local policies on delivery of NPPF Sustainable Drainage Systems (SuDS) policies (all major development and development in flood risk areas should include SuDS) to ensure SuDS proposals in development address local needs	• Include detailed policies outlining preferred adaptation approaches for climate hazards (e.g. a cooling hierarchy for heat, siting decisions for sea level rise) • Use the duty to cooperate to work on adaptation in key sectors at the right economic geography (e.g. the housing market or transport system scales) • Allocate and safeguard land in local plans for blue / green infrastructure or other adaptation action • Develop supplementary planning guidance on how to identify and address current and future climate risks in new development • Identify locations that might become unsustainable in the future due to climate change (NPPF policy 157d)	• National Planning Policy Framework • Climate Change Allowances Guidance • TCPA (2016) Planning for the Climate Challenge? Understanding the performance of English Local Plans • TCPA and RTPI (2018) Rising to the Climate Crisis: A guide for Local Authorities on Planning for Climate Change • GLA (2018) London Plan – Draft for Examination in Public (policies for heat risk, flood risk and green infrastructure) • Greater Manchester Spatial Framework • Bristol Local Plan Review – Draft Policies
5.2	Retrofit of built environment, including own assets and sites	• Promote water, energy efficiency and flood resistance and resilience measures to the public and in social housing • Develop a programme of water, energy retrofit and flood resistance and resilience measures for any council-owned housing stock or support Registered Social Landlords to deliver on this • Require energy, water efficiency and flood resistance and resilience measures in any local authority-enabled development • Specify requirement of the Building Research Establishment Environmental Assessment Method (BREEAM) adaptation credit in both new build and refurbishment and fit out of council assets • Specify use of Civil Engineering Environmental Quality Assessment and Award Scheme (CEEQUAL) in Public Realm / Infrastructure projects • Review current and future flood risk to council buildings and assets	• Conduct a risk assessment of the area's building stock for overheating / flooding under a range of future climate scenarios • Work with partners to deliver larger scale retrofit of nature-based solutions such as local authority-scale green roofs, green walls, SuDS or blue infrastructure • Ensure there are robust arrangements in place for long-term adoption and maintenance of sustainable drainage systems • Develop targeted building retrofit programmes for adaptation, ideally combined with mitigation to minimise disruption to home-owners	• BREEAM UK Refurbishment and Fit out 2014 – Non-domestic buildings • CEEQUAL version 5 • Your Home in a Changing Climate: retrofitting existing homes for climate change impact • Your Social Housing in a Changing Climate • Retrofitting Housing: a business case and checklist for retrofits • Innovate UK (2014) Design for Future Climate
5.3	Flood and coastal erosion risk management	• Work in partnership with Environment Agency and local authorities • Embed climate change in local flood risk management strategies • Ensure future impacts of climate change (from sea level rise and coastal erosion) are incorporated into shoreline management plans	• Proactively develop schemes with multiple benefits and diversify range of funding sources on offer (e.g. European Regional Development Fund, or health funds)	• Flood Risk Management – information for flood risk management authorities, asset owners, and local authorities • CIRIA Benefits of SUDS Tool • Shoreline Management Plans Guidance • Adapting to Climate Change: Advice for Flood and Coastal Erosion Risk Management Authorities

Public health, social care and community resilience

Strategic context

The impacts of climate change will affect people's health and wellbeing in a number of ways:

- direct impacts on public health, e.g., from heatwaves or floods;
- impacts on the ability to deliver health and social care services, and on demand for those services; and
- increasing frequency and intensity of extreme weather events requiring an emergency response and a need for community resilience.

These effects will not be experienced evenly across society, and explicit consideration of the risks to vulnerable people is needed to ensure socially just adaptation responses. A wide range of social and economic factors, including age, income and tenure, as well as the extent to which people are involved in the process of developing adaptation plans all having a bearing on how communities are affected by climate risk. The use of socially just principles (such as those identified in Welstead et al, 2012), can ensure socially equitable responses.

The Civil Contingencies Act (2004) requires local authorities to assess the potential for, and plan responses to, emergencies over a five-year period, based on the National Risk Register (NRR) (Cabinet Office, 2017) and local circumstances. The NRR includes a wide range of natural hazards whose severity and frequency will increase with climate change, including flooding, drought, and wildfires.

