Resilient Edinburgh
Climate Change Adaptation Framework
For Edinburgh 2014 – 2020

THE EDINBURGH PARTNERSHIP

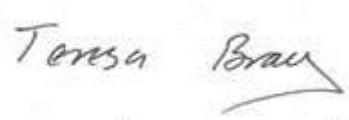
SUSTAINABLE DEVELOPMENT

FORWARD FROM COUNCILLOR LESLEY HINDS AND TERESA BRAY

Climate change is already happening. While working to reduce the causes of climate change, and avoid catastrophic change, the City of Edinburgh Council and its strategic partners also need to prepare for the unavoidable impacts of climate change over coming decades. Climate change will present many risks and threats to Edinburgh. But there will also be many opportunities for local businesses and communities if they take appropriate adaptation action now.

The Scottish Government has made it clear that community planning partnerships have a key role to play in making Scotland 'climate ready'. The Edinburgh Partnership is firmly committed to tackling climate change impacts. In particular, the Community Plan for Edinburgh recognises the importance of adapting to climate change. The Edinburgh Partnership, through the recently established Edinburgh Sustainable Development Partnership, will play its part in ensuring that partners work together to build a city-wide resilience to a changing local climate.

We intend to build on the Edinburgh Partnership's proactive approach in developing a response to climate change, and will work in partnership with other organisations in the city to deliver our programmes of work. In this way we are committing to thinking globally and acting locally.



Councillor Lesley Hinds,
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EDINBURGH WORLD HERITAGE

Queen Margaret University
EDINBURGH

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EXECUTIVE SUMMARY

This Framework sets out Edinburgh's strategic approach to increasing resilience to the impacts of climate change. Climate change adaptation provides a unique opportunity for the Council and its citywide partners to work together to ensure that Edinburgh continues to be a climate resilient city.

The remit of the Edinburgh Sustainable Development Partnership, comprising the Council, key external public and private stakeholders across the city, third sector and community groups, is aligned with Sustainable Edinburgh 2020 (SE2020). The Council, through SE2020 is committed to ensuring that by 2020 Edinburgh will have "adapted to the unavoidable impacts of climate change in partnership with key stakeholders and local communities".

OUR CHANGING CLIMATE

There is now scientific consensus that climate change is happening. The climate in the East of Scotland is set to get warmer and wetter, with an increased risk of severe weather events, extreme rainfall and flooding, warmer temperatures and periods of drought. As global average temperatures increase, we will also experience rises in sea level around the East Scotland coast.

The effects of changing weather patterns on Edinburgh will vary depending on the severity of global warming but even when only relatively modest increases in temperature are assumed, the impacts are likely to be significant.

The following changes to Edinburgh's climate are predicted:

- Warmer, drier summers
- Milder, wetter winters
- Extreme rainfall
- Greater frequency of severe weather events
- Rising sea levels

KEY CLIMATE APPROACH FOR EDINBURGH

The Framework takes a risk-based approach that:

- Assesses how vulnerable Edinburgh is to weather-related risks and predicted climate change impacts;
- Uses climate projections to understand how climate change accentuates existing risks or creates new risks/opportunities in the future;
- Identifies what city services and sectors may be affected by these existing and future risks and/or opportunities;
- Presents a number of high level actions that should be taken to address the most significant risks identified.

OUR PRIORITY ACTIONS

A number of high level actions have been identified to address the most significant risks identified. We will:

- identify new ways of working with our partners and stakeholders to make the best use of available resources and expertise to secure a well adapted future for Edinburgh;
- undertake a detailed analysis of the risks posed to the city's property and land use planning from the impacts of climate

change to identify the most vulnerable buildings, locations and neighbourhoods, and identify specific actions to address these;

- working in partnership, develop a Disaster Risk Reduction Strategy for the new Management Plan for Edinburgh's World Heritage Site;
- monitor the impacts of climate change on our transport infrastructure and use this information to incorporate adaptation into future transport planning and development;
- review Edinburgh's priority species and habitats to identify those at greatest risk from climate change, and utilise greenspace and ecological services to help mitigate and adapt to future impacts;
- work with our partners to develop a fuller understanding of the potential impacts on communities and health and from this, identify actions and develop recommendations to address community concerns and changing care needs across all sectors;
- work with our partners to develop a fuller understanding of the potential impacts of climate change on air and water quality, pest and disease control, and other environmental health factors, and from this identify actions to address these;
- ensure more robust risk management strategies that give prominence to climate change issues and aid informed resilience planning;
- work together to raise awareness of climate change impacts among Edinburgh's business community and to inform future planning of major events and attractions;
- ensure ongoing monitoring, evaluation and research to inform our decision-making on climate change adaptation;
- develop a communications strategy to ensure that up-to-date information on climate change effects and impacts are fully disseminated.

MONITORING AND REPORTING

The proposed timetable for the Framework is:

- Approval of the draft Framework by autumn 2014;
- By mid to end of 2015, development of a detailed Action Plan through engagement with partners and based on the high-level actions in the Framework;
- Development of indicators for the Action Plan linked to indicators already developed for Sustainable Edinburgh 2020;
- Progress on these actions reported as part of the Edinburgh Sustainable Development Partnership and Sustainable Edinburgh 2020 annual progress reports, starting in 2016;
- Three year review and update in 2018;
- A full review of the Framework in 2020.

INTRODUCTION

Edinburgh is the capital city of Scotland and our country's second most populous city. As our capital city, Edinburgh is of strategic importance to the rest of Scotland and to the UK as a whole. Edinburgh's Old and New Towns are jointly listed as an UNESCO World Heritage Site. Our city is a centre for learning, has the biggest annual international arts festival in the world and is the second largest financial and administrative centre in the UK and the second most popular tourist destination. It is essential that Edinburgh successfully adapts in order to minimise the social and economic impacts of climate change that could affect the city.

The Framework sets out Edinburgh's strategic approach to increasing resilience to the impacts of climate change. Climate change adaptation provides a unique opportunity for the Council and its citywide partners to work together to ensure that Edinburgh continues to be a climate resilient city. A lot of work has already been done by the Council and its partners to adapt the city to the impacts of climate change and the objective is to build on this work. The decisions and investments we make today will determine how we live with climate change in years to come.

The Adaptation Framework consists of the following sections:

1. The strategic context under which this Adaptation Framework has been developed;
2. The predicted future climate change trends for the East of Scotland and the Edinburgh area, and recent climate trends for the city;
3. An analysis of the results of a Local Climate Impact Profile (LCLIP) which helped identify Edinburgh's key vulnerabilities to severe weather and what future climate change impacts could mean for the city;
4. The scale of the challenge in terms of how climate change could impact on the city, taking a sectoral approach;
5. An identification of the key risks to Edinburgh from these climate change impacts;
6. Working in Partnership – only through working together with our citywide partners and communities, can Edinburgh continue to be a climate resilient city;
7. Our Priority Actions - A number of high level actions have been developed to address the most significant risks identified from the risk assessment, presented by sector;
8. Reporting and Monitoring – how progress on actions to adapt Edinburgh to the opportunities and challenges of climate change will be reported and monitored.

To support the Adaptation Framework, an accompanying document provides the evidence base on which this Framework is built. The evidence base summarises the background research that provided the reasoning behind the assumptions reached in the Framework, including the scientific evidence of past climate change and predicted future climate trends for the East of Scotland, their impact on Edinburgh and the way we deliver services. Finally the risks to the Council and the city from climate change impacts are assessed and graded.

