SOUTHERN COUNCILS CLIMATE COLLABORATION

CLIMATE CHANGE ADAPTATION PLAN 2024

SORELL COUNCIL CLIMATE CHANGE RISK ASSESSMENT

SORELL COUNCIL

Southern Tasmanian COUNCILS AUTHORITY

REGIONAL CLIMATE CHANGE INITIATIVE

SUMMARY

This climate change adaptation plan aims to improve the capability of Sorell Council to manage the risks associated with climate change. Climate change adaptation is defined as *action taken to prepare for actual or expected changes in the climate in order to minimise harm and to cope with consequences.* Climate change is affecting Council's service delivery and the infrastructure that the community depends upon by exacerbating the threats that existing extreme weather events pose.

Important drivers of adaptation planning are:

- recognition of the importance of identifying and managing emerging risks to Council infrastructure and functions;
- meeting expectations of Council's insurers;
- managing financial risks; and
- managing legal liability in relation to development decisions and asset performance.

This adaptation plan addresses climate related risks to each council business area and overarching corporate considerations. The vulnerability of Council infrastructure and community assets in relation to heavy rainfall, flooding, heat, bushfire and sea level rise to developing climate hazards has been assessed utilising the on-ground expertise and knowledge of council staff. Future modelled climate data specific to the Sorell municipal area was used to frame each risk statement.

Key climate change vulnerabilities identified were:

- Increased call on council's emergency response team in the face of the threat of unprecedented fire emergencies resulting in increasing pressure to ensure evacuation centre procedures are up to date to cover all potential scenarios, and that buildings are fit for purpose.
- Increasing frequency and intensity of bushfires exacerbating the potential for evacuation and access issues on some council roads serving residents in remote and isolated areas.
- A trend towards heavier rainfall events and unprecedented flooding resulting in infrastructure damage or failure (e.g. road surfaces and bridges).
- Increasing call on council resources for response to and recovery from heavy rainfall events.
- Increase in heavier rainfall events, and greater likelihood that stormwater infrastructure will fail, resulting in overland flow and localised flooding.
- NRM challenges due to changing conditions favouring invasive species to the detriment of local biodiversity.
- Increasing coastal inundation causing: damage to coastal assets; pressure on council to protect private assets; issues for planning decision making in coastal areas.

An adaptation action was identified to address each of the identified risks together with responsibility, suggested timeframe and likely stakeholders. Examples of adaptation actions to address some of the highest rated risks are:

- *Investment in infrastructure improvements and upgrades – 10 year capital program based upon condition. Have a budget contingency in asset management plan and ensure there is extra capital in the long term financial plan. Review level of service provision for assets.*
- *Ensure projected rainfall data for climate change is incorporated into future flood modelling to comprehensively understand emerging risks to assets.*
- *Audit of dead end roads to assist in better understanding resident's vulnerability to bushfire – communication and engagement with residents about the risk.*

Particular corporate actions are suggested and cover:

- *Management of legal liability in relation to development decisions and asset management which includes:*
  - *keeping up to date on general climate change science and information, particularly in relation to potential risks from natural hazards;*
  - *developing clear and certain criteria for decision making to increase public confidence that decisions are made on the basis of the best available scientific evidence.*
- *Incorporation of climate change action into existing documents and processes such as the Risk Register, Annual Plan, Strategic Plan and Financial Plan.*
- *Emergency response plans should be reviewed, developed and implemented considering hazard changes under climate change projections. Up to date emergency response procedures can minimise consequences when extreme events occur.*

The adaptation plan suggests a mechanism to implement regional adaptation actions where issues in common are identified across councils through both a regional adaptation strategy and ongoing involvement with the Regional Climate Change Initiative which is a forum for progressing actions collaboratively.

This climate change adaptation plan was developed under the Southern Councils Climate Collaboration Project (2021–24).

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1.0 INTRODUCTION

This climate change adaptation plan (CCAP) aims to improve the capability of Sorell Council to manage the risks associated with climate change. It is designed to:

- increase the capacity of council to protect and fortify assets/services;
- respond to increased and intensifying natural hazards;
- reduce exposure to potential liability in decision making; and
- minimise financial risks.

Climate change adaptation is defined as action taken to prepare for actual or expected changes in the climate:

- in order to minimise harm; and
- to cope with the consequences.

Extreme weather events, once deemed a rare occurrence, are evolving into a 'new normal' and need to be managed. The majority of Australians (80%) have experienced some form of extreme weather disaster since 2019.[1]

The term "climate whiplash" has recently been coined to describe the state of our weather as communities are flung between storms and flooding rains to heatwaves and bushfires and back again, a recent example being the carnage wrought across Victoria on 13th February 2024. Closer to home, extreme events in the Tasmanian spring and summer of 2023-24 are redefining the parameters of extreme events in this state, from out-of-season bushfires at Freycinet and Dolphin Sands and the unprecedented deluge in St Helens in February where recently upgraded stormwater systems still failed to cope with the rainfall volume.

Southern Tasmanian storm, May 2018, estimated cost – $135 million

Black summer bushfires 2019–20 – $103 billion in losses, $4.4 billion in response

Recorded extreme weather events have increased worldwide by 90% over the past 20 years. Between 2019-2022, 11 natural catastrophes were declared in Australia and $13 billion in insurance claims were paid.[2]

The cost of natural disasters in Australia is expected to rise from an average $38 billion currently to closer to $94 billion per year by 2060.[3]

Climate change is affecting how council delivers its critical services and maintains infrastructure that the community depends upon by exacerbating the threats that existing extreme weather events pose. Climate change risk statements and ratings, developed according to a standard risk management approach, form the basis of this plan.

Formulation of risk statements was based upon climate change modelling specific to the Sorell municipal area and involved input from council staff representing all business areas.

