Climate Ready Stirling

Building Capacity & Delivering Action

A Climate Adaptation Strategy for Stirling

September 2016

Foreword

Climate change is described by many as the biggest challenge ever faced by humankind. In order to avoid the worst impacts of a changing climate, we all need to change our behaviour to cut energy use and so reduce emissions of climate changing gases. But we also need to plan and prepare for those changes that are already built into our weather systems from historical emissions.

The Council has developed this Climate Adaptation Strategy to help us to develop greater understanding of the issues, guide us in building capacity, and deliver actions to deal with some of the biggest impacts of climate change. As a local planning authority and community leader, Stirling Council has an important role to play by ensuring a climate focus is built into policy, land use decisions, capital improvement projects, and funding priorities in order to ensure a more climate resilient future for the area and in doing so set an example for others to follow.

Everyone can do their bit so that, collectively, we build greater community resilience to deal with current and future weather extremes. Our aim is for Stirling to become a leader in climate resilience and for us all to work together – organisations, individuals and communities – to create a safer, cleaner, greener future for everyone.

Front cover photos
Main: Stirling Castle from the Forth at Riverside
Left: Roadside storm water swale
Centre: Household flood defences
Right: Edible Border, Glasgow Road

Acknowledgements
The authors would like to thank the European Commission for supporting the EU Cities Adapt Project as a means for exchanging knowledge between cities; the Project Consortium for organising and facilitating gatherings and information exchange against an almost impossible timescale; all those cities involved in the Northern, North-Central & North-Western Europe group for sharing their climate adaptation experiences so willingly; and Dr Jeremy Carter from the University of Manchester, Stirling's coach throughout the project, for his knowledge, drive and enthusiasm for spreading the word about climate change and for his determination to ensure a quality project product for Stirling. Any errors, omissions or oversights are entirely the responsibility of the authors.

Climate Ready Stirling: Building Capacity & Delivering Action
Stirling Council's Climate Adaptation Strategy

Strategy Vision, Aim and Objectives

This is the first Climate Change Adaptation Strategy for Stirling and lays the foundation to:

- build the capacity needed to minimise negative impact and maximise any benefits;
- deliver practical actions to reduce climate risks or exploit opportunities; and
- assist in enhancing the area's overall resilience to extreme weather and climate change.

Strategy Vision:
A Council and community that make timely, far-sighted and well-informed decisions to address the risks and opportunities posed by a changing climate.

The main aim of the Strategy is:

To build a more climate resilient Stirling by enhancing the Council's capacity and preparedness to respond to the impacts of a changing climate.

In order to achieve this aim the Strategy has the following Objectives, to:

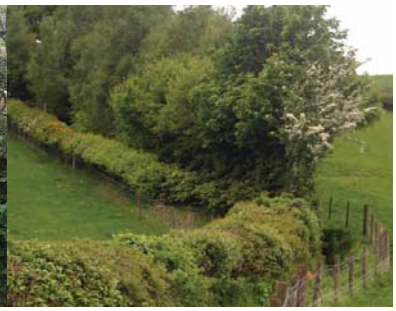
1. Raise awareness of climate change challenges, issues, threats and any opportunities;
2. Improve understanding of the impacts and costs of severe weather events by collecting, updating, synthesising and sharing information;
3. Strengthen the resilience of the Council by mainstreaming adaptation considerations into policies, plans, strategies and programmes
4. Improve understanding of potential adaptation costs and benefits in order to build more resilient infrastructure for future climate impacts;
5. Work with communities and external organisations to strengthen climate resilience throughout the Stirling area through partnership working;
6. Deliver practical adaptation actions in the built, social and natural environment; and
7. Continually review progress in developing a more resilient Stirling through monitoring, prioritising, managing and reporting adaptation activity.

