



Climate Change Risk Assessment and Response

Final Early Adaptation Plan

June 2012



RMCG

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Executive Summary

Introduction

Climate change scenarios presented by CSIRO and other research agencies indicate Victoria is likely to experience a range of challenging climate-related impacts. For Central Victoria, the general impacts include more hot days, less rainfall and run-off and increased frequency and intensity of extreme events such as drought, flash flooding and wildfire.

This project identified, analysed and evaluated climate change risks and developed an adaptation plan that will help the Macedon Ranges begin to plan for likely impacts arising from climate change. The purpose of this project was to:

- Undertake a risk assessment to identify the climate change risks for the Macedon Ranges Shire organisation, community, environment and economy.
- Set priorities and develop an action program to manage priority risks that will form an Early Adaptation Plan for the whole of Council.
- Recommend more detailed assessment of risks if required.

The focus of this project is on adaptation to climate change. Adaptation involves adjustment to cope with and take advantage of the effects of changes in climate. Mitigation of climate change, such as assessing and reducing greenhouse gas (GHG) emissions, is not considered in this project. However, this does not alter Council's intentions in relation to current mitigation activities.

A whole-of-council approach was taken to ensure that potential climate change risks, exposure and vulnerability, opportunities and adaptation options are identified for all Macedon Ranges directorates.

The development of the Early Adaptation Plan involved four main stages: Scoping; Consultation and development; Analysis of risks and adaptation options; Reporting. The process employed a best practice risk management approach in line with AS/NZS 31000:2009 (previously AS/NZS 4360:2004).

In this Executive Summary we confirm the key findings and priority adaptation actions for the four Macedon Ranges directorates:

- Organisational Development and Corporate Services
- Community Wellbeing
- Assets and Operations
- Planning and Environment

Organisational Development and Corporate Services

The main cause of climate risk for the Organisational Development and Corporate Services directorates is increased intensity of rainfall and extreme events. The key impacts are the inundation of buildings and storage facilities, financial cost and provision of critical services.

Early adaptation actions include backfilling temporary vacancies for when staff are involved in emergency management and recovery, and building cash reserves for recovery costs not funded by Federal or State Government. The key plans and strategies to assist adaptation are the Business Continuity Plan and Code Red Policy in the Operational Plan for Fire Danger Days.

Adaptation Number	Adaptation action
ODCS-3	Investigate the potential to increase rates and borrowing to increase cash reserves and reduce the reliance on State and Federal government assistance.
ODCS-5	Investigate the potential to increase rates and borrowing to cover increased insurance costs and infrastructure repair and maintenance.
ODCS-6a	Fill temporary vacancies caused by staff being off line during emergencies by engaging a recruitment agency and seconding staff from other councils, to ensure continuity of service delivery (also identified in CW-12a).
ODCS-6b	Finalise and implement a Business Continuity Plan to prioritise service delivery during emergencies and temporary 'back fill' of staff positions to ensure critical works program are delivered on schedule (also identified in CW-12b, CW-18a, AO-6b and AO-10).
ODCS-6c	Ensure the Business Continuity Plan is accessible and available to Council staff and managers during emergencies (also identified in CW-18b).
ODCS-7	Implement the Work from Home Plan and ensure Extranet operation and functionality to enable Council staff to continue service provision when Council buildings are inaccessible.
ODCS-8a	Implement a Code Red policy to cancel work and ensure safety of staff on Code Red days.
ODCS-8b	Implement flexible work hours and/or engage casual staff to allow work programs to be completed while avoiding extreme heat

Community Wellbeing

The main causes of climate risk for the Community Wellbeing directorate are increased number of hot days, heatwaves and extreme events. The key impacts are on recreation and associated facilities, vulnerable populations, volunteers and Information and Communication Technology (ICT) systems.

The early adaptation actions include better use of Resource Sharing Agreements, addressing social housing needs, and utilising the networks and relationships formed through community planning. The key plans and strategies to assist adaptation are the Health and Wellbeing Plan, Heatwave Plan, Municipal Emergency Management Plan and Business Continuity Plan.

Adaptation Number	Adaptation action
CW-1 CW-3 CW-4g CW-7 CW-10	Review Health and Wellbeing Plan, Heatwave Plan and Multi Agency Ageing Strategy to explicitly include considerations of climate change impacts. The Heatwave Plan is currently being reviewed using the Heatwave Plan Review Tool supplied by DHS (also identified in PE-11 and PE-13).
CW-2	Review Leisure Strategy Plan to incorporate considerations of heatwave impacts on swimming pool visitation and capacity.
CW-4a	In conjunction with neighbouring municipalities, advocate to State and Federal government for funding for low income families to retrofit homes with insulation, external blinds and other extreme heat mitigation devices.
CW-4d	Ensure that low-income energy efficient housing options are included in new developments.
CW-4e	Register for the Global Age Friendly Cities program and undertake planning with the funding already secured (1-2 year time frame in current work program).
CW-4f	Transfer social housing from Council to a registered provider with greater capacity to source funding, and review seniors housing (both currently underway).
CW-5a	Review the Resource Sharing Agreement between LGAs'. Seek to include more councils, improve connections with surrounding councils, understand systems, mentoring (e.g. Municipal Recovery Manager (MRM) shadowing), networking and opportunities to share lessons.

Adaptation Number	Adaptation action
CW-6 CW-18c	Utilise the networks and relationships built during community planning to optimise communication and engagement on climate change impacts and adaptation
CW-8 CW-11	Review the Municipal Emergency Management Plan (MEMP) and Heatwave Plan to explicitly include considerations of climate change impacts. A different section of the MEMP is reviewed on a tri-annual basis and the Heatwave Plan is currently being reviewed using the Heatwave Plan Review Tool supplied by DHS (also identified in AO-7).
CW-9	Finalise and implement emergency communications plan to include investigation of options such as CB radio and social media, as well as identifying communication gaps.
CW-12a	Fill temporary vacancies caused by staff being off line during emergencies by engaging a recruitment agency and seconding staff from other councils, to ensure continuity of service delivery (also identified in ODCS-6a).
CW-12b CW-18a	Finalise and implement a Business Continuity Plan to prioritise service delivery during emergencies and temporary 'back fill' of staff positions to ensure critical works program are delivered on schedule (also identified in ODCS-6a, AO-6b and AO-10).
CW-13	Collaborate with the Assets and Operations Directorate to prioritise recovery of key assets, and include these in the review of the Asset Management Plan (also identified in AO-8).
CW-14	Implement water use efficiency and reuse projects in order to increase the sustainability of indoor and outdoor aquatic facilities (underway and on-going).
CW-15	Undertake review of shade structures to ensure appropriate protection (underway and on-going).
CW-16	Finalise flood policy for aquatic and leisure centres and develop support program and implementation plan.
CW-17	Investigate the potential of a regional cool room to be shared with neighbouring Councils to store the meals delivered from Altona.
CW-18b	Ensure Business Continuity Plan is accessible and available to Council staff and managers during emergencies (also identified in ODCS-6c).

Assets and Operations

The main causes of climate risk for Asset Management directorate are the increased intensity of rainfall and frequency and severity of extreme events. The key impacts are from flooding, drainage and damage to infrastructure (e.g. unsealed road, vulnerable land), reduced access, response crews and staff safety.

The early adaptation actions include finalising the drainage studies, coordinating emergency response and utilising the Central Victorian Municipal Emergency Management Enhancement Group (MEMEG). The key plans and strategies to assist adaptation are the Asset Management Plan, MEMP, Operational Plan for Fire Danger Days and Communication Matrix.

Adaptation number	Adaptation action
AO-2a	Include other directorates e.g. Planning and Environment and Assets and Operations in asset management risk assessment so that wider climate change impacts are considered e.g. assessment of vegetation impact on drainage infrastructure (also identified in PE-10a).
AO-2d	Finalise assessment and incorporate recommendations from drainage studies into the Asset Management Plan using the new asset operation role (also identified in PE-14b).
AO-4a	In partnership with emergency services and community, improve preparedness for extreme events ('all hazards approach' - flood, fires, storms).
AO-4b	Council to take a consistent approach to communication during extreme events with regard to preparedness and provision of information to residents (also identified in PE-16).

Adaptation number	Adaptation action
AO-5b	Collaborate with DSE, Crown Land managers and CFA in regards to controlled burns to reduce fuel loads and risk in and around bushfire prone assets and land.
AO-6a	Improve resourcing and information sharing through the Central Victorian Municipal Emergency Management Enhancement Group (MEMEG) to build the capacity of the five member councils.
AO-6b AO-10	Finalise and implement Business Continuity Plan to prioritise service delivery and 'back fill' staff positions to ensure critical works program are completed on time (also identified in ODCS-6b, CW-12b and CW-18a).
AO-7	Review the MEMP and Heatwave Plan to explicitly include considerations of climate change impacts. A different section of the MEMP is reviewed on a tri-annual basis and the Heatwave Plan is currently being reviewed using the Heatwave Plan Review Tool supplied by DHS (also identified in CW-8 and CW-11).
AO-8	Prioritise recovery of key road assets and access points, and include these in the review of the Asset Management Plan (also identified in CW-13)
AO-9a	Implement the Operational Plan for Fire Danger Days and Communication Matrix under the MEMP to ensure staff safety e.g. response crews.
AO-9b	Use contractors and secondment staff from neighbouring councils to reduce pressure on Assets and Operations response crew. It is important to communicate to staff that costs associated with backfilling positions in these circumstances is covered by the National Disaster Response and Relief Fund.
AO-11b	Continue trials of drought tolerant turf specie and investigate the potential to extend these species to parks, recreation areas and gardens in conjunction with program partners Coliban Water and Melbourne Water.
AO-12a	Continue annual audit program of heritage trees in the municipality to monitor health and management requirements. Engage professional arborists to assist with the audit as required.
AO-12b	Investigate and recommend appropriate vegetation to replace old and dying trees in urban environments (also identified in PE-16).

Planning and Environment

The main causes of climate risk for the Planning and Environment directorate is reduced average rainfall, increased average temperature, fire and extreme events. The key impacts are on tourism visitation, vulnerability to bushfire and housing, new pest plant and animal incursions, amenity and heritage trees.

The early adaptation actions include greater collaboration with the Country Fire Authority (CFA), Catchment Management Authorities (CMAs) and tourism agencies, as well as improving internal and external communication. The key plans to assist adaptation are the Health and Wellbeing Plan and Heatwave Plan.

Adaptation number	Adaptation action
PE-2	Communicate that the region has undertaken risk assessment and planned for extreme events.
PE-3	Review programming of events to minimise risk of Code Red Day cancellation.
PE-5	Ensure the Visit Macedon Ranges website provides up to date information on major events and encourage event organisers to use the website for information updates and that there is a link from the Council website.
PE-6a	Develop and implement management plans for Council owned and managed bushland reserves (currently under development) that includes consideration of fuel loads and climate change impacts.
PE-6b	Collaborate with the CFA to incorporate emergency management, particularly bushfire, into

Adaptation number	Adaptation action
	community plans and encourage preparation of personal bushfire plans.
PE-7	Collaborate with the CFA to deliver education programs for people living in rural areas regarding hazard reduction, fire ecology, native vegetation management and native fauna.
PE-10a	Include other directorates e.g. Planning and Environment and Assets and Operations in asset management risk assessment so that wider climate change impacts are incorporated into assets management e.g. assessment of vegetation impact on drainage infrastructure (also identified in AO-2a).
PE-10b	Finalise assessment and incorporate recommendations from drainage studies into the Asset Management Plan using the new asset operation role (also identified in AO-2b).
PE-11 PE-13	Review Health and Wellbeing Plan, Heatwave Plan and Multi Agency Ageing Strategy to explicitly include considerations of climate change impacts. The Heatwave Plan is currently being reviewed using the Heatwave Plan Review Tool supplied by DHS (also identified in CW-1, CW-3, CW-4h, CW-7 and CW-10).
PE-12	Investigate and recommend appropriate vegetation to replace old and dying trees in urban environments (also identified in AO-12b).
PE-15a	Advocate to CMA's for ecosystem connectivity mapping for public and private land in Macedon Ranges.
PE-15c	Work with communities and relevant authorities to create vegetation corridors between existing remnant areas to allow for the movement of native flora and fauna in response to climate change.
PE-16	Incorporate climate change adaptation into community planning and communications (also identified in AO-4b).