1 Climate Council (2023), Climate Trauma: The growing toll of climate change on the mental health of Australians. www.climatecouncil.org.au/resources
2 Insurance Council of Australia
3 Update to the economic costs of natural disasters in Australia – Australian Business Roundtable for Disaster Resilience & Safer Communities – Deloitte Access Economics

Climate change adaptation is relevant across all council business areas

Figure 1 depicts the core functions and services of Tasmanian councils – these are common to all councils. The boxes with red borders indicate the roles and responsibilities of councils for which they have statutory responsibility. To ensure good climate governance and mitigate their potential exposure to liability councils need to ensure that climate considerations, at a minimum, have been integrated into strategic and operational systems and processes represented in the purple boxes.

Figure 1: Core functions and services of Tasmanian councils

Corporate

Corporate governance – risk acknowledgement

- Public risk register
- Strategic Plan
- Insurance implications and expectations
- Legal liability

Development approval and control – risk mitigation

- Building approvals
- Development approvals
- Local and regional land use plans

Asset management – manage risks to asset and service delivery

- Stormwater
- Roads
- Built assets
- Parks and reserves

Financial management – resources to prepare, prevent, respond, recover

Emergency management

Environmental health

Workplace health and safety

Community

Community development – facilitate building resilience in the local community

Natural resource management – managing threats to local biodiversity

The climate change adaptation plan includes an 'implementation plan' (Risks and Actions), the first step of which is the identification of potential adaptation actions, responsibility, and timeframes. For some risks and actions, stakeholders are identified for situations where it provides greater efficiencies for councils to work collaboratively to manage climate change hazards.

'Investment' in adaptation actions can be based upon factors such as risk priority and a cost benefit analysis which weighs up factors such as the value of the asset, the importance of the asset to the community and the average annual cost of protecting and maintaining the asset.

Experience has demonstrated that adaptation investments exponentially decrease economic losses from climate impacts and bigger investments leads to lower losses. However, there will always be costs from residual climate change impacts that adaptation cannot alleviate.[4] The World Resources Institute finds that every dollar invested in adaptation yields net economic benefits ranging from $2 to $10.[5]

This adaptation plan was developed under the Southern Councils Climate Collaboration Project (2021-24) and is a review of work undertaken under the Regional Climate Change Adaptation Project (RCCAP 2010-14).

Image: Graham Green

4 European Environment Agency 2023: assessing the costs and benefits of climate change adaptation.
5 World Resources Institute 2023: Adapt Now: A global call for leadership on climate resilience.

1.1 PROJECT BACKGROUND

The STCA's climate program, The Regional Climate Change Initiative (RCCI) has, since 2010, developed a range of climate resources to support, and increase the capacity of council's climate change management including:

- **Mitigation** (reducing emissions and energy use)

  Corporate:
  - 'How to undertake a corporate council inventory guide'.
  - Council Carbon Calculator and supporting fact sheets.

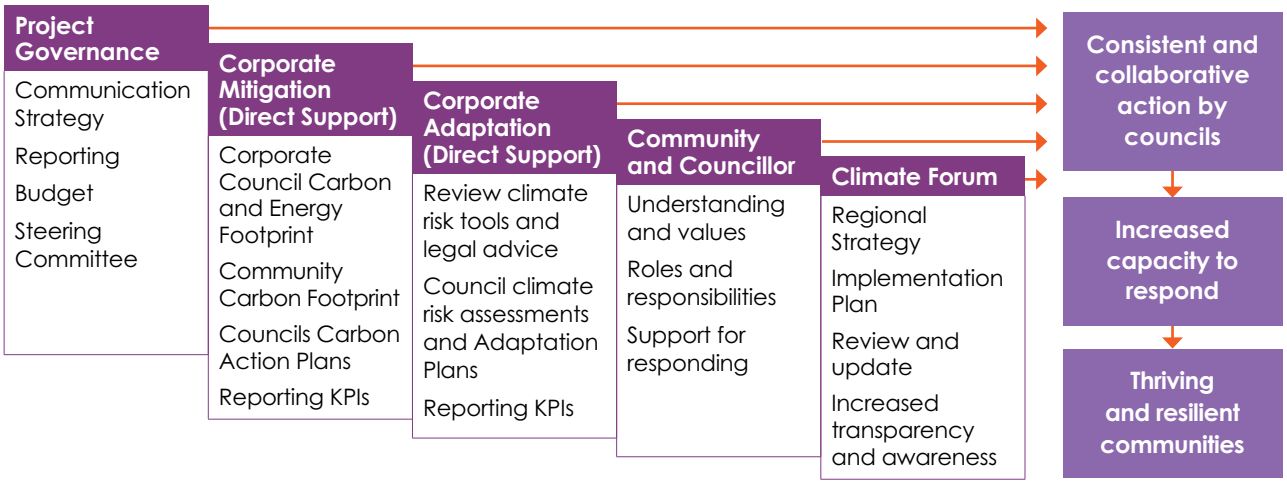
  Community:
  - Community (municipal) energy and greenhouse emissions profiles.
- **Adaptation** (responding to climate impacts and change)
  - Legal advice on councils' exposure to liability for climate change action.
  - Principles and objectives for local government climate change action.
  - Climate (municipal) profiles, based on UTAS Climate Futures program.
  - Corporate Adaptation Planning Modules (climate risk assessment and adaptation options tool).
  - Regional Strategy – adapting to a changing coastline in Tasmania.