Glossary

Adaptation	The process of adjusting to the actual or expected effects of climate change in order to limit harmful consequences or exploit beneficial opportunities.
Mitigation	Actions that reduce our contribution to the causes of climate change by reducing greenhouse gases and enhancing carbon storage.
Resilience	The ability of a system to adjust during or following changes or disturbances so that it can sustain required operations under both expected and unexpected conditions without significant loss of structure or function and return to a given state, rather than shift to a different state (the opposite of vulnerability).
Vulnerability	The degree to which a system is susceptible to, and unable to cope with adverse conditions, including climate variability and weather extremes (the opposite of resilience)
Transformation	The altering of fundamental attributes of a system. It is likely that measures to manage for *transitions* are going to be an increasingly significant part of the adaptation agenda where it will be important to adopt strategies that enable or facilitate the ability of a system to change in response to climate change, not just avoid or bounce back from the impacts.

Climate Ready Stirling

Summary



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The Climate is Changing

Climate change is one of the greatest challenges facing society. Warming of global climate systems can already be seen in increased air and ocean temperatures, widespread melting of snow and ice and sea level rise. The temperature increase is widespread across the planet and is greatest at higher northern latitudes. Land regions have warmed faster than the oceans. Sea levels are rising from a combination of melting glaciers, ice caps, and polar ice sheets and water expanding as it warms.

Analysis of ice cores going back many thousands of years shows that concentrations of greenhouse gases have increased markedly since 1750 and now far exceed pre-industrial values. The Inter-governmental Panel on Climate Change (IPCC) has concluded that most of the increase in global average temperatures since the mid-20th century is due to this increase in greenhouse gas concentrations[1]. There is significant evidence to show that, even with current emissions reduction policies and commitments in place, global greenhouse gas levels will continue to rise over the next few decades. Some climate change is inevitable due to historical emissions but actions to reduce emissions will be critical for determining whether the world experiences a high, medium or low emissions path.

IPCC estimates suggest business as usual use of fossil fuels will drive global average temperature up by between 1.4 and 6.4°C by 2100. This may seem like a small change but that is due to the distinction between weather and climate (see Box 1). In the 500 million years since the Pre-Cambrian it is estimated that global mean temperature varied by between +8°C and -6°C of the 1961-1990 mean. This range is just 14°C which, in terms of weather, is the difference between lying on a sunny beach and taking a hike in snow-covered mountains. In terms of climate, these are the boundaries within which the evolution of complex life took place: at the lower limit is a planet in deep glaciation; at the upper boundary tropical conditions are found near the poles.

Box 1. Weather or Climate?

The difference between weather and climate is a measure of time. Weather is what is happening outside the window right now, whilst climate describes longer-term patterns of weather averaged out over about 30 years. People are influenced by their most recent weather experiences and this is often given as evidence for or against climate change. But weather variability will always be greater than averaged-out changes in climate. Put simply, climate is what you expect and helps you decide what clothes to buy, whereas weather is what you get and helps you decide what clothes to wear.

The post-glacial period since the last ice age, about 11,000 years ago, has been a stable, warm period that gave rise to human civilisation within a narrow band of plus or minus 1°C of the 1961-1990 mean. Global average temperature is already estimated to have increased by 0.8ºC since pre-industrial levels. An increase of more then 1ºC goes beyond the range within which civilisations have prospered: when temperatures were last 2ºC above pre-industrial levels, ice-caps were much smaller and global sea level was at least 5m higher than today.

What needs to happen?

Governments across the world have agreed to work to keep global average temperature rise at or below 2ºC, a threshold which it is agreed would be dangerous to breach[2]. The risks are immense and can only be sensibly managed by reducing greenhouse gas emissions, which requires a low-carbon industrial revolution. However, the current pace of progress is not nearly rapid enough, with many industrialised countries being slow to make the transition to cleaner and more efficient forms of economic development.

