

CLIMATE CHANGE ADAPTATION

ACTION PLAN
2013-2015





CONTENTS

| | |
|--|----|
| INTRODUCTION..... | 3 |
| Climate Change..... | 3 |
| Climate Change Adaptation..... | 4 |
| Climate Change Impacts for Adelaide | 5 |
| STRATEGIC AND LEGISLATIVE CONTEXT | 8 |
| Legislative Requirements..... | 8 |
| Regional Planning Process..... | 8 |
| REVIEW OF CLIMATE CHANGE ADAPTATION ACTION PLAN 2011-2013..... | 9 |
| ACTION PLAN – COUNCIL'S RESPONSE..... | 10 |
| Strategic Relationships and Links..... | 10 |
| Principles | 10 |
| Strategies and Actions | 12 |
| Monitoring and Implementation..... | 13 |
| Review | 13 |
| REFERENCES | 13 |
| APPENDIX A: SUMMARY OF CCAAP 2011-2013 COMPLETED ACTIONS..... | 14 |

1. INTRODUCTION

CLIMATE CHANGE

Changes to the global climate are now considered unequivocal, and are evident from observations of increases in global average air and ocean temperatures, widespread melting of snow and ice, and rising average sea level (IPCC 2013). The Intergovernmental Panel on Climate Change (IPCC) continues to increase its level of confidence in climate change predictions and the evidence linking human activities and climate change (IPCC 2013, Climate Council 2013).

The observed trends in global climate are correlated with an increase in greenhouse gas emissions since pre-industrial times, and scientists have concluded that "It is extremely likely that human influence has been the dominant cause of the observed warming since the mid-20th century" (IPCC 2013).

A report released by the Australian Climate Commission entitled *The Angry Summer* (2013) outlined the extreme climate records set throughout Australia over the 2012/13 summer. The report unequivocally links these temperature extremes to human induced climate change.

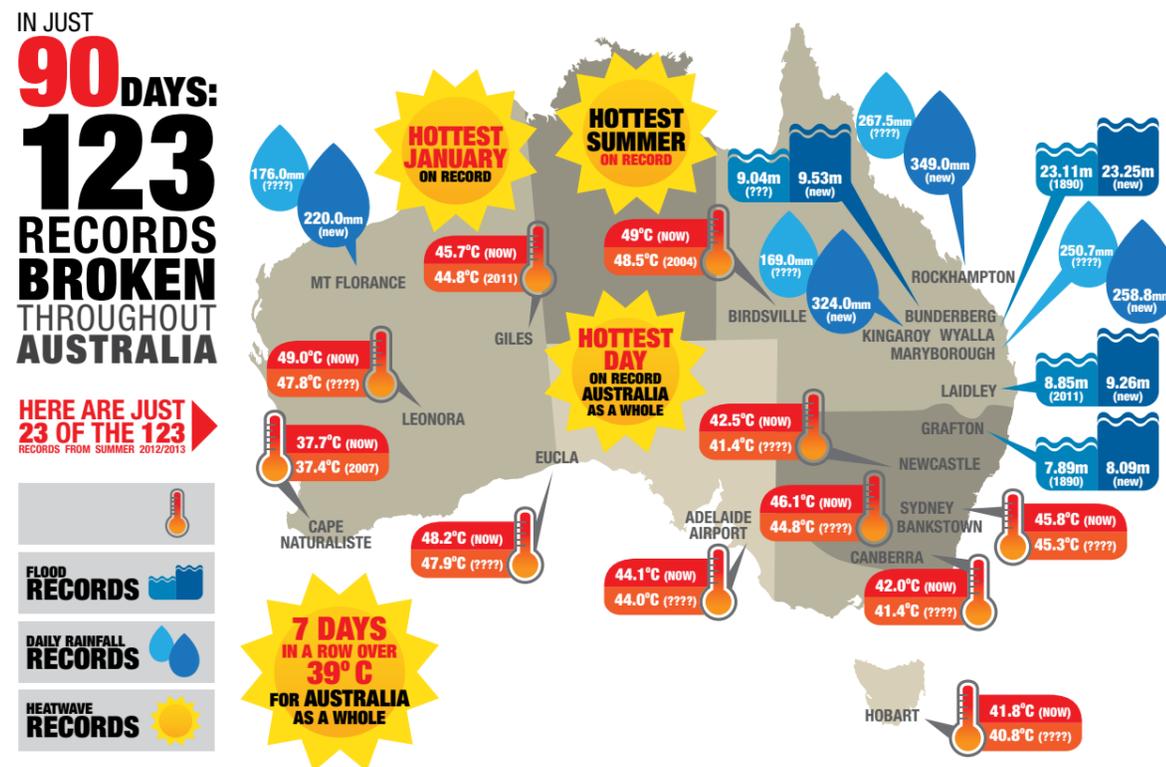
The Bureau of Meteorology and CSIRO's recently released "State of the Climate 2012" report highlights a number of climate trends which continue to match previous climate change predictions, including:

- Australian annual average daily mean temperatures have increased by 0.9 °C since 1910.
- Setting of extreme climate records continue to increase, for example: "The frequency of extreme (record) hot days has been more than double the frequency of extreme cold days during the past ten years".
- Each decade has been warmer than the previous decade since the 1950s.
- There has been a trend over recent decades towards increased spring and summer monsoonal rainfall across Australia's north; higher than normal rainfall across the centre; and decreased late autumn and winter rainfall across the south.

Climate records have continued to be set throughout 2013, with September 2013 the hottest September on record and the 12 month period up to this point also being the hottest on record (Bureau of Meteorology, 2013).

South Australia has experienced similar trends, for example since the 1950's, the average temperature has increased by 1.1°C (0.20°C per decade) (CSIRO 2007).

These statistics reflect the previous modelled predictions for Adelaide of increases in the number of extreme heat days, a decrease in annual average rainfall and an increase in the number of days of very high to extreme bushfire weather (Table 1; CSIRO 2007).



| Variable | Current | 2030 |
|--|-----------|-----------|
| Table 1 Summary of predicted climate changes in Adelaide to 2030 under a A1B 'low emissions' scenario (Source: CSIRO 2007; Lucas et al. 2007) | | |
| Extreme Heat Days – Number of days over 35°C | 17 Days | 23 Days |
| Rainfall – Average annual rainfall | 553.4mm | -4% |
| Extreme Rainfall – daily rainfall intensity (1 in 20 year event) | n/a | +3% |
| Bushfire weather – number of days Very High / Extreme Fire Weather | 19.5 Days | 41.1 Days |

The World Bank report entitled *Turn Down the Heat: Why a 4° World Must be Avoided* outlines that commitments to emissions reductions made in the latest rounds of climate negotiations in Copenhagen and Cancun, if fully met, would result in average global warming of well over 3°C with a 20% chance of exceeding 4°C by 2100. If not met, the chance of exceeding 4°C by 2100 is over 40%, with a 10% possibility by the 2070s (World Bank, 2012). Table 2 outlines the impact of these emissions scenarios on the number of extreme heat days Adelaide will experience to 2070.

| Variable | Current | 2030 low emissions scenario (A1B) | 2070 low emissions scenario (B1) | 2070 highest emissions scenario (A1FI 90th percentile) |
|--|---------|-----------------------------------|----------------------------------|--|
| Table 2: Number of annual extreme heat days in Adelaide to 2070 comparing the lowest and highest emissions scenarios (CSIRO 2007) | | | | |
| Extreme Heat Days – Number of days over 35°C | 17 | 23 | 26 | 47 |

Figure 1: *The Angry Summer* (Source: Australian Climate Commission)

CLIMATE CHANGE ADAPTATION

Global action on climate change is now widespread on two fronts: reducing emissions to limit future climate change (mitigation) and changing the way our environments are managed and shaped in response to the impacts of climate change (adaptation).

Mitigation is a response to the scientific conclusion that greenhouse gas emissions from human activities are responsible for climate change. Adaptation should be undertaken regardless of the perceived cause of climate change – it is an essential process of preparing societies and ecological systems for a changed climate. Given that climate change is unavoidable due to rising emissions and these changes are now starting to be observed, adaptation planning is needed now.

There remains uncertainty around predictions of climate change and its impacts. Therefore, adaptation planning is not a case of preparing for a predictable stable future climate, but of building a responsive and flexible framework for coping with and adapting to emerging climatic conditions.

Adaptation planning is based on the following:

- An understanding of expected climate change impacts.
- Assessment of the predicted impacts of various climate change variables.
- Assessment of the risks posed by the impacts.
- Assessment of the community and environment's vulnerability to the risks.
- Development of strategies and actions to manage those risks and build community and environmental resilience.

CLIMATE CHANGE IMPACTS FOR ADELAIDE

Climate change will impact on a wide range of aspects of the lives of people who live in and use the City. It will also impact on natural and man-made systems. Risks and impacts associated with climate change encompass a broad range of social, environmental and economic aspects of our existence as well as Council's operational and planning roles.

Adelaide City Council is the owner and manager of many natural and built assets (e.g. 750 hectares of Park Lands, public realm, biodiversity, stormwater infrastructure and waterways, car parks, aquatic centre, golf links, community centres and libraries) and provides a wide range of services to the City community.