The Project intends to develop a collaborative and consistent framework for all Tasmanian Councils in addressing climate action. It aims to:

- Provide a clear set of principles to guide Councils in responding to climate change adaptation and mitigation.
- Strengthen the resilience of Councils to climate impacts locally and regionally, and contribute to managing the transition to low carbon economies.
- Review existing strategies and plans and identify necessary updates.
- Provide strategic direction for key council functions including: land use planning, infrastructure/assets management, natural resource management, recreational and cultural values.
- Build awareness of potential liability for decisions and actions associated with climate change impacts, risks and hazards.
- Direct awareness to what councils' key stakeholders are doing to adapt to climate change to encourage collaborative responses and resource sharing.

Figure 2: Core functions and services of Tasmanian councils

The Southern Councils Climate Collaboration 2022 – 2024 is the latest initiative of the RCCI and the project under which this adaptation plan was developed, is summarised as follows:



1.2 PROJECT CONTEXT

In Australia, "Local governments are on the frontline in dealing with the impacts of climate change. They have an essential role to play in ensuring that local circumstances are adequately considered in the overall adaptation response, and local communities are directly involved in adaptation efforts. Local governments are well positioned to inform State and Commonwealth governments about on-the-ground needs of local and regional communities, communicate directly with those communities, and respond to local challenges."[6]

Specifically local governments are responsible for:

- Delivery of adaptation responses that align to State and Australian Government legislation.
- Provision of information about relevant climate change risks and contribution of appropriate resources to prepare, prevent, respond and recover from detrimental climatic impacts.
- Informing other levels of government about the on-the-ground needs of local and regional communities.
- Managing risks and impacts to Council's public assets and to local government service delivery.[7]

Scope is also afforded to Tasmanian Councils to address climate change under the *Local Government Act* (Tas) 1993, which describes the role of Councils to provide for the health, safety and welfare of the community; as well as represent and promote the interests of the community; and provide for the peace, order and good government of its municipal area.[8] Additionally the Local Government (Content of Plans and Strategies) Order 2014 s.8. (2) (2) (b) (vii) requires councils to have in place an Asset Management Policy that includes the planning for climate change adaptation and mitigation.[9]

In managing and preparing for the impacts of climate change, Local Government is well positioned to work with communities due to its:

- core function to directly support and assist local communities;
- local knowledge and experience;
- understanding of community needs and vulnerabilities;
- key role in responding to emergencies;
- role in infrastructure design, construction and maintenance;
- role in review and update of planning schemes (in relation to identified local impacts and threats); and
- ability to effectively disseminate information and provide support to the community.

Local experience, in combination with relevant scientific data and technical expertise, provides the basis for undertaking a well-informed 'risk management' approach to climate change. Effective adaptation requires a portfolio of actions, ranging from fortifying infrastructure to advocacy and collaboration. There is also an appreciation that managing climate change risks has benefits, regardless of the magnitude of climate change that occurs. It is a 'no regrets' approach that can bolster infrastructure, reduce risk and liability, improve community well-being, and protect biodiversity.

6 National Climate Resilience and Adaptation Strategy 2021 to 2025 (dcceew.gov.au)

7 Role and Responsibilities for Climate Change Adaptation in Australia, Council of Australian Governments Select Council on Climate Change 2012

8 *Local Government Act* (Tas) 1993.Section 20 Function and Powers.

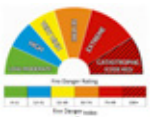
9 https://www.legislation.tas.gov.au/view/whole/html/inforce/current/sr-2014-035

1.3 CLIMATE CHANGE SUMMARY DATA FOR SORELL COUNCIL

The development of this climate change adaptation plan was based upon council-specific, climate projection data provided by Climate Futures for Tasmania. Modelled future climate is continually becoming a more exact science as real world data is fed back into models helping validate outcomes and improve forecasts. The modelling equips us well to forecast future scenarios in relation to council's assets and functions. However, climate change is likely to deliver surprises and potentially unforeseen outcomes through intensifying and intersecting climate driven hazards.

The information below is a summary of Climate Futures data[10] relevant to the Sorell municipal area.

The Forest Fire Danger Index (developed by CSIRO scientist, A. G. McArthur) **combines a measure of vegetation dryness with air temperature, wind speed and humidity**. If you add the daily FDI values over a year for a location, you get what is called the annual accumulated FDI.



Current climate and recent trends

- Sorell Council has a temperate, maritime climate. Long-term average temperatures have risen in the decades since the 1950s, at a rate of up to 0.1°C per decade, however this rate is now accelerating.
- The average annual rainfall across the municipality is currently around 640 mm however there is a rainfall gradient across the municipal area. The town of Sorell is in one of Tasmania's driest areas with an annual average 486 mm per annum. The eastern parts of the municipal area are the wettest. There has been a decline in average annual rainfall since the 'baseline period' (1961-1990).
- Tasmania's southern region is influenced by large-scale climate drivers. For example, the extended dry spell of 1995-2009 coincided with an 'El Nino' pattern; the dry spell of 2018-20 coincided with an Indian Ocean Dipole event; and extended wetter spells,

Table 1: Sorell future climate projection data– from Climate Futures Tasmania (average sub region data) 2019 RCP 8.5 (business as usual) scenario

	Baseline 1961-1990	Current	Mid-century 2040-2060	End of century 2080-2100
Average daily maximum temperature (°C)	16.2	17.3	18.1	19.7
Average annual hot days (above 30°C)	2	4	6	10
Mean Minimum Asphalt Critical Viscosity	154800	235400	314800	560700
Average annual cumulative Forest Fire Danger Index	1356	1473	1590	1861
Average annual rainfall (mm)	672	642	639	649
Average annual evaporation (mm)	1007	1081	1189	1408
Extreme rainfall – 24hr AEP 1%	236 mm	249 mm	259 mm	277 mm
Sea level – 1% AEP	1.97	2.12	2.2	2.8

10 Climate Change Information for Decision Making (2019): T. Remenyi, N. Earl, P. Love, D. Rollins, R. Harris; Climate Futures Programme, Discipline of Geography & Spatial Sciences, University of Tasmania.

such as between 2020-2022, often coincide with dominance of a 'La Nina' climate driver. It is predicted that climate change will exacerbate the impact of these broader scale patterns, and particularly from east-coast lows which are expected to intensify with potential to deliver damaging flood events to eastern Tasmania.

