

# Policy and Sustainability Committee

10.00am, Friday, 15 December 2023

## Draft Climate Ready Edinburgh Plan for Consultation

Executive/routine  
Wards

Executive  
All

### 1. Recommendations

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- 1.1 It is recommended that Policy and Sustainability Committee:
  - 1.1.1 Approves the Draft Climate Ready Edinburgh Plan 2024-2030 which has been informed by the updated citywide climate change risk assessment commissioned by the Council for public consultation;
  - 1.1.2 Notes that this plan has been developed in partnership by the Edinburgh Adapts Group and led by Gordon Reid, General Manager Zero Emissions, Scottish Water; and
  - 1.1.3 Notes that, if approved, a 12-week consultation on the draft plan will be held with the aim of bringing the final plan back to the Policy and Sustainability Committee for approval in Spring 2024.

**Paul Lawrence**

Executive Director of Place

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## Draft Climate Ready Edinburgh Plan for Consultation

### 2. Executive Summary

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- 2.1 Edinburgh's 2030 Climate Strategy placed a renewed focus on adapting the city to the effects of climate change. The Edinburgh Adapts Partnership has led this work on behalf of the city and has developed the Climate Ready Edinburgh (CRE) plan 2024-2030 for public consultation. If approved by Committee, a 12-week consultation will be held on the plan.
- 2.2 Development of the draft CRE plan has been informed by an updated climate change risk assessment, which identified the risks, impacts and potential adaptation options that could be taken to adapt the city. This assessment sets out the evidence base of why we need to adapt. This includes the most up-to-date projections of how Edinburgh's climate is likely to change in the future; the risks arising; their impacts; and the implications this could have for Edinburgh.
- 2.3 An economic assessment of the costs of adapting Edinburgh as compared to business as usual will be completed by spring 2024. The outcomes of this will feed into the Climate Ready Edinburgh Plan.

### 3. Background

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- 3.1 The City of Edinburgh Council declared a Climate Emergency in 2019 and a Nature Emergency in 2023.
- 3.2 A key ambition of Edinburgh's 2030 Climate Strategy was the development of a Climate Ready Edinburgh Plan to continue the process of adapting the city to the impacts of climate change. The Council is working closely alongside cross-sector partners to align action in response to this, maximising resource efficiencies and cross capital benefits.

### 4. Main report

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- 4.1 A Draft Climate Ready Edinburgh (CRE) plan to 2030 has been developed as the next phase of Edinburgh Adapts. This has been informed by:
  - 4.1.1 Actions developed through the 2030 Climate Strategy;

- 4.1.2 The outcomes of the citywide and Edinburgh's World Heritage risk assessments;
- 4.1.3 Coastal work undertaken in collaboration with the University of Glasgow; and
- 4.1.4 New actions identified by the adaptation partnership and key stakeholders.
- 4.2 CRE aims to ensure a just transition and climate justice approach to adaptation, through working inclusively and collaboratively with communities, partners and other sectors to ensure that all our citizens benefit, with a focus on our most disadvantaged and vulnerable citizens and communities.
- 4.3 As well as protecting and enhancing nature, a resilient natural environment is a critical part of the solution to the climate and nature emergencies. Green blue infrastructure and nature-based solutions play a crucial role in helping the city adapt as well as supporting the aim of Edinburgh becoming a nature positive city by 2030.
- 4.4 The CRE plan identifies the short, medium and long-term actions that need to be taken to adapt the city. This includes working towards achieving a whole system transformational approach to adaptation, moving away from taking incremental action to embedding adaptation into everything we do and into all levels of governance across the city.
- 4.5 Edinburgh's updated climate change risk assessment has shown a number of key risks and impacts for the city, with flooding and overheating identified as the ones that will impact the city most. As such, action to alleviate these risks and impacts are prioritised in the CRE plan.
- 4.6 The draft plan priority themes are in the following eight areas:
  - 4.6.1 **Planning and the built environment:** actions that will help to mitigate the effects of climate change by making our buildings and infrastructure more resilient;
  - 4.6.2 **Water management and resilience:** actions to tackle flooding and associated impacts from severe weather events;
  - 4.6.3 **Coastal adaptation:** actions to manage sea level rises and the impact to our coastline and surrounding communities;
  - 4.6.4 **Sustainable transport:** actions to support a well-connected city;
  - 4.6.5 **Safeguarding and enhancing our natural environment:** actions that will support our natural environment and biodiversity;
  - 4.6.6 **Strong, healthy community and economy:** actions to support our communities, addressing climate justice, to create a thriving city;
  - 4.6.7 **Building understanding of climate risk:** actions to continue to ensure our understanding of how the climate is changing and the impacts of this to the city are based on the latest climate science;- and
  - 4.6.8 **Governance and risk:** actions to drive delivery and partnership working.

- 4.7 The plan is not starting from scratch in adapting the city. Many of the actions are already underway, including the award winning work on developing Edinburgh's Green Blue Network (which received an 'Excellence in climate, environment and social outcomes' award from The Landscape Institute).
- 4.8 The Development Framework approved for Granton Waterfront aims to create a new vibrant, green and sustainable coastal quarter on Edinburgh's waterfront. This includes the creation of a coastal park as part of the development to provide natural resilience to coastal flooding from rising sea levels and storm surges.
- 4.9 Edinburgh was the first local authority in Scotland to develop a nature network. Developed by the Council's Thriving Green Spaces project, Scottish Wildlife Trust and the University of Edinburgh, it aims to connect, create and improve our natural spaces across Edinburgh for the benefit of people and nature.

## **5. Next Steps**

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- 5.1 If approved, a 12-week citywide public consultation on the draft Climate Ready Edinburgh Plan 2023-2030 will be held. During this period, a number of engagement exercises will be held, including workshops targeting the city's public, private and third sectors and internal partner workshops to ensure that the actions in the plan assigned to them are correct and align with their organisational priorities.
- 5.2 A final version of the plan will be brought to Committee for approval by Spring 2024.
- 5.3 The business case for undertaking a city region climate change risk assessment under the Edinburgh and East of Scotland City Region Deal's Shared Prosperity Framework has just been approved. This assessment will be undertaken over an 18 month period.
- 5.4 An economic assessment of the costs of adapting Edinburgh as compared to business as usual will be completed by Spring 2024 for committee consideration. The outcomes of this will feed into the CRE Plan.

## **6. Financial impact**

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- 6.1 Substantial investment and thorough planning are needed to meet the climate challenges Edinburgh faces. Adaptation of the city is a long-term agenda that needs to be planned and prioritised. The draft implementation plan consists of actions which are of minimal impact, are currently underway, already built into budgets or will need further investment to take forward. As this work develops and the need to adapt the city to the impact of a changing climate grows, the need for additional investment by all partners will become more acute.
- 6.2 Adapting the city will require the Council to ensure it uses our existing funds effectively to achieve our adaptation aims. We will also have to look at using funds differently, including through a mixture of public, partner and private finance to fund our adaptation aims. An investment and delivery plan and a series of business

cases will be developed as part of the plan, so that the Council is ready to apply for investment opportunities as and when they arise. Work will continue with City Deal regional partners to ensure a clear and consistent approach to defining the funding needs across Edinburgh and the Southeast Scotland.

- 6.3 Resource to enable delivery will also be a key challenge. Ongoing maintenance will also require additional time which will impact key delivery services across the city. Further work on the skills and resource needed to support a climate adapted city will be required.

## **7. Equality and Poverty Impact**

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- 7.1 Equality and poverty must be a key consideration of all our sustainability work. The CRE Plan aims to ensure that all our citizens will benefit from adaptation, with a focus on our most disadvantaged and vulnerable citizens and communities, by, for example, reducing the risk of flooding to homes, tackling dampness and water ingress of homes and buildings, reducing transport disruption from severe weather events, and tackling overheating in homes, health facilities and other public buildings.
- 7.2 The Integrated Impact Assessment (IIA) process for the plan has commenced, and will be further developed through the consultation period, taking account of insights emerging from the consultation and other engagement activity over the early part of 2024 as outlined above.
- 7.3 An Interim IIA has been completed ([Interim IIA](#)).
- 7.4 A full IIA will be published when the final Plan is brought to Committee in Spring 2024. Further IIAs will be carried out (as appropriate) as the implementation plan and wider work programme develops.

## **8. Climate and Nature Emergency Implications**

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- 8.1 The CRE Plan sets out the actions that need to be taken over the next few years to continue to adapt the city to the unavoidable impacts of our changing climate. By adapting, emissions will also reduce through, for example, maintaining and increasing carbon stores, reducing the vulnerability of the built environment and infrastructure to extreme weather events, and reducing energy demand for heating in buildings.
- 8.2 Edinburgh declared a nature emergency in 2023. As well as protecting and enhancing nature, a resilient natural environment is a critical part of the solution to the nature emergency. The CRE Plan is closely aligned with and supports Edinburgh's Biodiversity Action Plan, Edinburgh's Nature Network, and Million Tree City initiative, and specific actions are aimed at protecting and building the resilience of Edinburgh's species and habitats and using green and blue

infrastructure and nature-based solutions. This will support the aim of Edinburgh becoming a nature positive city by 2030.

## **9. Risk, policy, compliance, governance and community impact**

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- 9.1 The plan has been developed considering the substantial feedback received internally within the Council from a wide range of Council service areas, the Council's Sustainability Board and Sustainability and Climate and Nature Emergencies All Party Oversight Group and externally from members of the Edinburgh Adapts partnership and Net Zero Edinburgh Leadership Board.
- 9.2 The emphasis of the consultation on the draft plan will be on setting out the proposals and actions for how the city will prepare for and adapt to the impacts of climate change. The consultation will ensure it provides enough information to allow people to make meaningful representations in the response to the above.
- 9.3 The following activities will be used to raise awareness of the plan, encourage people to have their say and support the IIA of the final plan from an early stage:
- 9.3.1 Launch of the consultation document and questions on Consultation Hub. Publicity to raise awareness of the consultation;
  - 9.3.2 Notification to third sector, community and city partner groups and individuals telling them how to comment;
  - 9.3.3 Series of public events for third sector, community, and community council partners allowing opportunity to find out more about the consultation proposals, including specific engagement with seldom-heard groups; and
  - 9.3.4 Series of events with key stakeholders and sectors including business, investment, developers and public bodies.
- 9.4 The council's [risk appetite](#) for Health and Safety risk is currently set at minimal to low, meaning the Council will seek to take action to manage and mitigate risks assessed above this level. The risks caused by flooding leading to serious or fatal injury is noted as high within the CRE risk assessment. The CRE Plan can be considered as part of the management of this risk as it outlines projects and plans that address different types of flooding to mitigate these risks, so far as is reasonably practicable.

## **10. Background reading/external references**

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- 10.1 [2030 Climate Strategy: Delivering a net zero, climate ready Edinburgh](#)
- 10.2 [2030 Climate Strategy: Delivering a net zero, climate ready Edinburgh](#)
- 10.3 [2030 Climate Strategy Executive Summary](#)
- 10.4 [Edinburgh Adapts Climate Change Action Plan 2016-2020](#)

## 11. Appendices

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Appendix 1 – Draft Edinburgh Climate Ready Plan 2024-2030 for consultation

An aerial photograph of Edinburgh, Scotland, showing a dense urban landscape with numerous stone buildings and a prominent dome in the center. The city is set against a backdrop of rolling green hills and mountains under a blue sky with scattered clouds. A white text box is overlaid on the left side of the image.

# Draft Climate Ready Edinburgh Plan 2024-2030

December 2023

## Foreword

In 2019, the City of Edinburgh Council declared a climate emergency and made a commitment to be net zero by 2030. This recognised both the scale of the challenge ahead of us and the role we must play as Scotland's capital city.

Since then, the Council has declared a nature emergency and made ambitious commitments to support the health and wellbeing of our city and citizens.

Our 2030 Edinburgh Climate Strategy sets out what it will take to meet these goals. This includes the actions, investments, and changes we need to undertake as a Council and as a society to truly become a net zero, adapted and nature positive city.

While reducing our carbon emissions is crucial to the future of our city, we also need to recognise that a changing climate presents new risks to how we live both now and in the coming years. Put simply we need to adapt for our city to thrive.

For this reason, we need a single plan for how we can adapt to climate change, the *Climate Ready Edinburgh* plan.

Global and local events tell us we have no other choice. In Edinburgh, we are already experiencing extreme weather. From rising temperatures which have resulted in heatwaves and drought to heavy rainfall and significant flooding events across the city.

Extreme weather will create disruptions to how we all live, which is why we must take an inclusive approach with

climate justice at the heart of how we work. We know that inequality persists in our city, and we must ensure that climate change and our responses to it do not take us further away from our goal to end poverty in Edinburgh.

We will ensure that the needs of all our citizens, especially the most vulnerable, are understood and considered in every decision we take.

Poverty, nature and climate change are inter-related challenges which need to be addressed with urgency, determination, skill, and investment.

We know that the decisions we make now can secure the comfort, safety and wellbeing of future generations in a thriving green city, and we hope that you will work with us to help deliver our vision for a city and region, where people, communities and nature can live well in a changing climate.

### **Councillor Cammy Day**

Leader of the City of  
Edinburgh Council and  
Chair, Edinburgh  
Partnership

### **Gordon Reid**

General Manager Zero  
Emissions, Scottish Water  
and Chair, Edinburgh  
Adapts

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## Introduction

We're going to consult on this plan with the aim of having a final Climate Ready Edinburgh Plan by summer 2024. This is a progression from the 2016 to 2020 Edinburgh Adapts Plan. Based on the latest available evidence, this plan provides an assessment of the city's vulnerability to climate change. It builds on the Edinburgh 2030 Climate Strategy and sets out the actions needed to ensure the city can adapt to climate change. The strategy aims to adapt in a way which is fair, equitable and beneficial to our citizens, culture, communities, businesses, and nature.

### What do we mean by climate adaptation?

As defined by Adaptation Scotland, '*Adaptation is about responding to the changes that we have seen in Scotland's climate over the last few decades, and preparing for the challenges and opportunities that we will face as our climate continues to change in the decades ahead. Adaptation goes hand in hand with work to reduce greenhouse gas emissions, often referred to as climate change mitigation.*'

### Climate Justice: a definition

*'Justice that links development and human rights to achieve a human-centred approach to addressing climate change, safeguarding the rights of the most vulnerable people and sharing the burdens and benefits of climate change and its impacts equitably and fairly.'*

Intergovernmental Panel on Climate Change (IPCC)

### Just Transition: a definition

*'A transition that ensures the economic, environmental and social consequences of the ecological transformation of economies and societies are managed in ways that maximise opportunities of decent work for all, reduce inequalities, promote social justice, and support industries, workers and communities negatively affected, in accordance with nationally defined priorities, and based on effective social dialogue.'*

Joint Oireachtas Committee on Climate Action.