MITIGATION AND ADAPTATION

Climate is what you expect, weather is what you get Robert A. Heinlein

It is important to note the difference between climate and weather.

- **CLIMATE** is a long term average of weather (usually over a 30 year period) and trends in these average conditions are climate change.
- **WEATHER** is what we experience hour-to-hour, day-to-day, year-to-year, and as anyone living in Scotland will know, it can be highly variable.

On occasion weather may appear at odds with long-term climate change. The cold winter weather Edinburgh experienced in 2010-11 is a prime example of this. However short-term variations are expected to occur now and into the future.

There is scientific consensus that climate change is happening, that it is directly related to man-made greenhouse gas emissions and that we have little time remaining to stabilise and reduce these emissions if we are to avoid devastating impacts on our planet[1]. Even if we dramatically reduce our emissions in the short term some climate change is now unavoidable. This will present us all with new challenges but also with new opportunities.

MITIGATION AND ADAPTATION

Mitigation means taking action to tackle the causes of climate change, that is reducing concentrations of greenhouse gases in the atmosphere. A Sustainable Energy Action Plan is being developed to reduce the city's energy use and carbon emissions.

[1] Climate Change 2013 – The Physical Science Basis – Summary for Policymakers – Working Group 1 Contribution to the Fifth Assessment Report, IPCC, October 2013

Adaptation will be crucial in reducing vulnerability to climate change and is the only way to cope with the impacts that are inevitable over the next few decades… The Stern Review on the Economics of Climate Change

Adaptation is about building resilience to the unavoidable consequences of a changing climate, through identifying climate change impacts, minimising the negative effects and responding appropriately. Adaptation recognises both risks and opportunities arising from climate change, and the need to plan for them now.

In order to build adaptive capacity we need to develop an understanding of how climate change is likely to affect Edinburgh. This includes assessing the risks to the city in terms of:

- taking no or limited action – in terms of cost and potential damage to services, infrastructure, property, transport, biodiversity, local communities and the economy;
- the potential savings to be made by taking appropriate early and long-term action to respond to the impacts of climate change.

An important aspect of adaptive capacity is ensuring that decision makers are equipped with an adequate understanding of the issues being faced and are therefore able to decide appropriate action.

To deliver adaptation, we need to take action. The action we take will vary across services and locality but will include improving education, awareness and training on the impacts of climate change, as well as taking tangible steps such as increasing reservoir storage capacity or restricting housing development in areas of high flooding risk (in light of predicted climate change modelling scenarios), and to develop a range of flood proofing measures for existing properties.

THE STRATEGIC CONTEXT

CLIMATE CHANGE (SCOTLAND) ACT 2009

The Act introduces ambitious, world-leading legislation to **reduce carbon emissions by at least 80% by 2050**, equal to the 2050 target contained in the UK's Climate Change Act.

The Act places a statutory climate change duty on public bodies. A public body must, in exercising its functions, act in a way:

- best calculated to contribute to delivery of the Act's emissions reduction targets;
- best calculated to deliver any statutory adaptation programme; and
- that it considers most sustainable.

The Scottish Government's Climate Change Adaptation Programme addresses the impacts identified for Scotland in the UK Climate Change Risk Assessment and sets out Scottish Ministers' objectives in relation to climate change adaptation, their plans and policies for meeting these objectives, and the period within which these proposals and policies will be introduced. The programme requires all public bodies to conduct their business in a way that will help deliver climate change adaptation as per the Climate Change Act.

SUSTAINABLE EDINBURGH 2020

Sustainable Edinburgh 2020 (SE2020) sets out the City of Edinburgh Council's vision for the sustainable development of the city to 2020.

The Council, through SE2020, is committed to ensuring that by 2020 Edinburgh will have adapted to the unavoidable impacts of climate change in partnership with key stakeholders and local communities.

RESILIENCE PLANNING - COMMUNITY SAFETY

Under the Civil Contingencies Act 2004, the Council has a statutory obligation to promote business continuity to the wider community. The Council works with local organisations to ensure that the city is ready for any incident and is able to return to normal as soon as possible.

Scottish Government guidance states that all public bodies need to be resilient to the future climate and to plan for business continuity in relation to delivery of their functions and the services they deliver to the wider community.

OUR CHANGING CLIMATE

OUR CHANGING CLIMATE

The climate in the East of Scotland is set to get warmer and wetter, increasing the risk of storms, flooding and the potential for extended periods of drought. As global average temperatures increase, we will also experience rises in sea level around the East Scotland coast.

Some of the general trends for Scotland are as follows[2]:

- Warmer, drier summers and milder, wetter winters
- Rising sea levels
- More very hot days – extremes of temperature increase in intensity as well as frequency
- More intense downpours of rain - extremes of precipitation increase in intensity as well as frequency
- Snowfall will become less common.
- The growing season is now nearly five weeks longer in Scotland (1961 to 2004) with the greatest change occurring at beginning of the season.

If there continues to be a discharge of medium to high amounts of greenhouse gases into the atmosphere then in the East of Scotland it is possible that:

- Average daily temperatures will rise between one and two degrees by the 2050s. The largest temperature increase, up to 2^{o}C will be in the winter months.
- Summer rainfall will reduce by as much as 10% by 2050s.
- Winter rainfall is predicted to show a consistent increase of up to 10% by the 2050s. Winters will be milder and wetter, with increased risk of storms and flooding.
- Around the East Scotland coast snowfall will reduce by up to 80%.
- The sea level in Edinburgh is projected to increase by 10 to 18cm by 2050 and 23 to 39cm by 2095.
- Weather patterns could become more extreme e.g. high temperatures recorded occasionally today could become the norm by 2080
- There will be a greater frequency and intensity of extreme events – storms, floods, heat waves and drought
- The growing season may become longer by 20 to 60 days by 2080

The effects of changing weather on Edinburgh will vary depending on the severity of global warming, but even when only a relatively modest increase in temperature is assumed, the impacts are likely to be significant.

From the data, the following changes to Edinburgh's climate are predicted:

- Warmer, drier summers
- Milder, wetter winters
- Greater frequency and intensity of extreme rainfall
- Greater frequency of severe weather events
- Rising sea levels

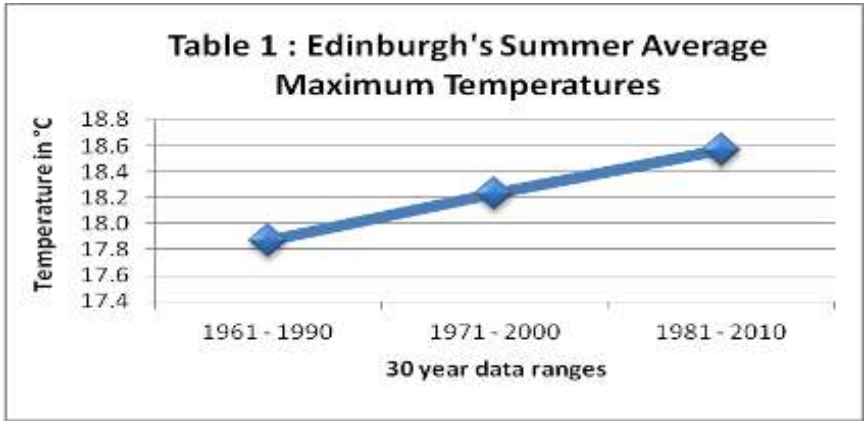
[2] Scottish Compendium of UKCP09 Climate Change Information, Adaptation Scotland Website, 2013

EDINBURGH'S RECENT CLIMATE TRENDS

Warmer, Drier Summers

Data from the Met Office[3] shows a distinct warming trend for Edinburgh in line with climate change predictions. Table 1 shows a daytime temperature rise of 0.75 ^{O}C comparing 1961-1990 averages with those of 1981-2010.