1 Introduction

1.1 Context and drivers for this project

Climate change scenarios presented by CSIRO and other research agencies indicate Victoria is likely to experience a range of challenging climate related impacts. For Central Victoria the general impacts include more hot days, less rainfall and run-off and increased frequency and intensity of extreme events such as drought, flash flooding and wildfire.

This project identified, analysed and evaluated climate change risks and developed an adaptation plan that will help the Macedon Ranges begin to plan for likely impacts arising from climate change. The purpose of this project was to:

- Undertake a risk assessment to identify the climate change risks for the Macedon Ranges Shire organisation, community, environment and economy.
- Set priorities and develop an action program to manage priority risks that will form an Early Adaptation Plan for the whole of Council.
- Recommend more detailed assessment of risks if required.

1.2 Strategic objectives

Based on a review of the relevant legislation, policies, strategies and plans the Project Steering Committee adopted the following strategic objectives to guide the outcomes of the Early Adaptation Plan:

- **Enable** Macedon Ranges Shire to adapt to the unavoidable impacts of climate change through a whole-of-council approach.
- **Build** awareness and understanding of climate change within Council.
- **Use** lessons from the past to inform better decision-making in the future.
- **Implement** solutions that are cost effective, transparent, recognise the needs of vulnerable groups and ensure equitable outcomes.
- **Prepare** Macedon Ranges to review and update the Early Adaptation Plan and undertake consultation with the community.

1.3 This plan

This Early Adaptation Plan will assist the Macedon Ranges to begin to plan for likely impacts arising from climate change. The plan is structured as follows:

- **Section 1:** Outline of the *Early Adaptation Plan*
- **Section 2:** Key considerations of the Plan including focus on adaptation, whole-of-council approach and geographic region
- **Section 3:** Implications of the Macedon Ranges socio-economic profile on adaptation
- **Section 4:** Legislative and policy context at the Federal, State and regional level
- **Section 5:** Analysis of guiding Council plans
- **Section 6:** Historical and current climate in the Macedon Ranges region

- **Section 7:** Climate change in the Macedon Ranges region
- **Section 8:** Climate change risks and prioritisation by Council directorate
- **Section 9:** Early adaptation actions by Council directorate
- **Section 10:** Areas of further work
- **Section 11:** Plan implementation and renewal

A detailed discussion paper analysing and documenting the scoping stage of the project was completed in April 2012. The Discussion Paper provides additional context and complements the Early Adaptation Plan.

2 Scope and Key Considerations

2.1 Focus on adaptation

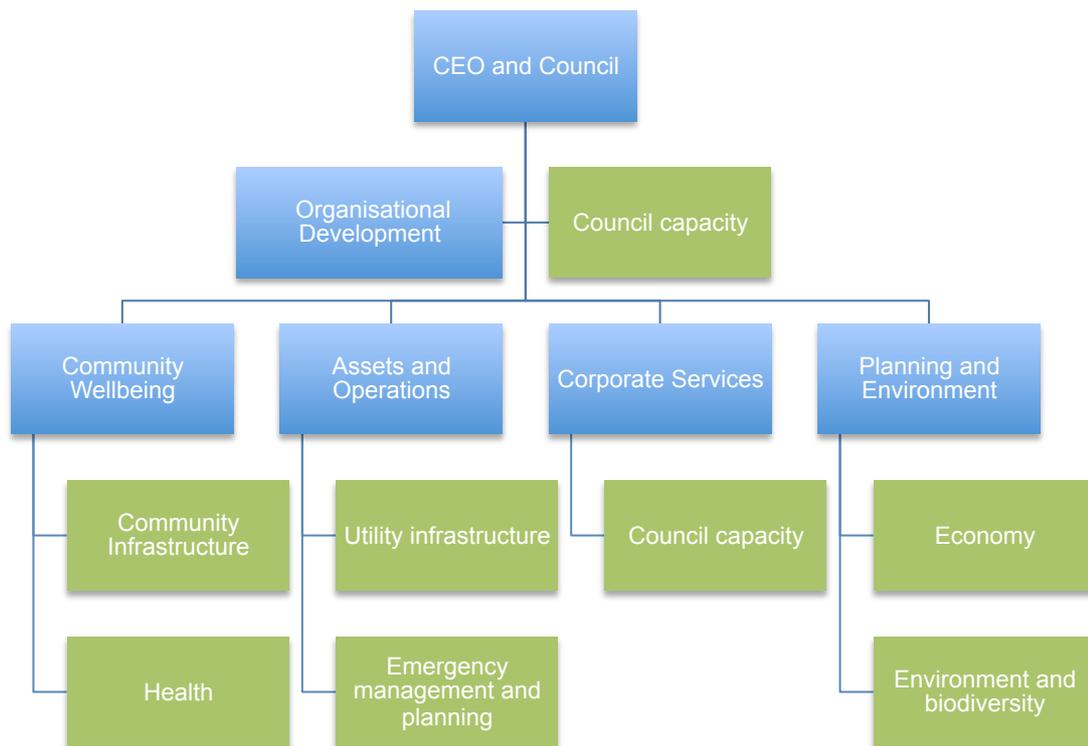
The focus of this project is on adaptation to climate change. Adaptation involves adjustment to cope with and take advantage of the effects of changes in climate.

Mitigation of climate change, such as assessing and reducing greenhouse gas (GHG) emissions, is not considered in this project. However, this does not alter Council’s intentions in relation to current mitigation activities.

2.2 Whole-of-council approach

A whole-of-council approach will be taken. This will ensure that potential climate change risks, exposure and vulnerability, opportunities and adaptation options are identified for all Macedon Ranges directorates.

Figure 2-1 outlines the five directorates (in blue) and their alignment with the seven major areas of climate change (in green) impacting on local government.



Council capacity relates to both organisational development and corporate services

Figure 2-1: The whole-of-council approach

2.3 Geographic region

The focus of the study will be the geographic area of Macedon Ranges (**Figure 2-2**). However, where required, the study may consider adjoining communities due to connections within the local economy and service provision.

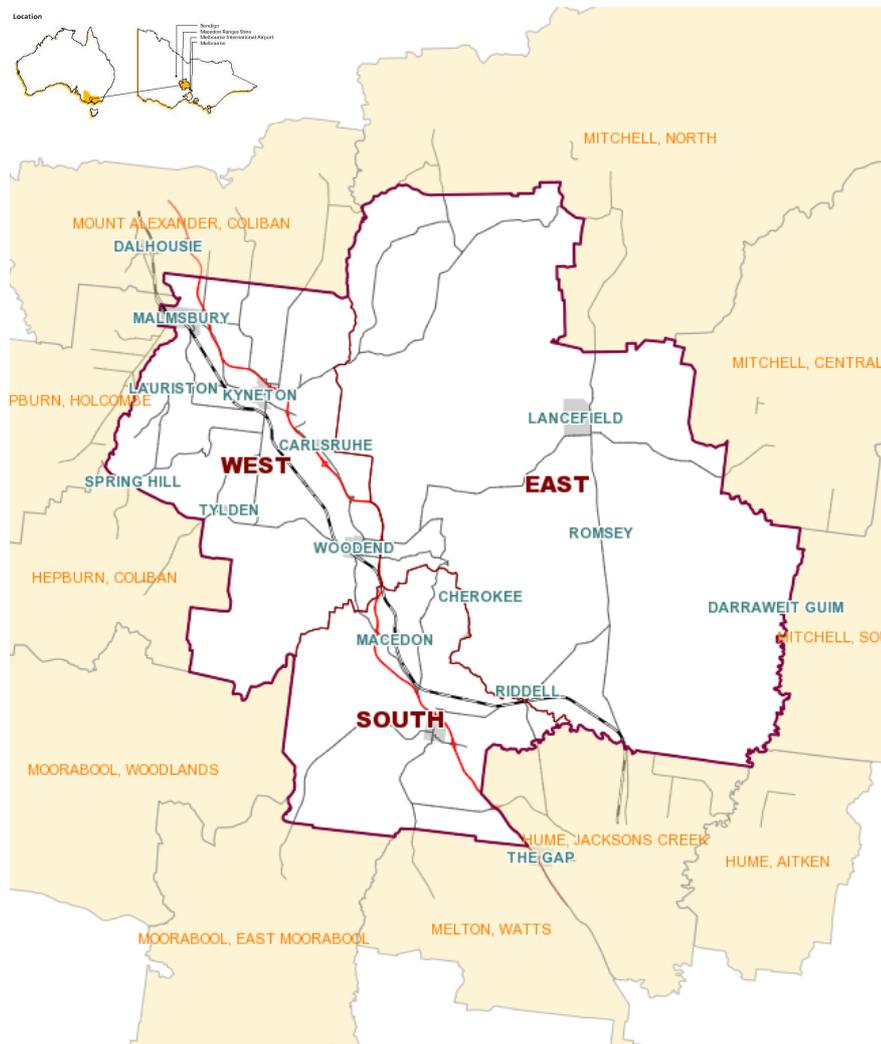


Figure 2-2: Location of Macedon Ranges

2.4 Planning timeframes

Timeframes for review and implementation of Council plans range between three to ten years. The regular review of Council plans provides an opportunity to incorporate consideration of climate change risk and current climate change information. While some climate change impacts may not be realised during the planning timeframes, the precautionary principle still applies. Adaptation actions undertaken now, based on the best available information, are likely to prove more cost effective and increase community resilience than if actions are delayed until the full effects of climate change are realised.

2.5 Development of the Plan

The development of the Early Adaptation Plan involved four main stages outlined in **Figure 2-3** below. This project employed a best practice risk management approach in line with AS/NZS 31000:2009 (previously AS/NZS 4360:2004).¹



Figure 2-3: Four stage approach involved in the Early Adaptation Plan

A risk assessment workshop was held with Council managers and staff to:

1. Confirm the key climate change risks.
2. Identify any existing controls that may help mitigate the impact of these risks.

Evaluate the risks – assigning consequence, likelihood and priority ratings to each of the risks.

3. Table 2-1 outlines the risk rating matrix used in the workshop and for this project.
4. Identify potential adaptation options to treat the risks.
5. Evaluate the adaptation options.

Table 2-1: Priority risk rating matrix

	Consequence				
Likelihood	Insignificant (1)	Minor (2)	Moderate (3)	Major (4)	Catastrophic (5)
Almost certain (A)	Medium	High	High	Very High	Very High
Likely (B)	Medium	Medium	High	Very High	Very High
Possible (C)	Low	Medium	Medium	High	Very High
Unlikely (D)	Low	Low	Medium	High	High
Rare (E)	Low	Low	Low	Medium	High

The outcome of the workshop was a list of the significant risks, an understanding of their ability to be managed, and potential responses to treat the risks.

An outcomes paper was distributed to Council staff and managers to seek further input on the risks and adaptation options (including their rating and priority) and on identifying gaps including additional risks and adaptation options.

Following the feedback on the outcomes paper, the risks and adaptation options were refined and validated through one-on-one consultation with Council staff. A consultation list is provided in Appendix 1.

¹ Australian Greenhouse Office (2006) Climate Change Impacts and Risk Management: A Guide for Business and Government, Canberra

3 Implications of socio-economic profile on adaptation

The adaptation implications of the Shire's socio-economic profile are outlined below.

3.1 Estimated resident population growth and industry structure

Macedon Ranges has experienced and is expected to continue to experience strong population growth. *Victoria in Future* data projects approximately 35% population growth from 2006 to 2026, an increase of more than 14,000 residents in the Shire. Most of this growth is expected to come from migration out of Melbourne.²

The largest residential population growth is seen in the age bracket 60-84 years. This group are amongst the most vulnerable to extreme weather events. The health care and social assistance sector is currently in the top five employers in the region and is a sector that may require adaptation to cope with increased elderly populations.

The young are also amongst the more vulnerable to climate change. The growth in numbers of children aged 0-14 years is projected to be less than 1,000 more than the 9,000 children currently living in the area (~11%).

It is important that updates of population forecasts and modelling are considered in the development and review of plans and strategies to ensure the appropriate balance of services for each sector of the community.

3.2 Trends in income

Twenty percent of Macedon Ranges working residents are classified as Professionals, compared with the Regional Victorian average of 16%.³ A further 17% of Macedon Ranges working residents are employed as Technicians and Trade Workers and 15% are employed as Managers.