### A Nature Positive City

*'In 2050 Edinburgh will have a species-rich nature network from the uplands of the Pentland Hills to the coastal waters of the Firth of Forth. It will be an environment abundant in wildlife that is enjoyed and respected by people, making Edinburgh a beautiful place to live, work and visit.'*

Edinburgh Biodiversity Action Plan 2022-2027 Vision

## Vision

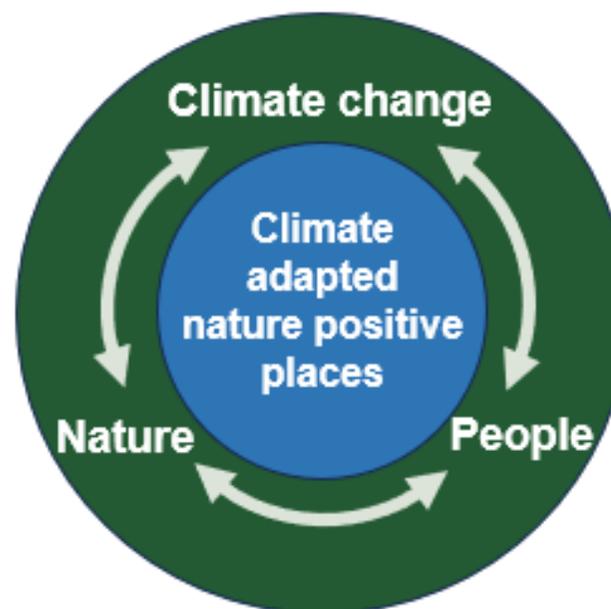
The vision of the plan links directly with our city's aims to be a net zero, climate resilient, and nature positive Edinburgh. It also aligns with climate justice principles and guaranteeing a Just Transition for all our citizens.

Figure 1 The Vision for a 'Climate Ready Edinburgh'



The relationship between climate change, nature and people are interconnected and will impact one another as the risks of climate change become more acute. We therefore consistently refer to them all when we discuss climate change.

Figure 2 Relationships between climate change, nature, people.



## Governance and Delivery

This Climate Ready Edinburgh plan has been developed by the Edinburgh Adapts Partnership chaired by Scottish Water, and approved by the Net Zero Edinburgh Leadership Board (NZELB). The delivery of adaptation actions will be through the Edinburgh Adapts partners. This will be alongside supporting agencies from the Net Zero Edinburgh Leadership Board, key stakeholders and city-wide organisations.

The Edinburgh Adapts Partnership is one of four thematic interconnected workstreams that reports to the Net Zero Edinburgh Leadership Board (figure 1). We will use both the Edinburgh Adapts Partnership and the NZELB to monitor progress and support partnership working.

Figure 1 Governance structure of adaptation in Edinburgh



Supporting and interconnected partnerships are:

- Transport Partnership chaired by City of Edinburgh Council
- Just Transition Partnership chaired by Edinburgh Chamber of Commerce
- Heat and Energy Efficiency Partnership chaired by SP Energy Networks and University of Edinburgh.

## Working in Partnership

The Edinburgh Adapts Partnership is made up of The City of Edinburgh Council, Scottish Water, Scottish Environment Protection Agency, Edinburgh World Heritage Ltd, Historic Environment Scotland, NHS Lothian, Naturescot, University of Edinburgh, Heriot-Watt University, Napier University, Edinburgh College and SNIFFER.

In some instances, it will be better to take actions forward at a regional level. Therefore, we are working with regional partners in surface water flooding and risk assessment. This helps ensure a clear and consistent approach to adaptation across Edinburgh and southeast Scotland.

All the actions will be examined through a lens of climate justice to ensure that we prioritise funding and work to support our most vulnerable citizens and communities.



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**NatureScot**  
**NàdarAlba**



“A changing climate is a here and now problem and we need to adapt. We in Scottish Water and our customers are already seeing the impacts. There is a lot to do, and no single organisation can solve this in isolation, and I welcome the publication of this plan as a key step in preparing Edinburgh for the future.”

**Gordon Reid**  
**General Manager Zero Emissions, Scottish Water and Chair, Edinburgh Adapts.**

"Sniffer is delighted to be part of the Climate Ready Edinburgh partnership, and to support the development and delivery of the Plan through the Adaptation Scotland Programme. Climate Ready Edinburgh is a leading example of the place-based, collaborative approach to climate adaptation that is crucial to ensuring that Scotland's cities and regions can flourish in our changing climate"

**Ben Connor**  
**Head of Climate Ready Placemaking, Sniffer**

“The Climate Ready Edinburgh plan is a stepping stone to protect and sensitively adapt the Old and New Towns of Edinburgh World Heritage Site against the current and future impacts of climate change. Its vision and actions will support Edinburgh World Heritage efforts to address these challenges whilst sustaining the Outstanding Universal Value of the World Heritage Site and enhancing the quality of life of its residents” **Yann Grandgirard, Head of Climate Change Edinburgh World Heritage**

“NatureScot recognises the extent of the challenges that climate change will bring to the City of Edinburgh, including the direct and long-term implications for our coastal and terrestrial habitats and species. While these challenges are often complex and difficult, we recognise there is also an opportunity to make the city greener, more nature rich and better for people through the process of climate change adaptation and infrastructure renewal. NatureScot warmly welcomes the content of the Adaptation Plan and looks forward to playing a collaborative role in its delivery, working with all stakeholders to ensure we protect, restore and value nature as part of the process.”

**Frazer McNaughton**  
**Operations Manager, Strategy and Partnerships, National Operations South NatureScot**

“Climate adaptation presents a proactive approach and pathway to safeguarding our future. Navigating the challenges of a changing climate requires collaboration, and the Climate Ready Edinburgh Plan exemplifies the collective effort needed. Embracing climate change adaptation not only enhances resilience but also presents a unique opportunity to shape a more equitable and just society for generations to come.”

**Dave Gorman**  
**Director of Social Responsibility and Sustainability, University of Edinburgh**

## Policy context

Under the Public Bodies Duties requirements of the Climate Change (Scotland) Act 2009, local authorities are required to help prepare Scotland for future changes in climate and take measures to adapt. This is an ever-changing and evolving area and the Climate Ready Edinburgh Plan will be revisited annually to ensure that its context and strategic direction are still correct.

The plan sets out short, medium and long-term actions, bringing together planned and ongoing actions across multiple strategies, new actions and a vision for a well-adapted city.

It embeds the seven outcomes of the Scottish Climate Change Adaptation Programme (SCCAP) which were developed by the Scottish Government. For further information on SCCAP outcomes see [Appendix 2](#). A new SCCAP is in development and the Climate Ready Edinburgh Plan will be revisited to ensure it continues to align with these outcomes.

This plan does not sit in isolation. It brings together key city strategies including:

- [End Poverty in Edinburgh Plan 2020-2030](#)
- [Vision for Water Management in the City of Edinburgh](#),
- [Edinburgh Biodiversity Action Plan](#)
- proposed [City Plan 2030](#)
- [City Mobility Plan 2030](#)
- [World Heritage Management Plan for Edinburgh Old and New Towns](#)
- [Thriving Green Spaces Strategy](#).

For further strategies and information see [Appendix 3](#).

The plan will enable the city to unlock and prioritise vital adaptation work to support the city to thrive whilst tackling the challenges we will face from the changing climate and nature emergencies, ensuring a Just Transition.

## The Case for Adaptation

### How has Edinburgh's climate already changed?

The City of Edinburgh Council commissioned AtkinsRealis to undertake an updated climate change risk assessment for the city. This included looking at how our climate has already changed. This work was based on the Met Office's "State of the UK Climate"<sup>1</sup> report which is produced annually.

Findings from the Met Office's report show that recent decades have been warmer, wetter and sunnier, with changes in rainfall patterns and more frequent, heavy downpours. Sea levels are rising along our coast and there have been fewer days with frost and snow cover.

**The changes in climate that we are already experiencing are projected to continue and intensify.**

	Scotland's 10 warmest years on record have all occurred since 1997.
	There has been an increase in rainfall over Scotland in the past few decades with an increasing proportion of rainfall coming from heavy rainfall events.
	Mean sea level around the UK has risen by approximately <b>1.4 mm/year</b> from the start of the 20th century.

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<sup>1</sup> The State of the UK Climate report is an annual publication which provides an accessible, authoritative and up-to-date assessment of UK climate trends, variations

and extremes, based on the latest available climate quality observational datasets. The [latest report](#) is available on the Met Office website.

## How will Edinburgh’s climate change in the future?

The climate change risk assessment also examined how the climate is predicted to change in the future.

The updated climate risk assessment used information from the Met Office’s UK Climate Projections 2018 (UKCP18). The UKCP18 provides the most up-to-date and appropriate climate change scenarios for understanding climate change in Edinburgh<sup>2</sup>.

There are four potential climate outcomes included in UKCP18 going from an assumption of sustained and rapid reductions in greenhouse gas emissions globally to more extreme changes that are projected if emissions continue to rise and emission reduction targets are not achieved.

The amount of change that occurs will depend on how successful we are in reducing greenhouse gas emissions globally.

For this plan, we have chosen the most extreme scenario called the ‘high emissions scenario’ (Relative Concentration Pathway 8.5 (RCP8.5)). This approach is recommended by the UK Climate Change Committee, who advise taking a precautionary approach and adapting to 2°C of warming while preparing for a 4°C temperature rise.

From the risk assessment analysis of UKCP18 for Edinburgh, the long-term projected climate trends for Edinburgh are:

	<p>Average temperatures will continue to increase across all seasons.</p>
	<p>Typical summers will be warmer and drier and winters milder and wetter.</p>
	<p>Weather will remain variable and may become more variable.</p>
	<p>Intense, heavy rainfall events will increase in both winter and summer.</p>
	<p>As global average temperatures increase, we will also experience rises in sea level around Edinburgh’s coast.</p>

The next section provide a more detailed breakdown of these climate trends.

<sup>2</sup> [Adaptation Scotland’s summary of UKCP18 projections for Scotland](#)

## Temperature

- Temperatures in the 21<sup>st</sup> century are around 1°C higher than in the pre-industrial era<sup>3</sup> and this warming trend is projected to continue into the latter half of the century. We therefore need to be ready for:
- Average temperature increases exceeding 5°C in the summer and 3°C during winter months.
- The number of days exceeding 22°C increasing in frequency to 11 days per year by the 2070s.
- Heatwaves becoming around 4 times more frequent.
- Overnight temperatures increasing minimum comfort thresholds for sleeping.
- The number of days below 14.4°C decreasing over the next 60 years.
- Extreme cold and snow events are likely to become less frequent, but extreme events such as the 2018 “Beast from the East” may still occur.

## Rainfall

- Rainfall patterns are changing and will continue to change. Average winters are projected to become wetter, with more heavy rainfall and a greater number of wet days.
- Summers will become drier. However, summer heavy rainfall events are projected to become more extreme, with greater amounts of rain falling over a shorter period of time.
- A notable increase in storm intensity can be expected over the next 30 years, with further increases in the subsequent 20 years.
- Climate projections are uncertain regarding changes in wind speed. However, it is more likely that wind gust speeds and storm intensity will increase under a warming climate.



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<sup>3</sup> [UK MET Office Climate Projections: Headline Findings](#)

Figure 1 Edinburgh average monthly temperatures for the baseline and future 2070s period under the high emissions scenario

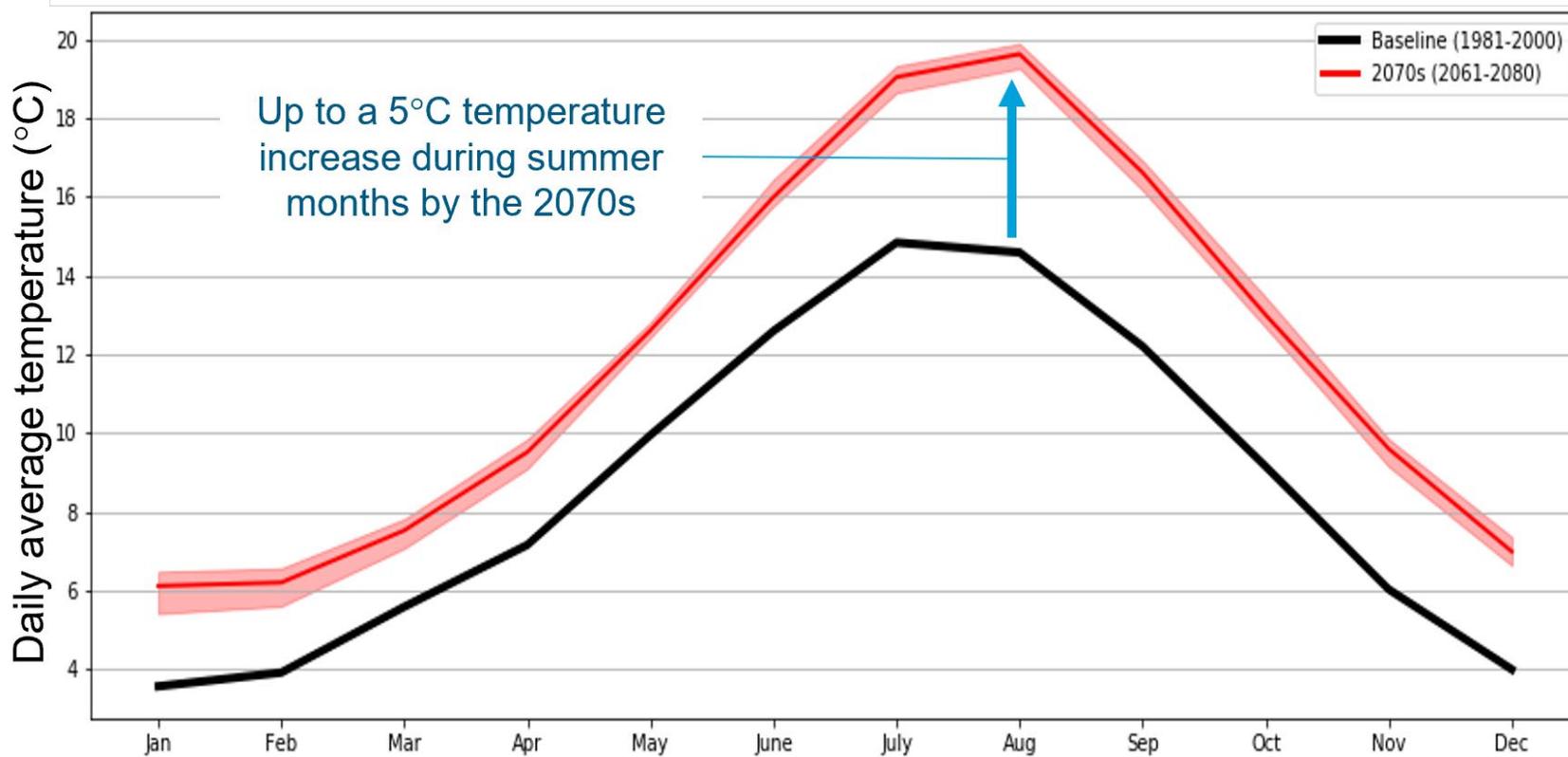
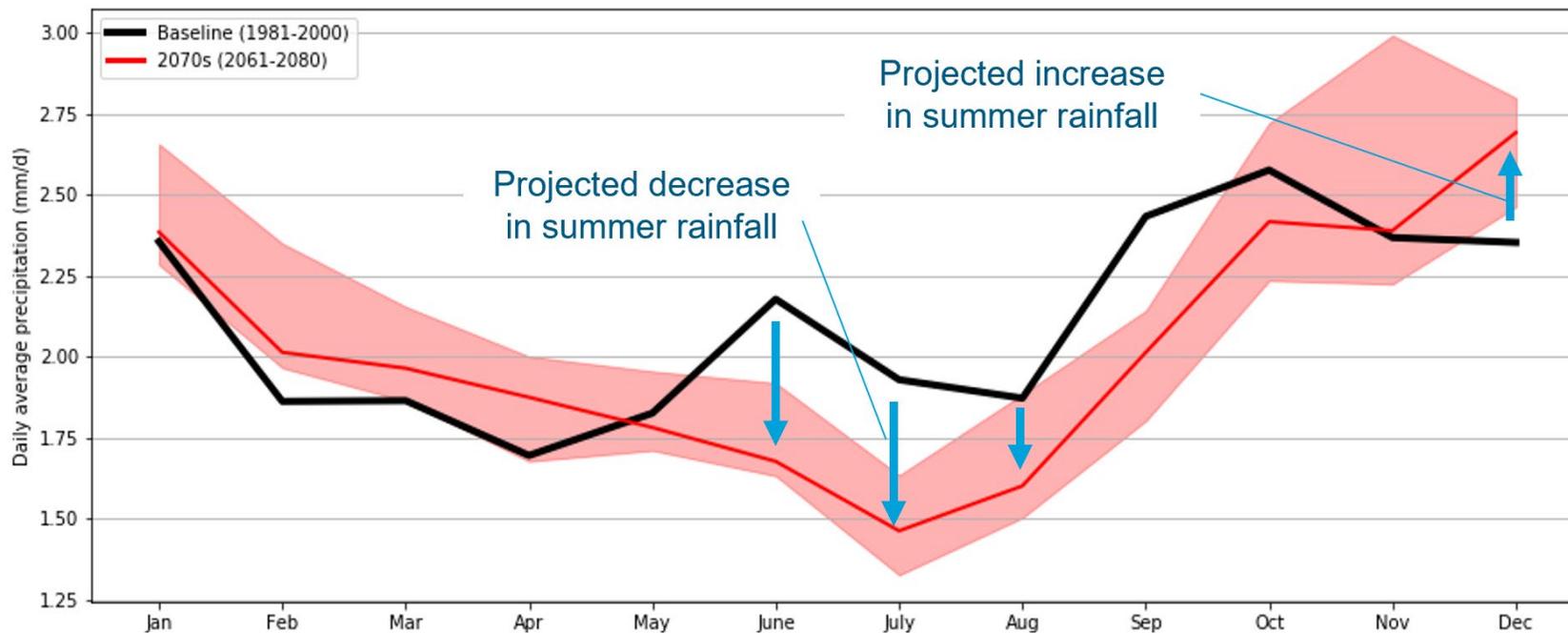


Figure 2 Edinburgh average monthly precipitation for the baseline and future 2070s period under the high emissions scenario



## Drought

Increasing temperatures and reduced average rainfall during summer months could lead to prolonged periods of hot and dry weather, leading to periods of localised drought. This will exacerbate the effects of changing rainfall patterns on lochs and reservoir levels and impact on river levels, wetlands and other water bodies in the city.