Some impacts of climate change for the City are described below.

Decline in liveability and comfort in the City caused by higher temperatures and more intense heat waves:

- Outdoor activities (events, sports etc.) become more uncomfortable and present greater health risks.
- Environment for pedestrians and cyclists will be less comfortable.
- Demand for outdoor activities, sports and use of Park Lands for events may change to cooler times of year.
- The City may become a less attractive place to shop and socialise as people seek cooler indoor environments.

Vulnerable members of the community are exposed to greater levels of risk during extreme weather events (extreme heat or flooding), particularly adverse health outcomes:

- People with chronic illness, people with a disability or frail older people may be socially isolated and less able to care for themselves.
- People experiencing homelessness may not be able to seek shelter.
- People on low incomes may be vulnerable due to the high cost of energy and increased air conditioning use.

Increased stress on vegetation caused by lower rainfall and increased temperatures:

- Higher water consumption and potentially increased maintenance required for parks and gardens.
- Potentially higher risk of limb drop caused by increased stress on trees.

Increased energy consumption, particularly peak consumption, associated with higher summer temperatures:

- Higher average temperatures and peak temperatures will increase the use of air conditioning.

- Higher air conditioner use will increase peak electricity consumption resulting in greater pressure on electricity supply infrastructure.

Potential increased flooding risk resulting from increase in extreme rainfall events:

- Disruption to transport and movement throughout the City during flooding events.
- Damage to property and infrastructure from flooding.

Exacerbation of the urban heat island effect requiring changes to urban design and planning approaches:

- Overall design of the City, such as building orientation and setbacks, and street layouts, exacerbates the heat island effect.
- Insufficient shading in public places (e.g. trees and shade structures).
- Insufficient 'green infrastructure' (water, parks, trees, water sensitive urban design) to cool the City.
- High prevalence of heat absorbent materials for pavements, roads and buildings.