[1] IPCC Fifth Assessment Report: Climate Change 2013 – The Physical Science Basis
[2] Main Objectives of the Cancun Agreements

Whilst the need to reduce greenhouse gas emissions to avoid the most severe impacts of climate change is an urgent one, society also needs to adapt to the effects of unavoidable changes to the climate from historical emissions lingering in the atmosphere. Reducing emissions and adapting to their effects should not be seen as alternatives but as a combined set of actions in an overall strategy to reduce and respond to the impacts of extreme weather and climate change. In general, the more quickly emissions are reduced the less will be the impacts to which we will have to adapt, and the less severe the risks for which we will have to prepare. Conversely, the better we prepare and adapt, the less may be the impacts associated with any given degree of climate change. And, unlike emissions reduction, adaptation will provide immediate local benefits as any measures will help residents to cope better with current climate variability and extreme weather.

Adaptation is not cost-free, but planned adaptation is more effective and less expensive than responding to an emergency or retro-fitting to cope with changed climate risks. Planning to adapt to the impacts of climate change can help communities save money, make better long-term decisions, and influence policies and incentives that foster climate mitigation and adaptation efforts. Ultimately, climate change adaptation planning can help protect people, property, and resources essential to community sustainability.

Trends & Projections

Over the last few decades, Scotland has become warmer, especially in spring and autumn, and wetter, especially in autumn, with an increase in total rainfall and heavy downpours. Severe weather events have already impacted many aspects of society such as agriculture, buildings, energy infrastructure, health, transport, and water resources.

The long-term climate change trends for Scotland are projected to be warmer and drier summers, milder and wetter winters and increasingly variable weather. We can also expect to see more frequent heatwaves, extreme temperatures and drought, more frequent intense rainfall events and flooding, and less frost and snowfall, with what is currently considered to be exceptional heat and precipitation events becoming more common and severe events becoming more extreme[3]. These are long-term average trends: there will always be short-term regional variations in the weather. These trends will bring challenges for many aspects of life, including Council service delivery. The extent, severity, and frequency to which Stirling will experience these impacts are dependent upon actions taken globally to reduce greenhouse gas emissions and locally to adapt to climate changes already underway.

Climate change acts as a 'risk multiplier', interacting with other trends to make it even more difficult to address poverty, disease, food and water insecurity across the world. Higher temperatures and changing patterns of precipitation are likely to affect the availability of food and water, leading to more hunger and increased volatility in food prices, affecting international stability and security. The consequences for the UK of climate changes in other parts of the world could be as important as changes directly affecting these shores[4].

Predicted Impacts

The Dept for Environment, Food & Rural Affairs' (DEFRA) Climate Change Risk Assessment for Scotland[5] indicates the potential impacts to be:

- Increased frequency & severity of river flooding;
- Higher groundwater levels and increased surface water flooding from more intense rain events leading to increased runoff and impacts on drains;
- Increased storm damage to buildings, roads, infrastructure (energy, ICT & phone networks, other transport);
- Water resource issues during drought;
- Health impacts from high temperatures, increased surface water & humidity, poorer air quality, increased survival and movement of disease vectors;

[3] UK Climate Projections 2009 (UKCP09)
[4] International Dimensions of Climate Change, UK Government Foresight report 2011
[5] A Climate Change Risk Assessment for Scotland, Defra

- Biodiversity - changing 'climate space' and migration patterns, increased water demand, warmer rivers & lakes, wildfires, new invasive species, risks from pests & diseases;
- Effects on agriculture & forestry;
- Coastal flooding & storm damage – potential storm swells up the River Forth.

As changes materialise, there will be significant impacts on the built, natural, and social environments within local authority areas: buildings, roadways, bridges, flood and storm-water control systems, public health systems, parks, woodlands and other aspects of our communities will be affected in both positive and negative ways. Severe weather events are already affecting the Council and its communities: landslides have blocked major transport routes, sudden cloud bursts flooded homes located well away from watercourses and winter service budgets overspent at significant cost. Such events are expected to become more frequent and more intense.

Potential Vulnerabilities

Built Environment

Hazards to buildings and infrastructure from flooding, storms, erratic freeze-thaw patterns, landslides and subsidence leading to increased water ingress, build-up of mould, travel disruption, disrupted supply chains, power outages, breakdown in communication systems, repair costs, distress for those directly affected, and rising insurance premiums. Higher temperatures and drought will require more cooling and improved water management to maintain supplies.