## Sea level rises

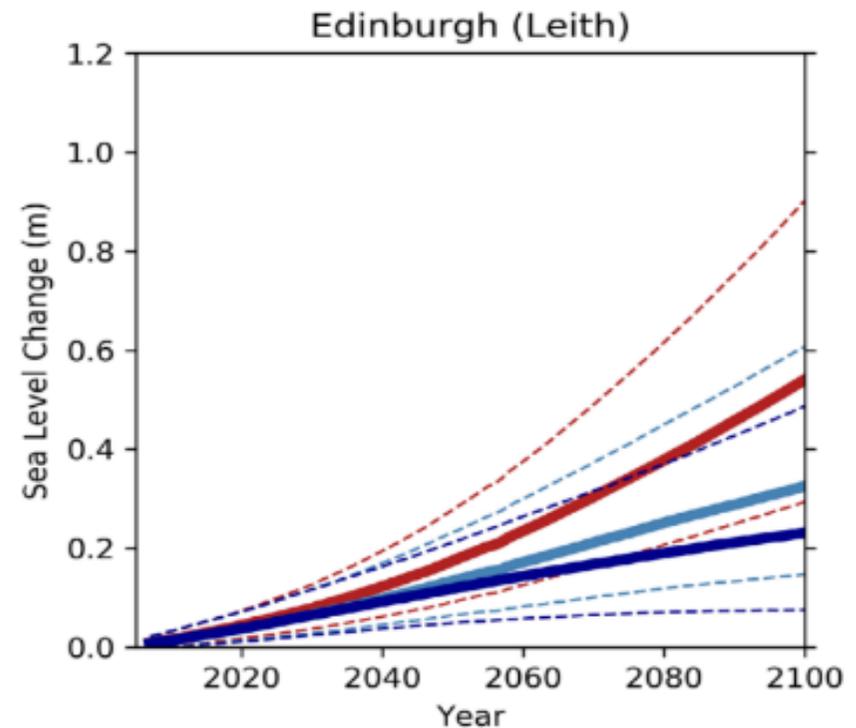
As global temperatures increase, sea levels will continue to rise along Edinburgh's 27 km coastline. This is associated with the increase in global temperatures and its impact on oceanic thermal expansion and ice melt. This trend is projected to accelerate in the decades ahead.

This means that sea levels are rising around Edinburgh's coast, with minimum increases of between 16-20 cm likely in the next 20 years. In the latter half of the century increases as high as 90 cm are possible under the high emissions scenario. A medium emissions scenario could result in sea level rise of 30-40cm but with the possibility of rising by up to 60cm. This is illustrated in Figure 4.

In addition, there is also a low possibility that sea level rise this century could be much faster than anticipated as a result of additional melt from the Greenland and Antarctic ice sheets. This means that a sea level rise of 2m by 2100 cannot be ruled out for the UK.

Rising sea levels will mean extreme events such as storms having a greater impact and a greater risk of flooding from wave overtopping. Sea level rise will also lead to greater erosion of Edinburgh's coastline and put increasing pressure on our sea defences.

Figure 3 Sea level rise projections for Edinburgh to 2100, the bold lines show the 50<sup>th</sup> percentile predictions, the dotted lines the 5<sup>th</sup> and the 95<sup>th</sup>. This is for the high (red), medium (light blue) and low (dark blue) scenarios.



## The risks from climate change

To build Edinburgh's climate resilience we need to understand how climate change is likely to impact the city and how best to address this.

This includes:

- understanding how climate change has already and will continue to affect Edinburgh and the potential consequences of this.
- quantifying the extent to which appropriate, prompt and long-term action will bring long term savings.
- making sure that the techniques used to adapt our city create beautiful, nature positive places.

The effects of climate change will not be felt evenly across the city and will depend on both geography and socio-economic circumstances. Climate change impacts are a threat multiplier which will affect certain groups disproportionately and could lead to increasing inequalities.

The experience of recent years has shown that global climate change and extreme weather events have already impacted many aspects of our lives locally, nationally, and globally.

## The risks and impacts of these changes across key sectors of the city

The impact of these climate change risks will be wide ranging and we need to understand the extent to which action now could bring about long-term benefit to Edinburgh. The common factor among these risks is the threat they pose to the health, safety and wellbeing of not

only our citizens but our natural environment. A full risk assessment for each impact is in [Appendix 4](#).

### Public health

The greatest risks from climate change are loss of human life associated with extreme weather and climate change events such as flooding and heat waves.

There is also a risk that there will be an increase in inequality across the city. Rising temperatures, increasing rainfall and extreme weather events are likely to impact the most vulnerable individuals, households and businesses.

This potentially amplifies the effects of the recent global pandemic and the cost of living crisis. Individuals who do not have the assets, finances and support to adapt will be impacted the hardest making life even more challenging.

Those in low paid work may experience more challenging working conditions, which in turn will negatively impact health and wellbeing. There will also be a knock-on impact in education services, with schools and educational establishments closing for periods, widening the attainment gap for those living in poverty. There will also be increased demand on our healthcare and emergency services who will struggle to respond to growing pressures, resulting in reduced care provision and overall poorer health for our citizens, especially those most in need.

### Housing, built environment and city landscapes

The built environment covers all infrastructure, including homes, commercial buildings, city landscapes, schools and hospitals. Our built environment is already experiencing the

impacts of our changing climate in the form of flooding, storms and coastal erosion resulting in damage to buildings, the public realm and infrastructure. The risk assessment has identified flooding, heatwaves, sea level rise and both drought and subsidence as emerging risks which will grow increasingly more severe in the next few decades. Many properties and areas of townscape in Edinburgh's World Heritage Site and conservation areas in the city are particularly vulnerable to these climate impacts due to their location, construction, age and cost to adapt.

Climate change will not impact all residents equally. While those who own properties may be able to adapt them to the impacts of climate change, tenants who rent their homes will depend on landlords to improve the resilience of their buildings.

There will also be increased risk to public health and risk to life from rising temperatures and severe weather, especially as many of our buildings and city landscapes were not designed with climate resilience in mind. Whilst there is a huge pressure to reduce emissions from buildings and construction of new townscapes, it is key that this is done in tandem with future proofing the buildings and the public realm to the shocks and stresses of climate change to ensure a resilient built environment.

### **Natural environment**

The natural environment has already experienced major changes and losses, with the city declaring a nature emergency in 2023. We know that we must work hard to protect and restore nature and our natural environment

both in the city and surrounding areas as we integrate climate adaptation measures using nature-based solutions.

Edinburgh is a place of great beauty and natural heritage. From the Pentland Hills to the Firth of Forth there is a wide diversity of habitats and natural places. This includes the Red Moss of Balerno on the edge of the Pentlands which is Edinburgh's raised peatland. Some of these places are home to rare and protected plants and animals, for example the Firth of Forth is of global and national importance for some species of birds. Added to this is habitat crucial for pollinators.

Rising temperatures, changing rainfall patterns, longer growing seasons and changes in seasonal events as well as extreme weather events will place increasing pressure on Edinburgh's unique and special natural environment, especially our sensitive habitats, species and ecosystems, as well as the ecological services they provide.

### **Transport Infrastructure**

Our transport infrastructure is vital to Edinburgh remaining a thriving, connected and desirable place to live, work and visit. Edinburgh's transport sector has already started to face regular disruption from severe rainfall and storms. Flooding caused by severe rainfall causes the greatest disruption and this risk will increase in the future. High winds and storms have also affected transport services and caused delays and cancellations.

Disruption to transport does not affect communities equally, with citizens in low income and in minority groups most likely to be impacted when transport and related infrastructure is disrupted. We must therefore ensure our

transport is well protected to ensure inequalities are not further exacerbated.

Reducing emissions from transport will remain a key focus through the City Mobility Plan, but this will be further supported by embedding climate adaptation measures into key transport infrastructure and working with partners to minimise disruptions.

### Call to action

This Climate Ready Edinburgh Plan is a call to action for our city. Our research has told us that we need to adapt now to mitigate the impacts of climate change. This means that all of our public health, infrastructure and investment decisions must embed climate adaptation and climate justice at the core of decision making.

We are focused on the actions Edinburgh must take to manage the shocks and stresses from predicted climate change and the impact this will have on nature, culture and our citizens, particularly our most vulnerable. This plan highlights the fundamental actions required to adapt the city. It also shows how much we can achieve by working in partnership across both the city and the region.

The next sections of this plan describe the actions we deliver over the next seven years. In the delivery of these actions, we think that Edinburgh can be a resilient, thriving, nature positive and 'Just' city.

This means that we need:

- Citizens to join us on our mission to be a climate adapted and nature positive city, that is inclusive and supports our most vulnerable as we tackle climate change.
- All organisations, public, private and third sector to collaborate with us, building relationships of trust and problem solving for our city together.
- The Scottish Government to commit to working with the city to unlock and facilitate new legislative powers, policy, and funding to enable good adaptation measures to be realised.



## Climate Ready Edinburgh

### What does good adaptation look like?

Overall, we think that good adaptation should include the following key building blocks:

- Focusing on a whole system approach to address structural and infrastructure issues. While the role of individuals, citizens and communities cannot be underestimated, we will also need to work in partnership across the city to address the major infrastructure requirements.
- Working inclusively and collaboratively with communities, ensuring no one is negatively impacted by climate change, to ensure a just transition and climate justice remains at the core of decision making.
- Using governance to provide oversight, drive delivery and ensure actions are implemented and changes can be documented and monitored.
- Recognising that we need multiple funding streams and investment from both government and the private sector.
- Using data, evidence and emerging research to inform our decision-making processes.

This plan sets out the specific actions our partnership has agreed are essential if we are to address the risks of climate change. We have identified eight priority themes, which each have a set of actions for delivery over the next between now and 2030.

For each action, the plan sets out the city partners who need to act, and the changes that need to be made to support climate justice and our natural environment.

### Climate Ready Edinburgh Priority Themes

**A - Planning and the build environment:** actions that will help to mitigate the effects of climate change by making our buildings and infrastructure more resilient

**B - Water management and resilience:** actions to tackle flooding and associated impacts from severe weather events

**C - Coastal adaption:** actions to manage sea level rises and the impact to our coastline and surrounding communities

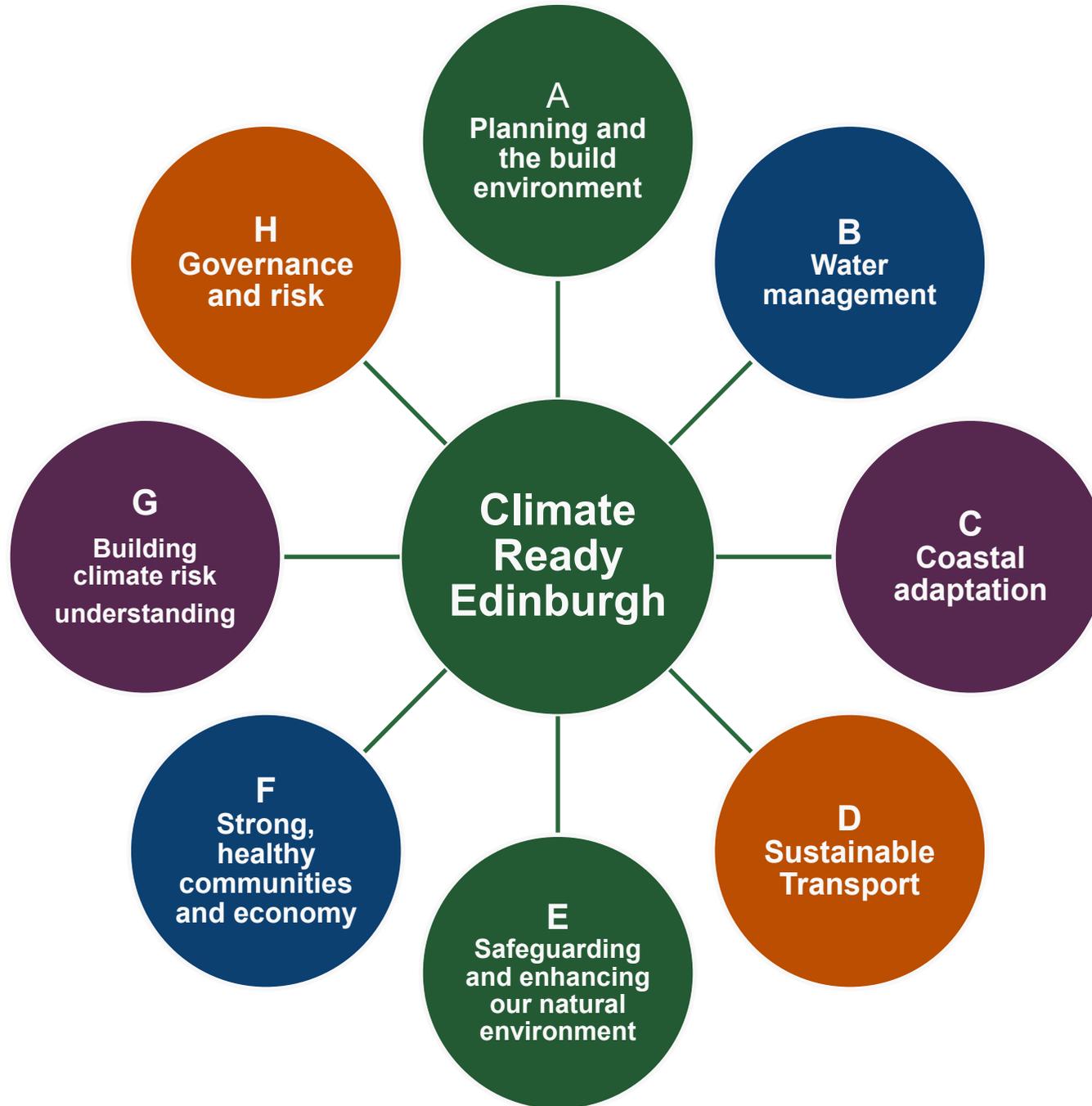
**D – Sustainable Transport:** actions to support a well-connected resilient city

**E - Safeguarding and enhancing our natural environment:** actions that will support our natural environment and biodiversity

**F - Strong, healthy communities and economy:** actions to support our communities, addressing climate justice, to create a thriving city

**G - Building understanding of climate risk:** actions to continue to ensure our understanding of how the climate is changing and the impacts of this to the city are based on the latest climate science.