As well as warming, climate change trends predict drier summers for South East Scotland, with periods of intense rainfall shifting from summer towards autumn.



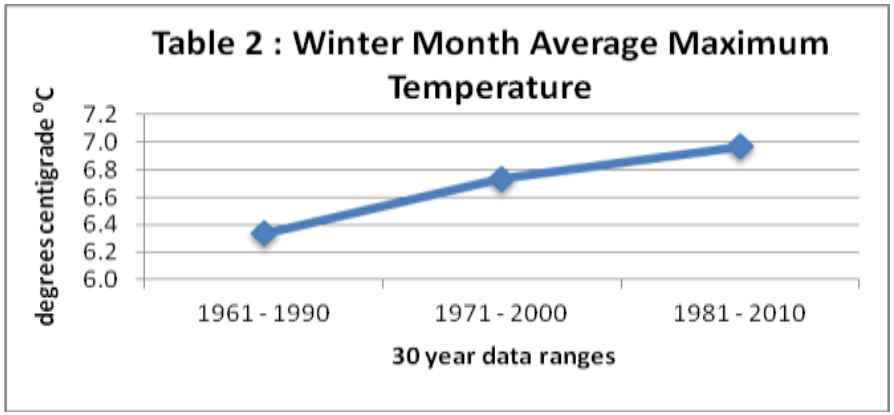
Milder, Wetter Winters

Edinburgh's winters are predicted to become milder. The winter temperature data for Edinburgh from 1961 to 2010 (Table 2) shows a clear rising trend that is consistent with climate change predictions.

Weather data suggests Edinburgh is already experiencing up to 4% wetter winters, with increased rainfall intensity in autumn and winter.

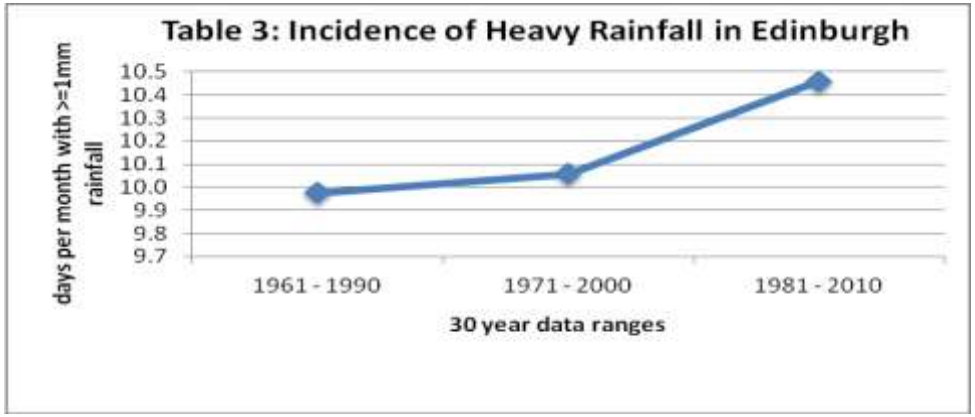
[3] Met Office Climate Averages,

This trend towards wetter winters is expected to continue into the future. The wettest year on record at Edinburgh's Royal Botanic Gardens was 2008 with a total of 907.9mm (981.4mm in 12 months in 2007/08 or 141% of the average)[4].



Extreme Rainfall

The incidence of heavy rain (days when the quantity that fell was equal to or greater than 1mm) in Edinburgh has grown by 5% comparing the period 1961-1990 with that of 1981-2010 (Table 3).



[4] Royal Botanic Gardens Edinburgh – Edinburgh Weather Station, webpage last updated 1 March 2012

Rainwater volumes have also increased over the same period. On average an extra 6mm of rain per month fell in the 1981-2010 period compared with the 1961-1990 one.

Severe Weather Events

There have been high profile consequences of severe wind and storm events in Edinburgh in recent years. Edinburgh, in common with Scotland as a whole, is prone to severe gales in the winter months. Eastern Scotland is one of the more windy parts of the UK. The strongest winds are associated with the passage of deep areas of low pressure close to or across the UK. The frequency and strength of these depressions is greatest in the winter half of the year, especially from December to February. The predicted trend is for a greater frequency of extreme events, including storms and high winds.

Rising Sea Levels

As global average temperatures increase, we will experience rises in sea level around the coast. Two major factors contribute to sea level rise. Firstly, as the sea warms it expands. This is called thermal expansion. Secondly, melting of land-based ice adds further water to the world's seas.

While Edinburgh has suffered from a number of river floods, coastal flooding has not been a significant issue up to now. However there are concerns that climate change could lead to more widespread coastal flooding, resulting from a combination of rising sea levels, increased frequency of storm surges, and rougher sea conditions.

Tidal surges caused by storms can occur in Scotland and mainly affect the East coast. However they are less significant around Scotland than further south. The most significant storm surge recorded over the last 100 years occurred in 1953. Surge levels of 0.60m and 0.83m were recorded in Aberdeen and Leith respectively but reached 2.97m in southern England and 3.36m in the Netherlands. The 1 in 50 year storm surge predictions for Scotland are around 1.25m.

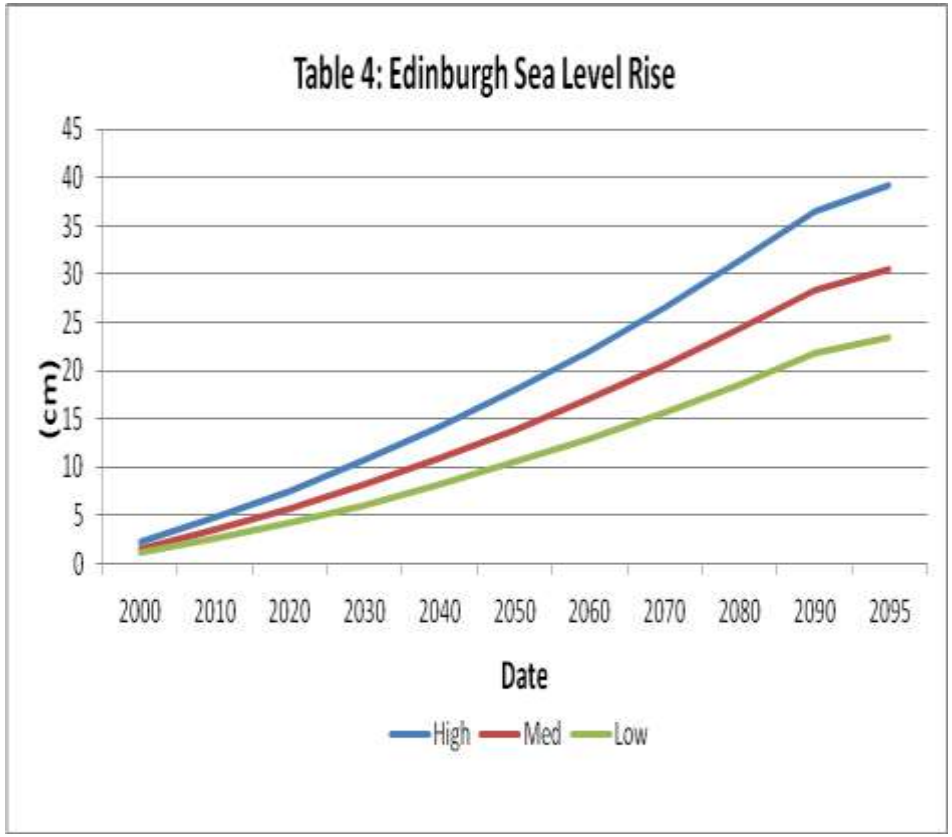


Table 4 shows UKCP09 projections for future sea level rise around Edinburgh's coast, based on the three scenarios of future levels of greenhouse gas emissions[5].