Natural Environment

Extreme weather events increase damage, or even mortality, to trees, plants and animals, especially the young. Higher temperatures threaten northern species at the southern portion of their range and increase vulnerability to new pests moving north and those previously controlled by cold winters, whilst invasive exotic species may be able to invade more vigorously. Animals dependent on plant communities that are changing will become vulnerable to loss of habitat, food sources and changes to food availability patterns. Wetland areas are vulnerable to both an increased frequency and intensity of severe rain events and longer, more frequent drought periods. Flash floods could cause erosion and damage to wetlands and also bring in more silt and sediment, increasing turbidity and decreasing functionality.

Social Environment

Additional hot days are likely to increase heat stress & humidity and reduce air quality leading to a higher incidence of heart attacks, respiratory problems, and vulnerability to disease outbreaks. Flood and standing water may be contaminated by sewage & harmful chemicals and provide a breeding ground for bacteria and other disease vectors. Extreme weather events can also precipitate emotional distress or even violent acts.

Impacts to businesses include reductions in asset value, higher costs from water & resource scarcity, insurance premiums, disruption to supply & delivery chains, utilities and transport, and a changing demand for goods and services. Extreme events will have greater impacts on sectors with closer links to climate, such as water, agriculture, food, forestry, health, and tourism.

Taking Action

National Legislation & Policy

- The Climate Change (Scotland) Act 2009 places a duty on public bodies to take action to adapt to the impacts of climate change.
- Scottish Government Planning Policy, 2010, recognises the need to adapt to the short- and long-term impacts of climate change and that these should be taken into account in all decisions throughout the planning system.
- The Flood Risk Management (Scotland) Act 2009 incorporates a joined-up, co-ordinated process to manage flood risk at a national and local level.
- Scottish Government and CoSLA Supplementary Guidance on Addressing Climate Change in Local Housing Strategies (2011) recognises that Scotland's climate is changing and that there is an increasing need to take account of these patterns by developing adaptation /

retrofit strategies for existing housing and by designing new-build housing with a range of weather-related risks in mind.

Current Activity
The following provides an overview of work already underway that will be built upon under the 5 themes of the Strategy Action Plan.

1. Communication & awareness- raising

- Information on Council climate change activity is communicated to the public through press releases, the Council's web-site and social media outlets.
- Flooding Officers have arranged numerous meetings with communities seen as most at risk from flooding with the aim of providing information on what has happened in previous flood events, what the Council has done to investigate the flooding, and options for reducing the impact of future flood events. The community is also advised on what actions they can take to help themselves, with discussions on property-level protection and the setting up of flood forums within communities.

2. Improving understanding

- A local Weather Impacts Profile for Stirling focussed on extreme weather impacts affecting the area between 2000 and 2010 to highlight potential vulnerabilities that may become more common in the future in order to better understand current exposure to weather and climate.
- Flood modelling and mapping have been used to identify areas at greatest flood risk and maps currently cover the Rivers Allan, Forth and Teith, plus part of the Endrick at Fintry.
- Appraisals to consider the viability of flood protection options have been carried out for those urban areas seen as most at risk from river flooding.
- The Central Scotland Green Network (CSGN) and Scottish Natural Heritage (SNH) have commissioned research into Integrated Habitat Networks (IHNs) to asses the ease with which species can move through and between them to prevent isolation.

3. Mainstreaming adaptation considerations

- One of the Single Outcome Agreement's Outcomes aims to make sure neighbourhoods are well served and safe, including ensuring that communities are resilient to climate change.
- One of the Council's Sustainable Development Strategy Framework's 4 Objectives includes working to reduce the effects of climate change.
- The Council signed Scotland's Climate Change Declaration in January 2007, which includes a commitment to take steps to adapt to the unavoidable impacts of a changing climate.
- The Council Risk Register considers failure to discharge the Climate Change Act's Public Bodies' Duties as a corporate risk.
- The Proposed Stirling Local Development Plan Policies and Supplementary Guidance include a range of issues relevant to climate adaptation.
- The need to adapt to a changing climate is recognised in the Open Space Strategy and draft Stirling Biodiversity Action Plan, but more could be done to better integrate adaptation actions.

