

# Adapt



## A Community Guide to the City of Stirling's Adaptation Plan

### Introduction

The City of Stirling has produced this Climate Change Adaptation Plan to begin assessing the potential impacts that projected climate change conditions could have on its essential services and operations. The main climatic changes likely to be of significance to the City are sea-level rise, increasing temperatures, reduced rainfall and infiltration, and increased frequency and intensity of storms.

Environmental impacts, built environment (infrastructure) and community impacts have been considered within this Adaptation Plan. These areas were chosen

because they are most likely to affect the City's services and operations.

The City acknowledges that climate change planning is an important and long-term task and the development of this Adaptation Plan represents the first stage of many in helping the City build resilience.

After the City has increased its understanding and resilience around climate change it will be better placed to support its community with the challenges that it will face specifically in response to a changing climate.

### What's inside?

Introduction	1
Potential impacts	2
Assessing vulnerability	2
Where is action required?	3
Short-term actions	4
Medium-term actions	5
Conclusion	6

This summary provides an introduction to the City of Stirling's Climate Change Adaptation Plan. Key findings and results are summarised here. For further information, readers are directed to the full Adaptation Plan.

impacts	natural	built	community
<p>This table summarises key projected impacts to the natural environment, built environment and the community as a result of projected changes in climate.</p>	<p><b>biodiversity</b> Loss of biodiversity (including flora and fauna species such as the Carnaby's Black Cockatoo and the Graceful Sun Moth)</p> <p><b>bushland</b> Drying of natural trees, increasing fuel loads</p> <p><b>coasts</b> Coastal erosion and decline in the condition of marine habitats</p>	<p><b>buildings</b> More severe storm damage, particularly from flooding</p> <p><b>assets</b> Accelerated degradation of construction materials</p> <p><b>infrastructure</b> Increased run off from storm events resulting in overloading or failure of sewers and stormwater systems</p>	<p><b>social</b> Indirect impacts, such as rising price of fuel, electricity and other services, exacerbate existing community vulnerabilities</p> <p><b>health</b> Increase incidence of food and vector borne diseases and heat-related illnesses</p> <p><b>values</b> Community expectations and values challenged</p>

## Assessing the City's vulnerability to climate change

To help determine where the City is most vulnerable to climate change, a risk assessment was undertaken using currently available research about potential impacts from climate change and rating how much of a risk they are to City operations. Any risks that were rated medium or low did not require treatment (i.e. adaptation action) since the City already adequately manages them or they are unlikely to impact upon the City's operations. The City will monitor and evaluate all of the risks identified in the risk assessment to help identify if additional action is required in the future.

The City considered the opportunities and challenges they would face when implementing each adaptation action. Some of the actions showed they face limited barriers while delivering multiple benefits to the community and the environment. The City can implement these types of actions readily. Other adaptation actions that may cost more to implement, or require partnerships between agencies to coordinate, or do not align to current community expectations, will mean more work is required before they can be

implemented. By identifying these barriers to action, the City is now aware of what needs to be done before the adaptation action is undertaken. This supports forward planning meaning barriers are addressed so that adaptation takes effect before the risk occurs.

Representatives from relevant business units participated in the development of the Adaptation Plan. Climate Change Adaptation is a relatively new area for the City, so the participation of a cross-section of Council Officers on a Climate Change Adaptation Working Group helped raise awareness of the projected impacts and encouraged ownership of these issues across operations. This Adaptation Plan is the beginning of a resilience process that the City will continue and involves sharing lessons learnt and improving the ability of the City to plan for and respond to the impacts of a changing climate. The science of climate change is always improving and this Adaptation Plan begins a learning process for the City and its community.

## Where is action required?

The outcomes of the climate change risk assessment and adaptation planning process indicated that the City is already implementing many activities that will build its



resilience to climate change. For example, the City's Water Smart Parks Initiative, which includes designing parks to reduce their watering requirements and a sophisticated control system that manages water use, ensures the City can efficiently respond to less rainfall. There are also policy documents being developed to address projected climate changes that will assist the City in its adaptation planning.

The outcomes of the risk assessment indicated that the City's risks are relatively low in comparison to other West Australian Local Governments that have worked on climate change adaptation. In the shorter term which is based around the year 2030, no 'extreme priority risks' and ten 'high-priority risks' were identified. In the longer term, which is based around the year 2070, the effectiveness of existing controls (put in place by the City) is less certain due to uncertainties in the projected climate changes and difficulties in predicting how the City's operations will be affected. Therefore, the number of high and extreme risks increased for this period. The impacts from climate change are expected to deliver challenges for the City which will require additional resources, training, collaborative partnerships

and uptake of new technologies. The adaptation planning process also highlighted some opportunities from the projected climate changes.

One such opportunity is an increase in tourism along the coastal strip as a result of prolonged warm seasons.

The following tables summarise short-term (to be implemented in the next financial year) and medium-term (to be implemented within four years) adaptation actions that were identified through the adaptation planning process. The complete Risk and Adaptation Register can be viewed in Annex 3.

## Strategic Community Plan

The adaptation actions identified in the risk assessment and adaptation planning process help support the City meet the objectives of its Strategic Community Plan.

### 1. Liveable City and Thriving Neighbourhoods

Adaptation actions reflect the City's vision for beautiful streetscapes and green open spaces whilst also appreciating the challenge of maintaining such a vision under a changing climate. Strategies to improve emergency response to extreme events will contribute to a Safe City; while actions to maintain outdoor and indoor recreation areas will contribute to an Active City.