The large proportion of high-income earners in the region could equate to high expectations around service delivery. Council will need to carefully communicate changes to service delivery arising from adaptation to climate change.

3.3 Natural assets settlement and tourism

The natural assets of Macedon Ranges Shire, in particular the Macedon Ranges themselves and surrounding vegetated land, are a major attraction for tourism and the migration of residents out of Melbourne and other areas. Threats to these assets from climate change impacts should be a major consideration of any adaptation planning exercise. As stated in the Natural Environment strategy '*accelerated climate change through human causes may see whole ecosystems being displaced from their current area. Ways of minimising the damage to the Shire's biodiversity must be developed in the face of these threats.*'⁴

² Department of Planning and Community Development (2008) *Victoria in Future: Macedon Ranges summary sheet*, Victorian Government, Melbourne

³ ABS - Census 2006

⁴ Macedon Ranges Shire Council (2009) *Natural Environment Strategy 2009-13*, Kyneton, page 35

The section on water in the Natural Environment Strategy indicates that the economy and aesthetic of the Macedon Ranges was more resilient to the drought than other parts of Victoria.

The extent of native vegetation in the Shire and the predicted increased frequency and intensity of bushfire also poses a significant threat to residents and visitors and also challenges for Macedon Ranges settlement and land use planning strategies.

3.4 Status of physical assets and extreme events

The large projected population growth and associated construction of housing poses a risk for the Shire if development occurs in flood and bushfire prone areas.

Recent residential developments have been designed and established with water conservation in mind, but potentially little emphasis placed on stormwater drainage, considering they have been constructed during a long-term drought.

The report of the 2009 *Victorian Bushfires Royal Commission* has significant implications for existing and future residential development in the region and presents major challenges in balancing community expectations around safety and lifestyle with planning policy context.

4 Policy Context

There are a number of Federal, State and regional policies that relate to climate change and will influence the Early Adaptation Plan.

The climate change legislative framework is extensive across all levels of government. Appendix 2 provides an overview of the current Federal and State legislation related to climate change.

National Climate Change Adaptation Program (DCCEE)

The Department of Climate Change and Energy Efficiency (DCCEE) program provides \$126 million to assist Australians better understand and manage risks linked to climate change and to take advantage of potential opportunities. Projects include:

- Research: investing in the National Climate Change Adaptation Research Facility (NCCARF)
- Grants programs for local government through the Local Adaptation Pathways Program (LAPP) and Integrated Assessment of Human Settlements sub-program.
- National vulnerability assessments including the National Coastal Risk Assessment, Biodiversity Vulnerability Assessment, and Interactions between Climate Change, Fire Regimes and Biodiversity in Australia: A Preliminary Assessment.

Victorian Adaptation Plan under the *Climate Change Act 2010*

A statewide Adaptation Plan will be prepared by December 2012 and every four years thereafter. The plan will contain risk assessments for specific areas in Victoria, and a statement of statewide priorities and strategic responses. The Victorian Government's Climate Change White Paper also commits to community-based Climate Change Preparedness programs. These will encourage climate change considerations to be built into risk management programs.

Loddon Mallee Regional Strategic Plan; Southern Region (RDV)

This Plan identifies the most important issues in the Southern Loddon Mallee region and presents a framework to maximise opportunities and manage future growth and change in a way that strengthens the economy, helps communities thrive and protects the region's natural and cultural heritage.

The Plan recognises that the climate is projected to become warmer and drier and as a consequence, stream flows are projected to fall, droughts are projected to become more intense and bushfire danger is projected to increase. Key initiatives to address climate change include assessing risks to the region's natural environment and agricultural systems from climatic change, to identify priorities to maintain or build the resilience of natural and rural environments ecosystems, and dryland and irrigation farming systems.

5 Guiding Council Plans

The guiding plans are those required under legislation and guide whole-of-council operation and service delivery. An overview of the plans and the relevance to the Early Adaptation Plan is outlined in Table 5-1.

Table 5-1: Existing guiding strategies and plans

Strategy/Plan	Overview	Relevance to the Early Adaptation Plan
Council Plan 2009-2013	<p>The Plan is built on four key themes and associated outcomes:</p> <ol style="list-style-type: none"> 1. Sustainable Living: Economic Vitality derived from Sustainable Principles <ul style="list-style-type: none"> ▪ A strong and diverse economy ▪ Appropriate development enhancing our lifestyle and community ▪ An community that is safe to live in 2. Community Wellbeing: Healthy, vibrant and resilient communities <ul style="list-style-type: none"> ▪ Engaged and connected community ▪ Improved quality of life for our community ▪ A healthy and creative community 3. Sustainable Environment and Infrastructure: Safe, functional assets and a protected natural environment <ul style="list-style-type: none"> ▪ Enhanced and protected natural environment ▪ Sustainable asset management ▪ Effective and sustainable maintenance and renewal of assets and open space ▪ Infrastructure that meets community needs. 4. Responsible Governance: Transparent accountable leadership and democratic decision-making <ul style="list-style-type: none"> ▪ Democratic governance ▪ Excellence in service provision, operational efficiency and management practice ▪ Responsible financial stewardship ▪ Effective and responsive organisational support. 	<p>Under theme three Sustainable Environment and Infrastructure, Outcome 3.1 – Enhanced and Protected Natural Environment addressing climate change issues is a key action for 2011/12. There is provision to undertake a climate change risk assessment and support building a place adaptive program.</p>
2025 Vision for Macedon Ranges	<p>The 2025 vision for the Macedon Ranges is ‘to be one of Australia’s leading and most inspired regions by providing the opportunity and balance required for all to live a fulfilling life, whilst protecting our heritage, environment and sense of Community through our shared commitment to a sustainable Macedon Ranges.’</p> <p>The following guiding principles are outlined for community wellbeing, natural environment, sustainable development, and community partnerships:</p> <ul style="list-style-type: none"> ▪ Healthy, vibrant and resilient communities 	<p>The Vision does not include climate change considerations. Climate change may influence the community indicators being achieved for community wellbeing, natural environment, sustainable development, and community partnerships.</p>

Strategy/Plan	Overview	Relevance to the Early Adaptation Plan
	<ul style="list-style-type: none"> ▪ The beauty, tranquility and biodiversity of our Natural Environment ▪ Economic vitality derived from sustainable principles ▪ A governance culture that is life-nourishing and collaborative 	
Strategic Resource Plan	<p>The Plan outlines the resources that it is expected will be required by Council to fulfill its obligations under the Local Government Charter (Part 1A of the Local Government Act) and to achieve Council’s strategic objectives as expressed in the Council Plan.</p> <p>The objectives of the Plan are to:</p> <ul style="list-style-type: none"> ▪ Maintain the existing range, level and standard of service provision and develop the capacity to add new services – if Council so determines ▪ Maintain a strong cash position, ensuring Council remains financially sustainable in the long-term ▪ Achieve operating statement surpluses with the exclusion of all non-operational items such as granted assets and capital income ▪ Maintain debt levels below prudential guidelines ▪ Continue to pursue recurrent grant funding and capital works grant funding from the state and federal government ▪ Provide for rate increases that includes increasing funding for capital works (asset renewal, expansion or upgrade) and asset maintenance ▪ Ensure critical renewal is funded annually over the timeframe of the SRP 	<p>The Plan does not make reference to climate change. The resources required by Council may increase due to the increase in asset maintenance and increase in severity and frequency of extreme weather events.</p>
Municipal Strategic Statement	<p>The Local Planning Policy Framework (LPPF) sets the local policy specific to the Macedon Ranges. It comprises the Municipal Strategic Statement (MSS) and specific local planning policies.</p> <p>The MSS provides a 10-15 year vision for land use planning and development in the Macedon Ranges Shire. It reflects the objectives of Council and the community and provides the framework for the application of actions and controls to achieve desired land use outcomes.</p> <p>Specific local planning policies guide decision making on particular issues of importance in the MSS such as vegetation protection, steep land and ridgelines and agricultural landscapes. These policies give guidance on how a planning decision will be made.</p>	<p>The MSS does not address climate change. The LPPF will be an important tool to assist Council to respond to land use planning issues that arise due to climate change, for example increased flooding in urban residential areas.</p>
Health and Wellbeing Plan	<p>The goals of the Plan on the four key themes of the Council Plan:</p> <p>1. Sustainable Living:</p> <ul style="list-style-type: none"> ▪ To promote economic development <p>2. Community Wellbeing:</p> <ul style="list-style-type: none"> ▪ To enhance the community’s mental and physical health and wellbeing by addressing social isolation, strengthening social capital and encouraging people to adopt a 	<p>Objective 3.3 Promote the sustainable use of natural resources and protection of native flora and fauna, outlines the strategic action 3.3f: Enhance focus on environmental issues including climate change.</p>

Strategy/Plan	Overview	Relevance to the Early Adaptation Plan
	<p>healthier way of life.</p> <p>3. Sustainable Environment and Infrastructure:</p> <ul style="list-style-type: none"> ▪ To promote community engagement in a physical setting that strives to achieve environmental sustainability and promotes a sense of safety and security. <p>4. Responsible Governance:</p> <ul style="list-style-type: none"> ▪ To build the community’s capacity through consultation, collaboration, excellence in service provision and information sharing. 	
Municipal Emergency Management Plan	<p>The aim of this Plan is to detail the agreed arrangements for the prevention of, the response to, and the recovery from emergencies that could occur in the Macedon Ranges Shire Council (MRSC) as identified in Part 4 of the <i>Emergency Management Act, 1986</i>.</p> <p>The objectives of the Plan are to:</p> <ul style="list-style-type: none"> ▪ Implement measures to prevent or reduce the causes or effects of emergencies ▪ Manage arrangements for the utilisation and implementation of municipal resources in response to emergencies. <p>Manage support that may be provided to or from adjoining municipalities. Assist the affected community to recover following an emergency. Complement other local, regional and state planning arrangements.</p>	<p>The MEMP does not explicitly address climate change. Climate change will likely result in an increase in frequency and severity of extreme events. This could put the safety of the Macedon Ranges community at risk, as well as increase the burden on council and volunteers in responding to such events, both in terms of financial and human resources and capacity. Council buildings may also be required as community refuges more often.</p>
Procurement Policy	<p>The Procurement Policy is made under Section 186A of the <i>Local Government Act 1989</i> which requires Council to prepare, approve and comply with a Procurement policy encompassing the principles, processes and procedures to be applied to all purchases of goods, services and works by Macedon Ranges Shire Council (Council).</p> <p>The purpose of this Policy is to:</p> <ul style="list-style-type: none"> ▪ Provide control and consistency over Procurement activities; ▪ Demonstrate accountability to Residents and Ratepayers; ▪ Provide clear instructions to Staff on best practice in purchasing; and <p>Increase the probability of obtaining the right outcome when purchasing goods, and services, or undertaking (construction and maintenance) works.</p>	<p>The Policy does not specifically mention climate change. Climate change may result in variations to the way Council procure goods and services and undertake maintenance in response to extreme events and heatwaves.</p>
Community Access and Inclusion Plan 2009-2013	<p>The Plan aims to maintain and improve access for all residents, workers and visitors within the Macedon Ranges Shire, especially those living with a disability and the aged. The Plan provides a number of strategic goals under the following four themes:</p> <p>1. Whole-of-council</p> <ul style="list-style-type: none"> ▪ To ensure that the corporate culture and responsibilities of Council include the principles of access and equity and that the organisation demonstrates and investigates best practices in relation to these concepts 	<p>The Plan does not make mention of climate change. The impact of climate change will influence the achievement of the strategic objectives across whole-of-council, community wellbeing, assets and environment and corporate services.</p>

Strategy/Plan	Overview	Relevance to the Early Adaptation Plan
	<ul style="list-style-type: none"> ▪ To ensure that Council advocates appropriately on behalf of people with disabilities for improved services, facilities and programs to meet community needs within the Shire ▪ To build an organisational culture which encourages all staff to address issues for people with disabilities as part of their regular practice ▪ To further develop the knowledge and competence of all Council staff to improve Council's awareness and understanding of access and inclusion issues ▪ To manage, implement and facilitate review of the CAIP's Strategic Goals and formulate new strategies for future development. ▪ To ensure Council's external communications are accessible and available in alternative formats ▪ To create greater cross-Council awareness of the accessible facilities provided by and available to Council <p>2. Community wellbeing</p> <ul style="list-style-type: none"> ▪ To encourage further participation of people with disabilities in Council organised and sponsored events and explore the opportunities for increased inclusion ▪ To provide and further promote external information on accessibility throughout the Shire <p>3. Assets and environment</p> <ul style="list-style-type: none"> ▪ To ensure that people of all abilities are able to access and utilise premises including buildings, facilities and public outdoor spaces provided by Council ▪ To develop consistent and appropriate, internal and external consultation processes to ensure that Council's built and natural environments are accessible to all <p>4. Corporate services</p> <ul style="list-style-type: none"> ▪ To provide (a mechanism for) internal accountability for implementation of Council's Community Access and Inclusion Plan ▪ To ensure that all Council employment practices encourage and are inclusive of people with disabilities and comply with the requirements of the Equal Opportunity Act and the Discrimination Act ▪ To further develop Council's knowledge of available communication systems to increase the promotion of accessible facilities and services <p>To ensure that all Council services are developed and delivered in an equitable manner and are accessible to all users</p>	

6 Historical and Current Climate in the Macedon Ranges Region

It is important to examine the region's historic climate in order to understand the spatial and temporal variation in temperature and rainfall. The climate in the Macedon Ranges region is variable, as are other areas in Victoria and Australia.