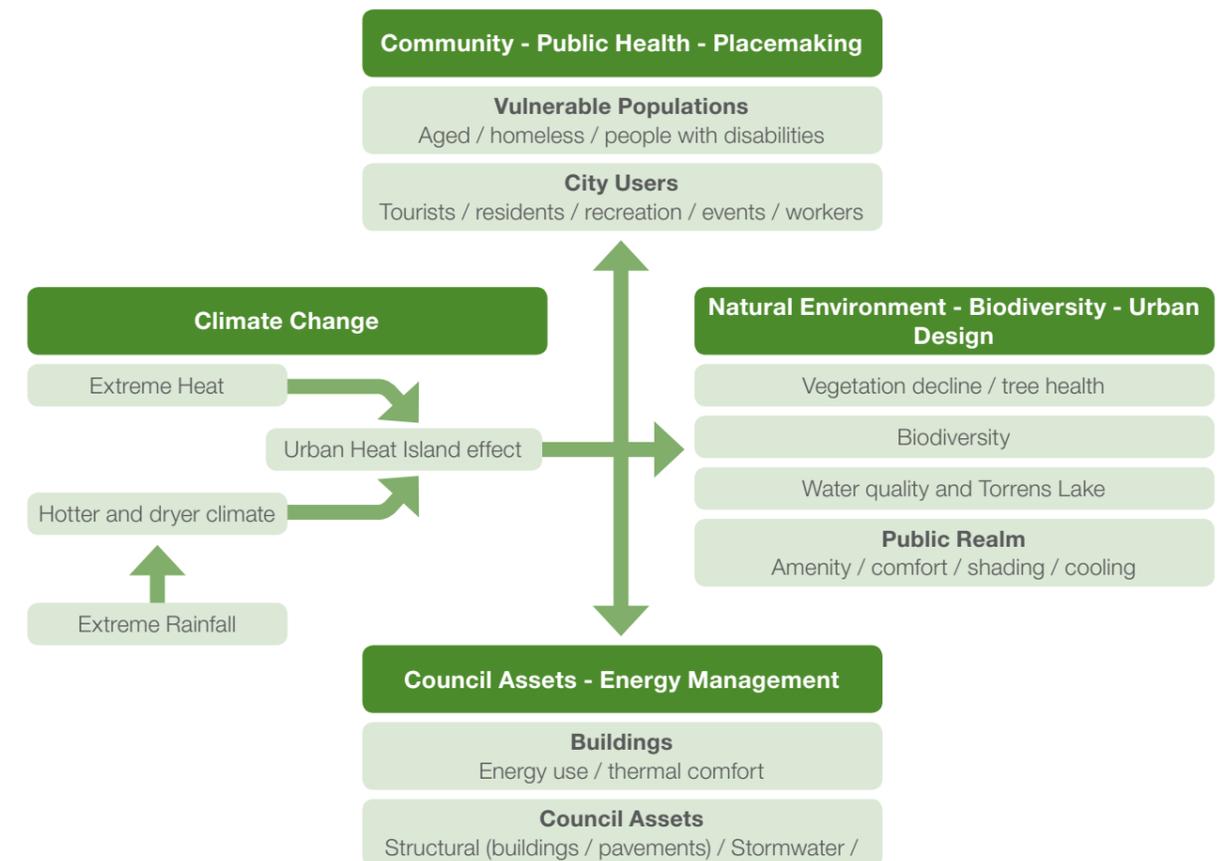


Figure 2: Outline of relationship between climate change impacts and key adaptation risks, issues and vulnerabilities.

Plants and culture

Plants convert sunlight into food and provide oxygen for us to breathe.

Plants are so important to our existence that they are often acknowledged within our culture through rituals and spiritual beliefs.

2. STRATEGIC AND LEGISLATIVE CONTEXT

Council's Strategic Plan 2012-2016 includes the vision 'Adelaide: One City, Many Places'. The Strategic Plan describes a vision of vibrant, productive and creative places, centred on the liveability and activation of the City, with ambitious targets to increase resident and working populations.

The Strategic Plan includes six outcomes: a City of Great Places, Accessible City, Creative City, Liveable City, Prosperous City and an Environmentally Sustainable City.

Council's vision mirrors the State Government's vibrant city goals and desired outcomes, including those articulated in the 30 Year Plan for Greater Adelaide.

This vision is also encapsulated in Council's Placemaking Strategy, with a purpose of "...creating a series of well planned, connected and unique districts..." and to develop "Great places for living and for community life to flourish. Great places for businesses to start up and grow. Great places for knowledge and creativity to build".

Climate change presents challenges and risks to this vision for the City.

LEGISLATIVE REQUIREMENTS

The following subsections of the Local Government Act 1999 form the legislative basis for climate change risk management and adaptation for Council:

Section 6 - Principal Role of Council

6 (c) to encourage and develop initiatives within its community for improving the quality of life of the community

Section 7 - Functions of Council

7 (a) to plan at the local and regional level for the development and future requirements of its area;

(c) to provide for the welfare, well-being and interests of individuals and groups within its community;

(d) to take measures to protect its area from natural and other hazards and to mitigate the effects of such hazards;

(e) to manage, develop, protect, restore, enhance and conserve the environment in an ecologically sustainable manner, and to improve amenity;

(f) to provide infrastructure for its community and for development within its area (including infrastructure that helps to protect any part of the local or broader community from any hazard or other event, or that assists in the management of any area)

REGIONAL PLANNING PROCESS

Numerous councils in Australia and South Australia have begun to actively plan for the impacts of climate change on their environments, communities and organisations.

In South Australia, the State Government's Climate Change Adaptation Framework (the Framework) has established regional groupings for climate change adaptation planning.

A number of South Australian regions identified under the Framework have begun to undertake Integrated Vulnerability Assessments (IVA) and regional climate change planning.

In 2013 Council resolved to participate in a regional climate change planning process with councils in the Eastern Region Alliance (ERA). The ERA consists of the Cities of Tea Tree Gully, Campbelltown, Burnside, Unley, Norwood Payneham and St Peters, and Prospect; and the Town of Walkerville.

This Action Plan has been developed to ensure that Council continues to maintain a process of managing climate change impacts and risks while a broader regional framework is developed in conjunction with the ERA councils.

An Integrated Vulnerability Assessment considers not only the potential impacts of climate change on regional economies, communities and natural environments but also their capacity to adapt to the changes, and the interconnections between the sectors.

REVIEW OF CLIMATE CHANGE ADAPTATION ACTION PLAN 2011-2013

The Climate Change Adaptation Action Plan 2011-2013 (CCAAP 2011-2013) established an adaptation response to the impacts of climate change in the City of Adelaide. It defined strategies and actions for high and extreme risks, allocated responsibility within Council for the actions, and established processes for building implementation into Council's Risk Management Framework and Business Plan and Budget process.

In recognition of the imperative for climate change adaptation planning to be dynamic and responsive, the Action Plan was scheduled for review 2-3 years after endorsement.