4. Working in partnership

- Community Resilience Plans are being developed by working with Community Councils.
- Stirling Council is a member of 4 Flood Districts and is working in partnership to deliver Local Flood Risk Management Plans for each by June 2016.
- The Council is the lead local authority working to develop a Forth District Local Flood Risk Management Plan for mid-2016.
- The Council works with partners in the Strategic Housing Forum and Private Rented Sector Forum to raise awareness of the risk from floods, the measures that can be taken to minimise the number of people affected by floods and joint working that would be required in the event of a flood.

5. Delivering action

- The Severe Weather Management Framework identifies a list of triggers and actions associated with severe weather that allow a proactive response.
- The Stirling and Bridge of Allan catchment has been identified as a priority for a Surface Water Management Plan.
- Discussions with Council Services, particularly roads, have been taking place to help them adapt their work to prepare for flooding and reduce the impact to their service and the public.
- Ten river gauges have been installed on a number of rivers at most risk of flooding to provide advance warning of rising water levels.
- The Council's Countryside team are working to protect peat soils and bog habitats

Stirling Council has taken the first steps in planning for climate change through its Flood Risk Management, Emergency Planning and Local Development Plan work but needs to take a more proactive approach in preparing for the impacts from changes in climate that are already underway. Taking action today can save the community money in the long run as the costs from extreme weather will keep rising so long as the world continues to warm. Stirling is at the beginning of its adaptation planning and the Climate Adaptation Strategy and Action Plan provide a solid foundation for further climate protection work.

Climate Ready Stirling

Delivering the Vision

A Climate Adaptation Action Plan for Stirling

September 2014

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Overview
Adapting to climate change provides the Council with an opportunity to plan for the future and ensure safe and efficient service delivery whilst protecting the public good in response to severe weather impacts. In order to take climate impacts seriously they need to be at the heart of current decisions and investments as these will determine how we live with climate change in years to come.

Evidence for global climate change, the expected changes to our climate, and the likely impacts for Scotland are outlined in the Strategy Main Issues Report. That document also provides evidence that severe weather events are already affecting the Council and its communities, with operational, reputational, financial and legal consequences: landslides have blocked major transport routes, sudden cloud bursts flooded homes located well away from watercourses and winter service budgets significantly overspent. The evidence indicates that these changes are part of a trend and that such events are likely to become more intense and more frequent. There is also evidence that some of the impacts may be disproportionately weighted towards more deprived and less resilient households

The Council is already delivering actions that contribute to climate resilience, although many may not currently be identified as climate adaptation actions. Activity that manages the threats of climate change should be flexible and include multiple benefits – not just for climate resilience but for other environmental, social and economic objectives.

The purpose of this Action Plan is to help the Council to manage our climate risks to an acceptable level and enable us to exploit any opportunities that may arise. Adaptation actions fall into two broad categories:

1. Building adaptive capacity helps to eliminate barriers or constraints by creating and improving supportive institutional frameworks; improving understanding of climate change, risks and impacts; and developing appropriate policies, plans and strategies.

2. Delivering adaptation actions involves taking practical action to reduce climate risks or exploit opportunities. Actions range from simple solutions to large scale infrastructure projects, including new flood defences and developing new services. Practical actions will be most effective when built into planned maintenance and investment programmes.

Governance & Management
It is important to clearly define governance and ownership of this Adaptation Action Plan to ensure that actions are delivered within defined timescales. This requires regular meetings of key personnel to review delivery, combined with management oversight to identify and remove barriers to implementation. Each Service is expected to generate appropriate actions to improve resilience on an ongoing basis. Each Director is responsible for implementation of adaptation actions as they apply to their own Service and is also responsible for ensuring that appropriate resources (capital, revenue, staff time, etc) are made available to support their implementation.