The Macedon Ranges region experiences cool and relatively wet winters and warm, dry summers. The current annual average temperature in the Macedon Ranges region is 14.8°C with an observed warming of 0.7°C over the last century (Table 6-1).⁵

Table 6-1: Current average temperatures in the Macedon Ranges region (1961-1990)

	Average daily temperature (°C)	Average daily maximum temperature (°C)	Average daily minimum temperature (°C)
Annual	14.8	21.2	8.5
Autumn	15.3	21.5	9.1
Winter	8.7	13.6	3.8
Spring	14.2	20.7	7.7
Summer	21	28.9	13.1

The average rainfall for the region is between 750mm and 800mm per year. There has been an observed trend of approximately 3mm reduction in rainfall per decade over the last 110 years. For example, the recent drought period saw a 20 to 25% reduction in annual average rainfall (Table 6-2).

Table 6-2: Comparison of current rainfall variability in Macedon Ranges

Location	'Average' rainfall 1961-1990 average (mm)	Drought conditions 2001-2008 average (mm)	Proportion change from average to drought (%)
Kyneton	823.5 ⁶	640.0	-22%
Gisborne	765.2	583.7	-24%
Lancefield	743.9	604.9	-19%

The current number of frosts and hot days per year in the Macedon Ranges region is shown in Table 6-3. Frosts are classified as days where the minimum temperature falls to 2°C.

Table 6-3: Historical frost and hot days in the Macedon Ranges region

Average	Number of days / yr
Frosts	35
Over 30°C	44
Over 35°C	11
Over 40°C	1

⁵ DSE (2008) Climate Change in the North Central Region, Victorian Climate Change Adaptation Program, Melbourne

⁶ Historic rainfall data was only available for Kyneton from 1969

7 Climate Change in the Macedon Ranges Region

7.1 Climate change scenarios and timeframes

A medium climate change scenario to 2030 plus the back casting technique for extreme events was used to plan for the potential future climate in the Macedon Ranges region.

There are a number of climate change scenarios and timeframes that can be used in adaptation planning. These include:

- **Low** emissions growth scenario (IPCC B1) assumes there is a rapid shift to less-fossil fuel intensive industries.
- **Medium** emissions growth scenario (IPCC A1B) where there is a balanced use of both fossil fuel and renewable energy sources.
- **High** emissions growth scenario (IPCC A1FI) assumes a continuation of strong economic growth based on continued dependence on fossil fuels.

The changes to temperature and rainfall in Victoria under a low, medium and high emission scenario for 2030, 2050 and 2070 are shown in Figure 7-1 and Figure 7-2 respectively.

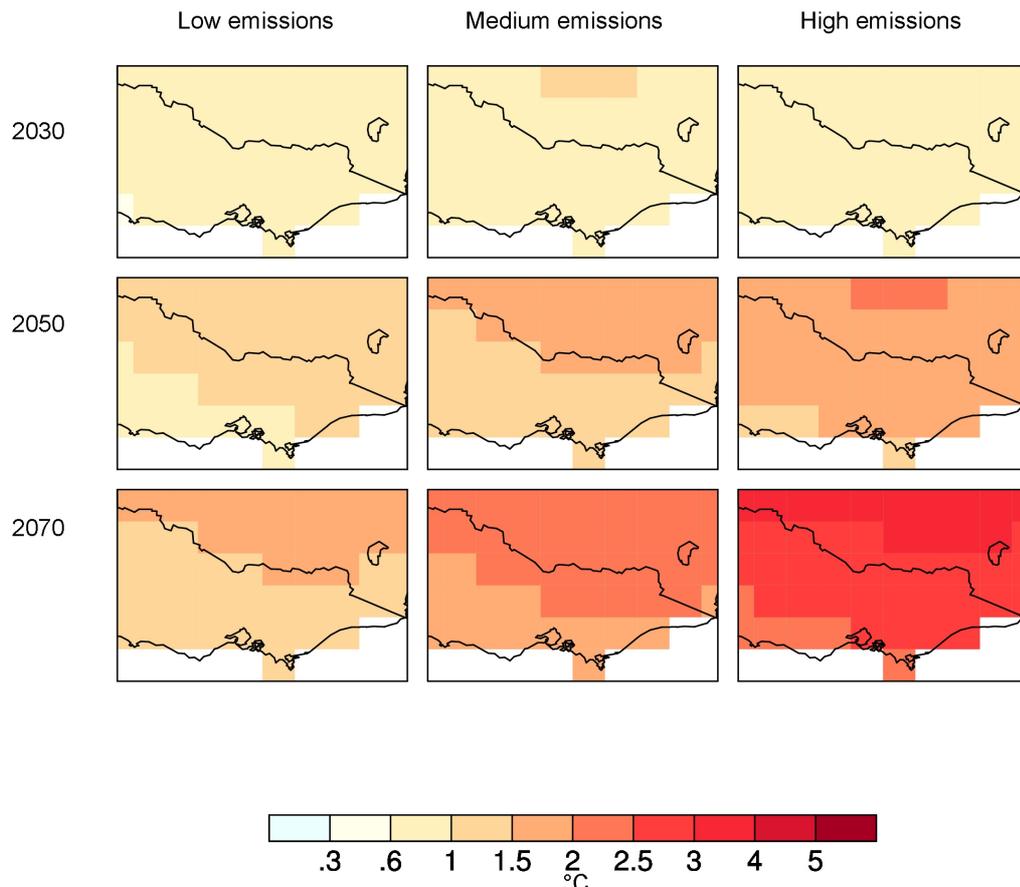


Figure 7-1: Change to temperature in Victoria under low, medium and high emissions scenarios

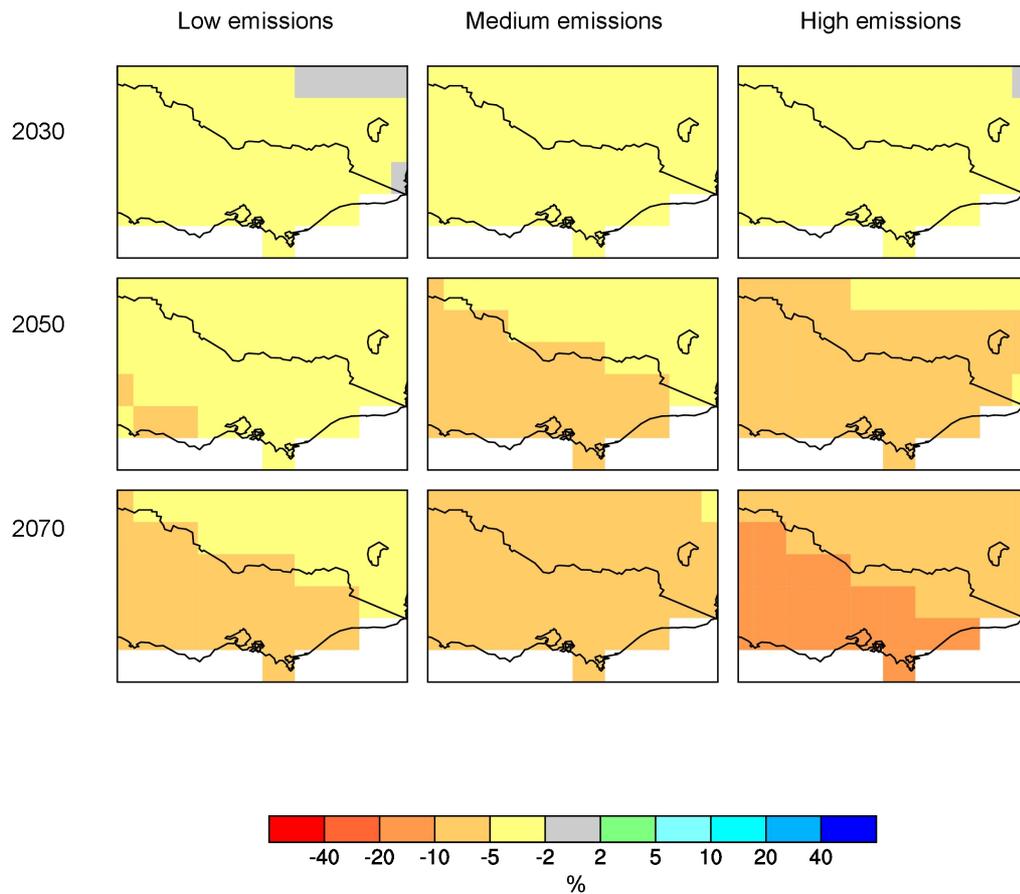


Figure 7-2: Change to rainfall in Victoria under low, medium and high emissions scenarios⁷

Whilst greenhouse gas concentrations are currently tracking towards the upper limit of the high emissions scenario, the concentration pathways of the medium and high scenarios are relatively similar at 2030. The timeframe of 2030 is more tangible for use in planning, and is more consistent with the timeframes outlined in the 2025 Vision for Macedon Ranges. Data availability and robustness is also greater for 2030, compared to 2050 and 2070.

7.2 Changes in climate variables

The predicted changes in climate in the Macedon Ranges region are warmer and drier conditions on average, with an increase in frequency and severity of hot and wet extremes.

The predicted changes in climate variables, relative to 1990 climate averages for the Macedon Ranges region are shown in **Table 7-1**.

⁷ CSIRO and Bureau of Meteorology (2007) Climate Change in Australia, in partnership with the Department of Climate Change and Energy Efficiency, Canberra

Table 7-1: Change in climate variables in the Macedon Ranges region under a median climate change scenario to 2030

	Northern Macedon Ranges ⁸		Southern Macedon Ranges ⁹		New Macedon Ranges climate will be similar to
	Average	Range	Average	Range	
Temperature (°C)	+0.9	0.6 to 1.2	+0.8	0.6 to 1.1	Ouyen
Rainfall (%)					
Annual	-4	-9 to +1	-4	-8 to no change	Charlton
Spring	-7	-15 to +1	-7	-17 to no change	Charlton
Summer	-1	-11 to +10	-2	-10 to +7	Charlton
Autumn	-1	-9 to +6	-2	-8 to +5	Charlton
Winter	-4	-14 to +2	-4	-11 to +1	Charlton
Rainfall intensity	+1.1	-7.2 to +15.9	+0.9	-7.7 to +15.2	Southern coastal NSW
Number of rainy days (%)	-5	-17 to -1	-6	-17 to -1	Charlton
Potential evaporation (%)	+2	no change to +5	+3	+1 to +5	Northern Loddon Mallee
Relative humidity (%)	-0.7	-1.5 to -0.1	-0.6	-1.2 to -0.1	Northern Loddon Mallee
Solar radiation (%)	+0.7	no change to +1.6	+0.9	+0.2 to +1.7	Northern Loddon Mallee
Frosts ¹⁰ (no.)	26	29 to 22	2	20 to 1	Northern Loddon Mallee
Hot days (no.)					
Over 30°C	52	50 to 57	34	33 to 37	Ouyen
Over 35°C	14	13 to 16	11	10 to 13	Ouyen
Over 40°C	2	1 to 2	2	2 to 2	Ouyen

Climate change is likely to change the frequency and intensity of extreme weather events such as the heatwaves, drought, floods and storms in the Macedon Ranges region. The number of extreme hot days and heavy precipitation has increased since 1950.¹¹

Analysis of recent (last 15 years) extreme weather events allows the practical assessment of the current vulnerability to climate variability in the Macedon Ranges Shire, which is an appropriate starting point for the preparation of an adaptation plan. The assessment involves describing aspects of storms (rain, hail and wind), floods, heatwaves and droughts. The impacts of recent extreme weather events are shown in Table 7-2.