**H - Governance and risk:** actions to drive delivery and partnership working.



## Climate Ready Edinburgh Action Plan

### A: Planning and the built environment

We can already see the impact of climate change on our built environment. Rising temperatures and severe weather are damaging our buildings and infrastructure and creating travel disruption. As temperatures rise, overheating of buildings will become an issue. Increasing frequency of severe weather will also lead to greater flooding, water ingress and dampness, increasing damage to the fabric of our buildings and surrounding areas.

The effects of climate change will not be felt evenly across the city. How exposed a place or community is to these impacts, the nature of surrounding built and natural environment and differences in socio-economic circumstances will all impact on people's ability to adapt, especially the poorest, most marginalised and vulnerable.

To build resilience into Edinburgh's built environment, we need to:

- Embed climate change adaptation into all the policies and guidance that we use to plan and develop Edinburgh's buildings and infrastructure. This means updating Edinburgh Design and Street Guidance to reflect City Plan 2030 planning policies relating to climate change adaptation, using Nature Based Solutions to enhance Edinburgh's green spaces, protect biodiversity, reduce flood and heat risk, improve air and water quality.
- Improve the resilience of Edinburgh's World Heritage Site (WHS) to the impacts of climate change by

continuing to develop and deliver adaptation actions in the next Old and New Towns of Edinburgh World Heritage Site Management Plan 2023-2031.

- Improve our understanding of and develop practical guidance to address climate change risks posed to Edinburgh's buildings and infrastructure in the WHS and conservation areas, including vulnerability and ability to cope with increasing heat, flooding and extreme weather events.
- Use this methodology and approach to extend this guidance and solutions to building types and areas outside the WHS and conservation areas.
- Work with the Council's Housing Team, social landlords and education institutions to adapt Edinburgh's housing and educational buildings and their landscapes.
- Engage with developers, investors and landowners to embed climate adaptation into existing developments.
- Embed adaptation into the Council's Corporate Property Strategy and as part of the Council's retrofit programme
- Embed adaptation into the Council's Authority Construction Requirements (ACRs) and link the ACR to Edinburgh's Design Guidance and Street Guidance.
- Support owners of basement properties to prepare for increased risk of ground water and surface water flooding through resilient design including garden areas.

## Climate Adaptation in Action: Old and New Towns of Edinburgh UNESCO World Heritage Site



In 2021, the Edinburgh World Heritage Trust undertook a Climate Change Risk Assessment (CCRA) project for Edinburgh's UNESCO World Heritage Site. The project's aim was to understand the challenges posed by climate change to Edinburgh's [Old and New Towns](#) and its communities who live and work there or visit the site. The work was supported by the [Place-Based Climate Action Network \(P-CAN\)](#) and the [AtlaS World Heritage project](#).

Extensive engagement was carried out, using two climate change risk and vulnerability assessment methodologies: one developed during the project, and the [Climate Vulnerability Index \(CVI\)](#) created by James Cook University Australia and applied for the first time to a 'urban' World Heritage Site.

This led to a draft Climate Action Plan for the Old and New Towns which will inform mitigation and adaptation policies and actions to help increase the site's resilience to climate change while preserving what makes it a unique place to live and visit.

### Edinburgh World Heritage's Climate Emergency Grant

In December 2022, Edinburgh World Heritage launched a new Climate Emergency Grant to address issues identified during implementation of the CCRA project. The grant provides funding to private owners and public, private and third sector organisations wishing to carry out targeted energy efficiency improvements or adaptation interventions alongside conservation repairs to their properties. The fund specifically focuses on two priorities:

energy efficiency improvements to historic windows or external doors to increase their thermal performance and reduce heat losses.

adaptation of rainwater goods to increase their capacity in handling larger volumes of rainwater.

Learning from these pilot projects will provide practical and replicable solutions that suit Edinburgh's local context. These will inform case studies and future guidance to support residents, local stakeholders, and construction professionals, in addition to supporting conservation repairs in the World Heritage Site and raising awareness on climate change challenges.

The first funding round attracted a high number of applications, and subsequent rounds are expected to be launched in the next three years.

## B: Water Management

Flooding has a huge impact on all sectors of society. In terms of severity, river, surface water and coastal flooding are one of the key risks that will impact the city the most. The Scottish Environment Protection Agency National Flood Risk Assessment 2018 estimated that in Edinburgh, there are currently 28,200 homes, businesses and services at risk of flooding from all sources in a significant storm. This event has a 29.5% chance of happening in a 70 year period<sup>4</sup>. Due to climate change this could increase by 37% to 38,800 homes, businesses and services by the end of the century.

The impact of flooding will not be felt evenly across the city, with vulnerable communities disproportionately affected when flooded. Flooding events have already led to disruptions to transport infrastructure, cutting off parts of the city, as well as damaging homes, communities, businesses, and our natural environment. At the same time, we know we will also experience more periods of water scarcity and drought affecting water supply, agriculture, city landscapes and increasing fire risks.

To build resilience into our water management systems, we need to:

- Update and deliver Edinburgh's Water Management Vision which will include the objectives to:
  - Further develop the Strategic Green Blue Network for the city, ensuring our waterways and green

spaces are interconnected and managed to deal with extreme weather events, provide biodiversity corridors and cool routes for people.

- Deliver blue green infrastructure to help reduce flooding and remove surface water from combined sewers in prioritized areas of the city and deliver biodiverse, beautiful places.
  - Update Edinburgh Design Guidance design, Sustainable Rainwater Management Guidance and factsheets for all types of flooding, water scarcity and fluvial erosion risks.
  - Support a city-wide communication and engagement programme to champion good rainwater management and water stewardship and value the water we use every day in homes and businesses.
- Work with the public and private sectors to develop risk assessments to support city wide resilience to flood events.
  - Develop and support the Gogarburn Partnership and other cross boundary river partnerships to explore Natural Flood Management opportunities upstream and improvements to river corridors. Support Edinburgh's Canal Partnership.
  - Manage demand for domestic and commercial water supplies during drought by working with key partners to increase infrastructure efficiency to reduce leaks and minimise water loss.

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<sup>4</sup> [Vision for Water Management in the City of Edinburgh](#), Page 9.

## Climate Adaptation in Action: A Water Management Vision for Edinburgh

Edinburgh's Water Vision aims to deliver a long term and sustainable approach to river and storm water management and conservation across the city to help manage current and future flood and drought risk in a changing climate.

This is being taken forward by Edinburgh's Blue-Green city partnership comprising the City of Edinburgh Council, Scottish Water, SEPA and NatureScot. The partnership reports to the Edinburgh and Lothians Strategic Drainage Partnership who co-ordinate action to tackle surface water and sewer flooding in the city.

Guidance has been produced under this Vision, including on Sustainable Rainwater Management with factsheets to help ensure all projects manage surface water sustainably.



## Climate Adaptation in Action: Edinburgh's Green Blue Network

Edinburgh's Green Blue network aims to deliver a network of beautiful, biodiverse, water resilient, connected places to help alleviate flood risk, enhance biodiversity connectivity, and provide cool green spaces and routes for people to move freely around the city.

Stage one of the project mapped Edinburgh's nature network, protected landscapes, future and existing slow active travel routes, all types of flooding and culverted water courses plus ecosystem services. Figure 5 shows the initial phase of the Green Blue Network.

Also from this mapping exercise, a prioritized list of blue green neighbourhoods across the city were identified.

The first blue green neighbourhood to be taken forward is the Drylaw, Craigleith and Inverleith area of Edinburgh. Flood modelling and more detailed townscape studies have built on the green blue network information. This has allowed a list of projects within this area to be prioritised. This is now being taken forward by a multi-disciplinary design team.

Edinburgh's Green Blue network and neighbourhood work known as 'Climate Ready Edinburgh' won The Landscape Institute Awards 2023 in 'Excellence in climate, environment, and social outcomes.'

These projects will deliver beautiful, green, biodiverse, well-connected places that also reduce the risk of surface water flooding.



Figure 4 Edinburgh's initial phase of the Green Blue network



### What is a green and blue network?

A Blue Green network is a broad term that refers to a set of interconnected green and blue spaces in our environment and refers to linked parks, woodlands, rivers and waterways, raingardens and tree-lined streets. Successful green and blue networks allow us to support biodiversity and nature restoration, increase the city's resilience to the impacts of climate change whilst providing safe and beautiful routes and places for people.

## C: Coastal Adaptation

Driven by global temperature increases, rising sea levels and increased coastal erosion are now emerging as key climate risks for Edinburgh.

Although storms coupled with high tides have caused damage to our coastal defences in the past, to date coastal flooding in the city has been relatively limited. Between 2008 and 2011 maintenance and repairs to coastal defences in Edinburgh was estimated at £740,000. Maintenance and repair costs are likely to increase as coastal defences are nearing or already past their design life, and defences are more frequently tested by storm events. Buildings and other infrastructure currently exist in areas that would be at risk if these coastal defences were breached. Whilst there is ongoing monitoring and management of existing defences, further understanding of the risks posed by sea level rise and coastal erosion is required to protect existing infrastructure and facilitate future coastal development.

As well as impacting our communities, sea level rise and coastal erosion presents a direct risk to nature with potential knock-on effects for other habitats and species for which these assets provide important corridors that contribute to ecological connectivity. Edinburgh's coast is globally important for nature and parts of it are designated as a Special Protection Area. This is an international designation for the protection of rare, threatened and vulnerable bird species.

To manage the risk to our coastal communities and infrastructure we need to:

- develop and deliver a new Coastal Change Adaptation Plan by 2026.
- deliver the actions set out in the Local Flood Risk Management Plan with City Region and key partners.
- work collaboratively to engage with communities to ensure increased awareness of risks to homes and businesses and to support action to protect and increase resilience.

To ensure we are protecting and enhancing this key habitat and ecosystem we will:

- Continue to work with partners to identify and undertake measures to increase the resilience of coastal habitats.
- Where feasible, develop natural coastal defences which are fit for purpose, protecting both communities and the natural environment.

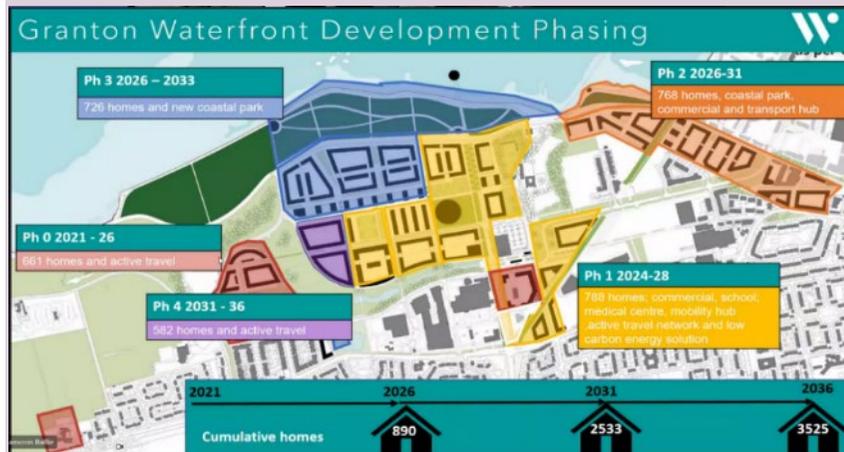


## Climate Adaptation in Action: Granton Waterfront

A Development Framework has been approved for Granton Waterfront to create a new vibrant, green and sustainable coastal quarter on Edinburgh's waterfront.

This includes the creation of a coastal park as part of the development to provide natural resilience to coastal flooding from rising sea levels and storm surges, and networks of natural spaces and blue and green infrastructure which will help to protect and enhance biodiversity and improve health and well-being.

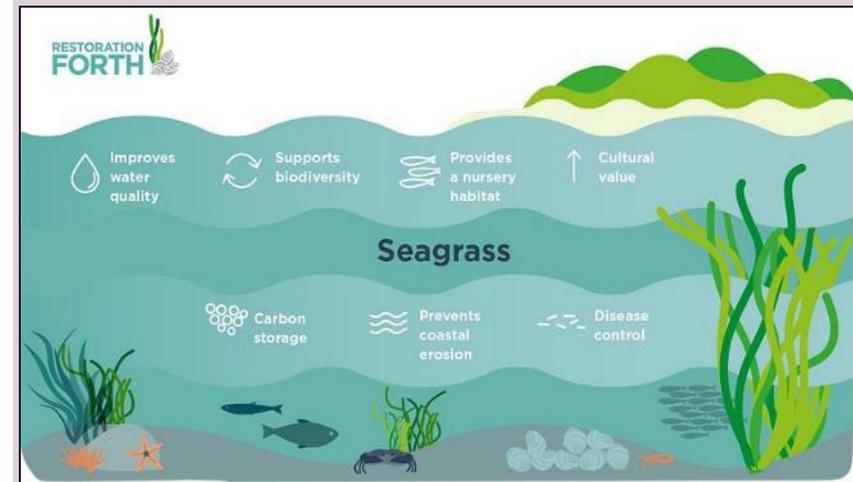
Granton Waterfront is the largest regeneration project of its kind in Scotland. Edinburgh's ambitions to tackle climate change and transition to a net zero-carbon economy are fundamental to the Granton Waterfront vision.



## Climate Adaptation in Action: Restoration Forth

Restoration Forth, led by WWF, is a conservation partnership between charities, local community groups and scientists which aims to restore seagrass and oyster reef habitats in the Firth of Forth in order to enhance the coastal environment of the Forth, helping to support biodiversity, prevent coastal erosion, sequester carbon and improve water quality.

This project works closely with local communities through volunteering activities, citizen science and marine awareness programmes to restore these habitats and to champion habitat restoration in the marine environment for the benefit of these communities.



## D - Sustainable Transport

Edinburgh's transport infrastructure plays a key role in helping our city prosper and stay connected. It helps people access jobs, education, and services they depend on, and helps our businesses to access customers and investors they need to thrive.

Our transport systems are exposed to the elements throughout the year and already experience disruption caused by flooding and damage from trees caused by high winds and storms. All these events cause disruption, cancellations and delays to people's ability to move efficiently and safely across the city. These disruptions could increase in severity and frequency in coming years as a result of climate change.



To ensure our transport infrastructure adapts and increases its resilience to climate change we need to:

- Work with national and local transport providers on raising awareness of the impacts of climate change on our transport infrastructure and services, and on ways to incorporate adaptation into future planning and development of travel services to increase resilience.
- Embed adaptation into Edinburgh's City Mobility Plan by ensuring Edinburgh's upcoming Circulation Plan and associated Streetspace Allocation Framework considers green blue infrastructure, biodiversity requirements and ways to reduce surface water runoff. Other adaptive measures to reduce the urban heat island effect by providing shade and improving air quality also need to be included in strategies and plans.
- Engage with the ports sector on risks to their operations from climate change and explore options for building resilience.
- Build climate resilience into Edinburgh's roads network. This includes delivering training for road engineers on nature based solutions and using surface treatments to extend the life of roads to minimise the requirement for full resurfacing.