The Council Environment & Housing Committee formally adopted the Climate Adaptation Strategy in September 2014. The Chief Executive, as strategic lead for sustainability, will oversee its implementation and ensure annual reports are submitted to Committee to review progress.

Delivery of the Action Plan will be monitored by the Sustainable Development & Climate Change Working Group, established by Stirling Council in January 2014 to guide delivery of the public sector duties required by the Climate Change (Scotland) Act 2009. The Working Group meets quarterly and is chaired by the Director of Housing & Environment as strategic corporate lead for sustainability. Membership covers Senior Managers and Managers from key areas across the Council involved with delivering a more sustainable Stirling. Membership will be kept under review to ensure that Managers with responsibility for delivering policies and proposals in the Action Plan are appropriately represented.

Taking Action
In many cases, Stirling Council already has strategies or policies in place to protect against those impacts likely to pose the greatest risk, such as more frequent flooding events. The Adaptation Action Plan complements these sectoral responses, by providing guidance for a sustainable approach to climate change adaptation and encouraging greater integration of policy across services. The Adaptation Action Plan, and associated commitment to public reporting, will also demonstrate leadership and help to catalyse action across the Community Planning Partnership and wider community.

Action Plan Themes
In order to achieve its Aim and Objectives, the Strategy has the following themes:

1. Communicate & raise awareness
of climate change challenges, issues, threats and any opportunities.

2. Improve understanding
of potential climate change impacts and costs that are crucial for adaptation.

3. Mainstream adaptation considerations
into policies, plans, strategies and programmes.

4. Work in partnership
with communities and other organisations to strengthen climate resilience across the area.

5. Deliver practical actions & review progress
through monitoring, prioritising, managing and reporting adaptation activity.

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Climate Change Adaptation Action Plan

Theme 1. Communicate & raise awareness of climate change challenges, issues, threats and any opportunities

More needs to be done to raise awareness across the Council and beyond of the potential risks of climate change, measures to build preparedness for dealing with its impacts, and the differing responsibilities of homeowners, businesses and public sector organisations. The Stirling Weather Impacts Profile, 2000-2010, highlighted the need to educate and inform the wider community regarding public sector responsibilities versus what they are individually responsible for. This will be particularly important as severe weather becomes more common and Council resources become more stretched. In such circumstances, greater public and individual responsibility will become more of a necessity. Consulting both within the Council and externally with partners and communities on the contents of this Strategy and publicising other relevant information will assist in raising awareness of many of the issues.

No.	Action	Service	Lead	Completion Date	Status
1.1	Develop a Communications Plan to include: • Publication and circulation of the adopted Adaptation Strategy; • Issuing press releases and articles on development and delivery of the Strategy; • Taking the opportunity to present the Plan to internal and external audiences; and • Producing a brief summary to increase accessibility.	Housing & Environment	Environment (Angela Heaney)	August 2014	
1.2	Raise awareness of flood risk across communities by: • consulting those involved in the option appraisal process (Aberfoyle, Bridge of Allan, Callander and Stirling) via Community Council and open meetings; • informing the wider public via community meetings and newsletters; • maintaining Council web pages with most current flooding information and measures to improve individual household resilience.	Housing & Environment	Flooding Team (Ian Young)	Dec 2015 Ongoing Ongoing	
1.3	Develop and promote our 'Warning and Informing' procedures to advise communities before, during and after incidents.	Corporate Operations	Resilience & Risk (David Bright)	March 2015	

Theme 2. Improve understanding
Knowledge of potential climate change impacts and costs is crucial for adaptation

It is clear that the Council is at risk from severe weather events but reducing that risk and potential impacts cannot be managed without better quantification and assessment of those impacts. A system of monitoring and recording the impacts and consequences of severe weather events on assets and service delivery would provide a more comprehensive overview of impacts across the whole organisation that could be more readily analysed to indicate areas for improvement, especially as severe weather events become more common.