⁸ DSE (2008) Climate Change in the North Central Region, Victorian Climate Change Adaptation Program, Melbourne

⁹ DSE (2008) Climate Change in the Port Phillip and Westernport, Victorian Climate Change Adaptation Program, Melbourne

¹⁰ Days where the minimum temperature falls to 2°C or less

¹¹ IPCC (2012) Summary for Policymakers. In: Managing the Risks of Extreme Events and Disasters to Advance Climate Change Adaptation [Field, C.B., V. Barros, T.F. Stocker, D. Qin, D.J. Dokken, K.L. Ebi, M.D. Mastrandrea, K.J. Mach, G.-K. Plattner, S.K. Allen, M. Tignor, and P.M. Midgley (eds.)]. A Special Report of Working Groups I and II of the Intergovernmental Panel on Climate Change. Cambridge University Press, Cambridge, UK, and New York, NY, USA, pp. 1-19.

Table 7-2: Consequences of extreme weather events in the Macedon Ranges region

Weather event	Date	Weather detail	Impact	Consequence	Responsible organisations	Staff time and resources	Impact on service or operations	Estimated cost
Storm	March 2010	50mm fell in Bendigo on 6 March.	Damage to houses from rainfall intensity.	Water entering houses caused by reduced capacity of drains and structural integrity compromised (e.g. hole in roof).	SES Macedon Ranges Shire Council (community buildings).	Over a fortnight to secure, clean up, and longer to repair. Additional aid of Interstate emergency crews needed.		Total cost to Victoria greater than \$200 million.
		Strong winds up to 156 km/h.	Wind damage to houses and businesses.	Fallen trees and power line damage restricted road access. Water entering some homes due to wind compromising roof structures.	SES Macedon Ranges Shire Council (community buildings).	Over a fortnight to clean up, and longer to repair. Additional aid of Interstate emergency crews needed. 850 emergency calls received.		
Flood	January 2011	Moderate flooding of the upper Campaspe River and tributaries, as well as stormwater due to rainfall intensity. Approximately 284 mm of rain fell between 1 to 31 January.	Houses and businesses damaged. Infrastructure damage. Road closures.	Kyneton police station, local swimming pool Woodend nursing home flooded. Houses in Malmsbury also flooded. Power outages affected 2,300 homes in Kyneton, Gisborne, Macedon and Woodend.	SES	Sandbagging and clean up.	Residents unable to live in homes temporarily.	Total cost to Victoria was \$350 million.
Heatwave	February 2009	Hottest day of 45°C, with five days of temperatures over 40°C.	Heat stress on local residents.	A number of elderly (65+ years) and young (<5 years) people affected by heat.	Local aged care facilities. GPs and hospitals.	Increase in number of heat related cases in the health care sector.	Increased pressure on aged care facilities.	Total cost to Victoria was \$100 million over seven days.

Weather event	Date	Weather detail	Impact	Consequence	Responsible organisations	Staff time and resources	Impact on service or operations	Estimated cost
Drought	~1998 to 2009	Severe reduction in average rainfall. Rainfall reduction between 2001-08 and 1961-1990 mean was: <ul style="list-style-type: none"> ▪ Kyneton -22% ▪ Gisborne -24% ▪ Lancefield -19% 	Reduced farm income. Financial pressure and family strain. Reduced urban water storages.	Reduced regional gross value of agricultural production (GVAP). Increased farmer mental illness. Increased urban and rural water scarcity.	DAFF DPI DHS Farmers Water authorities (GV Water and Western Water)	Government drought relief packages. Mental health assistance.	Increased pressure on welfare services. Reduced irrigation allocation. Urban water restrictions.	Downward impact on GDP growth of 1.0 percentage point between 2001-02 and 2002-03.
Bushfires	February 2009	Temperature was mid to high 40°C and winds were in excess of 100 km/h.	Damage to properties and infrastructure. Injury and loss of life.	In central Victoria one life was lost, more than 70 homes were destroyed, wildlife and livestock were decimated, and many kilometres of fencing and farmland were scorched.	CFA DSE Macedon Ranges Shire Council SES	CFA and SES volunteer crews.	Displacement of residents. Lack of access due to road closures.	Total cost to Victoria was \$4.4 billion.

8 Climate Change Risks and Prioritisation

This section outlines the climate change risks and prioritisation for each Council directorate. The risks were captured and prioritised in consultation with Council managers and staff.

8.1 Organisational Development and Corporate Services

The Organisational Development directorate includes Human Resources, Performance Improvement, Occupational Health and Safety and Risk Management. The Corporate Services directorate includes Finance, Information and Communications, and Internal Audit and Contracts. These two directorates were combined as they primarily address council capacity.

The main causes of climate risk for these directorates are increased intensity of rainfall and extreme events. The key impacts are the inundation of buildings and storage facilities, financial cost and provision of critical services. The climate change risks and prioritisation are outlined in the table below.

Table 8-1: Organisational Development and Corporate Services risks and prioritisation

Risk number	Assets and/or activities at risk	Risk priority
ODCS-3	Increased severity and frequency of extreme events and the associated increased financial cost may limit the availability of State and Federal government assistance requiring Council to self fund infrastructure repairs.	Very High
ODCS-1	Increased rainfall intensity and flash flooding may cause inundation of buildings, which will interrupt service provision and cause safety issues for staff.	High
ODCS-5	Increased severity and frequency of extreme events may increase the cost of insurance and infrastructure repair and maintenance.	High
ODCS-6	Increased severity and frequency of extreme events will cause Council staff to be diverted to emergency work causing a backlog of routine service delivery.	High
ODCS-8	Increased heatwaves may cause more stress on outdoor and home care staff.	High
ODCS-2	Increased rainfall intensity and flash flooding may cause inundation of storage facilities, or increased humidity, damaging historical records and IT equipment.	Medium
ODCS-4	Increased severity and frequency of extreme events (e.g. storm, fires, flood and heatwaves) may negatively impact power supply and make IT systems unavailable.	Medium
ODCS-7	Increased severity and frequency of extreme events may prevent staff accessing work places and ability to provide critical services.	Medium

8.2 Community Wellbeing

The Community Wellbeing directorate includes Community Development, Community Services and Recreational and Cultural Development.

The main causes of climate risk for this directorate are increased number of hot days, heatwaves and extreme events. The key impacts are on recreation and associated facilities,

vulnerable populations, volunteers and Information and Communication Technology (ICT) systems. The climate change risks and prioritisation are outlined in the table below.

Table 8-2: Community Wellbeing risks and prioritisation

Risk number	Assets and/or activities at risk	Risk priority
CW-4	Increase in heatwaves will increase negative impacts on vulnerable populations	Very High
CW-5	Increased number of hot days and heatwaves increases the demands on Community Wellbeing Directorate service delivery. Reduced staff on code red days and OHS restrictions reduces the capacity to support vulnerable people especially in prolonged heatwaves (e.g. domestic assistance).	Very High
CW-8	Increased severity and frequency of extreme events may cause a crash of communications systems and impact recovery capability	Very High
CW-9	Increased severity and frequency of extreme events will increase demands on volunteers, leading to fatigue.	High
CW-17	Increased number of hot days and heatwaves reduces the capacity of volunteers to provide the Meals-on-Wheels service due to small food storage cool room and lack of temperature control in delivery vehicles.	High
CW-1	Decreased average rainfall will lead to drying of sports fields and passive recreation facilities which may reduce amenity and exercise levels.	Medium
CW-2	Increased number of hot days may increase demand on swimming pools beyond safe levels of use	Medium
CW-3	Increased number of hot days may reduce the capacity of the community to exercise resulting in health impacts.	Medium
CW-6	Increase in fire conditions and danger coupled with the Shire's susceptibility to bushfire may increase community anxiety.	Medium
CW-7	Increase in number of hot days and heatwaves may lead to train stoppages and strand Shire residents that work in Melbourne.	Medium
CW-10	Decreased average rainfall and increased average temperature may lead to a loss of private gardens (food and aesthetics) having negative impacts on wellbeing and health.	Medium
CW-11	Increased variability and uncertainty of extreme events reduces the capacity of Council to plan emergency management and recovery budgets.	Medium
CW-12	Increased severity and frequency of extreme events will cause Council staff, particularly from the Community Wellbeing Directorate, to be diverted to emergency work (also identified in ODCS-6).	Medium
CW-13	Increased severity and frequency of extreme events damages infrastructure and leads to closure of assets reducing service provision and liveability of the Shire (also identified in AO-8).	Medium
CW-14	Decline in average rainfall may increase water restrictions on indoor and outdoor aquatic facilities.	Medium
CW-15	Increased number of hot days and heatwaves increases the need for shade structures at outdoor aquatic facilities.	Medium
CW-16	Increased intensity of rainfall increases the risk of flooding at aquatic and leisure facilities e.g. Woodend outdoor pool and Gisborne aquatic centre.	Medium
CW-18	Increased severity and frequency of extreme events increases community expectation of Council's responsibility for providing community services during emergencies (also identified in AO-4).	Medium

8.3 Assets and Operations

The Assets and Operations directorate includes Engineering Planning, Engineering Infrastructure and Projects, Operations and Community Safety.

The main causes of climate risk for this directorate are the increased intensity of rainfall and frequency and severity of extreme events. The key impacts are on flooding, drainage and damage to infrastructure (e.g. unsealed road, vulnerable land), reduced access, response crews and staff safety. The climate change risks and prioritisation are outlined in the table below.

Table 8-3: Assets and Operations risks and prioritisation

Risk number	Assets and/or activities at risk	Risk priority
AO-1	Increased intensity of rainfall may flood and damage built assets, in particular unsealed roads.	Very High
AO-12	Decreased average rainfall and increased severity of drought reduces public safety due to falling limbs and dead trees. There are currently 18,000 trees in towns throughout the municipality that are between 50-150 years old, a large proportion of these are heritage trees.	Very High
AO-2	Increased intensity of rainfall may overwhelm the capacity of stormwater drainage infrastructure causing flooding.	High
AO-3	Increased severity and frequency of extreme events increases community expectations of Council to improve management and repair assets (links with Community Development consequence).	High
AO-4	Increased severity and frequency of extreme events increases damage to assets on vulnerable land, e.g. Councils buildings, recreation facilities, subdivision on floodplain.	High
AO-5	Increased severity and frequency of extreme events increases costs and staff resources pressures required to maintain and repair assets	High
AO-6	Increase in the severity and frequency of extreme events increases the frequency that the MEMP is activated	High
AO-7	Increased rainfall intensity and flash flooding increases road closures and reduces access (also identified in CW-13).	High
AO-8	Increased severity and frequency of extreme events increases demands on Assets and Operations response crews and reduces staff safety (also identified in ODCS-8 and links with CW-5).	High
AO-9	Increased severity and frequency of extreme events diverts Assets and Operations staff from routine work programs (also identified in ODCS-6 and CW-12).	High
AO-10	Increased severity and frequency of extreme events (e.g. drought, wind storms) increases ongoing capital maintenance costs of parks and gardens. This includes trucking water for heritage trees (up to \$70 K per annum) and botanical gardens e.g. Malmsbury, and damage to trees from wind storms, particularly in towns (one response event can cost \$150 K).	High

8.4 Planning and Environment

The Planning and Environment Directorate includes Planning and Development, Economic Development and Tourism and Strategic Planning and Environment.

The main causes of climate risk for this directorate are reduced average rainfall, increased average temperature, fire and extreme events. The key impacts are on tourism visitation, vulnerability to bushfire and housing, localised species extinction, new pest plant and animal incursions, and amenity, heritage and native trees. The climate change risks and prioritisation are outlined in the table below.