[5] UK Climate Projections – Sea Level Rise, updated 11 March 2011

EDINBURGH'S RECENT WEATHER

The Council carried out a Local Climate Impacts Profile (LCLIP) to identify Edinburgh's key vulnerabilities to severe weather and help assess what future climate change could mean for the city.

The research showed the impact of severe weather events on the city. The prevalence of storms and gales and extreme rainfall seem to be happening with increasing frequency. The research also highlighted a warming trend, with earlier springs and warmer summers.

The research provided an assessment of Edinburgh's vulnerability to extreme weather events, especially flooding and high winds, over the short term. Using existing regional research and recorded local weather events, the potential impact of climate change on the city's buildings, local infrastructure and the ways we manage our services, was assessed.

The LCLIP identified the following types of extreme weather causing disruption to Edinburgh:

- Extreme rainfall and flooding, impacting on infrastructure, property and transport movement, leading to road and rail closures and damage to homes and businesses. The most recent severe flooding occurred in April 2000. Since then mainly short duration storms or periods of extensive rainfall have led to a number of localised flooding incidents;
- Severe weather events, leading to, for example, the cancellation of the Hogmanay celebrations and closure of the Winter Wonderland, closure of major city attractions and loss of business revenue, street and road closures and transport disruption, and public safety concerns;
- Edinburgh experienced two bouts of particularly severe winter weather in 2009/10 and 2010/11 causing major disruption to the city and its residents, especially the most vulnerable.
- Climate change is having a direct impact on the city's biodiversity, evident in the shift in timing of seasonal events[6]. It is also acting as a further stress on some ecosystems already under pressure. The longer growing season means that city buildings are more likely to have some degree of fungal growth on walls and plant growth in gutters. Wetter winters may increase damp problems in housing and other properties. There has also been a rise in complaints about pests.

Edinburgh World Heritage, together with climate scientists and conservation experts, are currently working on a climate modeling tool for the whole city. This tool aims to assess risks and impacts on the built fabric, particularly in their historic centres, to help understand future climate impacts. The tool will look at 100 years worth of data in order to establish historic weather patterns and model more accurate projections. This project will provide further historic data about weather patterns in Edinburgh over a hundred year period.

[6] Edinburgh Spring Index, Royal Botanic Garden Edinburgh, 2013

INTRODUCTION

THE SCALE OF THE CHALLENGE

Adaptation is about building resilience to the impacts of climate change. Without decisive action, climatic change will impact on our infrastructure, transport, economy, natural environment and communities' health and quality of life.

It is therefore crucial that we prepare and plan for these changes, to adapt and build resilience into our services and activities, maximise the benefits and minimise the costs that a changing climate presents.

This includes managing the risks from extreme weather events and designing environments and buildings that can withstand the impacts. By taking proper adaptation measures now, the city can help to avoid the worst impacts and costs.

KEY CLIMATE RISKS FOR EDINBURGH

The Local Climate Impacts Profile report helped identify potential risks. To further this process, a high level analysis of existing climate risks for Eastern Scotland was conducted, based on the known climate trends outlined in this Framework

A number of high-level risks have been identified for Edinburgh and should act as a precursor to a more rigorous sector-based risk assessment.

This step will also be vital in identifying and developing appropriate actions for responding to the climate risks.

The following pages describe the scale of the challenge and key climate risks facing Edinburgh by sector.

PROPERTY, PLANNING AND FLOOD PREVENTION

THE SCALE OF THE CHALLENGE

Climate change will impact on the design, construction and ongoing upkeep of Edinburgh's buildings and land. Based on current projections, the main consequences for the city's buildings include:

- Flooding damage to housing and commercial buildings;
- Damage to the building fabric;
- Loss or damage to historical buildings and heritage;
- Potential loss of insurance for at risk buildings.

A changing climate will influence the location and design of new development as more information becomes available on flood risk. Increases in the variability of river flows, intensity of rainfall events, surface water flooding, seasonality of rainfall and intervals of drought will present numerous and complex challenges for the city. Wetter winters and more intense downpours throughout the year may increase the risk of flooding of property.

The predicted increase in intense rainfall will increase the risk of pluvial and fluvial flooding[7] and ground water and drainage surcharge. Property located in areas that are at increased risk of flooding or landslips will be especially vulnerable. The Scottish Environment Protection Agency's indicative river, coastal and surface water flood map shows areas of Scotland that are at increased risk of flooding. Building in high-risk locations may become extremely expensive to insure.

While Edinburgh has suffered from a number of river floods, coastal flooding has not been a significant issue up to now. There are

concerns that climate change could lead to more widespread coastal flooding. Rising sea levels and storm surges will increase the risk of flooding in low-lying areas. Rising seas will also see increased occurrence of coastal flooding, erosion and coastal retreat. Integrated Coastal Zone Management will be important in managing rising sea level risks to communities, infrastructure and assets near the coast.

SEPA's indicative flood map shows areas of Edinburgh's waterfront potentially at medium to high risk of coastal flooding, taking into account climate change.

An increase in severe weather events poses significant risks for older and historic buildings, and new build. New buildings must be designed to withstand the impacts of climate change. The National Planning Framework and Scottish Planning Policy state planners and developers should address these issues in their plans and designs.

Flooding and severe weather damage to housing could have serious consequences for residents, especially the most vulnerable. Edinburgh's City Housing Strategy 2012-17 aims to reduce the impacts and consequences of climate change wherever possible.

Some buildings are an important part of Edinburgh's historic environment. Buildings and other structures of significant historical importance may be particularly vulnerable and special consideration must be given to how these cultural assets can be preserved in the face of a changing climate. Rising sea levels and the impacts of

[7] Flooding that occurs after excessive rainfall that is not able to get absorbed into the ground or drainage system due to excessive water flow is referred to as pluvial flooding. Fluvial flooding is caused by river water overflowing/bursting of river banks.

coastal erosion also make protecting Edinburgh's vulnerable historic archaeology and coastal landscapes vital.

The risks of overheating of buildings in summer will increase in Scotland. Although the temperature rise is expected to be less than England and Wales there may be an increase in the number of heat waves over time. Consideration has to be given to the effect this will have on the ability of buildings to deal with a period of raised temperatures.

The longer growing season means that city buildings are more likely to have fungal and plant growth in gutters etc. This combined with more frequent instances of heavy rainfall will impact on building maintenance, particularly as regards historic buildings. Wetter winters and increased summer temperatures means that there is a greater chance of dampness and condensation.

In assessing the effects of climate change on land use, the main challenges are seen to be from increased flooding, coastal erosion, warmer temperatures and changing precipitation patterns and the consequences of these impacts for land use and spatial planning.