This review has been undertaken with the following aims:

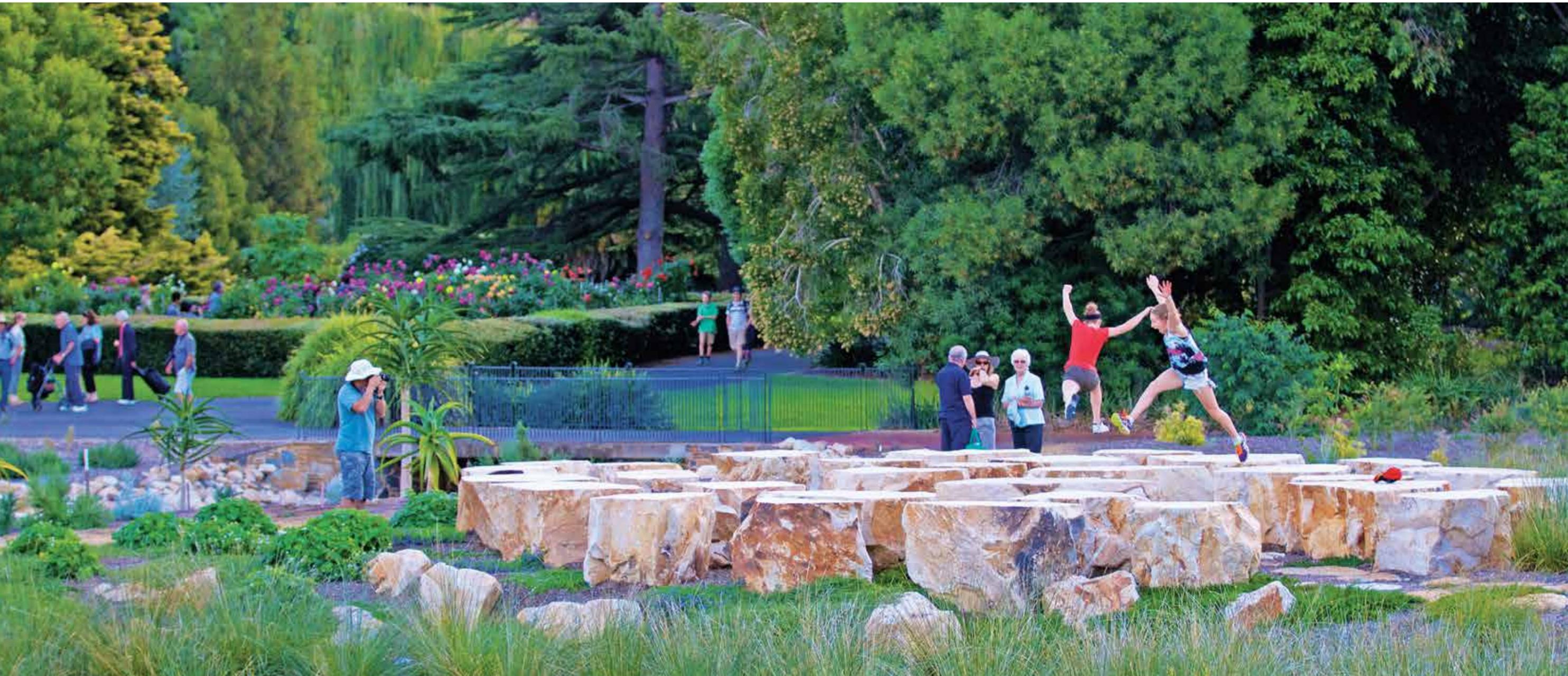
- Assess progress of actions against the original targets for delivery.
- Evaluate the appropriateness and relevance of the actions and overall approach to climate change adaptation.
- Ensure that immediate risks are being appropriately managed.
- Monitor the progress of the State Government Climate Change Adaptation Framework and Council's regional partners current status in relation to adaptation planning.
- Re-evaluate relevant data, research and resources in relation to climate change and impacts.

Important learnings and directions from the review include:

- Understand and refine Council's role. Council is one organisation among many that is impacted by climate change and responsible for adaptation planning. As climate change adaptation planning evolves Council will evaluate its role and improve collaboration with other agencies and organisations.
- Incorporate climate change adaptation into existing Council frameworks. The actions within the CCAAP 2011-2013 overlap with the responsibilities of a range of Programs within Council. The focus of a revised action plan should be on ensuring that these Programs adequately incorporate climate adaptation planning within existing frameworks rather than dictating specific responses to programs or duplicating responses.
- Continuous engagement. A greater emphasis is needed on raising the profile of the issues and risks associated with climate change and empowering Council Programs to engage with and respond to the issues.

- Identify priorities and focus Council's efforts. Given the uncertainty and timeframes apparent in adapting to climate change and challenges with ongoing engagement, it is worthwhile narrowing the immediate focus or 'core' actions to ensure that immediate priorities are met and resources are appropriately targeted. This will ensure greater focus and engagement of the Council and community as a whole.
- Follow emerging research and best practice. There is a constantly growing body of knowledge on the impacts of climate change and adaptation responses. An important component of adaptation planning is communicating climate science and best practice responses and incorporating this into Council's planning and processes.