Table 8-4: Planning and Environment risks and prioritisation

Risk number	Assets and/or activities at risk	Risk priority
PE-8	Increased fire danger and activity increases the uncertainty as to the appropriateness of rural lifestyle properties around townships as it is not clear if they increase or reduce bushfire risk.	Very High
PE-1	Increased average temperature and decline in average rainfall may cause a decline in agriculture due to inadequate decision-making skills, information, and financial resources to maintain economically viable and sustainable farm businesses.	High
PE-4	Increased severity and frequency of extreme events may reduce tourist safety e.g. increasing dependence by visitors on good signage and directions to exit from high-risk areas and find safe areas.	High
PE-6	Increased fire danger and activity place an increasing number of people within fire prone areas that may not have information and knowledge to respond.	High
PE-10	Increased intensity of rainfall may overwhelm the capacity of stormwater drainage infrastructure causing flooding (also identified in AO-2).	High
PE-11	Increased severity and frequency of extreme events may increase the demands on Council to track larger numbers of disconnected individuals (e.g. single, elderly) potentially leading to them being 'forgotten' during emergency response.	High
PE-15	Increased average temperature and decline in average rainfall may cause local extinction of species due to the lack of ecological linkages.	High
PE-16	Increased variability and weather extremes may increase the community expectation that Council will assist them to adapt (also identified in AO-4 and PE-6).	High
PE-2	Increased severity and frequency of extreme events and perception that the region is not safe may lead to reduced tourism visitation and subsequent impact on the Shire economy.	Medium
PE-3	Increased severity and frequency of extreme events (e.g. Code Red Days) will result in the cancellation of major events resulting in increased costs to tourism operators, event organisers and businesses (e.g. purchase of unused items).	Medium
PE-5	Increased severity and frequency of extreme events may increase community/tourist expectation that Council will have information on the status of tourism events e.g. via internet and mobile coverage.	Medium
PE-7	Increased fire danger and activity reduces the conservation values of the municipality due to 'over zealous' fire prevention practices	Medium
PE-9	Increased severity and frequency of extreme events may result in existing housing stock being unsuitable for vulnerable populations	Medium

PE-12	Decline in average rainfall and increased average temperature will increase stress on old and heritage trees and the need for Council maintenance and reduce township amenity	Medium
PE-13	Increased duration and frequency of extreme events (e.g. drought) with increase mental health and stress issues in Council staff and the community.	Medium
PE-14	Increased average temperature and decline in average rainfall may introduce new pest plant and animal species and threaten the biodiversity values of the Shire due to the lack of management knowledge and experience.	Medium

9 Early Adaptation Actions

This section outlines the early adaptation actions for each Council directorate,

Early adaptation actions are those that are project ready and could be budgeted into work programs over the next one to three years. The early adaptation actions were identified in consultation with Council managers and staff. The adaptation numbers identified relate directly to the climate risk numbers outlined in section 8.

A number of actions were identified that are currently underway as part of a work program or in development. These have been integrated into the Early Adaptation Plan.

9.1 Organisational Development and Corporate Services

The early adaptation actions for the Organisational Development and Corporate Services directorates are outlined in the table below. Early adaptation actions include backfilling temporary vacancies for staff involved in emergency management and recovery and building cash reserves for recovery costs not funded by Federal or State Government. The key plans and strategies to assist adaptation are the Business Continuity Plan and Code Red Policy in the Operational Plan for Fire Danger Days.

Table 9-1: Organisational Development and Corporate Services early adaptation actions

Risk Number	Adaptation action
ODCS-3	Investigate the potential to increase rates and borrowing to increase cash reserves and reduce the reliance on State and Federal government assistance.
ODCS-5	Investigate the potential to increase rates and borrowing to cover increased insurance costs and infrastructure repair and maintenance.
ODCS-6a	Fill temporary vacancies caused by staff being off line during emergencies by engaging a recruitment agency and seconding staff from other councils, to ensure continuity of service delivery (also identified in CW-12a).
ODCS-6b	Finalise and implement a Business Continuity Plan to prioritise service delivery during emergencies and temporary 'back fill' of staff positions to ensure critical works program are delivered on schedule (also identified in CW-12b, CW-18a, AO-6b and AO-10).
ODCS-6c	Ensure the Business Continuity Plan is accessible and available to Council staff and managers during emergencies (also identified in CW-18b).
ODCS-7	Implement the Work from Home Plan and ensure Extranet operation and functionality to enable Council staff to continue service provision when Council buildings are inaccessible.
ODCS-8a	Implement a Code Red policy to cancel work and ensure safety of staff on Code Red days.
ODCS-8b	Implement flexible work hours and or engage casual staff to allow work programs to be completed while avoiding extreme heat

9.2 Community Wellbeing

The early adaptation actions for the Community Wellbeing directorate are outlined in the table below. Early adaptation actions include better use of Resource Sharing Agreements, addressing social housing needs, and utilising the networks and relationships formed

through community planning. The key plans and strategies to assist adaptation are the Health and Wellbeing Plan, Heatwave Plan, MEMP and Business Continuity Plan.

Table 9-2: Community Wellbeing early adaptation actions

Adaptation Number	Adaptation action
CW-1 CW-3 CW-4g CW-7 CW-10	Review Health and Wellbeing Plan, Heatwave Plan and Multi Agency Ageing Strategy to explicitly include considerations of climate change impacts. The Heatwave Plan is currently being reviewed using the Heatwave Plan Review Tool supplied by DHS (also identified in PE-11 and PE-13).
CW-2	Review Leisure Strategy Plan to incorporate considerations of heatwave impacts on swimming pool visitation and capacity.
CW-4a	In conjunction with neighbouring municipalities, advocate to State and Federal government for funding for low income families to retrofit homes with insulation, external blinds and other extreme heat mitigation devices.
CW-4d	Ensure that low-income energy efficient housing options are included in new developments.
CW-4e	Register for the Global Age Friendly Cities program and undertake planning with the funding already secured (1-2 year time frame in current work program).
CW-4f	Transfer social housing from Council to a registered provider with greater capacity to source funding, and review seniors housing (both currently underway).
CW-5a	Review the Resource Sharing Agreement between LGAs'. Seek to include more councils, improve connections with surrounding councils, understand systems, mentoring (e.g. Municipal Recovery Manager (MRM) shadowing), networking and opportunities to share lessons.
CW-6 CW-18c	Utilise the networks and relationships built during community planning to optimise communication and engagement on climate change impacts and adaptation
CW-8 CW-11	Review the Municipal Emergency Management Plan (MEMP) and Heatwave Plan to explicitly include considerations of climate change impacts. A different section of the MEMP is reviewed on a tri-annual basis and the Heatwave Plan is currently being reviewed using the Heatwave Plan Review Tool supplied by DHS (also identified in AO-7).
CW-9	Finalise and implement emergency communications plan to include investigation of options such as CB radio and social media, as well as identifying communication gaps.
CW-12a	Fill temporary vacancies caused by staff being off line during emergencies by engaging a recruitment agency and seconding staff from other councils, to ensure continuity of service delivery (also identified in ODCS-6a).
CW-12b CW-18a	Finalise and implement a Business Continuity Plan to prioritise service delivery during emergencies and temporary 'back fill' of staff positions to ensure critical works program are delivered on schedule (also identified in ODCS-6a, AO-6b and AO-10).
CW-13	Collaborate with the Assets and Operations Directorate to prioritise recovery of key assets, and include these in the review of the Asset Management Plan (also identified in AO-8).
CW-14	Implement water use efficiency and reuse projects in order to increase the sustainability of indoor and outdoor aquatic facilities (underway and on-going).
CW-15	Undertake review of shade structures to ensure appropriate protection (underway and on-going).
CW-16	Finalise flood policy for aquatic and leisure centres and develop support program and implementation plan.
CW-17	Investigate the potential of a regional cool room to be shared with neighbouring Councils to store the meals delivered from Altona.
CW-18b	Ensure Business Continuity Plan in accessible and available to Council staff and

Adaptation Number	Adaptation action
	managers during emergencies (also identified in ODCS-6c).

9.3 Assets and Operations

The early adaptation actions for the Assets and Operations directorate are outlined in the table below. Early adaptation actions include finalising the drainage studies, coordinating emergency response and utilising the Central Victorian Municipal Emergency Management Enhancement Group (MEMEG). The key plans and strategies to assist adaptation are the Asset Management Plan, MEMP, and Operational Plan for Fire Danger Days and Communication Matrix.

Table 9-3: Assets and Operations early adaptation actions

Adaptation number	Adaptation action
AO-2a	Include other directorates e.g. Planning and Environment and Assets and Operations in asset management risk assessment so that wider climate change impacts are considered e.g. assessment of vegetation impact on drainage infrastructure (also identified in PE-10a).
AO-2d	Finalise assessment and incorporate recommendations from drainage studies into the Asset Management Plan using the new asset operation role (also identified in PE-14b).
AO-4a	In partnership with emergency services and community, improve preparedness for extreme events ('all hazards approach' - flood, fires and storms).
AO-4b	Council to take a consistent approach to communication during extreme events with regard to preparedness and provision of information to residents (also identified in PE-16).
AO-5b	Collaborate with DSE, Crown Land managers and CFA in regards to controlled burns to reduce fuel loads and risk in and around bushfire prone assets and land.
AO-6a	Improve resourcing and information sharing through the Central Victorian Municipal Emergency Management Enhancement Group (MEMEG) to build the capacity of the five member councils.
AO-6b AO-10	Finalise and implement Business Continuity Plan to prioritise service delivery and 'back fill' staff positions to ensure critical works program are completed on time(also identified in ODCS-6b, CW-12b and CW-18a).
AO-7	Review the Municipal Emergency Management Plan (MEMP) and Heatwave Plan to explicitly include considerations of climate change impacts. A different section of the MEMP is reviewed on a tri-annual basis and the Heatwave Plan is currently being reviewed using the Heatwave Plan Review Tool supplied by DHS (also identified in CW-8 and CW-11).
AO-8	Prioritise recovery of key road assets and access points, and include these in the review of the Asset Management Plan (also identified in CW-13)
AO-9a	Implement the Operational Plan for Fire Danger Days and Communication Matrix under the Municipal Emergency Management Plan (MEMP) to ensure staff safety e.g. response crews.
AO-9b	Use contractors and secondment staff from neighbouring councils to reduce pressure on Assets and Operations response crew. It is important to communicate to staff that costs associated with backfilling positions in these circumstances is covered by the National Disaster Response and Relief Fund.
AO-11b	Continue trials of drought tolerant turf specie and investigate the potential to extend these species to parks, recreation areas and gardens in conjunction with program partners Coliban Water and Melbourne Water.
AO-12a	Continue annual audit program of heritage trees in the municipality to monitor health and management requirements. Engage professional arborists to assist with the audit

Adaptation number	Adaptation action
	as required.
AO-12b	Investigate and recommend appropriate vegetation to replace old and dying trees in urban environments (also identified in PE-16).

9.4 Planning and Environment

The early adaptation actions for the Planning and Environment directorate are outlined in the table below. Early adaptation actions include greater collaboration with the Country Fire Authority (CFA), Catchment Management Authorities (CMAs) and tourism agencies, as well as improving internal and external communication. The key plans to assist adaptation are the Health and Wellbeing Plan and Heatwave Plan.

Table 9-4: Planning and Environment early adaptation actions

Adaptation number	Adaptation action
PE-2	Communicate that the region has undertaken risk assessment and planned for extreme events.
PE-3	Review programming of events to minimise risk of Code Red Day cancellation.
PE-5	Ensure the Visit Macedon Ranges website provides up to date information on major events and encourage event organisers to use the website for information updates and that there is a link from the Council website.
PE-6a	Develop and implement management plans for Council owned and managed bushland reserves (currently under development) that includes consideration of fuel loads and climate change impacts.
PE-6b	Collaborate with the CFA to incorporate emergency management, particularly bushfire, into community plans and encourage preparation of personal bushfire plans.
PE-7	Collaborate with the CFA to deliver education programs for people living in rural areas regarding hazard reduction, fire ecology, native vegetation management and native fauna.
PE-10a	Include other directorates e.g. Planning and Environment and Assets and Operations in asset management risk assessment so that wider climate change impacts are incorporated into assets management e.g. assessment of vegetation impact on drainage infrastructure (also identified in AO-2a).
PE-10b	Finalise assessment and incorporate recommendations from drainage studies into the Asset Management Plan using the new asset operation role (also identified in AO-2b).
PE-11 PE-13	Review Health and Wellbeing Plan, Heatwave Plan and Multi Agency Ageing Strategy to explicitly include considerations of climate change impacts. The Heatwave Plan is currently being reviewed using the Heatwave Plan Review Tool supplied by DHS (also identified in CW-1, CW-3, CW-4h, CW-7 and CW-10).
PE-12	Investigate and recommend appropriate vegetation to replace old and dying trees in urban environments (also identified in AO-12b).
PE-15a	Advocate to CMA's for ecosystem connectivity mapping for public and private land in Macedon Ranges.
PE-15c	Work with communities and relevant authorities to create vegetation corridors between existing remnant areas to allow for the movement of native flora and fauna in response to climate change.
PE-16	Incorporate climate change adaptation into community planning and communications (also identified in AO-4b).