KEY CLIMATE RISKS

In summary, significant risks to property and planning arising from climate change include:

- Increased energy consumption in summer months due to increased need for air conditioning/cooling in existing buildings
- Increased bioproductivity promoting growth of problem species, pests infestations and vermin
- 'Heat island' effect[8]
- Damage to property from wetter winters and severe weather events
- Increased dampness and mould in buildings
- Disruption to construction work due to severe weather
- Vulnerability of key heritage and cultural assets
- Increased insurance costs
- Increased incidence of inundation and flood damage
- Damage to sea defences and increased vulnerability to storm surges
- Tourism and recreational demand
- Storm water management and flooding infrastructure.

[8] Temperatures are often a few degrees higher in cities than in surrounding areas. This temperature discrepancy is known as the urban heat island effect. Normally the temperature disparity is not very large but even a few degrees can make a huge difference.

TRANSPORT

THE SCALE OF THE CHALLENGE

The potential for increased flooding, erosion and landslides, storms and high winds, and rising sea levels may damage Edinburgh's transport infrastructure and lead to disruption and delays.

More intense rainfall could result in flooding, which could disrupt traffic, delay construction activities and weaken or wash out the soil and culverts that support roads, tunnels and bridges. Heavy precipitation could also lead to delays and disruption on the railway.

The location and design of new infrastructure, whether for road, tram or cycle, must take into account an increased likelihood of risks from flooding and landslips.

High winds can have an impact on the routes high-sided (particularly freight) vehicles can take, for example if bridges on key routes have to close more often. This limits route options and can add significantly to journey times and length, increase emissions and reduce overall business efficiency.

Severe weather events may make it more difficult for commuters, resulting in staff absence from key organisations which deliver essential services to the community just at the point when demand for these services is acute due to the immediate impacts of the severe weather.

As average temperatures increase, disruptions from snow and frost may become less frequent, reducing reliance on resources to deal with cold weather. However higher temperatures are likely to require the provision of air conditioning on public transport, particularly buses. This could adversely affect the purchase and operating costs of vehicles.

KEY CLIMATE RISKS

In summary, significant risks to Transport arising from climate change include:

- Failure of essential road infrastructure
- Road deterioration
- Failure of drainage infrastructure
- Disruption to work programmes and operational issues
- Significant increases in maintenance costs and requirements for new infrastructure
- Disruption to public transport, cycling and pedestrian networks due to the increased incidence of localised and widespread flooding
- Increased number of emergency call-outs
- Failure of coastal defences
- Storm surge inundation
- The economic and reputational ramifications of major transport disruption to Edinburgh

PARKS AND GREENSPACES

THE SCALE OF THE CHALLENGE

Climate change is already having a direct impact on biodiversity. Certain species and ecosystems may be adversely affected by droughts and flooding. As the climate becomes wetter and warmer, some species may move north, so that the species mix suiting a warmer Edinburgh may change.

Trees, being long lived (potentially 100 years+), will experience more environmental change then short-lived flora such as grasses, herbs and shrubs that can be replaced with adapted species relatively quickly and easily.

Some species moving north may be 'pest' species, adversely affecting local habitats and species, while some will increase the diversity of species found locally.

Climate change could also have implications for the spread of plant diseases. It is crucial that action is taken to manage the consequences on Edinburgh's existing biodiversity.

There will also be physical effects on habitats, including loss of habitat to coastal erosion. Ultimately, the effects of a changing climate and the loss of species diversity could degrade ecosystem function. Action will be required to secure the ecosystem services that support nature, the economy and contribute to quality of life, as well as to reduce their vulnerability to the impacts to climate change.

As projected trends in temperature and rainfall become more evident in Edinburgh some form of intervention or active management may be necessary to maintain the city's current natural habitats and wild species and to accommodate new species moving into the area.

KEY CLIMATE RISKS

In summary, significant risks to parks and greenspaces arising from Climate Change include:

- Summer drought
- Deterioration in river and wetland environments
- Species and habitat stress
- Introduction of new species
- Tree damage and changes in woodland ecosystems
- Deterioration of public parks
- Increased soil erosion and land instability
- Erosion of coastal habitats

HEALTH AND COMMUNITY WELLBEING

THE SCALE OF THE CHALLENGE

Weather and climate play a significant role in people's health. Changes in climate affect the average weather conditions that we are accustomed to, with a disproportionate impact on vulnerable groups. High risk groups include the elderly, individuals with pre-existing illnesses, children and the economically and socially vulnerable.

Warmer average temperatures could lead to hotter days and more frequent and longer heat waves, increasing the number of heat-related illnesses and deaths. According to a Health Protection Agency report[9], rising summer temperatures may lead to a rise in hospital admissions and premature deaths from respiratory problems. Higher temperatures could also increase the spread of disease, cases of food poisoning and affect air quality. A warming climate threatens to make air quality worse, with the prevalence of harmful photochemical smogs likely to increase throughout longer, hotter summers.[10] Poorer air quality will directly result in poorer health for greater numbers of people, more hospital admissions and a greater risk of cardio-vascular disease.

Climate change may also increase risks to health from buildings overheating, and increases in vermin and pests. Living in a ground or basement flat may increase health risks related to flooding. Hospitals and care homes may be adversely affected by high temperatures during heatwaves. Heavy precipitation and flooding may also adversely affect health care infrastructure.

Increased frequency and/or severity of extreme weather events will increase the risk of flooding, high winds and other direct threats to people and property. Flooding, damage and disruption from severe weather have already had major impacts on communities, damaging property, flooding homes and gardens, and disrupting transport.

Extreme weather-related events are likely to increase mental as well as physical health problems, as well as placing unusual strain on Edinburgh's emergency services. Severe weather events could also disrupt local service delivery if healthcare and social services staff are unable to commute to work or visit clients.

[9] Health Effects of Climate Change in the UK 2012, *Sotris Vardoulakis and Clare Heaviside (Report Editors),* September 2012

[10] Air Quality and Climate Change: Integrating Policy Within Local Authorities, *Environmental Protection UK,* 2011

KEY CLIMATE RISKS

In summary, significant risks to Health and community wellbeing arising from Climate Change include:

- Disruption to essential community services
- Increased incidence of vector borne diseases[11]
- More heat stroke, dehydration and respiratory problems.
- Increase in pest numbers and distribution, and increased demand for pest control services
- Increased incident of food poisoning
- Reduced water and air quality
- Mould and fungal illnesses and associated respiratory problems
- General increase in public health and safety risks

[11] Disease that results from an infection transmitted to humans and other animals by blood-feeding insects, such as mosquitoes, ticks and fleas.

EMERGENCY AND RESCUE SERVICES

THE SCALE OF THE CHALLENGE

The demands on emergency and rescue services will change – in a changing climate emergency services may need to respond to an increased frequency and severity of extreme weather and flooding events, and increase the number of incidents requiring a multi-agency emergency planning response.

There may also be changes in social and recreational behaviour that present new challenges to emergency and rescue services.

KEY CLIMATE RISKS

In summary, significant risks to Emergency and Rescue Services arising from Climate Change include:

- Changes and increases in demand for emergency and rescue services
- Increase in number of incidents requiring a multi-agency emergency planning approach

ECONOMIC DEVELOPMENT

THE SCALE OF THE CHALLENGE

Climate change poses threats to the future prosperity of the city. A healthy economy is vital for protecting and enhancing Edinburgh's environment over the long term. In addition to local impacts, potential disruptions to global trade are highlighted as risks. Although there is limited scope to influence global events, there are some responses to such risks that can improve the city's resilience, for example, sourcing goods with shorter and more reliable supply chains.