1.3.1 Extreme events

The changes in climate that are most likely to impact upon council infrastructure, roads, the local community and the environment are an increase in intensity of extreme events and intersecting hazards. Intersecting hazards include the combined impact of, for example:

- heavy rain and gale force winds associated with storms which may cause road cuts due to both fallen trees and flash flooding;
- heatwave conditions associated with bushfire and smoke pollution;
- a confluence of low pressure, high tide, and in some cases high river levels, have the potential to result in unprecedented coastal inundation, and
- compounding events that exhaust the economic and human resources of councils to manage and respond.
- Increased evaporation and longer dry periods coupled with more extreme temperatures is likely to enhance the occurrence and intensity of bushfires, with more starts due to lightning strikes. Future fire danger. A guide to the increasing bushfire risk under climate change is: twice the danger, twice the area, twice as often.
- Heavier rainfall events than witnessed historically, particularly from east-coast lows, are expected to occur. High daily runoff events are likely to increase, including those that may lead to erosion, landslips or flooding.
- Inundation in vulnerable coastal areas will increase due to sea level rise. The current 100-year coastal inundation event is likely to occur almost every year by 2100.

Aside from the incremental rise of sea level, extreme coastal inundation events with the potential for infrastructure damage and erosion will occur when there is a confluence of low pressure, high tide and localised flooding if heavy rainfall occurs at the same time.

More Information

Detailed information from the Climate Futures Programme on the modelled future climate for Tasmanian sub-regions may be found here: **www.wineaustralia.com/climate-atlas**

Figure 3. Threat multiplier – intersecting hazards

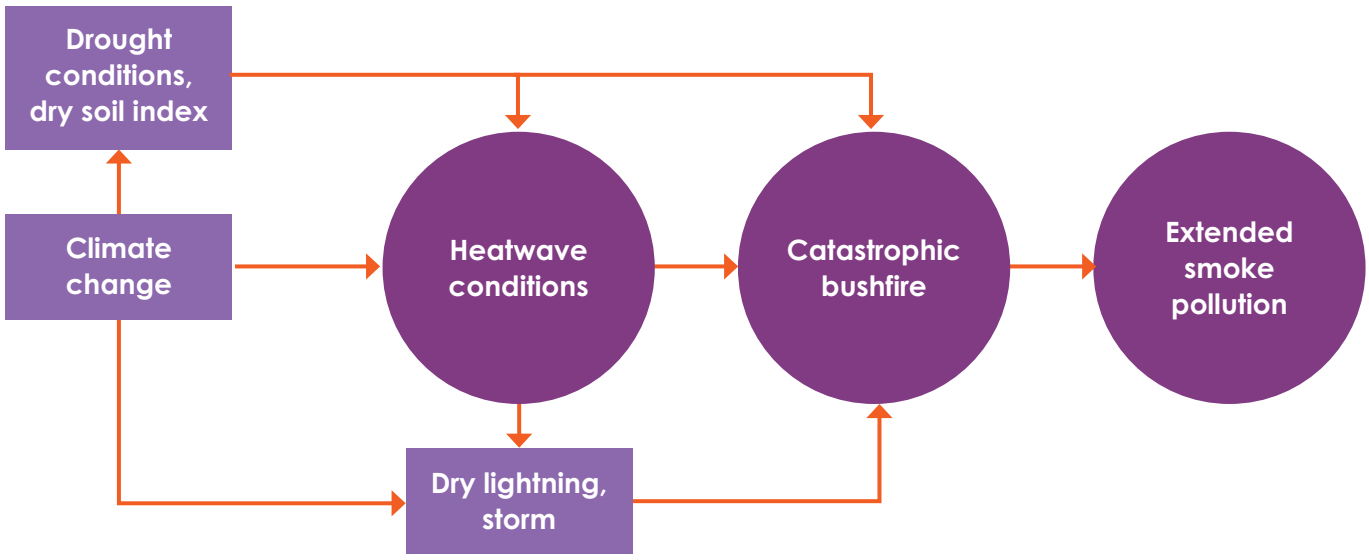


Image adapted from: Tasmanian Disaster Risk Assessment (TASDRA) 2022

2.0 OVERARCHING CORPORATE CONSIDERATIONS

Corporate climate change adaptation considerations fall across all Council strategic, operational and service areas. Engagement with these requires the development of understanding and governance by senior management who have overall responsibility for the setting and delivery of strategic and budgetary parameters. They are also increasingly expected to demonstrate leadership in the response to climate change.

Insurer Expectations

Local government insurer Municipal Association of Victoria (MAV) is increasingly expecting council's to demonstrate responses to climate hazards, exposure and resultant risk. Lack of engagement and action could at a minimum result in insurance premiums rising and at worst litigation for negligence in failure to address risks appropriately. Councils with a solid framework in climate change adaptation procedures will minimise risk to council business and the community who relies on decision making that is well considered, based in up to date facts, and appropriate.

Legal Liability

The threat of climate change is now clearly established through legislation and national and state policy and international agreements. It is likely that a court will construe that the risks and impacts of climate change are now foreseeable.

With increasing vulnerability to climate change impacts councils need to provide solutions to adapt to and manage, identified risks associated with climate change. A key consideration of councils in the face of climate change is potential liability that they are exposed to in discharging their various statutory roles, powers and functions in times where exposure to natural hazards is increasing.