Appendix A provides a summary of the review of key strategies and actions in the CCAAP 2011-2013.



3. ACTION PLAN – COUNCIL’S RESPONSE

STRATEGIC RELATIONSHIPS AND LINKS

A key element of Council’s climate change adaptation planning is incorporating adaptation responses within existing Council decision making and planning frameworks. This will involve aligning climate change adaptation planning with ‘business as usual’ processes of Council (Figure 3).

Adaptation to climate change requires an integrated and collaborative response between Council Programs, organisations and the community. For example, within the Park Lands context, climate change adaptation will require planning and delivery via numerous Council Programs, including Active City, Vibrant City, Infrastructure Management, City Planning, City Design and Sustainable City.

Additionally, it is necessary to identify any gaps in climate change planning and determine Council’s role in responding to these. As climate change will impact on many areas of our lives it is important that we continue to build our understanding of the responses that are needed as evidence of the impacts grows and changes in climate occur.

PRINCIPLES

Council will adopt the following principles as the basis for integrating climate change adaptation into all of Council’s activities:

1. Council projects will contribute to adapting the City for climate change.
2. Council will engage with the community to build resilience and capacity to adapt to climate change.
3. Council will utilise the best available information on climate change adaptation to inform the development of strategies, policy and delivery of projects.

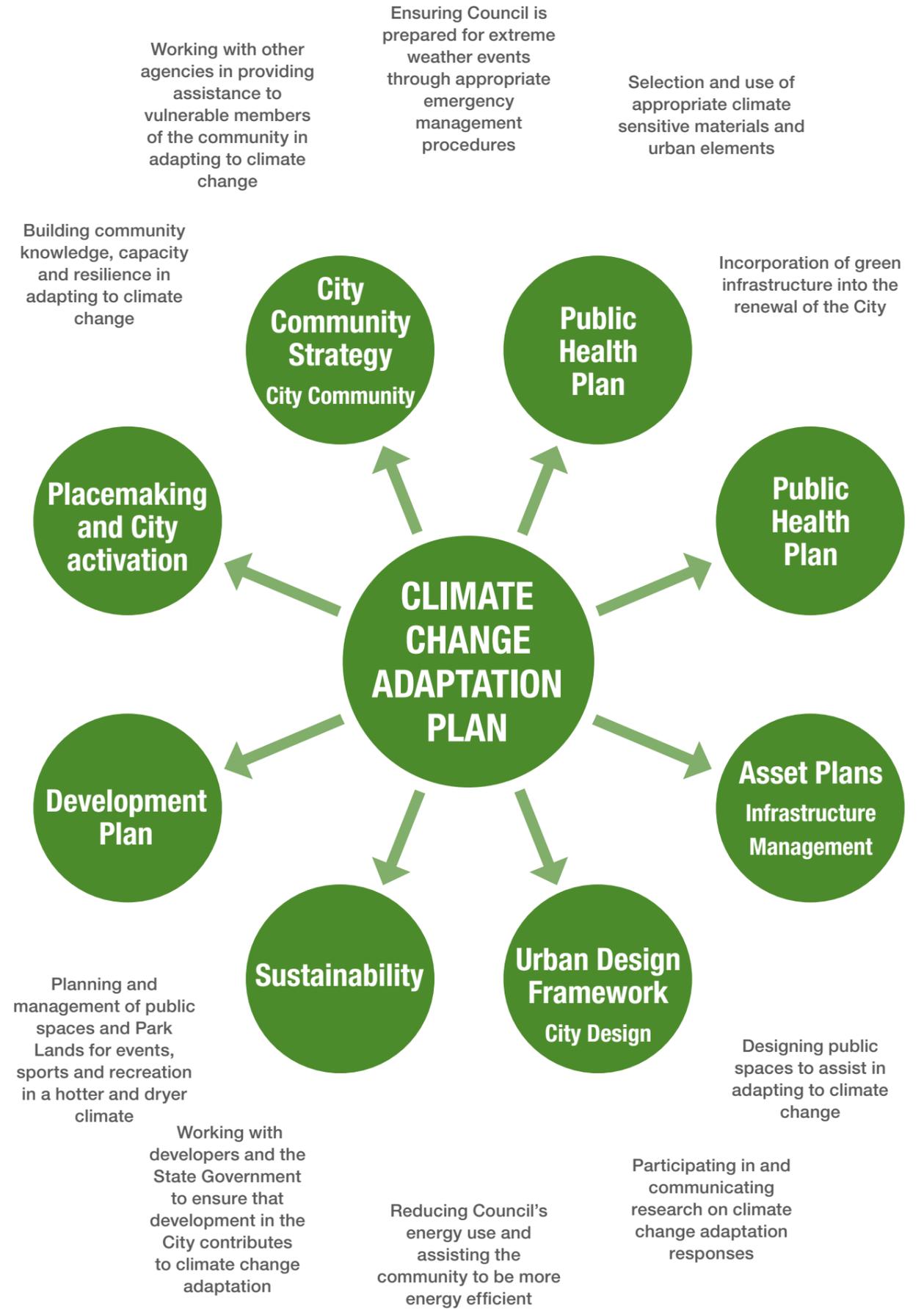


Figure 3: Outline of key Council strategies, Programs and adaptation measures linked to climate change adaptation planning

STRATEGIES AND ACTIONS

| Strategy 1: Incorporate best practice knowledge regarding climate change adaptation into Council's processes | |
|--|---|
| 1.1 | Provide training and resources (e.g. guidelines) for planners to assist with negotiation of better design outcomes with developers. |
| 1.2 | Seek opportunities to incorporate climate change adaptation measures into the Development Plan and development planning processes. |
| 1.3 | Increase the amount of awareness raising activities for staff regarding emerging climate change adaptation research and strategies. |
| 1.4 | Increase adoption of measures such as WSUD and green infrastructure initiatives (e.g. via integration with asset planning and city design processes). |
| 1.5 | Formalise street tree and vegetation selection policies that incorporate climate adaptation requirements and increase monitoring and research of methods to improve tree and vegetation health. |
| 1.6 | Ensure climate change impacts are considered in the selection, design and renewal program for public open space and Park Lands used for sport, recreation and events. |
| 1.7 | Continue monitoring of climate change impacts on open space and sports ground condition, use and management practices. |