Such hazards can also affect the ability to deliver direct or commissioned health and social care services, for example through risks of flooding or overheating to premises, the ability of staff, patients or deliveries to access premises, or indirect impacts such as failure of infrastructure.

The Marmot Review recognised that wider social, economic and environmental factors have a bearing on people's health outcomes. The Health and Social Care Act (2012) places broad duties on Directors of Public Health to improve health outcomes, whilst Department of Health guidance on Joint Strategic Needs Assessments and Health and Wellbeing Plans require local authorities to consider the impacts of climate change on current and future health and social care needs (DH, 2013).

Climate change will cause risks to health and worsen existing medical conditions. For example, heatwaves can exacerbate respiratory conditions such as asthma and COPD, whilst flooding can have serious physical and mental health impacts. In contrast, targeted adaptation solutions can also deliver health co-benefits – for example, appropriately sited green space can simultaneous support climate proofing, whilst improving air quality or mental health.

Planning effectively to minimise climate impacts will also reduce longer-term financial costs to the health system and to communities by reducing the need for emergency response and excess demands on health and social care. Avoiding disruptions that close schools, care homes, hospitals, and workplaces will also improve community resilience.

Guide to adaptation activity

	Area of activity	Initial adaptation	Maturing adaptation	Examples & Guidance
6.1	Civil contingencies and community resilience	• Include current weather risks on the community risk register where relevant • Work with local resilience forums to collect and share data on resource impacts of severe weather events • Implement local responses to the Heatwave Plan for England	• Ensure debriefs are fed back to key council services and partners to inform adaptation planning • Work with LRFs to seek community input into community planning, and identify exposed and vulnerable communities • Effectively communicate the longer-term risks posed by climate change to communities to help 'future proof' them for an increase in severe weather events • Consider how climate change may affect the community risk registers in future	• Newcastle City Council (2013) Newcastle Scrutiny Review of Extreme Events • Cabinet Office Community Resilience Resources and Tools
6.2	Public health	• Include possible health impacts from weather events and future climate risks in the Joint Strategic Needs Assessment • Use local data on population and health to consider social vulnerability to climate change impacts • Include adaptation health and wellbeing plans	• Review and develop adaptation actions to support health in dedicated strategies or health and wellbeing plans	• DH Statutory Guidance on JSNAs and JHWS • LCCP (2012) Linking Environment and Health in JSNAs
6.3	Health and Social Care Delivery	• Assess the range of social care assets and key routes used by staff at risk of flooding • Support commissioners to embed consideration of future climate change into the commissioning processes of care providers • Assess flood risk of residents (particularly vulnerable adults and children) who have care provided at home • Develop flexible working arrangements such as remote working or alternative visitation arrangements for staff unable to travel to sites due to extreme weather	• Assess the risk of overheating in care homes, hospitals and other assets • Work to understand climate risks to other relevant health actors including the voluntary and community sector, other health and social care providers and the NHS • Develop shared adaptation plans for Health and Social Care delivery	• JRF (2016) Care provision fit for a future climate
6.4	Climate Justice	• Ensure processes for development of plans to address climate risk involve those most likely to be affected • Target development of flood risk management schemes into areas of significant flood disadvantage • Ensure the most vulnerable groups to climate change risks are identifiable	• Develop targeted programmes for addressing future heat disadvantage • Audit plans, policies and activities for the extent to which they account for climate justice and develop further recommendations.	• Climate Just • JRF (2015) Targeting flood investment to minimise flood disadvantage

Contributing case studies and sharing good practice

This guidance is intended to be a living document, which will be updated by the LAAP on a periodic basis. To inform these updates, the LAAP would be grateful to receive examples from other local authorities that may have other practices, or examples, which are working for them, and which may be of value to others. If this is the case and you are happy to share, please get in touch with secretariat@adeptnet.org.uk.

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This guidance has been developed in partnership between ADEPT, Defra and the Local Adaptation Advisory Panel. It is intended for a wide range of officers working to implementation climate change adaptation within local government, as well as relevant stakeholders and partners who have a role in working alongside local authorities to progress adaptation in their areas.

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