10 Adaptation Actions Requiring Further Work

This section outlines the adaptation actions that require further work (e.g. data analysis, comparison of options) or additional budget (e.g. external funding) over the next three to five years. Further work and budgeting should be based on the risk priority rating identified.

10.1 Organisational Development and Corporate Services

The areas of further work for the Organisational Development and Corporate Services directorate are outlined in the table below.

Table 10-1: Areas of further work for Organisational Development and Corporate Services

Adaptation number	Adaptation action	Risk(s) addressed	Risk priority
ODCS-1	Investigate and prioritise improving the structural integrity of existing Council buildings, and improving drainage on existing Council properties.	Increased rainfall intensity and flash flooding may cause inundation of buildings, which will interrupt service provision and cause safety issues for staff in buildings and when attempting to leave.	High
ODCS-2	Shift to electronic documentation system, and investigate the potential for climate controlled offsite storage of hardcopy historical records.	Increased rainfall intensity and flash flooding may cause inundation of storage facilities, or increased humidity, can cause damage to historical records and IT equipment.	Medium
ODCS-4	Invest in fit-for-purpose backup generators to ensure IT system operation during power failures, in conjunction with implementing the Business Continuity Plan and Work from Home Plan.	Increased severity and frequency of extreme events (e.g. storm, fires, flood and heatwaves) may negatively impact power supply and make IT systems unavailable.	Medium

10.2 Community Wellbeing

The areas of further work for the Community Wellbeing directorate are outlined in the table below.

Table 10-2: Areas of further work for Community Wellbeing

Adaptation number	Adaptation action	Risk(s) addressed	Risk priority
CW-4b	Ensure low cost, energy efficient, climate adapted housing is built and available as part of the Housing Strategy (part advocacy project).	Increase in heatwaves will increase negative impacts on vulnerable populations	Very High
CW-4c	Develop a communications strategy to ensure that vulnerable people have access to information / strategies to deal with heatwaves. This may include investigating if vulnerable people can be targeted through HACC Assessment and		

Adaptation number	Adaptation action	Risk(s) addressed	Risk priority
	Enhanced MCHN.		
CW-5b	Develop a larger pool of people to draw on in emergencies. Consider permanent staff in community services, contract staff and volunteers (local and shared). Consider applying the 'early years model, used by Shires for training staff for emergency recovery.		Very High
CW-5c	Improve and implement volunteer coordination. Investigate appropriate models, developing a central Macedon Ranges database (e.g. City of Greater Bendigo) and establishing what resources the Shire can draw upon (e.g. dollar figures on what volunteers are saving MRSC).	Increased number of hot days and heatwaves increases the demands on Community Wellbeing Directorate service delivery. Reduced staff on code red days and OHS restrictions reduces the capacity to support vulnerable people especially in prolonged heatwaves (e.g. domestic assistance).	
CW-5d	Develop and implement a staff wellness program in collaboration with DHS, which could consider training, stress management, medicals, and/or review of position descriptions and work loads.		
CW-17a	Invest in a larger cool room at a different location to the current infrastructure in Kyneton.	Increased number of hot days and heatwaves reduces the capacity of volunteers to provide the Meals-on-Wheels service due to small food storage cool room and high temperature of delivery vehicles.	High

10.3 Assets and Operations

The areas of further work for the Assets and Operations directorate are outlined in the table below.

Table 10-3: Areas of further work for Assets and Operations

Adaptation number	Adaptation action	Risk(s) addressed	Risk priority
AO-1a	Review Road Asset Management Plan to explicitly include considerations of climate change impacts. This may include investigating and prioritising a sealing program for unsealed roads using lessons from the recent floods. A 'do nothing' scenario that considers community expectations could also be considered.	Increased intensity of rainfall may damage and flood built assets, in particular unsealed roads.	Very High
AO-1b	Investigate and prioritise drainage upgrades to increase capacity using the recent drainage studies to guide decision making		
AO-3	Investigate and prioritise drainage upgrades to increase drainage		High

	capacity using the recent drainage studies to guide decision making		
AO-5a	Undertake flood and hazards mapping exercise to inform decisions on development proposals e.g. riverine flooding Kyneton and Malmsbury.	Increased severity and frequency of extreme events increases damage to assets on vulnerable land, e.g. Councils buildings, recreation facilities, subdivision on floodplain.	High
AO-11a	Establish a Council emergency response and recovery fund for extreme events not covered by the National Disaster Response and Relief Fund.	Increased severity and frequency of extreme events (e.g. drought, wind storms) increases ongoing capital maintenance costs of parks and gardens. This includes trucking water for heritage trees (up to \$70 K per annum) and botanical gardens e.g. Malmsbury, and damage to trees from wind storms, particularly in towns (one response event can cost \$150 K).	High

10.4 Planning and Environment

The areas of further work for the Planning and Environment directorate are outlined in the table below. The key plans involving further work are the Natural Environment Strategy and Housing Strategy.

Table 10-4: Areas of further work for Planning and Environment

Adaptation number	Adaptation action	Risk(s) addressed	Risk priority
PE-1	Undertake risk assessment and adaptation training for the range of economic development sectors.	Increased average temperature and decline in average rainfall may cause a decline in agriculture due to inadequate decision-making skills, information, and financial resources to maintain economically viable and sustainable farm businesses.	High
PE-4	Develop / review road signage plan that identifies major touring routes through the municipality and provides consistent signage that incorporates tourism destinations, town, and emergency management considerations.	Increased severity and frequency of extreme events may reduce tourist safety e.g. increasing dependence by visitors on good signage and directions to exit from high-risk areas and find safe areas.	High
PE-8	Review the Housing Strategy to explicitly consider the impacts of climate change, particularly increased frequency and severity of bushfire on existing and future rural residential development.	Increased fire danger and activity increases the uncertainty as to the appropriateness of rural lifestyle properties around townships as it is not clear if they increase or reduce bushfire risk.	Very High
PE-9	Review the Housing Strategy to explicitly include considerations of climate change impacts and meet needs of socio-economic profile of the community, including design guidelines for new homes, retirement village and visitor accommodation (also identified in PE-8).	Increased severity and frequency of extreme events may result in existing housing stock being unsuitable for vulnerable populations	Medium
PE-14	Review Natural Environment	Increased average temperature	Medium

	Strategy to explicitly include considerations of climate change impacts.	and decline in average rainfall may introduce new pest plant and animal pressures and threaten the biodiversity values of the Shire due to the lack of management knowledge and experience.	
PE-15b	Prepare a Roadside Management Plan that includes consideration of regional ecosystem connectivity.	Increased average temperature and decline in average rainfall may cause local extinction of species without ecological linkages between climate zones and protection/enhancement of existing remnant species.	High

11 Plan Implementation and Renewal

11.1 Next steps

The effective implementation of the Early Adaptation Plan will assist the Macedon Ranges in adapting to the likely impacts of climate change. Figure 11-1 outlines the key needs of local government in relation to climate change adaptation planning that were identified in a study for the Municipal Association of Victoria. The first stage of adaptation planning for Macedon Ranges has been completed, which included:

- Information and guidance on climate change adaptation and planning.
- Understanding of and engagement in adaptation planning and implementation amongst council executive, council staff and councillors.
- Resources to conduct initial assessments and planning and to facilitate and monitor implementation.

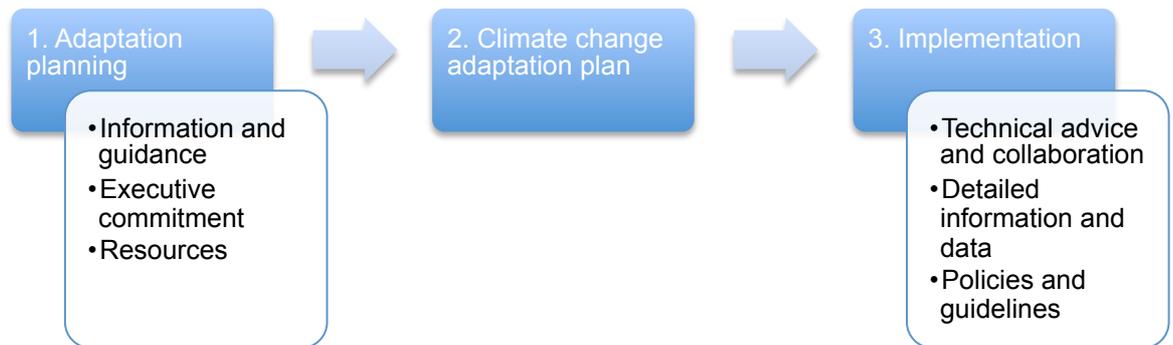


Figure 11-1: Key needs of local government in climate change adaptation planning¹²

It should be noted that the project budget allowed for a relatively limited validation of the risks and adaptation options. We recommend that prior to implementing the Plan, further validation and refinement of risks and adaptation options be undertaken to ensure that adaptation actions are ‘project ready’ for inclusion in work programs. There are sufficient skills and experience within the Macedon Ranges organisation for this to be undertaken internally.

Once this is completed, the implementation of the adaptation plan requires three key factors (Figure 11-1):

- Technical advice and collaboration on issues as they arise during implementation of adaptation plans.
- Information and data regarding projected changes in climate of sufficient detail to be integrated into Council’s asset management and business continuity plans.
- Policies and guidelines that facilitate implementation of adaptation actions.

¹² RMCG (2011) Supporting Victorian Local Government in Climate Change Adaptation Planning, report prepared for the Municipal Association of Victoria and Department of Sustainability and Environment, Camberwell

The Council, through the Risk Management Unit, will use the existing Integrated Risk Management System (IRMS) to implement the early adaptation actions outlined in section 9. The IRMS will integrate the early adaptation actions into existing planning and operational processes. Unit managers will then work with their business units to ensure all activities are carried out within agreed timeframes to effectively manage climate risk.

Concurrently, further work can commence on the risks and adaptation actions outlined in section 10.

The Adaptation Plan should be reviewed every three years to evaluate progress against the adaptation actions, validate the priority risks, and incorporate current climate change data and policy changes. This will ensure continuous improvement and constitutes best practice.

11.2 Integration with council plans and strategies

The council plans and strategies that require updating with content from this plan are outlined in Table 11-1 below.