## E: Safeguarding and enhancing our natural environment and city landscapes

Edinburgh declared a nature emergency in 2023 in recognition of the need for an accelerated response to reversing global biodiversity loss.

Climate change is placing additional pressure on already struggling habitats and species in and around Edinburgh. The increasing occurrence and severity of climate change related events such as flooding, sea level rises, droughts and wildfires are expected to result in species and habitat change and loss, affecting species ability to survive and adapt.

**These changes represent a risk to the city's natural environment and city landscapes, as well as its role as a safe and vibrant place to live and work. But it also has serious implications for Edinburgh's resilience to the climate emergency. As well as protecting and enhancing nature, a resilient natural environment is a critical part of the solution to the climate emergency. Nature-based solutions play a vital role in helping the city to adapt as well as supporting the aim of Edinburgh becoming a nature positive city by 2030.**

To safeguard and enhance the natural environment and city landscapes, we will:

- embed adaptation into city planning processes, land management plans and strategies which will include;
  - developing a Forestry and Woodland Strategy to improve protection for ecologically important areas of

woodland habitat, identify priority areas for woodland restoration, creation and regeneration, carbon sequestration, a reduced heat island effect, flood mitigation and nature recovery.

- embedding adaptation as part of the delivery of Edinburgh's Thriving Greenspaces Strategy and Nature Network. This will include development of park masterplans which include sustainable drainage features and improvements for nature.
- Ensure Edinburgh's habitats and species are protected, enhanced and resilient to climate change by:
  - undertaking a natural capital and biodiversity assessment of the city, identifying habitats, ecosystems and ecological services at greatest risk from climate change and those which offer the greatest benefits to nature and adaptation.
  - supporting delivery of the key actions in Edinburgh's Biodiversity Action Plan, the Strategic Green Blue Network, the proposed Nature Vision, Nature Networks, One Million Tree City project.
  - developing guidance on priority habitats and special landscape areas in the city, the risks and opportunities to these from climate change, carbon capture potential, and species choice for future habitat resilience within different city development contexts.
  - Updating the iTree Survey to feed into all plans and strategies in the Council as required and help define

city wide tree canopy targets and protection mechanisms.

- Developing a drought and fire risk strategy for all council owned trees and greenspaces to feed into management plans.
- Developing a Green Finance model to help fund nature and adaptation projects (FIRNS)
- Building a coordinated approach to protecting and enhancing Edinburgh's natural assets across key public and private sector estates

**Climate change has also had a significant impact on soil health globally. We will introduce measures to encourage management and protection of soil during planning, development and construction while also implementing measures to restore soil function and the natural processes which aid carbon sequestration and slow run off within wider catchments.**

### **Edinburgh's New Gardens Project programme – FIRNS**

The Edinburgh New Gardens project is part of a national programme of exploratory blended finance projects called 'FIRNS' (Facility Investment in Nature Ready Scotland). Blended finance is money that comes from both the private and the public sectors. Edinburgh's project will build a methodology for a blended green finance model using Drylaw, Craigleith and Leith projects. These projects have already been designed to a stage that we can measure (and put a financial value to) the improvements to the environment that would be created after construction.

Ultimately, we hope to use green finance to plan, design and construct many projects for climate adaptation and nature recovery in the city.

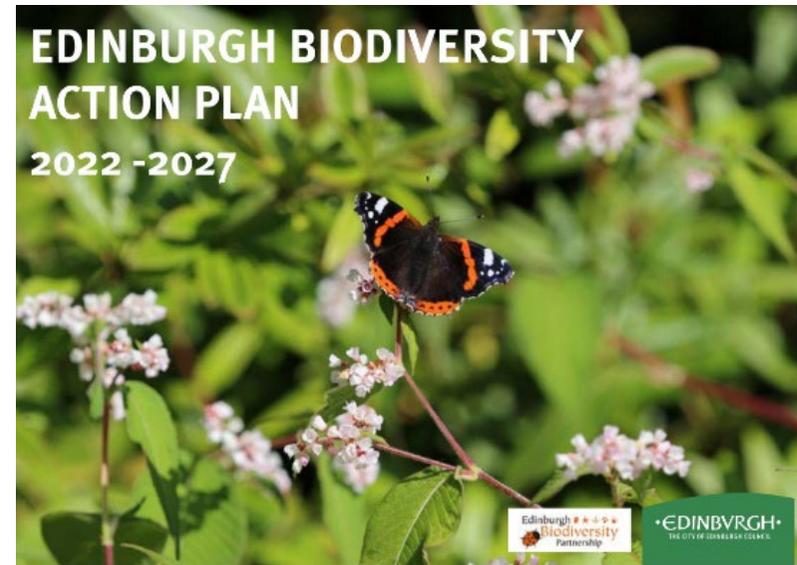
Stakeholders who are working with us include: the Scottish Wildlife Trust (SWT), Scottish Environment Protection Agency (SEPA), Scottish Water, Finance Earth, Scottish Nature Finance Pioneers and AtkinsRealis.

## Climate Adaptation in Action: Edinburgh's Biodiversity Action Plan and Nature Network

Edinburgh's Biodiversity Action Plan (EBAP) is the framework for nature conservation in the city. The EBAP aligns with the 2050 Goals A and B of the [Global Biodiversity Framework](#), which aims to increase natural ecosystems, reduce species loss, protect genetic diversity, and restore ecosystem services. It also responds to emerging commitments including ensuring Edinburgh becomes a nature positive city by 2030.

There are over 30 organisations and groups working as part of the Edinburgh Biodiversity Partnership. From research organisations such as Royal Botanic Garden Edinburgh and city universities, to government agencies, environmental and conservation charities, expert species and nature groups, and local communities working in parks and greenspaces, there is a huge resource of people and knowledge committed to improving our city for nature.

Actions in the EBAP aim to connect, protect, improve and create new habitats within the city and increase the resilience of ecosystems which enable species to cope with the climate change pressures placed upon them. Actions also aim to increase understanding of how Edinburgh's changing climate is affecting the city's habitats, species and the functioning of its ecosystem services, and what measures need to be taken to alleviate them.



## Climate Adaptation in Action: Edinburgh Nature Network

As part of Edinburgh's Thriving Green Spaces initiative, the City of Edinburgh Council has become the first local authority in Scotland to develop a citywide nature network, developed in partnership with Scottish Wildlife Trust, University of Edinburgh, Edinburgh Biodiversity Partnership members and other stakeholders.

The aim of the network is to protect and enhance the city's species and habitats and the ecological services they provide, as well as creating nature corridors to increase species movement and expansion.

The majority of the Network is based on the city's large network of designated sites and priority habitats. Mapping these areas gives the core Nature Network area. A buffer zone has also been added. Opportunities for habitat creation in this zone deliver an increase in the coverage of the network.

The nature network has been incorporated into Edinburgh's green blue network. Development of the network provides multiple benefits for people, wildlife, and climate across the city.



## F: Strong, Healthy Communities and Economy

Communities across the city are vulnerable to a whole range of impacts from climate change, including flooding, damage to property and temperature fluctuations. Climate change impacts are frequently felt most by the poorest and most marginalised groups in society, who may also suffer from reduced health and wellbeing. Addressing climate impacts requires a cross sector approach in recognition of the many factors that contribute to health, ensuring that we protect all our citizens, especially the most vulnerable.

Climate change also poses a threat to the future prosperity of Edinburgh. A vibrant economy is vital to the continued success of the city and the wellbeing of its communities. Appropriate adaptation is required to maintain a city that remains attractive to investors and businesses. Edinburgh is Scotland's leading tourist destination with a unique cultural and historic environment, and world renown events destination which could be impacted by future climate events.

We need to protect our citizens, economy and embed a Climate Justice approach in the following ways:

- Align climate change adaptation measures with plans to alleviate poverty, recognising that these two issues are interlinked and must be addressed in tandem to support Climate Justice.
- Improve community resilience to climate change, targeting disadvantaged and vulnerable groups.
- Work with the Edinburgh Partnership to develop actions to build community climate resilience into Edinburgh's

Local Outcome Improvement Plan and Local Improvement Plans

- Build community capacity through promoting Adaptation Scotland's "Community Climate Adaptation Routemap: A practical guide for communities to adapt to climate change" and working with existing citizen platforms and community initiatives.

Improve the health sector's ability to adapt by:

- Working with health providers on reducing the impact of those whose health will be most impacted by climate change.
- Working with key health providers on ways to improve the climate resilience of key health infrastructure in the city, such as care homes and hospitals.
- Embedding climate change in health and social care planning and in business continuity arrangements.
- Utilise the Integrated Impact Assessment process to ensure we are protecting vulnerable communities and inequalities are key considerations of all city developments, strategies, projects and upgrades to infrastructure.

We will support Edinburgh's economy and prosperity through a Just Transition by:

- Work with Edinburgh's business sector to ensure a proactive strategic approach to climate change adaptation.
- Embedding climate adaptation measures across all areas of the city, strengthening the understanding and

utilising key partnerships such as the Just Economic Transition forum.

- Increasing the resilience of Edinburgh's cultural sector, festivals and events through venue management and training.

Listening to our communities will be a key focus as we adapt to climate change. We are committed to engaging with communities, ensuring we are inclusive in our decision making and all voices are represented.



## **G: Building understanding of climate change risks**

Understanding the risks and consequences of climate change, and the impacts this will have on our city will be key to ensuring the right investment decisions are taken, whilst also ensuring our communities and nature are protected. The need to adapt will require us to continually engage in new research to ensure our level of understanding and resilience planning is always fully embedded in our decision-making processes.

We will ensure we embed climate change risks and build our understanding of climate impacts through:

- Ongoing monitoring, evaluation and research to inform decision-making on climate change adaptation.
- Transparency on our progress and ensuring public climate change datasets are available to the public in user friendly and accessible formats.
- Working collaboratively with leading industry experts to ensure future policies take account of climate adaptation measures.
- Learning from our own and the successes of others and applying those to future interventions.

## H: Governance and investment

Ensuring we embed climate adaptation across our work, organisations and communities will be key to ensuring action and delivery of climate adaptation measures. Governance and collaborative working will enable us to tackle this challenge as a collective.

Governance of this strategy has already been established through the Net Zero Edinburgh Leadership Board, with the Edinburgh Adapts partnership responsible for overseeing the delivery of this plan and cross sector working with supporting workstreams.

This Plan will be further embedded in key governance structures by:

- Establishing an Edinburgh Adapts core review group to annually monitor and update the plan, which works with and reports into the Net Zero Edinburgh Leadership Board.
- Embedding adaptation across all Council services, including risk and establishing governance to support delivery.

Funding the challenge will be a key area of focus. To address the investment gap, we must:

- Work with the Scottish Government to unlock and facilitate new legislative powers, policy and funding to enable good adaptation measures to be realised.
- Unlock investment and reevaluate current capital budgets to ensure resource can be allocated to climate adaptation measures.

- Support the delivery of a regional climate change risk assessment focusing on the Forth estuary and ESECRD local authority partner area.
- Collaborate with key partners, including the government to develop a pipeline of investable projects.

Protecting our most vulnerable citizens is also a key area of focus. To ensure a just transition we must:

- Embed adaptation across all plans, policies and strategies including health and social care.
- Ensure that citizens and areas that are most vulnerable to the adverse effects of climate are prioritised for action.

### Funding the change

Substantial investment will be required to address the impacts of climate change in our city. By acting now, we can minimise the longer-term investment requirements to create a fair, green, inclusive and adapted city. New investment, using existing funds differently and leveraging in private finance will be key to addressing the funding gap.

## Climate Ready Edinburgh Implementation Plan

### A: Planning and the Built Environment

Objective 1: Embed climate change adaptation into future planning policy and guidance				
Short term Delivery Actions	Delivery Timescale	Medium/Long Term Delivery Actions	Delivery Timescale	Delivery Partners
Update Edinburgh Design and Street Guidance to reflect City Plan 2030 planning policies relating to climate change adaptation (enhance Edinburgh's green spaces, protect biodiversity, reduce flood and heat risk, improve air and water quality)	2023 - 2024	Embed climate change adaptation into city and area spatial strategies, masterplans, development briefs and project requirements to address National Planning Framework Four (NPF4) and Local Development Plan requirements	2024 - 2030	<b>The City of Edinburgh Council</b> City partners
		Embed climate change adaptation into Edinburgh's next local development plan (City Plan 2040)	2026 - 2030	<b>The City of Edinburgh Council</b> City partners
Objective 2: Adapt the Old and New Towns of Edinburgh World Heritage Site to be resilient to climate change				
Short term Delivery Actions	Delivery Timescale	Medium/Long Term Delivery Actions	Delivery Timescale	Delivery Partners
Continue to support the development of adaptation actions in the next Old and New Towns of Edinburgh World Heritage Site Management Plan 2023-2031	2023 - 2024	Implement the adaptation actions in the Old and New Towns of Edinburgh World Heritage Site Management Plan 2023-2031	2024 -2030	<b>Edinburgh World Heritage Trust, Historic Environment Scotland, The City of Edinburgh Council</b>

	Deliver heritage adaptation and energy retrofit pilots to test innovative approaches to adapting the World Heritage Site buildings and infrastructure	2023 - 2030	<b>Edinburgh World Heritage Trust, Historic Environment Scotland, The City of Edinburgh Council</b>
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### **Objective 3: Deliver climate resilient buildings and infrastructure across the city**

<b>Short term Delivery Actions</b>	<b>Delivery Timescale</b>	<b>Medium/Long Term Delivery Actions</b>	<b>Delivery Timescale</b>	<b>Delivery Partners</b>
Undertake consultation on the risks posed to Edinburgh's buildings and infrastructure from climate change in Edinburgh's World Heritage Site and conservation areas, including vulnerability and ability to cope with increasing heat, dampness, mould flooding and extreme weather events. Develop guidance and practical solutions to alleviate the issues identified	2023 - 2024	Work with the Council's Housing Team, social landlords and further and higher education partners, across the city on ways to adapt Edinburgh's social housing stock and educational establishments including finance mechanisms and creation/retrofitting of green spaces and rain gardens around housing estates, social housing and educational establishments including schools, as well as the ongoing maintenance of measures once installed.	2024 - 2030	<b>The City of Edinburgh Council, University of Edinburgh, Edinburgh and South East Scotland City Region Deal partners</b>  Edinburgh World Heritage, Social/private landlords, development sector, construction industry, building owners
Extend the WHS/conservation areas consultation to other building types and areas of the city, using similar methodologies and consultation approaches. Develop guidance and	2024 - 2026	Engage with developers, investors and landowners to fully embed climate adaptation into existing developments.	2024 - 2030	

practical solutions to alleviate the issues identified.				
Embed adaptation into the Council's Authority Construction Requirements (ACRs) and link the ACR to Edinburgh's Design Guidance and Street Guidance.	2024 - 2026	Embed adaptation into the Council's Corporate Property Strategy and as part of the Council's retrofit programme	2024 - 2030	<b>The City of Edinburgh Council</b>
Support owners of basement properties to prepare for increased risk of ground water and surface water flooding through resilient design including garden areas.	2024 - 2025			<b>The City of Edinburgh Council</b>

## **Objective 4: Reduce the impact of urban creep and increase green and permeable surfacing in public spaces**

### **Medium/Long Term Delivery Actions**

Promote retrofitting of green roofs, introduction of raingardens, permeable hard landscape areas and not paving over front gardens in the city. Undertake a review of permitted development rights for householders to increase permeability and prevent urban creep. Ensure Edinburgh's Water Vision, Sustainable Rainwater Management Guidance and Edinburgh Design Guidance provides sufficient guidance and support.