MAV Insurance,[11] has provided advice that councils have a duty of care in the context of climate change adaptation which may arise in the context of:

- Development approvals – where the risk of harm was foreseeable;
- The provision of protective standards in planning schemes e.g. regarding bushfire protection;
- Failure to maintain or build infrastructure e.g. stormwater systems; and
- The provision, or lack thereof, of information which is considered by a court to be negligent.

Baker and McKenzie, in a report to the Australian Local Government Association[12] outlined actions that councils may follow to reduce liability. These include:

- keeping up to date on general climate change science and information, particularly in relation to potential risks from natural hazards;
- developing clear and certain criteria for decision making to increase public confidence that decisions are made on the basis of the best available scientific evidence;
- exercising reasonable care when making planning decisions, taking care to ensure relevant facts are known and understood, and reasons for decisions are clear, accurate and documented;
- increasing public consultation, as this may improve transparency around decision-making processes and limit administrative review; and
- facilitating the provision of up to date information to property owners on potential risks to property.

Useful information and case studies about legal risk and climate change adaptation can be accessed at: https://coastadapt.com.au/sites/default/files/information-manual/IM06_Legal_Risk.pdf

11 MAV Insurance Fact Sheet: Liability Risk & Climate Change Adaptation
12 Local Councils Risk of Liability in the Face of Climate Change Resolving Uncertainties; a report for the Australian Local Government Association, Baker and McKenzie, 22 July 2011.

Emergency Management

As the closest level of government to the community, together with having a responsibility for the wellbeing of their community, Councils have an important role in emergency management. Although Councils are not a provider of emergency services, Councils are required to have in place Emergency Management Plans that cover functions including:

- provision of recovery centres and relief services during emergencies or disasters;
- provision of resources and information to emergency service teams such as Tasmania Fire Service and the SES;
- informing the community of the current situation, developments and ongoing prognosis during emergency events; and
- local emergency planning and development of mitigation options using risk analysis, prioritisation and treatment approaches.

As outlined earlier, extreme events and associated emergencies are likely to increase as a result of climate change, potentially resulting in resources for emergency management being required more frequently than in the past. Emergency management planning may be coordinated through a special council committee who have the role of preparing and reviewing a municipal emergency management plan. It is pertinent for this committee to be aware of, and discuss, possible scenarios for intensifying natural hazards and the implications for council's ability to respond appropriately.

Specific identified risks and actions in relation to council's emergency management role are presented in Sections 3 and 4.

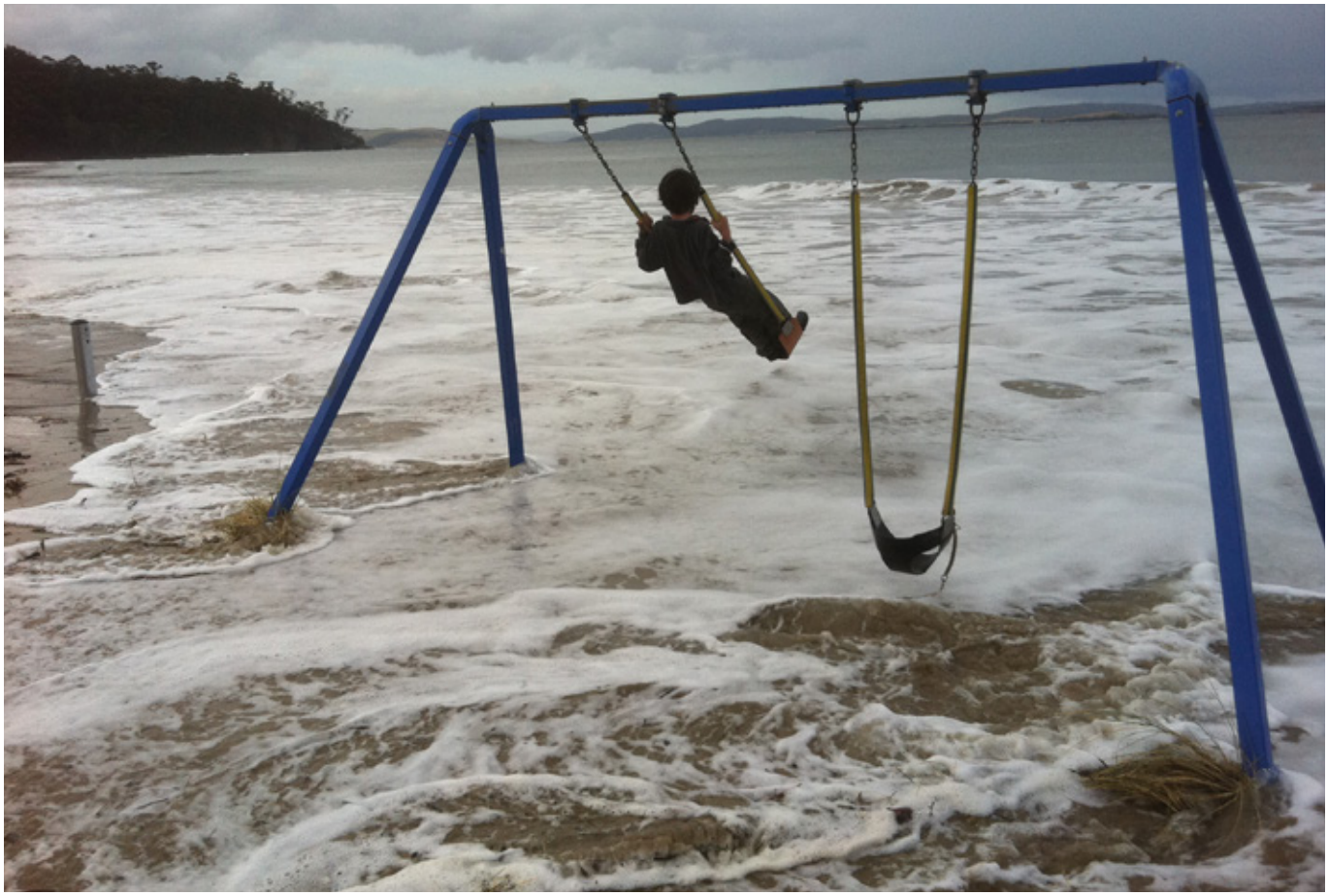


Image: Katrina Graham

3.0 CLIMATE CHANGE IDENTIFIED RISKS AND ACTIONS

Risk is the outcome of the confluence of hazard, vulnerability and exposure. Hazards only become risks if there is exposure, and that there is vulnerability to their impacts.