Flooding has caused significant economic disruption to the city, with both localised and general impacts, including major operational difficulties, insurance claims and anxieties about recurrence. The effects of high winds on business in the city has been similar with general disruption to travel and essential services as well as localised damage to business premises.

Severe weather is particularly disruptive of events and facilities which have a major outdoor component. Edinburgh Castle, Ratho Climbing Centre and the Botanic Gardens have all closed for limited periods in recent years because of high winds. The cancellation of Hogmanay celebrations in 2003 and 2006 because of high winds and heavy rain had some immediate impacts on business revenues but the greater concern has been for the long term reputation of the event and its ability to continue to attract tourist interest and revenue to the city in the winter holiday season.

Climate change may influence Scotland's capacity to generate weather-dependent renewable energy. Climate change can also impact on power distribution, with impacts ranging from damage caused by extreme weather events to reduced transmission efficiency occurring as a result of temperature fluctuations and so may increase energy costs. Impacts on global energy markets may also affect energy supplies in Scotland and consequently our overall energy security. Our energy, transport, water, and ICT networks support services are vital to our health and wellbeing and economic prosperity. The effect of climate change on these infrastructure systems will be varied. They are likely to be impacted by an increase in disruptive events such as flooding, storms, drought, and heatwaves. Our infrastructure is closely inter-linked and failure in any area can lead to wider disruption across these networks.

KEY CLIMATE RISKS

In summary, significant risks to the economic development of the city arising from Climate Change include:

- Changes in demand for goods and services
- Heat stress impact on service provision
- Closure of water reliant recreational activities
- Lost work days
- Disruption to transport and supplies
- Disruption to energy supplies/increasing energy costs
- Increased insurance and repair costs
- Loss of land and property values
- Disruption and/or cancellation of winter festival and Hogmanay celebrations

ADAPTATION OPPORTUNITIES

As well as negative impacts, Edinburgh's changing climate offers opportunities. The trend towards warmer, drier summers may increase outdoor leisure and community activities and events, improving health and increasing fitness. Milder winters may reduce heating bills and the likelihood of outside events being cancelled. The longer growing season will benefit gardeners and allotment owners.

A changing climate and the need to adapt to it also presents a number of economic opportunities for business, for example:

- **Financial and Business services** where ethical and green investment is expanding;
- **Life Sciences** where developing responses to climate change related threats to human health offers the potential for new business;
- **Tourism** where hotter drier summers will be more attractive to visitors and more outdoor events are possible;
- **Universities** where adaptation related research work may be a growth area.
- **Edinburgh Centre for Carbon Innovation (ECCI**) where leaders in the low carbon sector, academics, government, other public sector organisations, networks for business and finance can work together to help find solutions to the impacts of climate change. ECCI also jointly manages ClimateXClimate, which is Scotland's centre for expertise on climate change.

KNOWLEDGE GAPS

There are always going to be gaps in our understanding of the challenges, risks and potential opportunities of Edinburgh's changing climate. Ongoing research is needed to ensure we continue to learn how our climate is changing and the impacts of this, now and into the future.

This knowledge acquisition is particularly important when Edinburgh is affected by major climatic impacts and events, in order to gauge how resilient the city will be to them, for example: how resilient the heat and energy systems that the city depends on are or what would be the impact of major transport disruption to the city (e.g. east coast mainline disruption).

This will also help to assess the economic and reputational impacts to the city of climatic events or disruptions and how these can be minimised

WORKING IN PARTNERSHIP

Climate change adaptation presents a unique opportunity for the Council and its citywide partners to work together to ensure that Edinburgh becomes a climate resilient city. Community planning in Edinburgh involves a wide range of partnerships, initiatives and projects, supported by public, private, third sector and community organisations, in the delivery of agreed joint outcomes.

The Edinburgh Partnership encompasses all of the city's community planning partnership arrangements, brought together under the auspices of the Edinburgh Partnership Board, which oversees and coordinates the delivery of the Plan's vision and four priority outcomes. The Community Plan presents the partnership's agreed priorities and outcomes, including its vision of Edinburgh as a "…sustainable capital city". A cross-cutting priority is carbon management and climate change. The partnership is committed to helping to reduce greenhouse gas emissions, raising awareness and assisting in adapting the city to the impacts of climate change.

The Edinburgh Sustainable Development Partnership (ESDP) will provide the lead for adaptation across the city and will co-ordinate communication and responses on behalf of the Edinburgh Partnership.

EDINBURGH SUSTAINABLE DEVELOPMENT PARTNERSHIP

The remit of the Edinburgh Sustainable Development Partnership (ESDP), comprising the Council, key external public and private stakeholders across the city, the third sector and community groups, is aligned with Sustainable Edinburgh 2020. This means that the ESDP is perfectly placed to coordinate adaptation work throughout the city.

The key adaptation roles of the Partnership are to:

- facilitate joint working across the city on climate change adaptation issues, policies and projects;
- develop best practice, which can be shared throughout the city and the city region;
- stimulate debate and raise awareness of the opportunities as well as the challenges presented by a changing climate for residents, businesses and organisations;
- assess, monitor and report on how prepared Edinburgh is for climate change; and
- work in ways which contribute to sustainable development and are complementary to the work of other organisations and partnerships.

RESILIENCE PLANNING - COMMUNITY SAFETY

Linking to the Edinburgh Partnership through the community safety partnership, the city has a number of partnerships and organisations involved in wider citywide resilience issues and concerns. The Council leads the Edinburgh Resilience Forum, with membership from large business and public bodies who have established resilience functions. The Forum recognises the need to strengthen local urban resilience. Severe flooding in 2000, severe winter weather events in 2009/10/11 and pandemic influenza in 2009/10 has raised concern about the resilience risks facing the city and the need for comprehensive resilience building at all levels including individual citizens. This is complemented by a need for a more holistic, all-risks approach, to include climate change and economic risks and one which builds on new technology opportunities.

Within this wider over-arching context the city's key resilience priorities are to:

- compile an Edinburgh Risk Register, taking an holistic approach including key areas such as climate change;
- develop an integrated city wide resilience strategy and plan;
- nurture and support resilience communities in partnership with other Responders, the Edinburgh Partnership, neighbourhood partnerships and community councils;
- safeguard infrastructure, homes, businesses and historic buildings against severe weather, including flooding;
- plan and design, ensuring our buildings and housing are as resilient as possible by developing relevant planning guidance and land-use planning.

RESILIENT HERITAGE

A World Heritage Site (WHS) Management Plan is being prepared in partnership with Edinburgh World Heritage, The City of Edinburgh Council and Historic Scotland. The Management Plan identifies risks and actions undertaken by partners on sustainability, energy efficiency and climate adaptation and mitigation in order to preserve the Old and New Towns of Edinburgh WHS Outstanding Universal Value. The Edinburgh City Local Plan includes general policies focused on the city-wide built heritage as well as specific reference to the WHS Management Plan as a material consideration for decisions on planning matters.

RESILIENT ECONOMY

A vibrant economy is vital to the continued success of the city and the well-being of its communities. Appropriate adaptation is required to maintain a city that remains attractive to investors and businesses. Informing and encouraging local business is of crucial importance to achieving this goal. Taking early action now will ensure businesses are best prepared for the impacts of climate change and able to take full advantage of the business opportunities offered by a changing local and global climate.

A number of organisations represent business interests on the Edinburgh Sustainable Development Partnership, including Scottish Enterprise, the Edinburgh Chamber for Commerce and the Edinburgh Centre for Carbon Innovation. These organisations will help ensure that business is fully engaged with the adaptation work being done in the city and is proactively involved in finding solutions to the potential economic and business impacts of a changing climate.