| 1.8 | Continue to monitor research into the impacts of climate change on asset renewal program and incorporate best practice adaptation measures. |
| 1.9 | Ensure that Council strategies (e.g. Urban Design Framework) proactively incorporate climate adaptation and urban heat island (UHI) mitigation strategies. |
| 1.10 | Ensure climate change adaptation measures are incorporated into asset management planning and renewal processes (e.g. Asset Management Plans). |
| 1.11 | Incorporate the principles of climate change adaptation into Council's project management framework. |

| Strategy 2: Foster external partnerships to ensure that the City is prepared for climate change | |
|---|---|
| 2.1 | Participate in research, partnerships and projects that provide practical and implementable urban heat island mitigation and climate change adaptation measures (e.g. CRC for Low Carbon Living project). |
| 2.2 | Undertake regional climate change adaptation planning in conjunction with Eastern Region Alliance Councils. |
| 2.3 | Work with other agencies to reduce barriers to climate change adaptation. |

| Strategy 3: Ensure Council and the community is prepared for climate change | |
|---|--|
| 3.1 | <p>Formalise extreme heat strategies, including:</p> <ul style="list-style-type: none"> • Protocol for providing extreme heat refuge. • Support of and coordination with other community service providers. • Communication strategy via measures such as the Prepared Adelaide Project. • Support for business access to appropriate SA Health information on food safety measures and requirements as detailed in Council's Emergency Plan 2012-2016. |
| 3.2 | Continue to review appropriateness and effectiveness of planned responses following flooding events. |
| 3.3 | Monitor and review implementation of Council's Emergency Plan 2012-2016 and ensure implementation continues to consider climate change impacts. |
| 3.4 | <p>Build the community's capacity to adapt to climate change through Council's community programs and services, including:</p> <ul style="list-style-type: none"> • Community centre and library programs. • Placemaking and City activation programs. • Partnerships and services aimed at vulnerable and disadvantaged people in the community (e.g. HACC). |

MONITORING AND IMPLEMENTATION

Program Manager Sustainable City is responsible for ensuring that this Action Plan is implemented and for assessing progress against the actions.

REVIEW

In recognition of the imperative for climate change adaptation planning to be dynamic and responsive, this Action Plan is scheduled for review in 2015 unless a regional adaptation plan is completed beforehand.



4. REFERENCES

Bureau of Meteorology (2013) Australia's Warmest 12 Month Period on Record, Again. From www.bom.gov.au/climate/change.

Climate Council (2013) Unpacking the Fifth Assessment Report. From www.climatecouncil.org.au.

CSIRO (2007) Climate Change in Australia: Technical Report 2007. CSIRO and Australian Bureau of Meteorology, Australia.