**Delivery Timescale**

2024 - 2030

**Delivery Partners**

**The City of Edinburgh Council, Edinburgh and Lothians Strategic Drainage Partnership**

Developers, utilities providers, transport agencies

## B: Water Management

Objective 1: Deliver a long term and sustainable approach to water management across Edinburgh				
Short term Delivery Actions	Delivery Timescale	Medium/Long Term Delivery Actions	Delivery Timescale	Delivery Partners
Update Edinburgh's Water Management Vision for dealing with water scarcity	2024-2025	Deliver a city-wide Surface Water Management Plan, identifying priority areas and supporting strategic projects to improve flood resilience and placemaking in those areas.	2023-2030	<b>Edinburgh and Lothians Strategic Drainage Partnership (The City of Edinburgh Council, Scottish Water, SEPA, NatureScot)</b> , Edinburgh World Heritage, Council Nature Recovery and Climate Adaptation Working Group
Support the development of the Gogarburn Partnership and other cross boundary river partnerships in delivering natural flood management upstream and improvements to river corridors. Support Edinburgh's Canal Partnership.	2024-2027	Deliver green and blue infrastructure in prioritised areas of the city (Drylaw, Inverleith, Craigeith then Morningside and Oxgangs)	2023-2030	<b>Edinburgh and Lothians Strategic Drainage Partnership (The City of Edinburgh Council, Scottish Water, SEPA, NatureScot)</b> , Council Nature Recovery and Climate Adaptation Working Group
		Work within the ELSDP to remove surface water from the combined sewer network	2023-2030	<b>Edinburgh and Lothians Strategic Drainage Partnership (The City of Edinburgh Council, Scottish Water, SEPA, NatureScot)</b> , Council Nature Recovery and Climate Adaptation Working Group
		Develop Council processes to support the introduction of	2023-2030	<b>Edinburgh and Lothians Strategic Drainage Partnership (The City of</b>

		shared surface water maintenance agreements within Scottish Water (Section 7 Agreements (of the Sewerage (Scotland) Act 1968). Maintain above ground landscape aspects of the adopted sustainable drainage assets.		<b>Edinburgh Council, Scottish Water, SEPA, NatureScot</b> ), Edinburgh World Heritage, Council Nature Recovery and Climate Adaptation Working Group ( NRCA)
Update Edinburgh Design Guidance design and Sustainable Rainwater Management Guidance and factsheets for all types of flooding, water scarcity and fluvial erosion risks	2024-2026	Work with local communities through delivery partnerships to contribute to the maintenance of city landscapes and green spaces.	2024-2030	<b>Edinburgh and Lothians Strategic Drainage Partnership (ELSDP)</b> , Council NRCA Group, Edinburgh and Lothians Greenspace Trust, Royal Botanic Garden Edinburgh, Edinburgh World Heritage
<b>Objective 2: Deliver a strategic Green Blue Network for Edinburgh</b>				
<b>Medium/Long Term Delivery Actions</b>			<b>Delivery Timescale</b>	<b>Delivery Partners</b>
Define Edinburgh’s Strategic Green Blue Network and identify and prioritise projects on the network that will complete the missing links. Embed these into Edinburgh’s Local Development Plan and in all council plans and strategies.			2023 – 2030	<b>ELSDP, Council NRCA Group</b> , Historic Environment Scotland, Edinburgh World Heritage

<b>Objective 3: Manage demand for domestic and commercial water supplies during drought</b>		
<b>Medium/Long Term Delivery Actions</b>	<b>Delivery Timescale</b>	<b>Delivery Partners</b>
Manage the increased risk of lower river and reservoir levels associated with droughts by managing demand for water all year round, through reduced leakage and water efficiency improvements, in alignment with SEPA's water supply and wastewater sector plan.	2024 - 2030	<b>Scottish Water</b>
<b>Objective 4: Build public and private sector organisational resilience to water management</b>		
<b>Short Term Delivery Actions</b>	<b>Delivery Timescale</b>	<b>Delivery Partners</b>
Work with public and private sector partners on the development of climate risk assessments of their organisations and estate and on measures to adapt their systems, assets and services, assess the efficiency and inspect the condition of existing networks (operational, repair, frequency of maintenance). Includes both urban and rural agricultural working practices.	2024 - 2025	<b>The City of Edinburgh Council, Scottish Water, SEPA, Edinburgh and South East Scotland City Region Deal (ESECRD) partners</b>

## C: Coastal Adaptation

Objective 1: Ensure future development of Edinburgh's coast is resilient to climate change					
Medium Delivery Actions	Delivery Timescale	Delivery Partners	Medium/Long Term Delivery Actions	Delivery Timescale	Delivery Partners
Continue to take forward Edinburgh's coastal actions in Cycle 2 of the Local Flood Risk Management Plan (LFRMP) for the Forth Estuary Catchment	2022-2028	<b>The City of Edinburgh Council, neighbouring local authorities, SEPA, Scottish Water</b>	Continue robust inspection regimes and maintenance of coastal defences	2022-2030	<b>The City of Edinburgh Council</b>
Deliver an Edinburgh Coastal Change Adaptation Plan, taking into account research on sea level rise, coastal erosion and storm surge from Dynamic Coast and the regional climate assessment. The plan will inform the measures to be taken to adapt and protect Edinburgh's coast, and when.	2023 - 2026	<b>The City of Edinburgh Council, Dynamic Coast Partnership (SEPA, NatureScot, Scottish Government, University of Glasgow), Edinburgh and South East Scotland City Region Deal partners</b>	Use the Coastal Change Adaptation Plan to inform the implementation of City Plan 2030 planning policies, development plans and decisions, infrastructure investment and habitat protection along the coast.	2026 - 2030	<b>The City of Edinburgh Council, Scottish Water, SEPA</b>  Edinburgh Biodiversity Partnership, NatureScot
			Engage with Scottish Water on coastal climate risks affecting their infrastructure and assets	2024-2030	<b>Scottish Water</b>

## Objective 2: Protect and enhance Edinburgh’s coastal habitats and species

Medium Delivery Actions	Delivery Timescale	Delivery Partners	Medium/Long Term Delivery Actions	Delivery Timescale	Delivery Partners
Work with partners to understand the implications of climate change on coastal habitats and species	2024-2026	<b>The City of Edinburgh Council, Edinburgh Biodiversity Partnership,</b> Edinburgh and South East Scotland City Region Deal (ESECRD) partners	Implement measures to protect, restore and enhance coastal habitats and species through the next local development plan and projects	2026-2030	<b>The City of Edinburgh Council, Edinburgh Biodiversity Partnership</b>  Forth Estuary Forum, Edinburgh Living Landscapes
			Support the development of natural coastal defences to improve the resilience of vulnerable soft coastal areas to flooding and erosion. Where this is not possible and hard engineering is required, use eco-engineering methods to ‘green the grey’ hard surfaces to provide habitat for marine life.	2024-2030	<b>The City of Edinburgh Council, Edinburgh Biodiversity Partnership</b>  Forth Estuary Forum, Edinburgh Living Landscapes

### Objective 3: Protect coastal communities and businesses

Long Term Delivery Actions	Delivery Timescale	Delivery Partners
Raise awareness with residents, businesses and others of the risks to the coast from climate change to help them take action to increase the resilience of their homes, businesses and communities	2024-2030	<b>Edinburgh and South East Scotland City Region Deal partners, The City of Edinburgh Council, SNIFFER, Edinburgh Community Climate Forum, Just Economic Transition Partnership</b>

## D: Sustainable Transport

Objective 1: Build resilience into Edinburgh’s transport network and infrastructure				
Short Term Delivery Actions	Delivery Timescale	Medium/Long Term Delivery Actions	Delivery Timescale	Delivery Partners
Actively engage with local transport companies and providers on the risks and impacts of climate change on their services and infrastructure and ways to alleviate them	2024 -2026	Engage with regional and national transport providers on building resilience into major transport infrastructure and routes in and out of the city. This includes working with road and rail providers to ensure design and specifications for current and future transport infrastructure are robust to future climate impacts such as flooding and heat.	2024 - 2030	<b>City Transport Infrastructure Partnership, Edinburgh and South East Scotland City Region Deal (ESECRD) partners</b> , Transport Scotland, Transport for Edinburgh, Lothian Buses, Network Rail, Edinburgh Adapts Partnership
		Engage with the ports sector on risks to their operation due to sea level rise, storms and coastal erosion and options for adaptation.	2024-2030	<b>Edinburgh Adapts Partnership</b>
Objective 2: Embed adaptation into Edinburgh’s City Mobility Plan				
Short Term Delivery Actions	Delivery Timescale	Medium/Long Term Delivery Actions	Delivery Timescale	Delivered By
Ensure Edinburgh's upcoming Circulation Plan and associated Streetspace Allocation Framework considers blue green infrastructure and biodiversity requirements, permeable surfaces and other adaptive	2023-2025	Ensure the design and routing options of any future tram extensions has adaptation embedded and takes into consideration increasing heat, flooding and extreme	2023-2025	<b>The City of Edinburgh Council</b>

measures to reduce the urban heat island effect, provide shade, reduce flood risk and improve air quality.		weather events, and impacts on existing green infrastructure and green corridors.		
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**Objective 3: Build resilience into Edinburgh’s road network**

<b>Short Term Delivery Actions</b>	<b>Delivery Timescale</b>	<b>Medium/Long Term Delivery Actions</b>	<b>Delivery Timescale</b>	<b>Delivered By</b>
Deliver training for road designers on how to incorporate sustainable drainage within roads design to help ensure the city’s transport infrastructure is future proofed	2024-2026	Sustainably design, plan, upgrade, maintain and manage Edinburgh’s local road network, to increase the city’s resilience to extreme weather, and reduce embodied carbon in road and infrastructure construction.	2023-2030	<b>The City of Edinburgh Council</b>
Use surface treatments to extend the life of roads to minimise the requirement for full resurfacing	2023-2025			<b>The City of Edinburgh Council</b>

## E: Safeguarding and enhancing our natural environment

<b>Objective 1: Embed adaptation into city planning processes, land management plans and strategies relating to the natural environment</b>					
<b>Short Term Delivery Actions</b>	<b>Delivery Timescale</b>	<b>Delivery Partners</b>	<b>Medium/Long Term Delivery Actions</b>	<b>Delivery Timescale</b>	<b>Delivery Partners</b>
Develop a Forestry and Woodland Strategy to improve protection for ecologically important areas of woodland habitat, identify priority areas for woodland restoration, creation and regeneration, carbon sequestration, a reduced heat island effect, flood mitigation and nature recovery.	2024 - 2026	<b>The City of Edinburgh Council, Forestry Commission, NatureScot</b>	Embed adaptation policies into Edinburgh’s Nature Vision and all land use planning decisions through Local Development Plan processes and guidance. This would include tree canopy cover and habitat creation, restoration and enhancement.	2024 - 2030	<b>The City of Edinburgh Council, Edinburgh Biodiversity Partnership</b>  University of Edinburgh, NHS Lothian
Embed adaptation as part of the delivery of Edinburgh’s Thriving Greenspaces Strategy and Nature Network. This would include development of park masterplans, school playgrounds which include sustainable drainage features, heat energy solutions and improvements for nature.	2024 - 2025	<b>The City of Edinburgh Council</b>			

**Objective 2: Ensure Edinburgh’s habitats and species are protected, enhanced and resilient to climate change**

Short Term Delivery Actions	Delivery Timescale	Delivery Partners	Medium/Long Term Delivery Actions	Delivery Timescale	Delivery Partners
Undertake a natural capital and biodiversity assessment of the city, identifying habitats, ecosystems and ecological services at greatest risk from climate change and those which offer the greatest benefits to nature and adaptation.	2024 - 2025	<b>The City of Edinburgh Council</b>	Embed the findings of the natural capital and biodiversity assessment into Edinburgh’s Strategic Green Blue network, Nature Network, Biodiversity Action Plan, site management plans and other policies and projects to increase habitat and species resilience, connectivity, reduce flood risk, provide shade, improve air and water quality.	2024-2030	<b>Edinburgh Adapts partnership, Edinburgh and South East Scotland City Region Deal partners, Edinburgh Biodiversity Partnership, The City of Edinburgh Council, University of Edinburgh, Other relevant partners</b>
Support delivery of the key actions in Edinburgh's Biodiversity Action Plan, the Strategic Green Blue Network, Local Nature Networks and One Million Tree City project	2023 - 2027	<b>Edinburgh Biodiversity Partnership, Edinburgh Living Landscapes, Edinburgh and Lothians Greenspace Trust, Woodland Trust</b>	Create a practical guide for climate adaptation and nature recovery for communities and individuals	2024-2030	<b>The City of Edinburgh Council</b>

Develop guidance on priority habitats and special landscape areas in the city, the risks and opportunities to these from climate change, carbon capture potential, and species choice for future habitat resilience within different city development contexts.	2024 - 2025	<b>Edinburgh Biodiversity Partnership, NatureScot, Scottish Wildlife Trust, Historic Environment Scotland, RBGE</b>	Work in partnership on assessing the risks and opportunities to priority habitats and protected historic and special landscape areas within in the city.	2023-2027	<b>The City of Edinburgh Council, NatureScot, Scottish Wildlife Trust, Royal Botanic Garden Edinburgh</b>
Update the iTree Survey to feed into all plans and strategies in the Council as required	2024 - 2025	<b>The City of Edinburgh Council</b>	Provide information and training for landscape architects/managers and associated professionals who work on future planning of the city's landscape and habitats	2024 - 2030	<b>The City of Edinburgh Council, Edinburgh Living Landscapes, Edinburgh and Lothians Greenspace Trust, Woodland Trust, RBGE</b>
Develop a drought and fire risk strategy for all council owned trees and greenspaces to feed into management plans	2023 - 2025	<b>The City of Edinburgh Council</b>	Continue robust inspection regimes and maintenance of the Council owned trees and greenspaces	<b>2023-2030</b>	<b>The City of Edinburgh Council</b>
Develop a Green Finance model to help fund nature and adaptation projects (FiRNS)	2023-2025	<b>The City of Edinburgh Council</b>	Continue robust inspection regimes and maintenance of the Council owned trees and greenspaces	<b>2023-2030</b>	<b>The City of Edinburgh Council</b>

**Objective 3: Build a co-ordinated approach to protecting and enhancing Edinburgh’s natural assets across key public and private sector estates**

Short Term Delivery Actions	Delivery Timescale	Delivery Partners
Support the preparation and updating of landscape management plans for key sites across the city to improve climate resilience and biodiversity, complimenting Historic Environment Scotland’s work on historic landscapes.	2024 - 2025	<p><b>Edinburgh Adapts partnership, Historic Environment Scotland</b></p> <p>Other public, higher and further education and private sector organisations</p>

**Objective 4: Encourage minimum disturbance, positive management and protection of soil during planning, development and construction processes, to maintain soil function, natural processes, quality and stability**