Quantitative information on the costs and benefits of practical adaptation actions is currently limited, but some studies in climate-sensitive sectors indicate that many of the options provide benefits in excess of cost. More in-depth studies are required and relevant data included in updates to the Council's Adaptation Strategy as information becomes available to incorporate more specific and targeted adaptation actions.

No.	Action	Service	Lead	Completion Date	Status
2.1	Carry out risk assessment workshop with service managers	H&E & Corporate Operations	Angela Heaney & David Bright	Early 2015	
2.2	Establish a system for monitoring and recording the impacts and consequences (including financial) of severe weather events [needs further discussion – potentially at Adaptation workshop outlined in 2.1]	tbc	tbc	2015	
2.3	Continue to carry out flood studies[6] to identify areas at flood risk and measures to reduce this risk: • Bridge of Allan Surface Water Management Plan • Fluvial Flood Alleviation Option Appraisal (Aberfoyle, Bridge of Allan, Callander, Stirling)	Housing & Environment	Flooding Team (Ian Young)	Sept 2014 Sept 2014	
2.4	Common Recognised Information Picture (CRIP) template to be adopted to collate incident details and impacts.	Corporate Operations	Resilience & Risk (David Bright)	June 2014	

[6] Such studies incorporate an allowance for climate change when assessing risk but are not climate change impact studies

Theme 3. Mainstream adaptation considerations into policies, plans, strategies and programmes

Implementing this Strategy requires that all Council policy, procedures, and operations are viewed through a "Climate Lens" and updated to include any relevant modifications. This includes ensuring that any weather and climate change risks continue to be incorporated into existing asset management plans and added to Service, Corporate and Project Risk Registers and risk management processes. All Services' contingency plans need to consider the impacts of large-scale and unpredicted weather events, such as heavy rainfall, heat waves, drought and snow / ice.

Continuing adoption of a number of flexible working practices will assist business continuity during future severe weather events and will be of increasing importance as climate change projections materialise. These include widespread adoption of flexi-time to avoid difficult travel situations, working from home when office access is restricted, greater access to centrally held computer information, and more use of video-conferencing or equivalent technology. Provision of clear protocols on who takes charge in different locations in an emergency and checklists for dealing with electricity and IT outages would also prove beneficial.

No.	Action	Service	Lead	Completion Date	Status
3.1	Ensure climate considerations are included in all relevant policies, plans, strategies and programmes, including reviews of existing policies:				
	• a) Ensure climate change considerations are incorporated into Capital Programme projects.	Corporate Operations	Infrastructure Delivery (Brian Roberts)	Annually	
	• b) Integrate climate change considerations into risk management processes. Monitor and manage through Risk Register.	Corporate Operations	Resilience & Risk (David Bright)	March 2015	
	• c) Integrate climate change considerations into future iterations of the City Investment Plan	CEO	Economic Development (Carol Beattie)	2016	
	• d) Incorporate adaptation issues into Procurement policy and procedures to ensure resilience to impacts	Communities & Partnerships	Manager – Strategic Procurement	tbc	
	• e) Integrate climate change considerations into Service Asset Management Plans	Corporate Operations	Infrastructure Developments & Service Managers	2016	
	• f) Integrate climate change considerations into Pitch & Pavilion Strategy	Corporate Operations & H&E	Infrastructure Developments (Drew Leslie)	Summer 2014	

	• g) Integrate climate change considerations into the Biannual Review of the School Estate	Corp Ops + C,Y P & E	Infrastructure Developments (Drew Leslie)	January 2015	
	• h) Integrate climate change considerations into Property Performance Procedures	Corporate Operations	Infrastructure Developments (Drew Leslie)	End of 2015	
	• i) Integrate climate change considerations into Roads Asset Management Plan	Housing & Environment	Roads & Transport (Jamie Wright)	November 2014	
3.2	Consider climate change when undertaking flood studies and ensure any alleviation schemes are sustainable and can be enhanced as needed.	Housing & Environment	Flooding Team (Ian Young)	Ongoing	
3.3	Ensure climate change and increased flood risk is considered in determining planning applications	Housing & Environment	Flooding Team (Ian Young)	Ongoing	