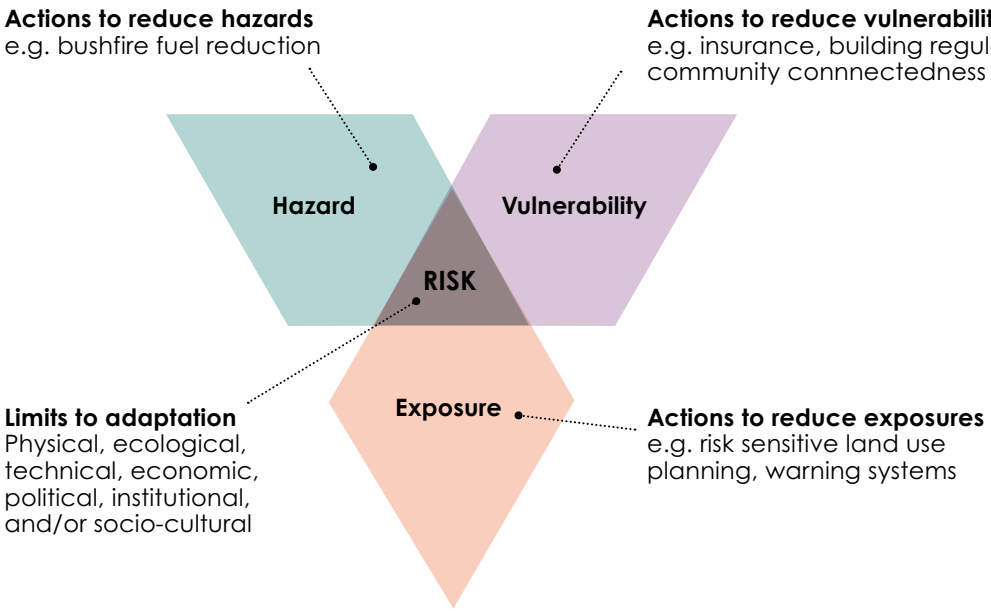


Image adapted from: Tasmanian Disaster Risk Assessment (TASDRA) 2022

Adaptation is about actively reducing exposure or building coping mechanisms for when hazards occur. Adaptation options that are feasible and effective today are likely to become constrained and less effective with increasing global warming. In other words, there are limits to adaptation, in some case moving away from the hazard may be the only option.

'Risk statements' are the key way that Councils define hazards and their implications for council. Climate change requires the development of specific risk statements to cover emerging climate hazards. Components of a meaningful risk statement are:

1. Climate change impact/hazard;
2. Consequence; and
3. Implication for council.

Example risk statement:

Increase in the frequency and intensity of extreme storms will result in heavier rainfall and unprecedented flooding (identify specific locations) leading to infrastructure damage or failure.

The risk management approach used in this adaptation plan was undertaken in accordance with the Risk Management Standard ISO 31 000.

3.1 RISKS AND ACTIONS ASSOCIATED WITH EXTREME EVENTS

3.1.1 Rainfall and Flooding

Heavier rainfall events, particularly from east-coast lows, are expected to create challenging hazards for council:

VULNERABILITIES

Rainfall and Flooding

Increasing extreme rainfall events has the following implications:

- **Exposure of infrastructure vulnerabilities – more frequent damage to assets.**
- **Implications for planning decisions made in areas that are vulnerable to flooding, likely to unprecedented levels.**
- **Absence of up to date modelling or hydrological studies to guide planning decision making.**
- **Exposure of shortcomings in the stormwater system – management of localised flooding associated with council infrastructure.**
- **Testing of emergency services capacity, e.g. managing road closures and recovery centres.**
- **More resources required for dealing with the aftermath of more intense rainfall events.**

Identified risks, ratings and draft actions for rainfall and flooding are presented in Table 2.

Table 2: Identified risk statements, ratings and management for rainfall and flooding

Risk ID	Risk Statement	Primary business area impacted	Primary risk category	Secondary risk category	Risk rating in light of increasing climate change threats (primary risk category)			Existing Controls	Risk Treatment Options	Target risk level	Responsibility	Timeframe
					Likelihood	Consequence	Risk rating	Controls and treatments (existing)	Proposed additional treatments – draft adaptation actions			
RAINFALL AND FLOODING												
1	A trend towards heavier rainfall events and unprecedented flooding resulting in infrastructure damage or failure (e.g. road surfaces and bridges).	Infrastructure Assets Roads & Stormwater	Financial	Service delivery	**Likely**	**Major**	**High**	Reactive clean up effort and cost. Investment in infrastructure improvements and upgrades – 10 year capital program based upon condition. Review level of service provision.	Continuation of current controls. Have a budget contingency in asset management plan and ensure there is extra capital in the long term financial plan.	**Medium**	Infrastructure and assets management	Ongoing
2	Increase in heavier rainfall events and unprecedented flooding meaning that new developments near waterways could be in harms way, requiring review of information for planning decisions to avoid impact on property and people and future litigation risk.	Planning	Financial	Governance	**Unlikely**	**Major**	**Medium**	Issue is well accounted for with good mapping and update of the flood inundation overlay accordingly. Residual flood anaylsis reporting once subdivisions are completed.	Continuation of current controls.	**Medium**	Manager Planning	Ongoing
3	Increase in the frequency and magnitude of flood events leading to road inundation and increased call on emergency response resources to ensure affected roads are signed and closed.	Infrastructure Assets Roads & Stormwater	Public safety	Financial	**Almost certain**	**Moderate**	**High**	Deployment of signage on effected roads. Current proplem areas have been documented.	An escalation procedure is in place – extra resources to improve logistics and efficiency with response.	**High**	Infrastructure and assets management	Ongoing