As part of the wider Edinburgh Partnership family of partnerships, the Economic Development Strategic Partnership will be able to influence and work with a range of partners who are delivering a range of strategic priorities including supporting business, encouraging inward investment and international trade, supporting regeneration and infrastructure development, helping the unemployed into work or learning, and promoting the development of the city's highly skilled workforce. All these areas of activity now require a proactive approach to climate change adaptation.

RESILIENT COMMUNITIES

Greater community cohesion is needed to build local resilience to the impacts of climate change. Communities working together and in

partnership with the Council and its partner organisations will help build self-reliance and enable residents to address the impacts of climate change at a community level.

The Third Sector, a key part of the ESDP and wider Edinburgh Partnership, has a pivotal role in Edinburgh's resilience to the impacts of climate change. The sector has immense potential to link up grassroots community action, communicate policy initiatives, and run training programmes. The Third Sector is often best placed to connect with individuals that the public and private sector finds hardest to reach, working with the most vulnerable in our society and helping tackle the 'equality gap' which could be widened by the impacts of climate change.

The Third Sector also provides a valuable contribution to the collection of data, through their networks of staff and volunteers who observe wildlife and undertake research, as well as providing advice about managing protected areas and other valuable habitats.

RESILIENT COUNCIL

The Corporate Resilience Unit, in conjunction with stakeholder and partner organisations, is responsible for ensuring the Council complies with the emergency planning and business continuity obligations contained in the Civil Contingencies Act 2004 and other relevant legislation. Resilience planning is managed through three main groups, each of which addresses a key resilience issue. These are: the Council Resilience Group, the Edinburgh Resilience Partnership and the Council Contest Group. The Council Resilience Group drives the Council's Resilience Management Programme, and is the focus for the Council's resilience activities including planning, training and exercise initiatives, and facilitates the sharing of information across the Council on business continuity, emergency planning and preparing for major events.

The Council's Corporate Severe Weather Resilience Plan aims to ensure continued delivery of essential Council services during periods of severe weather and their aftermath. The Plan aims to enhance the Council's resilience, ability to respond to, cope with and recover from the consequences of a severe weather event that impacts on the normal service delivery of essential services and activities.

The Council, through Sustainable Edinburgh 2020 (SE2020), is committed to ensuring that by 2020 Edinburgh will have "adapted to the unavoidable impacts of climate change in partnership with key stakeholders and local communities". The Council's Carbon, Climate and Sustainability (CCS) Team is taking SE2020 forward through the development of this Adaptation Framework and subsequent development of an Adaptation Action Plan for the city.

Planning and Design

Spatial planning, development and building design will play a major role in helping Edinburgh to adapt. As a planning authority, the Council is best placed to ensure that the future development of Edinburgh takes climate change adaptation into consideration. The current Edinburgh City Local Plan and Rural West Edinburgh Local Plan contain measures to ensure climate change adaptation and flood prevention is incorporated into planning policy, as does the second proposed Edinburgh Local Development Plan (ELDP). The ELDP aims to promote development in sustainable locations and enhance the city's green network by encouraging land management practices which capture, store and retain carbon, and prevent and manage flood risk. This includes managing surface water drainage, treatment and flood risk through sustainable urban drainage, providing amenity and biodiversity benefits e.g. green roofs, swales and ponds, planting trees to intercept and absorb rainfall.

In 2010, the Council prepared an Open Space Strategy to ensure a co-ordinated and consistent approach to meeting Edinburgh's open space needs and protect and develop the city's network of open spaces. The Strategy sets standards for the provision of different types of open space and identifies where these standards are not currently met, identifying opportunities to improve the quantity and quality of open space provision in Edinburgh.

Flood Prevention

Edinburgh has two Flood Prevention Schemes in place to protect vulnerable communities adjacent to the Water of Leith and the Braid Burn. The Council's flood prevention schemes were developed in response to past severe flooding events. The Braid Burn scheme has been completed. The Water of Leith scheme is being implemented. The Council has also identified undeveloped areas of land which fulfil an important flood function and which should be allowed to flood in order to protect other, built-up areas from floodwater. These are shown on the ELDP Proposals Map as areas important for flood management. The ELDP identifies up-to-date Areas of Importance for Flood Management and has been informed by SEPA's most recent flood area modelling.

As part of a Scotland-wide initiative, a Flood Risk Management Plan for the Firth of Forth area will be published at the end of 2015. The City of Edinburgh Council, neighbouring local authorities, the Scottish Environmental Protection Agency and Scottish Water are currently developing this plan which will describe an agreed set of actions to manage flood risk locally.

Housing

The City Housing Strategy is the Council's key strategic document for housing in the city. One of the three outcomes of the strategy is to ensure people live in warm, safe homes, in well managed neighbourhoods. As this outcome is concerned with housing quality, repair and maintenance issues, and the management and creation of successful neighbourhoods, it takes into account adaptation.

The Council has invested over £205 million in bring homes up to the Scottish Housing Quality Standards since 2006/07. The effect of climate change on Council owned homes is one of the research topics under the 2014/15 Changeworks service level agreement.

Greenspace

Edinburgh's green network forms part of a wider Central Scotland Green Network (CSGN), which is identified as a national development in National Planning Framework 2. The Council is a signatory to the CSGN declaration and is working in partnership with neighbouring authorities and other stakeholders to support and deliver a range of projects. Edinburgh's Local Biodiversity Action Plan 2010-15 (LBAP) includes a new section and various actions on climate change mitigation and adaptation.

The Edinburgh and Lothians Forestry and Woodland Strategy provides a long term vision of woodland creation and management to increase woodland cover and create better links. Forestry Commission Scotland provide financial support for woodland planting and management of existing woodlands, and advice on developing resilient woodlands and planting species adapted to predicted climate change. The Council's Natural Heritage Strategy sets out how planning can meet the objectives of national policy on biodiversity and fulfill the commitments of the Biodiversity Duty and the Scottish Geodiversity Charter.

RESILIENT EDINBURGH

Working in partnership is crucial to achieving a Resilient Edinburgh. We will work cooperatively with key citywide stakeholders and local citizens to design creative, effective and sustainable solutions to the challenges and opportunities of a changing local climate.

The main mechanism for driving this forward is the Edinburgh Sustainable Development Partnership, made up of key organisations, business interests and community groups throughout the city. The Partnership's central coordinating function will ensure that key risks are addressed, optimising efficiencies in terms of sharing lessons learnt and providing accountability for delivering actions.

All the organisations and groups in this Framework will play a crucial role in climate change adaptation. These key organisations and groups are the main agencies driving adaptation forward, and as such, must work together to achieve our shared vision of a Resilient Edinburgh.

CITYWIDE PRIORITY ACTIONS

This chapter presents a number of high level actions to address the most significant risks identified in the preceding risk assessment chapter. The actions are presented by sector.

ACTION: GOVERNANCE

Working together, we will identify new ways of working with our partners and stakeholders to make the best use of available resources and expertise to secure a well adapted future for Edinburgh.

This could include:

- Facilitating joint working across the city on climate change adaptation issues, policies and projects, and highlighting best practice, which can be shared throughout the city and the city region;
- Including the impacts of climate change into Edinburgh's Risk Register and citywide resilience strategy and plan;
- Identifying processes and guidance which can incorporate climate resilience into, for example, Strategic Environmental Assessment, Environmental Impact Assessment, sustainability checklists, sustainable procurement guidance and estate asset management guidance.