### 2. Sustainable Environment

Adaptation actions to maintain biodiversity despite a changing climate will be critical in ensuring long-term sustainability of the biodiversity factors valued by the City.

### 3. Engaged Communities

Many of the programs currently delivered by the City will continue to play an important role in ensuring community vulnerability is effectively monitored and managed.

### 4. Accessible and Connected City

The City's Local Housing Strategy is being used to guide the development of planning documents, such as Local Area Plans. In addition to the Strategy, adaptation actions to improve accessibility, specifically in the coastal zone, have been identified.

### 5. Prosperous City

Implementing planning and development actions that enhance the tourist potential along West Coast Drive will support achievement of the vision for a Prosperous City.

short term	risk	actions	risk 2030	risk 2070
	<p>In this table, the adaptation actions that will be implemented in the short term (within next financial year) are outlined. They are presented next to the risk that the action is intended to address as well as the risk priority level that was assigned during the risk assessment and adaptation planning process.</p> <p>The level of risk was assessed at two future timeframes, 2030 and 2070. H indicates a high-risk priority, M indicates a medium-level risk priority. This risk priority level provides the City with insight into the priority of risk treatment.</p>	<p>Decrease in the quality of public open green space; reduced water quality and quantity resulting in less watering/irrigation of open space and sports grounds and closure of ovals</p> <p>Increase in heat island effect in built up areas</p> <p>Loss and damage to street trees</p>	<p>Review and report on the feasibility of altering the timing of recreation use changes between seasons to avoid exposure to extreme heat</p> <p>Undertake aerial imagery assessment of the City; and</p> <p>Conduct a flyover to determine the baseline percentage (%) vegetation cover of the total City area. Subsequently, set annual targets for an increase in urban tree establishment</p> <p>Review and incorporate climate change projections in review of the Street Tree Policy</p>	<p>H</p> <p>M</p> <p>M</p>

## Conclusion

In summary, the risk assessment and adaptation planning process the City has undertaken indicates that it is well placed to respond to the impacts of climate change. The wealth of knowledge generated through existing management activities (such as coastal monitoring programs) and other programs in place sets a foundation for proactive management within the City. In combination with the detailed Adaptation Plan and the expertise gained through cross-business unit collaboration in climate change risk management, the City can respond adaptively to changes in climate, ensuring maintained service delivery and more importantly working towards the achievement of community objectives.

medium term	risk	action	risk 2030	risk 2070
<p>In this table, the adaptation actions that will be implemented in the medium term (within the next four years) are outlined. They are presented next to the risk that the action is intended to address as well as the risk priority level that was assigned during the risk assessment and adaptation planning process.</p> <p>The level of risk was assessed at two future timeframes, 2030 and 2070. H indicates a high-risk priority, M indicates a medium-level risk priority. This risk priority level provides the City with insight into the priority of risk treatment.</p>	Over extension of drainage capacity	Catchment analysis program developed to include climate change scenarios to assess sensitivity to drainage capacity on publication of revised Australian Rainfall and Runoff (ARR) guidelines in 2014	H	H
	Increased number of emergency response and recovery operations in response to floods and storm events	Consider projected changes in extreme climatic events (using the latest climate projections) during reviews of emergency management plans	H	H
	Decrease in the quality of public open green space; reduced water quality and quantity resulting in less watering/irrigation of open space and sports grounds and closure of ovals	Investigate and report on improvements to irrigation technology; and Implement soil conditioning for water retention	H	H
	Increase in geographical range and/or incidence of vector-borne and water-borne diseases	Increase monitoring range and occurrence of vector borne/water borne diseases; and Develop a plan to respond to changes in vector-borne disease	H	H
	Higher rates of building damage and deterioration (focus on council owned buildings)	When assets come up for replacement, implement standards that cater for projected changes in climate over the asset's lifetime.	M	H
	Interruption of road traffic from extreme weather events and emergency transport routes disrupted	Include related risk (i.e. interruption of road traffic and emergency transport routes during extreme events) into reviews of emergency management plans; and	M	H
	Loss of existing public space in coastal and estuarine areas and erosion, inundation and storm damage leading to loss of coastal and estuarine recreational infrastructure	Research and report on further information on projected impacts (e.g. maps of projected sea level rise and additional sediment transport studies); and deliver community awareness campaign to raise awareness of projected risks	M	H

<p>medium term</p> <p>In this table, the additional adaptation actions that will be implemented in the medium term (within the next four years) are presented.</p>	risk	action	risk 2030	risk 2070
	<p>Decline in wetlands due to lowering of groundwater table and/or saltwater intrusion; increase in acid sulphate soils, loss in wetland biodiversity; acidification of water bodies</p>	<p>Re-establish wetland transition vegetation, planting naturally occurring species and natural biodiversity in the following sites: Carine Lakes, Lake Gwelup, Jackadder Lake, Herdsman Lake; and Investigate opportunities to use biofilters to increase water retention, reabsorption and provide update report</p>	M	H
	<p>Opportunity: The City has access to a wide range of spatial information, which if compiled within its central management system, would provide a useful tool to support risk assessment and adaptation planning</p>	<p>Investigate and compile a list of climate change adaptation data (natural environment and community) that is available within the City in various formats (Excel spread sheet, hard copy) and determine if it would be beneficial to future adaptation planning processes to convert some or all of these data into a spatial format to assist with vulnerability mapping and corporate knowledge of potential climate change impacts</p>	H	H

Please note: Detailed descriptions of the methods adopted, scenario selection and other technical aspects of the study are presented in supplementary documents (Annexes 1 to 3) to the Adaptation Plan.