Table 2: Identified risk statements, ratings and management for rainfall and flooding (continued)

Risk ID	Risk Statement	Primary business area impacted	Primary risk category	Secondary risk category	Risk rating in light of increasing climate change threats (primary risk category)			Existing Controls	Risk Treatment Options	Target risk level	Responsibility	Timeframe
					Likelihood	Consequence	Risk rating	Controls & treatments (existing)	Proposed additional treatments – draft adaptation actions			
RAINFALL AND FLOODING												
4	Increase in heavier rainfall events, and greater likelihood that stormwater infrastructure will fail, resulting in overland flow and localised flooding.	Infrastructure Assets Roads & Stormwater	Financial	Service delivery	**Likely**	**Major**	**High**	Council's Stormwater System Management Plan lists vulnerable locations. Current asset upgrade program is in place. Stormwater policy for new developments.	Ensure projected rainfall data for climate change is incorporated into future flood modelling to comprehensively understand emerging risks to assets. Improve high intensity rainfall harvest by improving storage capacity and implementing Water Sensitive Urban Design principles where possible.	**Medium**	Infrastructure and assets management	Immediate
4a	Increase in heavier rainfall events, and greater likelihood that wastewater systems will be inundated (e.g. Southern Beaches), resulting in localised contamination.	Regulatory services	Environ-mental	Public safety	**Likely**	**Moderate**	**High**	SAP – Southern Beaches Onsite Wastewater Plan.	Continuation of current controls.	**Medium**	Regulatory Services, Environmental Health	Ongoing
5	Increasing frequency of damage from heavy rainfall events (e.g. washouts, spread of debris, and damage to buildings) requiring more resources to attend to clean up and repair.	Infrastructure Assets Roads & Stormwater	Service delivery	Financial	**Almost certain**	**Minor**	**Medium**	Proactive effort to clear culverts before forecast events. Improvements to stormwater infrastructure to cope with flash flooding. Tree Management Policy – inspections and treatment of high risk trees.	Identify vulnerabilities to storm damage in existing building stock and build resilience where appropriate.	**Medium**	Infrastructure and assets management	Immediate

3.1.2 Increasing Temperature

The modelled temperature rise for Sorell from the baseline period to end of century is 3.1°C with an expected tripling of hot days (above 30°C) (Table 1).

There are synergies between increasing temperature, decreasing moisture in the landscape, and increasing likelihood of fire-starts. Increasing temperature, particularly resultant temperature extremes and heatwaves, is part of a range of climate-forced factors that often in combination produce an impact. Temperature related risks for Sorell Council are listed in Table 3.

Image: Graham Green

Table 3: Risk statements, ratings and management for temperature change

Risk ID	Risk Statement	Primary business area impacted	Primary risk category	Secondary risk category	Risk rating in light of increasing climate change threats (primary risk category)			Existing Controls	Risk Treatment Options	Target risk level	Responsibility	Timeframe	Key External Stakeholder
					Likelihood	Consequence	Risk rating	Controls and treatments (existing)	Proposed additional treatments – draft adaptation actions				
TEMPERATURE ↑													
6	Increasing temperatures, heatwaves and evaporation having implications for water storages (for both firefighting and localised supply), and hence council's role in emergency bushfire response.	Risk & Strategy	Public safety	Service delivery	**Likely**	**Minor**	**Medium**	Inter-agency issue, facilitation and advocacy role.	Endeavour to understand vulnerabilities in water supply for emergency response in discussion with NRE (register of dams). Continued advocacy and engagement with TasFire Service.	**Medium**	Risk and Strategy Officer	Commenced and ongoing	Tas Fire Service
7	Changes to mean temperature, increasing hot days and heatwaves will result in local biodiversity loss and favour introduced weed species having implications for council's NRM resources and priorities.	Planning	Environ-mental	Financial	**Almost certain**	**Minor**	**Medium**	Tree planting programs, biodiversity protection support initiatives and weed management program.	Continue to resource, or seek grant funding for, biodiversity protection and restoration programs. Potential allocation of extra resources for weed management.	**Medium**	Planning and NRM	On a needs basis	State Govt

Risk ID	Risk Statement	Primary business area impacted	Primary risk category	Secondary risk category	Risk rating in light of increasing climate change threats (primary risk category)			Existing Controls	Risk Treatment Options	Target risk level	Responsibility	Timeframe	Key External Stakeholder
					Likelihood	Consequence	Risk rating	Controls and treatments (existing)	Proposed additional treatments – draft adaptation actions				
8	Increasing temperatures, longer dry spells and more severe droughts will result in impacts on street trees (e.g. loss of limbs, ingress of roots into moist areas, death) having implications for tree maintenance, species selection and planting technique (e.g. tree cells).	Infrastructure Assets Roads & Stormwater	Financial	Environ-mental	**Possible**	**Minor**	**Medium**	Reactive and proactive inspections in both urban and rural areas. Tree surgeon inspects and advises on higher risk assets.	Investigation of using tree cells for new plantings in urban areas.	**Low**	Infrastructure and assets management	Ongoing	
9	Changes to mean temperature, increasing hot days and heatwaves will result in greater instances of material degradation, particularly road surfaces having consequences for budgets.	Infrastructure Assets Roads & Stormwater	Financial	Service delivery	**Rare**	**Insignificant**	**Low**	None as yet	None as yet	**Low**	Infrastructure and assets management		

3.1.3 Bushfire

Twice the danger, twice the area, twice as often is a mantra that is now being used to summarise the increasing bushfire risk.