ACTION: PROPERTY AND PLANNING

We will undertake a detailed analysis of the risks posed to the city from the impacts of climate change to identify the most vulnerable buildings, locations and neighbourhoods, and specific actions to address these.

This could include:

- Working in partnership to analysis fully the risks posed to our built environment from the impacts of climate change;
- Ensuring the climate change adaptation actions integrated into the second proposed Local Development Plan (green roofs, flooding, green networks etc), are fully implemented;
- Encouraging developers to ensure that all new buildings and drainage systems are 'climate ready' for future impacts;
- Encouraging developers to 'piggyback adaptation onto development projects, undertake sympathetic retrofitting measures for older buildings, and other measures such as incorporating green roofs, green walls and/or rainwater collectors on buildings where appropriate;
- As far as possible, protecting residents' property from damage from climate change impacts through awareness raising and community action.

ACTION: DISASTER RISK REDUCTION STRATEGY

Working in partnership, we will develop a Disaster Risk Reduction Strategy for the new Management Plan for Edinburgh's World Heritage Site

This could include:

- Edinburgh World Heritage (EWH) drafting a Disaster Risk Reduction Strategy (DRR) for world heritage properties in the city in partnership with The City of Edinburgh Council and Historic Scotland;
- Developing a climate modelling tool for the city, to assess risks and impacts on the built environment to help understand future

climate impacts. This will involve looking at past data to establish more accurate historic weather patterns and trends, and future climate projections;

- Ensuring the project's governance is coordinated by the Edinburgh Sustainable Development Partnership (ESDP) as the facilitating umbrella body.

ACTION: TRANSPORT

We will monitor the impacts of climate change on our transport infrastructure and use this information to incorporate adaptation into future transport planning and development.

This could include:

- Ensuring climate change adaptation is fully incorporated into all city transport strategies, plans and guidance;
- Retrofitting green infrastructure onto existing streets and public spaces through, for example, the development of rain gardens, permeable paving on pavements, paths and roadways, etc.
- 'Piggybanking' adaptation onto future transport infrastructure development, roadworks and repairs.

ACTION: PARKS AND GREENSPACE

We will review Edinburgh's priority species and habitats to identify those at greatest risk from climate change, and utilise greenspace and ecological services to help mitigate and adapt to future impacts.

This could include:

- Promotion of natural flood management in catchment planning;
- Using natural features in urban environments to assist adaptation, for example through the use of living roofs to improve habitat connectivity, reduce heat gain and slow the movement of rainwater drainage into the urban drainage system;
- Increase planting of street trees for their cooling effect, to reduce flooding through canopy capture and evaporation, and for improvement of solid drainage by their deep root structure;
- Management of nature conservation sites to take account of a changing climate, and to consider the placement of these sites in the wider ecological network;
- Managing species conservation priorities to take account of a changing climate;
- Reducing pressures on habitats vulnerable to climate change;
- Promoting ecological connectivity to assist in species movement in response to climate change, and as a means of building larger, resilient species populations and habitats;
- Continuing pressure on invasive non-native species that impact on native biodiversity, some of which may be even more successful in a warmer climate, and a considered response to the gradual northwards movement of species.

ACTION: HEALTH AND COMMUNITY WELLBEING

We will work with our partners to develop a fuller understanding of the potential impacts on communities and health and from this, identify actions and develop recommendations to address community concerns and changing care needs across all sectors.

This could include:

- Ensuring climate change risks are addressed in the commissioning and provision of health and social care services, and the refurbishment programmes of the health and social care estates;

- Ensuring climate change adaptation is incorporated into all Edinburgh's community planning processes and city organisations work in partnership with communities to ensure climate change impacts are minimised for residents, especially the most vulnerable;
- Ensuring the engagement of all Edinburgh's citizens in the process.

ACTION: ENVIRONMENTAL HEALTH

We will work with our partners to develop a fuller understanding of the potential impacts of climate change on air and water quality, pest and disease control, and other environmental health factors, and from this identify actions to address these.

This could include:

- Ensuring an Air Quality Action Plan for the city reflects a growing understanding of the interrelationship between climate change and local air quality;
- Ensuring the impacts of climate change are taken into consideration when developing actions to improve water quality;
- Ensuring the threat of a rise in pests and diseases due to climate change is fully realised, and that pest and disease control services are fully prepared to meet potential increased demand for their services;
- Raising awareness of the potential environmental health risks of climate change and ensuring the engagement of all Edinburgh's citizens in this process.

ACTION: RISK PLANNING

We will ensure more robust risk management strategies that give prominence to climate change issues and aid informed resilience planning.

ACTION: ECONOMIC DEVELOPMENT

We will work with our partners to raise awareness of climate change impacts among Edinburgh's business community and to inform future planning of major events and attractions.

This could include:

- Working with a range of local economic development partners to ensure a proactive approach is taken to climate change adaptation;
- Ensuring businesses are able to take full advantage of the business opportunities offered by a changing local and global climate;
- Encouraging local production and markets to try to offset disruptions in global trade due to climate change impacts.

ACTION: RESEARCH

We will ensure ongoing monitoring, evaluation and research to inform our decision-making on climate change adaptation.

This could include:

- Collating key sets of evidence (flood risk maps, Urban Heat Island/coastal change info etc) and making these available to inform risk assessments and decision making;
- Carrying out further research to enable options appraisal and cost benefit analysis of different adaptation responses;
- Acknowledging the gaps in our understanding about climate change impacts.

COMMUNICATION AND EDUCATION

Climate change will impact upon every individual, business and organisation in Edinburgh.

Communications and education campaigns will be actively developed to promote awareness about these impacts throughout the Council, partner organisations, other stakeholders and the general public, in collaboration with the local media.

The following action is proposed:

ACTION: A communications strategy will be developed to ensure that up-to-date information on climate change effects and impacts are fully disseminated.

MONITORING MILESTONES

This preparation of this Climate Change Adaptation Framework will be the start of a major process that will deliver a wide range of actions and measures to adapt the city to the impacts of climate change over a long period of time.

The proposed timetable for the Framework is:

- Approval of the draft Framework by autumn 2014;
- By mid to end of 2015, development of detailed Action Plan through engagement with partners and based on the high-level actions in the Framework;
- Development of indicators for the Action Plan to show active progress towards achieving the below measures of success;
- Progress on these actions reported as part of Edinburgh Sustainable Development Partnership and Sustainable Edinburgh 2020 annual progress reports, starting in 2016;
- Three year review and update in 2018;
- A full review of the Framework in 2020.

MEASURES OF SUCCESS

The following measures will show how successfully the Framework is being implemented across the city:

- Levels of technical capacity increase across the city to assess and respond to the risks of climate change;
- The extent to which climate change considerations are increasingly incorporated into high level policies, plans and practical programmes in priority impact areas;
- Growing evidence that implemented adaptation strategies are increasing citywide resilience to extreme weather events;
- The extent to which climate change adaptation strategies continue to reduce stress on vulnerable members of society;
- Growing evidence of engagement between the Council and its partners, city-wide communities, local communities of interest, non-governmental organisations and other levels of government on addressing climate change issues;
- The extent to which climate change adaptation is integrated into Edinburgh's risk planning agenda, resilience strategy and action plan;
- Increase level of public, staff and stakeholder awareness about climate change and its impacts, and support for actions to protect against climate change.

If you would like more information, please contact:

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