IPCC (2013) Climate Change 2013: The Physical Science Basis: Summary for Policy Makers, Working Group I Contribution to the IPCC Fifth Assessment Report.

Lucas, C., Hennessy, K., Mills, G. and Bathols, J. (2007) Bushfire weather in Southeast Australia: Recent trends in projected climate change impacts. Bushfire CRC, Melbourne, Vic.

World Bank (2012) Turn Down the Heat: Why a 4° World Must be Avoided.

5. APPENDIX

Appendix A: Summary of CCAAP 2011-2013 completed actions

| Appendix A: Summary of CCAAP 2011-2013 completed actions | |
|---|---|
| Development planning and urban design and research | |
| Ensuring resource efficiency and thermal comfort through development planning | Advocacy to State Government for improved incorporation of resource efficiency measures in the Development Plan and broader State policy (e.g. WSUD Consultation Statement). |
| Reduction of urban heat island (UHI) effect | Participation in research partnerships to improve understanding of the impacts and solutions of climate change for Adelaide with Flinders University and CRC for Low Carbon Living. Integrating specific policy and program responses, such as water sensitive urban design (WSUD), to assist in UHI mitigation. Incorporate increased vegetation in capital works projects (e.g. Frome Rd, Hindley St West etc.). |
| Biodiversity and vegetation management | |
| Maintenance of vegetation health, amenity and safety and protection of biodiversity | Street tree selections consider changing climate with more drought and disease tolerant species preferred. Incorporating improved management and protection measures to improve health of existing stock, including use of approaches incorporating WSUD principles. Continued implementation of Biodiversity and Water Quality Action Plan. Urban Design strategies and approaches incorporating UHI mitigation measures. Ongoing tree condition assessment at high risk locations (e.g. for limb drop risk) incorporated into asset management system. |
| Managing water quality, waterways and Torrens Lake | Adelaide City Council Emergency Plan 2012-2016 completed. Strategy covers extreme weather events (including heat waves and flooding). Adelaide Central Bus station established as refuge for the community during extreme heat conditions. Home and Community Care (HACC) clients encouraged to register on the State Vulnerable Persons Register. |



Appendix A: Summary of CCAAP 2011-2013 completed actions Continued

| Community, public health and placemaking | |
|--|---|
| Assisting vulnerable members of the community during extreme heat events | <p>Adelaide City Council Emergency Plan 2012-2016 completed. Strategy covers extreme weather events (including heat waves and flooding).</p> <p>Adelaide Central Bus station established as refuge for the community during extreme heat conditions.</p> <p>Home and Community Care (HACC) clients encouraged to register on the State Vulnerable Persons Register.</p> <p>Audit/review of public water supplies completed – regular maintenance and review is undertaken by public realm. Additional roll out of drinking taps/bottle fill stations to be completed in 2013/14.</p> <p>HACC energy efficiency pilot program completed delivering energy efficiency and thermal comfort measures in HACC client homes.</p> <p>Continued coordination with Street to Home service providers to monitor and assist rough sleepers during extreme heat events.</p> |
| Managing transport logistics in major flooding events | Measures incorporated into Emergency Plan 2012-2016. |
| Food and health risks | <p>Food safety standards set requirements for food businesses.</p> <p>Recent upgrades to the CBD electricity network have improved security of supply.</p> |
| Sports ground condition and patronage | <p>Responses to extreme weather conditions and sports field management included in Emergency Plan 2012-2016.</p> <p>Continued expansion of the Glenelg Adelaide Pipeline (GAP) recycled water network for water security.</p> <p>Grants offered to support additional connections to GAP recycled water network.</p> |
| Tourism, business and events | <p>UHI mitigation strategies listed in previous sections.</p> <p>Risk assessment frameworks in place for events responding to extreme weather events.</p> |

Appendix A: Summary of CCAAP 2011-2013 completed actions Continued

| Council operations and asset management | |
|--|---|
| Managing Council energy use and prices | Implementation of Energy Management Action Plan 2011-2014 to reduce energy use. |
| Impact on building and public realm assets | <p>Monitoring and response as per asset management and public realm protocols.</p> <p>Condition reports undertaken on major buildings. Smaller sites review commencing in 2013/14.</p> |
| Emergency management | Adelaide City Council Emergency Plan 2012-2016 completed. Strategy covers extreme weather events (including heat waves and flooding). |
| Council operations and asset management | |
| Communications and awareness raising | <p>Communication of emerging research on the local impacts of climate change.</p> <p>Participation in stakeholder forums (e.g. with universities, LGA and State Government).</p> <p>Engagement with ERA on regional climate change adaptation planning.</p> |