Short Term Delivery Actions	Delivery Timescale	Delivery Partners	Medium/Long Term Delivery Actions	Delivery Timescale	Delivery Partners
Signpost to good practice guidance and provide information on ways to improve soil management for land managers and those involved in food growing in the city. Include information about the importance of preserving soil function and the natural processes that aid carbon sequestration, flood reduction and biodiversity.	2024-2025	<p><b>Edinburgh Biodiversity Partnership</b> NatureScot, Edinburgh Adapts partnership</p>	Develop policy and guidance to reinforce the importance of soil and construction risks. Include training for planners, key construction professionals including land surveyors, Homes for Scotland and local community councils, architects, landscape architects and engineers. Update council strategies and Edinburgh Design Guidance and embed in future Local Development Plans.	2024-2030	<p><b>The City of Edinburgh Council</b></p> <p>SEPA, construction sector, NatureScot</p>

## F: Strong, healthy communities and economy

Objective 1: Improve community resilience to climate change, targeting disadvantaged and vulnerable groups				
Short Term Delivery Actions	Delivery Timescale	Medium/Long Term Delivery Actions	Delivery Timescale	Delivery Partners
Work with the Edinburgh Partnership to develop actions to build community climate resilience into Edinburgh's Local Outcome Improvement Plan and Local Improvement Plans	2024 - 2026	Build community capacity through promoting Adaptation Scotland's "Community Climate Adaptation Routemap: A practical guide for communities to adapt to climate change" and work with existing citizen platforms and community initiatives.	2024 - 2030	<b>Edinburgh Partnership</b> Community Planning partnerships, Edinburgh Adapts Partnership, Voluntary and community organisations
Hold a citywide summit to raise awareness of adaptation and engage with all sectors on the Plan, including community, public, private and third sector.	2024 - 2025	Align climate change adaptation measures with plans to alleviate poverty, recognising that these two issues are interlinked and must be addressed in tandem to support climate justice.	2024 - 2030	<b>The City of Edinburgh Council</b>
Use the Integrated Impact Assessment process to ensure we are protecting vulnerable communities and inequalities are key considerations of all city developments, strategies, projects and upgrades to infrastructure.	2024 - 2025	Work with key agencies and stakeholders to improve systems for reporting flooding and co-ordinating responses, and to improve advance warning of flood risk	2024 - 2030	<b>The City of Edinburgh Council, Scottish Water, SEPA</b>

<b>Objective 2: Improve the health sector’s ability to adapt</b>		
<b>Medium/Long Term Delivery Actions</b>	<b>Delivery Timescale</b>	<b>Delivery Partners</b>
Work with health providers on reducing the impact of those whose health will be most impacted by climate change	2024 - 2030	<b>NHS Lothian</b> Emergency Services
Work with key health providers on ways to improve the climate resilience of key health infrastructure, such as care homes and hospitals	2024 - 2030	<b>NHS Lothian</b>
Embed climate change in health and social care planning and in business continuity arrangements	2024 - 2030	<b>NHS Lothian</b> Emergency Services
<b>Objective 3: Build up the resilience of Edinburgh’s cultural sector, festivals and events</b>		
<b>Short Term Delivery Actions</b>	<b>Delivery Timescale</b>	<b>Delivery Partners</b>
Encourage and support the Council's cultural sector partners to increase the adaptive capacity of their venues, events and collections including promotion of training and sources of advice.	2024 - 2030	<b>The City of Edinburgh Council</b> , Creative Carbon Scotland, Edinburgh and South East Scotland City Region Deal (ESECRD) partners, Edinburgh’s cultural sector, Festivals Edinburgh
Encourage and support the climate resilience of Edinburgh’s winter festivals and other major events.	2024-2030	<b>The City of Edinburgh Council</b>

**Objective 4: Work with Edinburgh’s business sector to ensure a proactive strategic approach to climate change adaptation**

Short Term Delivery Actions	Delivery Timescale	Medium/Long Term Delivery Actions	Delivery Timescale	Delivery Partners
Build understanding of the impacts and risks of climate change to Edinburgh’s business sector	2024-2026	Investigate opportunities for innovation, technology and skills development in the adaptation sector.	2026 -2030	<b>Edinburgh Adapts Partnership</b> , ESECRD partners, Just Economic Transition Partnership, Sniffer
Promote Adaptation Scotland’s guidance and tools to support small businesses to adapt.	2024-2026	Encourage local production and markets to reduce climate change induced disruptions in global trade impacting the city	2024-2030	<b>Edinburgh Adapts Partnership</b> , ESECRD partners, Just Economic Transition Partnership, Sniffer
		Work with the Scottish government and educational institutes to ensure development of relevant skills and supply chains to enable the industry to deliver and maintain climate adaptation infrastructure.	2024-2030	<b>The City of Edinburgh Council</b> Higher education sector

## G: Building understanding of Climate Change Risks

<b>Objective 1: Ensure ongoing monitoring, evaluation and research to inform decision-making on climate change adaptation</b>	
<b>Delivery Partners</b>	
<b>University of Edinburgh ECCI, Edinburgh and South East Scotland City Region Deal (ESECRD), Sniffer, Dynamic Coast, SEPA, DDI, The City of Edinburgh Council, further and higher education partners, wider city</b>	
<b>Medium/Long Term Delivery Actions</b>	<b>Delivery Timescale</b>
Utilise latest research and data to drive innovation in tackling climate change including collation of key evidence sets (flood risk maps, Urban Heat Island/coastal change etc) and make these available to update risk assessments and improve decision making. Work with SEPA to improve mapping of surface water flood risk.	Ongoing
Make sure public climate change datasets are available to the public in understandable and accessible forms	2024-2030
Carry out further research to enable options appraisals and cost benefit analysis of different adaptation responses in Edinburgh to improve decision making	2024-2024
Encourage research programmes to address adaptation gaps and build knowledge of adaptation measures that work for Edinburgh.	2024-2030
Develop a spatial map showing locations across Edinburgh most at risk from overheating/exceeding different temperature thresholds.	2024-2025
Research design guidelines for increased temperatures including consideration of the thermal comfort impact for people including the measurement of radiant temperatures. Support and inform the development of planning policy to help reduce exposure and enhance ability to react (e.g. affect building planning guidelines, shading, and density controls).	2025-2026
Develop adaptation partnership training and placement opportunities for students	2024-2030
Learn from successful research and projects in other cities and regions and apply lessons learned to adaptation in Edinburgh	2024-2030

## H: Governance and Investment

### Objective 1: Ensure governance structures are in place to adapt Edinburgh to the impacts of climate change

Short Term Delivery Actions	Delivery Timescale	Medium/Long Term Delivery Actions	Delivery Timescale	Delivery Partners
Establish an Edinburgh Adapts core review group to annually monitor and update the plan, which works with and reports into the Net Zero Edinburgh Leadership Board.	Annually	Develop an engagement plan with businesses and organisations to support and mitigate against the impacts of climate change and future proof their organisations	2024-2028	<b>Edinburgh Adapts partnership</b> , Dynamic Coast, SEPA, Scottish Water, NatureScot, Net Zero Leadership Board and partnerships
Embed adaptation across all Council services, including health and social care, including risk and establish governance to support delivery	2024 -2026			<b>The City of Edinburgh Council</b>
Ensure that citizens and areas that are most vulnerable to the adverse effects of climate are prioritised for action.	2024-2026			<b>The City of Edinburgh Council</b>

## Objective 2: Increase investment in adaptation

Short Term Delivery Actions	Delivery Timescale	Medium/Long Term Delivery Actions	Delivery Timescale	Delivery Partners
Embed adaptation into the Council's Capital Budget Strategy, ensuring resources are set aside for investment in adaptation measures and that new investments take account of the impacts of climate change	2024 -2026	Work in partnership to develop a pipeline of priority investment adaptation proposals and business cases to deliver the key priorities of the Plan. This includes identification of a pipeline of pilot projects building on current and future partnership working and demonstration of best practice	2024 - 2030	<b>Edinburgh Adapts partnership, The City of Edinburgh Council, Edinburgh and South East Scotland City Region Deal (ESECRD) partners</b>
		Embed adaptation into city financial plans. Any new investment should take account of climate change to avoid later retrofit or redesign.	2024 - 2030	<b>Edinburgh Adapts partnership, The City of Edinburgh Council, Edinburgh and South East Scotland City Region Deal (ESECRD) partners</b>
		Work with the Scottish Government and partners to develop sustained and dedicated resources across all sectors to enable development, installation, maintenance and management of adaptation infrastructure.	2024 - 2030	<b>The City of Edinburgh Council</b>

**Objective 3: Support the development of a regional climate change risk assessment and adaptation measures**

Short Term Delivery Actions	Delivery Timescale	Medium/Long Term Delivery Actions	Delivery Timescale	Delivery Partners
Support the delivery of a regional climate change risk assessment focusing on the Forth estuary and ESECRD local authority partner area	Delivered by 2026	Collaborate with ESECRD partners on regional approaches and opportunities for cross-boundary and shared action on adaptation	2026-2030	<b>Edinburgh and South East Scotland City Region Deal (ESECRD) partners, Sniffer</b>
		Support proposals to develop a regional climate adaptation investment technical assistance fund, to develop and test new business models and bankable project ideas.	2024-2030	<b>Edinburgh and South East Scotland City Region Deal (ESECRD) partners, Sniffer</b>

**Objective 4: Deliver rapid whole-system change**

Ongoing Delivery Actions	Delivery Partners
Advocate nationally and influence for review of key national and local policy, fiscal and regulatory frameworks to support climate action at the pace and scale required to respond to the climate and nature emergencies	<b>Edinburgh Adapts partnership, Edinburgh and South East Scotland City Region Deal (ESECRD) partners</b> NatureScot, other partners
Collaborate with Scottish Government and other partners on identifying resources for supporting local partnerships in developing a pipeline of investable sustainability projects	<b>Edinburgh Adapts partnership, Edinburgh and South East Scotland City Region Deal (ESECRD) partners</b> NatureScot, other partners

## Appendix 1 – Collaboration and Partnership Working

This Plan was built in collaboration with the following partnerships, programmes and initiatives across the city in order to embed climate adaptation across the city.

Edinburgh Adapts Partnership	The City of Edinburgh Council, Scottish Water, Scottish Environment Protection Agency, Edinburgh World Heritage, Historic Environment Scotland, NatureScot, University of Edinburgh, Heriot Watt University, Napier University, Edinburgh College, SNIFFER
Net Zero Edinburgh Leadership Board	<p><b>Board Members</b> The University of Edinburgh (representing the FE and HE sector), SP Energy Networks, Scottish Gas Networks, NHS Lothian, Scottish Water, Edinburgh Chamber of Commerce and City of Edinburgh Council</p> <p><b>Advisory Members</b> Edinburgh Climate Change Institute, Climate-KIC, members of City of Edinburgh Council</p>
Edinburgh and Lothians Strategic Drainage Partnership	The City of Edinburgh Council, East Lothian and Mid Lothian Councils, Scottish Water, SEPA, NatureScot
Blue Green City Partnership	The City of Edinburgh Council, Scottish Water, Scottish Environment Protection Agency
Old and New Towns of Edinburgh World Heritage Site Steering Group	Edinburgh World Heritage Trust, Historic Environment Scotland, The City of Edinburgh Council
Dynamic Coast	SEPA, NatureScot, Scottish Government, University of Glasgow
Edinburgh and South East Scotland City Region Deal partnership (regional adaptation partnership)	East Lothian, Edinburgh, Fife, Midlothian, Scottish Borders and West Lothian Councils
SNIFFER	Scotland and Northern Ireland Forum for Environmental Research

## Appendix 2 - Climate Ready Scotland: climate change adaptation programme 2019-2024

Read about [the programme](#) on Scottish Government's website.

- Outcome 1: Our communities are inclusive, empowered, resilient and safe in response to the changing climate
- Outcome 2: The people in Scotland who are most vulnerable to climate change are able to adapt and climate justice is embedded in climate change adaptation policy
- Outcome 3: Our inclusive and sustainable economy is flexible, adaptable and responsive to the changing climate
- Outcome 4: Our society's supporting systems are resilient to climate change
- Outcome 5: Our natural environment is valued, enjoyed, protected and enhanced and has increased resilience to climate change
- Outcome 6: Our coastal and marine environment is valued, enjoyed, protected and enhanced and has increased resilience to climate change
- Outcome 7: Our international networks are adaptable to climate change

## Appendix 3 – Strategic Drivers and Policy Drivers

The Climate Ready Edinburgh Plan has been developed taking into account international, national and local drivers, including policy and legislation. This is an ever-changing and evolving area and the plan will be revisited annually to ensure that its context and strategic direction are still correct.

### International

#### [EU Adaptation Strategy](#)

[Paris Agreement](#), a legally binding international treaty on climate change

The “[Glasgow Climate Pact](#)”- agreed at the UN Climate Change Conference (COP26) in November 2021 set up processes towards delivering a global goal on adaptation.

[IPCC Summary for Policymakers: Global Warming of 1.5°C](#). An IPCC Special Report' 2018

Intergovernmental Panel on Climate Change (IPCC) assessment report, [AR6 Climate Change 2021: The Physical Science Basis](#) indicated that human induced climate change is already affecting many weather and climate extremes.

#### [United Nations Framework Convention on Climate Change](#)

Climate Action is one of the [17 UN Global Goals](#), encouraging urgent action to combat climate change and its impacts.

## National

[Stern Review on the Economics of Climate Change](#), 2006 concluded the benefits of strong and early action far outweigh the economic cost of not acting

[Climate Change Act 2008](#) sets a framework for a UK reduction in greenhouse gas emissions and provision for adaptation to climate change.

[Third UK Climate Change Risk Assessment 2022](#). The assessment is required by the Act and updated every 5 years.

[UK Climate Projections \(UKCP18\)](#) provide evidence on projected changes to climate.

Committee on Climate Change [Independent Assessment of UK Climate Risk](#) identified 8 areas of risk requiring most urgent attention in the next 2 years

[Evidence for the Third UK Climate Change Risk Assessment](#) – Summary for Scotland identified 61 risks, 51 with high urgency scores for Scotland

[UK Climate Resilience Programme](#), bringing together climate research and expertise

[Supplementary Green Book Guidance: Accounting for the Effects of Climate Change](#)

[Climate Change \(Scotland\) Act 2009](#), includes objectives in relation to adaptation. Part 4 of the Act places duties on the public sector to act in the way best calculated to help deliver the Scottish Adaptation Programme.

[Climate Ready Scotland: 2nd Scottish Adaptation Programme](#), updated every five years and addresses climate risks for Scotland identified in the UK Climate Risk Assessment.