Table 11-1: Integration with existing council plans and strategies

Council directorate	Existing plan or strategy	Recommended content inclusion
Guiding plans	Council Plan 2009-2013	Consider the impact of climate change on the achievement of the Council Plan objectives. A whole-of-council approach to climate change adaptation planning, and does not just focus on the natural environment is needed.
	2025 Vision for Macedon Ranges	Consider the impact of climate change on the achievement of the 2025 vision for Macedon Ranges.
	Strategic Resource Plan	Consider the impact of climate change on the resources required by Council to ensure the strategic objectives in the Council Plan can be achieved.
	Municipal Strategic Statement	Consider the impact of climate change in the MSS and Local Planning Policy Framework (LPPF) to account for more frequent and severe extreme events.
	Health and Wellbeing Plan	That the current strategic action 3.3f: Enhance focus on environmental issues including climate change is pursued, as well as climate change impacts on the broader health and wellbeing of the Macedon Ranges community be considered by the Plan, in particular mental health of the rural community and links with the Heatwave Plan.
Organisational Development	Risk Assessment Framework	The MRSC Risk Assessment Framework was used to guide the risk assessment process undertaken as part of this project. All risks captured by this project should be inputted into the MRSC risk register.
Corporate services	Council Budget 2011/12	That the current Early Adaptation Plan is adopted and implemented, and climate change is considered in relation to the key budget influences, vulnerable communities and asset management.
	Procurement Policy	That consideration of climate change impacts is included in the Policy. Provision of the 'Directors Discretion' clause should continue to be supported. This allows in the event of a clear and present emergency or an unforeseen urgency then the relevant Director may, upon receiving a written explanation from the relevant Manager, give approval to seek less than the number of quotes required by section 2.3.1 of the Policy.
Community	Housing	That impacts of climate change are explicitly considered in

Council directorate	Existing plan or strategy	Recommended content inclusion
Wellbeing	Strategy	relation to: <ul style="list-style-type: none"> Increased frequency and severity of bushfire on existing and future rural residential development. Meeting the needs of socio-economic profile of the community, including design guidelines for new homes, retirement village and visitor accommodation.
	Heatwave Plan 2009-2012	That the Plan considers the potential increase in number of hot days and heatwaves as a result of climate change on vulnerable communities and tourists.
	Leisure Strategy Plan	That the impacts of climate change on the achievement of the objectives of the Plan are considered, particularly reduced average rainfall, increased number of hot days and heatwaves, and extreme events impact on infrastructure.
	Community Access and Inclusion Plan 2009-2013	That the impacts of climate change are considered in the monitoring of the Plan's strategic objectives, particularly vulnerable communities within Macedon Ranges.
	Macedon Ranges Small Towns Study	That the potential climate change impacts and the associated Planning Scheme amendments are considered for each of the 10 smaller communities.
Assets and Operations	Asset Management Strategy	That climate change impacts are considered in the planning, acquisition, operation and maintenance, renewal and disposal of assets.
	Policy for Asset Protection	That climate change impacts be considered in Policy for Asset Protection.
	Policy for Engineering Requirements for Infrastructure Construction	The climate change is considered in future policy for engineering requirements for infrastructure construction, including the type and extent of materials approved.
	Road Management Plan	That the impact of climate change on road management, planning and maintenance is considered, particularly in relation to road mix materials and access.
	Shire-wide Footpath Plan 2011	That the Shire consider the potential impact of climate change in relation to increased number of hot days and extreme events on surface type and access provide by footpaths
	Sustainable Water Use Plan	Consider the impacts of climate change on the volume of water used by council, source of water, targets fro reduction actions that have been developed to achieve these reductions. There has already been significant progress made in relation to recycled water use on parks, gardens and recreational facilities within the Shire.
	Domestic Wastewater Management Plan	That the review mechanism of the action plan be used to incorporate climate change impacts into the major DWMP strategies to account for flooding and potential environmental contamination issues, as well as other extreme events.
	Municipal Emergency Management Plan	That the MEMP considers the potential increase in frequency and severity of extreme events caused by climate change, including the appropriateness of MECCs and community refuges for differing events e.g. flood as opposed to bushfire. MECC and refuge selection should be based on location, elevation and access from urban centres. Climate change considerations also need to be built into the Municipal Fire Prevention Plan. This includes the reduction in

Council directorate	Existing plan or strategy	Recommended content inclusion
		relative humidity and rainfall and increase in number of hot days resulting in conditions more conducive to fire danger/code red days.
Planning and Environment	Natural Environment Strategy 2009-2012	<p>One of the aims of Theme 5 is to ensure Council plans for effective adaptation to climate change.</p> <p>Council has taken initial steps to addressing climate change mitigation, and through undertaking this project is planning for the impacts posed by climate change. The existing Sustainability Framework Matrix enables whole-of-council assessment.</p> <p>The key findings of this project should be incorporated into the Strategy, and used to build on the whole-of-community climate change risk analysis (Action 5.11). However, Council must firstly communicate climate change as a whole-of-council issue and analyse the risk to business continuity and service provision prior to consulting with the community.</p>
	Macedon Ranges Economic Development Strategy	That consideration of climate change impacts is included in the Strategy. The role of council as facilitator and advocate is supported and will be critical in positioning the Shire to respond to the impacts of climate change while meeting the economic development objectives, particularly within the retail and tourism, public service and manufacturing and construction sectors.
	Macedon Ranges Tourism Industry Strategic Plan	That consideration of climate change impacts on natural assets and the built environment in relation to tourism are included in the Plan. It will also be important to include potential heatwave impacts on tourist health and visitation.
	Events Strategy 2010-2013	That lessons from including climate change considerations in the Tourism Industry Strategic Plan are applied and incorporated into the Events Strategy.
	Weed Management Strategy	That the impacts of climate change on average temperature and rainfall are assessed in relation to weed species distribution and composition.
	Waste Management Strategy	That the potential impacts of climate change are considered in relation to Council's statutory obligations in managing the closed landfill sites at Kyneton, Bullengarook and Lancefield.

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Appendix 1: Consultation List

Table A1-1: List of workshop participants

CONSULTATION GROUP	NAME
Community Wellbeing	
Director Community Wellbeing	Karen Stevens
Maternal and Child Health, Early Years Services, Aged and Disability	Suzie Mansell
Recreation/Cultural Development	Rod Clough
Youth	Jill Karena
Community Places and Partnerships	Gaynor Aitkin
Aquatic/Leisure	Luke Beattie
Planning and Environment	
Tourism and Economic Development	Kylie Lethbridge
Strategic Planning and Environment	Katie Xiao
Strategic Planning and Environment	Deborah Varney
Strategic Planning and Environment	Lachlan Milne
Strategic Planning and Environment	Paul Gray
Strategic Planning and Environment	Lorraine Beyer
Planning and Development	Rick Traficante
Assets and Operations	
Local Laws, Environmental Health, Emergency Management	Anne-Louise Lindner
Emergency Management	Andrew Hamilton
Waste, Saleyards, Airfield	Brendan Pearce
Road Maintenance	Kevin Keating
Infrastructure, Planning & Design	Enrique Gutierrez
Corporate Services	
Rates & Payments	Leon den Dryver
IT & GIS	Maureen Tresize
Records	Belinda Borg
Chief Executive	
Risk	Sue Baker
Risk	Sandra Griffin
TOTAL	23

Table A1-2: List of further consultation with Council managers and staff

CONSULTATION GROUP	NAME
Community Wellbeing	
Youth	Jill Karena
Director	Karen Stevens
Aquatic/Leisure	Luke Beattie
Planning and Environment	
Strategic Planning and Environment	Deborah Varney
Strategic Planning and Environment	Paul Gray
Strategic Planning and Environment	Lorraine Beyer
Economic Development and Tourism	Kylie Lethbridge
Planning and Development	Rick Traficante
Assets and Operations	
Local Laws, Environmental Health, Emergency Management	Anne-Louise Lindner
Parks and Gardens	Peter Jones
Organisational Development and Corporate Services	
Risk	Sandra Griffin
Customer Service, Governance & CEO/Councillors	Stephen Mahon
TOTAL	12

Appendix 2: Legislative framework

The climate change legislative framework is extensive across all levels of government. Table A2-1 provides an overview of the current Federal and State legislation related to climate change.

Table A2-1: Legislative framework

Level	Title	Aim
Federal	<i>Energy Efficiency Opportunities Act 2006</i>	To improve the identification and evaluation of energy efficiency opportunities by large energy using businesses and, as a result, to encourage implementation of cost effective energy efficiency opportunities.
	<i>National Greenhouse and Energy Reporting Act 2007</i>	To introduce a single national reporting framework for the reporting and dissemination of information related to greenhouse gas emissions, greenhouse gas projects, energy consumption and energy production of corporations.
	<i>Carbon Credits (Carbon Farming Initiative) Act 2011</i>	<ul style="list-style-type: none"> ▪ To implement certain obligations that Australia has under the Climate Change Convention and the Kyoto Protocol. ▪ To create incentives for people to carry on certain offsets projects. ▪ To increase carbon abatement in a manner that is consistent with the protection of Australia's natural environment and improves resilience to the effects of climate change.
	<i>Clean Energy Act 2011</i>	<ul style="list-style-type: none"> ▪ To give effect to Australia's obligations under the Climate Change Convention and the Kyoto Protocol. ▪ To support the development of an effective global response to climate change, consistent with Australia's national interest in ensuring that average global temperatures increase by not more than 2 degrees Celsius above pre-industrial levels. ▪ To take action directed towards meeting Australia's long-term target of reducing Australia's net greenhouse gas emissions to 80% below 2000 levels by 2050; and ▪ To put a price on greenhouse gas emissions in a way that encourages investment in clean energy; and supports jobs and competitiveness in the economy; and supports Australia's economic growth while reducing pollution.
	<i>Climate Change Authority Act 2011</i>	<ul style="list-style-type: none"> ▪ The Authority is to conduct reviews under: <ul style="list-style-type: none"> ▪ The <i>Clean Energy Act 2011</i>; and ▪ The <i>Carbon Credits (Carbon Farming Initiative) Act 2011</i>; and ▪ The <i>National Greenhouse and Energy Reporting Act 2007</i>; and ▪ The <i>Renewable Energy (Electricity) Act 2000</i>; and ▪ This Act. ▪ Establishes the Land Sector Carbon and Biodiversity Board. ▪ The Board is to advise the Environment Minister, the Climate Change Minister and the Agriculture Minister about climate change measures that relate to the land sector.
	<i>Clean Energy Regulator Act 2011</i>	<p>Establishes the Clean Energy Regulator which has such functions as are conferred on it by or under:</p> <ul style="list-style-type: none"> ▪ The <i>Clean Energy Act 2011</i>; and ▪ The <i>Carbon Credits (Carbon Farming Initiative) Act 2011</i>; and ▪ The <i>National Greenhouse and Energy Reporting Act 2007</i>; and ▪ The <i>Renewable Energy (Electricity) Act 2000</i>; and ▪ The <i>Australian National Registry of Emissions Units Act 2011</i>.
State	<i>Climate Change Act 2010</i>	<ul style="list-style-type: none"> ▪ To establish a target to reduce Victoria's greenhouse gas emissions. ▪ To facilitate the consideration of climate change issues in specified areas of decision making of the Government of Victoria;

Level	Title	Aim
		<ul style="list-style-type: none"> ▪ To promote collaboration, cooperation and innovation in the Victorian response to climate change by strengthening the role of communities and other measures; ▪ To provide for a strategic response by the Government of Victoria to climate change through a Climate Change Adaptation Plan; ▪ To facilitate Victoria's contribution to national and international carbon sequestration efforts; ▪ To provide for the creation of forestry rights, carbon sequestration rights and soil carbon rights; ▪ To provide for Forestry and Carbon Management Agreements in relation to private land and Carbon Sequestration Agreements in relation to Crown land; ▪ To promote transparency and accountability by providing basic, accessible information to the Victorian community on climate change. <p>In October 2011, the Minister for Environment and Climate Change announced the Victorian Government will undertake a review of the Victorian <i>Climate Change Act 2010</i>. The introduction of the Federal Government's Clean Energy Bills into Commonwealth Parliament triggers section 19 of the Act, which requires the Minister for Environment and Climate Change to:</p> <ul style="list-style-type: none"> ▪ Undertake a review of the Act; and ▪ Table a copy of the review before each House of Parliament within 10 sitting days of that House after the completion of the review.
	<i>Victorian Renewable Energy Amendment Act 2009</i>	To amend the <i>Victorian Renewable Energy Act 2006</i> as a result of the expansion of the Commonwealth renewable energy target scheme under the Renewable Energy (Electricity) Act 2000 of the Commonwealth.
	<i>Victorian Energy Efficiency Target Act 2007</i>	To promote the reduction of greenhouse gas emissions by establishing the VEET scheme which: <ul style="list-style-type: none"> ▪ Provides for the creation and acquisition of energy efficiency certificates; and ▪ Requires the surrender of energy efficiency certificates.
	<i>Renewable Energy Authority Victoria Act 1990</i>	The purpose of this Act is to create the Renewable Energy Authority Victoria to replace the Victorian Solar Energy Council. The objectives of the Authority are to encourage and promote research into, and the development and use of, renewable energy resources and energy conservation measures to the benefit of the Victorian community.
	<i>Water Act 1989</i>	To provide integrated and sustainable management of water resources in Victoria to ensure equitable and efficient use.