Theme 4. Work in partnership with communities and organisations to strengthen climate resilience across the area

The Council and Community Planning Partners play a major role in setting the course for Stirling's future. This Adaptation Strategy should be utilised in that process and incorporated into the Single Outcome Agreement and other strategic plans to provide the climate focus necessary to co-ordinate policy, make land use decisions, identify appropriate capital improvement projects, and inform funding priorities in order to ensure a more climate resilient future for the area and its communities. To move adaptation efforts forward effectively, partner organisations and the wider public need to be made aware of the potential threats and opportunities for the area and given the opportunity to contribute to climate adaptation activity. One way to accomplish this is to incorporate discussions about climate change and sustainability into wider community consultation processes that will ultimately support the area's communities into the future.

No.	Action	Service	Lead	Completion Date	Status
4.1	Hold Community Planning Partnership Adaptation event	Communities & Partnerships	Manager - Communities	Highlighted as a future agenda item for the CPP leadership Group.	
4.2	Promote, develop and support Community Resilience through Community Emergency Plans. In April 2014, 12 Community Council areas had plans in place and 14 were developing plans. Work will focus on encouraging the 17 communities not currently engaged, whilst also supporting those that are.	Corporate Operations	Resilience & Risk (David Bright)	Community Event 29 March 2014 Programme to March 2015	
4.3	a) Lead development of Forth District Flood Risk Management Plan	Housing & Environment	Flooding Team (Ian Young)	June 2016	
	b) Participate in developing 3 other District Flood Risk Management Plans	Housing & Environment	Flooding Team (Ian Young)	June 2016	
4.4	Consult with Community Flood Forums (active in Callander, potential in Aberfoyle)	Housing & Environment	Flooding Team (Ian Young)	As required	
4.5	Upper Allan Water Natural Flood Management Project (led by SEPA) - consider projects (such as planting and watercourse realignment) to reduce flood risk in Bridge of Allan	Housing & Environment	SEPA & Flooding Team (Ian Young)		
4.6	Work with Emergency Services to develop improved response to flood events, including purchase of equipment	Housing & Environment	Flooding Team (Ian Young)	October 2014	
4.7	Investigate partnership possibilities and potential of EU 2014-2020 funding to support climate adaptation action	H&E + Corporate Operations	Environment (Angela Heaney)	October 2014	

Theme 5. Deliver practical actions & review progress through monitoring, prioritising, managing and reporting adaptation activity.

Delivering adaptation actions involves taking practical action to reduce climate risks or exploit opportunities in the built, social and natural environment. Actions range from simple solutions to large scale infrastructure projects, including new flood defences and developing new services, and will be most effective when built into planned maintenance and investments.

Progress in delivery will be achieved through monitoring, prioritising, managing and reporting adaptation activity across Services and beyond.

No.	Action	Service	Lead	Completion Date	Status
5.1	Sign up to EU Mayors Adapt, the Covenant of Mayors initiative on climate change	Housing & Environment	Environment (Angela Heaney)	September 2014	
5.2	Outcomes of refined option appraisal reports and Surface Water Management Plan will determine which flood alleviation options will be implemented: • Aberfoyle • Bridge of Allan, Callander, Stirling	Housing & Environment	Flooding Team (Ian Young)	August 2014 October 2014	
5.3	Implement programme of small works to reduce flood risk, as set out in District Flood Risk Management Plans: • Improve drainage • Upgrade culverts • Maintain culvert inlets	Housing & Environment	Flooding Team (Ian Young)	At the end of the FRM Plan 6-year cycle	
5.4	Implement programme to install individual household protection against flooding to Council properties	Housing & Environment	Housing Management (Gregor Wightman)		
5.5	Annual reporting to Committee via Sustainable Development & Climate Change Working Group	Housing & Environment	Environment (Angela Heaney)	Each autumn	