[Flood Risk Management \(Scotland\) Act 2009](#)

[National Flood Risk Assessment \(NFRA\) 2018](#)

[National Planning Framework 4](#)

[Scotland's Biodiversity Strategy 2022-2045](#)

## Regional

[Forth Estuary Local Flood Risk Management Plan 2022-2028](#)

[Edinburgh and Lothians Strategic Partnership](#)

[Edinburgh and East of Scotland City Region Deal](#) and [Regional Prosperity Framework](#)

## Local

[Edinburgh City Vision 2050](#)

[2030 Climate Strategy: Delivering a Net Zero, Climate Resilient Edinburgh](#)

[City Plan 2030](#) and [Strategic Flood Risk Assessment](#)

[Vision for Water Management in the City of Edinburgh](#)

[Edinburgh Green Blue Network](#)

[World Heritage Management Plan for Edinburgh Old and New Towns](#)

[City Mobility Plan 2030](#)

[The Edinburgh Partnership: Local Outcome Improvement Plan](#)

[End Poverty in Edinburgh Plan 2020-2030](#)

[Equality and Diversity Framework 2021-2025](#)

[THRIVE Edinburgh: A mental health and wellbeing road map for all](#)

[20-minute Neighbourhood Strategy](#)

[Thriving Green Spaces Strategy](#)

[Edinburgh Biodiversity Action Plan](#)

[Edinburgh Living Landscapes programme](#)

[Million Tree City Initiative](#)

[Edinburgh 2030 Tourism Strategy](#)

[Citywide Culture Plan Edinburgh 2023-2030](#)

## Appendix 4: Climate Risk Across Sectors

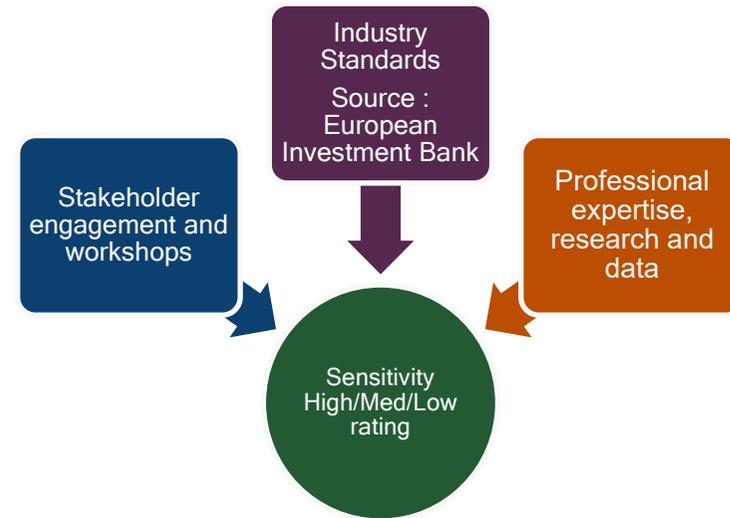
The Council commissioned consultants to assess the vulnerability of people, locations and assets in Edinburgh to the impacts of climate change. The consultants used European Investment Bank industry standards, professional judgement based on analysis of all the available data, and engagement with stakeholders to assess:

- the exposure of people, locations and assets to climate events such as flooding or storms
- the sensitivity or degree to which each would be affected by the climate event

Scoring these as low, medium or high, the vulnerability to these climate risks was worked out as shown in the table. When both the sensitivity and exposure were high, this would result in a high vulnerability score. Where there was a mixture of scorings, further work was undertaken to determine the most likely vulnerability.

This provides a starting point for informing the prioritization of climate action and investment in adaptation in the city.

We have summarised the risk assessment for the strategy but email us for a copy of the full report [Climatechange@edinburgh.gov.uk](mailto:Climatechange@edinburgh.gov.uk).



Vulnerability Assessment

	High Sensitivity	Medium Sensitivity	Low Sensitivity
High Exposure	High	High	Medium
Medium Exposure	High	Medium	Medium/Low
Low Exposure	Medium	Medium/Low	Low

## Climate vulnerability of the Public Health Sector in Edinburgh

Climate Hazard	Sensitivity	Exposure	Vulnerability	Summary
<b>Flooding</b>	<b>Red</b>	<b>Red</b>	<b>Red</b>	Hospitals, care homes, and private homes are vulnerable to all types of flooding. Flooding can impact on the ability to deliver healthcare services, reduce or prevent access to medical facilities and disrupt or damage the infrastructure that health facilities rely on, such as power and communications. It can also cause physical and mental health impacts.
<b>Sea level rise and coastal erosion</b>	<b>Amber</b>	<b>Green</b>	<b>Green</b>	Sea level rise and coastal erosion present a risk to people living or working in close proximity to the coast. While the physical health risks are low because measures are taken to safeguard people and homes from coastal flooding and erosion, the impacts on mental health over the long term could be higher due to anxiety and uncertainty regarding the viability of coastal communities.
<b>Storms</b>	<b>Red</b>	<b>Red</b>	<b>Red</b>	Increasing frequency and intensity of extreme weather events is likely to increase the demand for healthcare services due to physical and health impacts associated from injury and trauma in storms, such as from road accidents. Storms also impact critical infrastructure that health facilities rely on. Heavy rainfall could also increase damp and mould in buildings, increasing respiratory and related problems. Power and communications outages caused by storms can have significant impacts on vulnerable people in care homes and private homes.
<b>Heatwaves</b>	<b>Amber</b>	<b>Amber</b>	<b>Amber</b>	Climate change increases the likelihood of heatwaves which will be felt most among vulnerable, older people and children. This could increase the number of heat related illnesses and is a particularly high risk in care homes. Rising summer temperatures may lead to a rise in hospital admissions and respiratory problems. Higher temperatures and longer growing seasons could also increase pollen levels in the air affecting those suffering from asthma and related conditions. Higher temperatures can also adversely

				affect air quality and lead to an increase in ground level ozone. Higher temperatures with periods of reduced rainfall or drought will increase the risk of wildfires, again impacting on air quality and people's health.
<b>Drought</b>	<b>Amber</b>	<b>Amber</b>	<b>Amber</b>	Drought impacts on public water supply would have significant consequences for hospitals, care homes, and private homes. Drought can have a significant impact on natural environments and green spaces in the city, diminishing the recreation and amenity value that these areas provide which could impact both mental and physical health. Drought can also impact the availability of food, at worst resulting in food shortages and increases in food prices, however this is considered lower risk for Edinburgh.

## Climate Vulnerability of Housing and Built Environment in Edinburgh

Climate Hazard	Sensitivity	Exposure	Vulnerability	Summary
<b>Flooding</b>	<b>Red</b>	<b>Red</b>	<b>Red</b>	River, surface water and coastal flooding all affect Edinburgh's built environment. Flooding can cause structural damage including to the external fabric of the building and increase building dampness and mould. Flooding of basement flats is a particular issue in some areas of the city.
<b>Sea level rise and coastal erosion</b>	<b>Amber</b>	<b>Amber</b>	<b>Amber</b>	Edinburgh has 27km of coastline. Sea level rise will increase the risk of coastal flooding, erosion and wave overtopping during storms, damaging buildings and infrastructure situated at or near the coast.
<b>Storms</b>	<b>Red</b>	<b>Red</b>	<b>Red</b>	Storms pose a significant risk to Edinburgh's built environment. Driving wind and rain can cause structural damage to buildings and infrastructure and disrupt travel, This includes longer term damage to buildings through water ingress, dampness and mould. They can create public safety concerns from disruptions to services and the danger of falling masonry, trees and branches etc.
<b>Heatwaves</b>	<b>Amber</b>	<b>Amber</b>	<b>Amber</b>	Prolonged exposure to temperature extremes can cause damage to buildings. Excessive indoor temperatures can affect thermal comfort, health and productivity. In high density urban areas such as Edinburgh, the urban heat island effect can exacerbate overheating. Building materials and design can enhance or reduce this effect. Increased greening of the built environment can reduce the heat island effect, e.g. shading from trees, areas of vegetation including living roofs which cool internal spaces. The risk of heat and extreme temperatures is currently assessed as moderate but will increase as temperatures rise. This is a risk that the city has not traditionally had to manage, meaning that preparedness may be low. Historic buildings, with thick walls and high ceilings are in many cases better equipped to

				deal with heat than more modern buildings with limited ventilation and no air conditioning.
<b>Drought</b>	<b>Amber</b>	<b>Amber</b>	<b>Amber</b>	Warmer temperatures and changes to precipitation accelerate the deterioration of buildings materials. Subsidence can also occur as a result of drought which can affect building foundations and levels. Drought also impacts the built environment by increasing water shortages.

## Climate vulnerability of the natural environment in Edinburgh

Climate Hazard	Sensitivity	Exposure	Vulnerability	Summary
<b>Flooding</b>	<b>Amber</b>	<b>Amber</b>	<b>Amber</b>	<p>Increases in frequency of flooding can lead to changes in habitat and species distribution (see below) and influence processes of soil formation and erosion. Areas of existing public greenspace may be unusable during floods or at greater susceptibility to damage. Wash outs can deposit sediments that overwhelm vegetation and fish species, and sewage overflows can result in the transfer of pests, diseases, and invasive non-native species. Natural assets or parts of assets could be lost to flood damage or their condition/quality can be degraded through multiple events over time. Damages caused by flood events will also place increasing pressure on already sensitive habitats and species that are also susceptible to other pressures. Natural assets located within flood zones, adjacent to watercourses, or at the Edinburgh coast will be most exposed. Specialised habitats and their species such as the Firth of Forth coastal complex are likely to be most sensitive. Natural assets can also contribute to flood protection through investment in nature-based solutions. It is important that these solutions are designed to be resilient to flooding and other climate hazards.</p>

Sea level rise and coastal erosion	Red	Red	Red	Sea level rise and coastal erosion presents a direct risk to nature with potential knock-on effects for other habitats and species for which these assets provide important corridors that contribute to ecological connectivity. Edinburgh’s Firth of Forth’s Site of Special Scientific Interest and beaches are particularly exposed and can be considered highly sensitive due to their national and international designation. These habitats may also be susceptible to “coastal squeeze” whereby coastal habitats are unable to retreat inland over time through natural processes due to the presence of hard infrastructure. Hazards to these assets will make Edinburgh more susceptible to sea level rise and coastal erosion given the natural protection they provide. Ensuring these assets can be resilient to change will contribute to mitigating this hazard.
Storms	Amber	Amber	Amber	Increasing frequency and intensity of extreme weather events is likely to damage natural assets and place increasing pressure on already sensitive habitats and species. Examples include wind damage to urban trees and woodland leading to losses of carbon and the amenity value of greenspaces. Increased flooding (see above) and risk of wildfires (see below) are related hazards. Woodlands, coastal habitats, and peatlands are likely to be the most exposed. Assets could be lost to storm damage reducing quantity, or their condition/quality could be degraded through multiple events over time.
Heatwaves	Amber	Amber	Amber	Climate change will bring heatwaves of greater duration, frequency, and extremity. This will affect the natural environment through drought and changes in habitat ranges and phenology (see below). Assets which are most sensitive will be those most dependent on stable temperature regimes, such as the peatland at Balerno Red Moss Nature Reserve as peat requires cool damp conditions for formation. This is also likely to put increasing pressure on public greenspaces as demand for outdoor space will increase. Natural assets such as urban woodland, street trees, living roofs, wetlands and ponds provide an important role in urban cooling. Reduced quantity and quality of these assets due to heatwaves and other climate hazards will increase the magnitude of this risk to the natural environment and other sectors. It is important that nature-based solutions that provide urban cooling, such as increased urban tree cover, are designed to be resilient to climate change by choosing appropriate tree species.

<b>Drought</b>	<b>Red</b>	<b>Amber</b>	<b>Red</b>	<p>Water can be considered a natural capital stock and drought would reduce the quantity available for public supply. Drought also poses risks for all natural assets as less water would be available in the environment for plants and animals. This increases their susceptibility to other climate hazards and non-climate related pressures. Water-based assets such as rivers, ponds, wetlands, and peatbogs would be particularly sensitive. This could have knock-on consequences for soil erosion and storage of carbon in soils and peat loss due to dependence on specific wetting regimes for their formation. These risks will particularly affect small or shallow water bodies. Damage and loss of natural assets due to drought would increase their susceptibility to drought in the future: vegetation cover promotes a more humid environment through evapotranspiration and encourages infiltration of water into soil to slow and reduce runoff. Drought risks to the natural environment poses risks to other sectors.</p>
<b>Wildfires</b>	<b>Red</b>	<b>Amber</b>	<b>Red</b>	<p>Upland habitats including peat are most exposed and most sensitive to wildfires. There are areas of peatland in the Pentland Hills, such as at Balerno Red Moss nature reserve. Due to changes in temperature and precipitation patterns and increased likelihood of heatwaves, wildfires are more likely and these habitats are particularly sensitive due to their large stores of carbon. Losses and degradation of these assets due to wildfires will increase carbon emissions and thus undermine Edinburgh's capacity to contribute to climate mitigation. Peatland restoration can increase resilience to wildfires, as well as providing carbon storage and mitigating flood impacts downstream.</p>

<p><b>Changes in habitat and species ranges, and timings</b></p>	<p><b>Red</b></p>	<p><b>Red</b></p>	<p><b>Red</b></p>	<p>Changing climate conditions alter the intricate ecological balances that let plants and animals grow and survive. Extreme events such as sea level rise, wildfires and wind damage will result in the direct damage or a total loss of some areas of habitat. These could lead to changes in habitat distribution, species ranges, and phenology (periodic events in biological life cycles which are influenced by seasonal and interannual variations e.g. bird migrations, flowering). How these changes will manifest in Edinburgh are uncertain, although there is evidence of these changes in Scotland and the rest of the UK. Due to temperature and precipitation regimes, related erosion, and wildfires it is possible that the areas of Pentland peatland may be lost, as well as beaches and coastal habitats due to sea level rise. <i>The effects of these in driving other climate hazards is discussed for each hazard.</i> Phenology changes could mean that young birds might not hatch at the same time as their prey, and flowers might not open when their pollinators are active. Relationships between pests or diseases and their hosts will also change. These impacts will further increase the sensitivity of natural assets to climate hazards and other pressures.</p>
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## Climate Vulnerability for Transport in Edinburgh

Climate Hazard	Sensitivity	Exposure	Vulnerability	Summary
<b>River and surface water flooding</b>	<b>Red</b>	<b>Red</b>	<b>Red</b>	Extreme rainfall events create a number of challenges for rail infrastructure including inundation of rail lines and flooding of underground tunnels. Railbed damage and a decrease in structural integrity can occur due to erosion, landslides and increased soil moisture levels. Heavy rains may 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. Exposure to more intense precipitation also shortens the life expectancy of highways and roads. Key rail and road routes in Edinburgh suffer disruption from flooding, including the M8, flooding between Haymarket and Edinburgh Waverley stations, and flooding on critical routes such as the Edinburgh-Glasgow, and Edinburgh to Berwick-on-Tweed rail lines. The airport has a moderate risk of flooding. The tram depot has flooded in the past following heavy rainfall, and parts of the tram network may also face areas of flood risk. Both surface water flooding and river flooding are expected to increase in future.
<b>Sea level rise and coastal erosion</b>	<b>Red</b>	<b>Amber</b>	<b>Red</b>	This is a localised risk, however, storm surges and coastal erosion can destroy coastal road, rail and future tram infrastructure, as well impacting harbour and port activities. Road infrastructure in coastal areas is particularly sensitivity to more frequent and permanent flooding from sea level rise, storm surge and storm tide. Sea level rise will increase the risk from storm surges.
<b>Storms</b>	<b>Red</b>	<b>Red</b>	<b>Red</b>	Storms and high winds can cause damage to rail and tram infrastructure and electrified tracks with overhead cables. Strong winds can cause obstruction of rail, tram, and road due to fallen trees. Storms and high winds cause delays to flights and could cause cancellations.

<b>Heatwaves</b>	<b>Amber</b>	<b>Amber</b>	<b>Amber</b>	Thermal expansion can cause rail and tram track movement, leading to slowing down or disruption of services. Overheating is a risk particularly on older forms of public transport. Higher temperatures can cause pavements to soften and expand. This can create rutting and potholes, particularly in high-traffic areas and can place stress on bridge joints. Heat waves can also limit construction activities. Increases in maximum temperature are likely to increase disruption to both road, tram, and rail transport and pose a risk to elderly and vulnerable passengers in particular.
<b>Landslides</b>	<b>Red</b>	<b>Amber</b>	<b>Amber</b>	Landslides and soil movement pose a risk to certain areas of the rail network, in particular cuttings, and can result in tracks being blocked. Increased rainfall intensity will increase the likelihood of landslides, however, for Edinburgh there are few locations where landslides pose a threat to transport.
<b>Drought</b>	<b>Amber</b>	<b>Amber</b>	<b>Amber</b>	Drought can cause subsidence and destabilise and damage road and rail infrastructure. There is a moderate risk from drought to the transport sector across Edinburgh.