Rising average temperatures and more frequent extreme temperatures have the potential to contribute to a variety of impacts including: rapid drying of the landscape (flash droughts); longer bushfire seasons; enhanced wildfire intensity; and heatwave related illness and mortality (particularly in vulnerable demographics such as the elderly). Impacts may also be incurred on council's infrastructure and property, and on natural resources.

VULNERABILITIES

Bushfire

Changes to bushfire likelihood and behaviour may result in:

- **Emergency services response capacity challenges.**
- **An increase in repair or replacement costs of council and community infrastructure.**
- **Planning considerations in relation to development in locations with extreme bushfire hazard and exposure.**
- **Difficulty in accessing sufficient water resources when fire is associated with drought.**
- **Significant community disruption leading to a range of public health and safety issues, and delays to core council services.**
- **Exposure of shortcomings in the communications network i.e. mobile phone black-spots and/or damage to communications infrastructure.**
- **Pressure to upgrade roads in vulnerable areas to enable safe evacuation and access for emergency services.**
- **Pressure on natural resources not well adapted to fire.**

Identified risks, ratings and draft actions for bushfire are presented in Table 4. 'Risk and Strategy' is the function of council identified as being especially implicated in relation to the increasing bushfire hazard. An 'extreme' rated risk involves implications for Council's ability to ensure evacuations centres are fit for purpose and have the ability to function under a range of scenarios, including power outages, to ensure public safety.

Table 4: Identified risk statements, ratings and management for bushfire hazard

Risk ID	Risk Statement	Primary business area impacted	Primary risk category	Secondary risk category	Risk rating in light of increasing climate change threats (primary risk category)			Existing Controls	Risk Treatment Options	Target risk level	Responsibility	Timeframe	Key External Stakeholder
					Likelihood	Consequence	Risk rating	Controls and treatments (existing)	Proposed additional treatments – draft adaptation actions				
BUSHFIRE – twice the danger, twice the area, twice as often													
10	Increased call on council's emergency response team in the face of the threat of unprecedented fire emergencies resulting in increasing pressure to ensure evacuation centre procedures are up to date to cover all potential scenarios, and that buildings are fit for purpose.	Risk & Strategy	Public safety	Community and lifestyle	**Almost certain**	**Major**	**Extreme**	Comfortable with current plans. SE Stadium is fit for purpose. A lot of experience and intellectual capital remains with council from management of previous events.	Continuation of current controls	**High**	Risk Management Committee	Ongoing	Tas Fire Service
11	Increasing frequency and intensity of bushfires has implications for residents and developments in close proximity to the bush, or those with no reticulated water, having implications for council's role in hazard abatement and compliance.	Planning	Planning	Community and lifestyle	**Unlikely**	**Minor**	**Low**	Current robust hazard abatement program with compliance follow up and enforcement procedures.	Potential for more rigour with hazard abatement work on residential land in high risk areas as a standard procedure, not just as part of the development process.	**Low**	Planning management	Ongoing	Tas Fire Service

Table 3: Identified risk statements, ratings and management for bushfire hazard (continued)

Risk ID	Risk Statement	Primary business area impacted	Primary risk category	Secondary risk category	Risk rating in light of increasing climate change threats (primary risk category)			Existing Controls	Risk Treatment Options	Target risk level	Responsibility	Timeframe	Key External Stakeholder
					Likelihood	Consequence	Risk rating	Controls and treatments (existing)	Proposed additional treatments – draft adaptation actions				
12	Increasing frequency and intensity of bushfires will result in increasing likelihood of damage to infrastructure and assets such as community halls that provide public services, having consequences for budgets and 'insurability'.	Finance	Financial	Service delivery	**Likely**	**Major**	**High**	Fuel load abatement programs, lessons learned from the Dunalley bushfire disaster.	Mechanisms to minimise implications of ember attack on vulnerable buildings such a community halls (e.g. gutter guard).	**High**	Infrastructure and assets management	Short term	
13	Increasing frequency and intensity of bushfires exacerbating the potential for evacuation and access issues on some council roads serving residents in remote and isolated areas.	Risk & Strategy	Public safety		**Almost certain**	**Catastrophic**	**Extreme**	There is more than one way out for most areas.	Communication and engagement with residents about the risk and developing a plan. Audit of dead end roads to assist in better understanding vulnerabilities.	**High**	Risk Management Committee	Immediate	Tas Fire Service
14	Increasing high fire risk conditions resulting in a higher probability of fire starts on council land that impact the property of others – resulting in litigation.	Infrastructure Assets Roads & Stormwater	Financial	Environ-mental	**Unlikely**	**Major**	**Medium**	Fire abatement policy and schedule for council reserves.	Continuation of current controls	**Medium**	Infrastructure and assets management	Scheduled into annual works program	

3.1.4 Sea Level Rise and Storm Surge

There are several useful resources available to Council when considering the implications of sea level rise and storm surge, including:

- Regional Strategy – Adapting to a Changing Coastline in Tasmania
- CoastAdapt;
- Sea level rise planning allowances for Tasmania;
- Coastal vulnerability mapping; and
- Tasmanian Coastal Adaptation Pathways Project.

Regional Strategy – Adapting to a Changing Coastline in Tasmania

This 'Strategy' developed by the Regional Climate Change Initiative (RCCI) in 2022, will help Councils to employ a risk management approach to existing or potential hazards on the coastline that threaten harm to public and natural assets, infrastructure, people or property. Risk assessments lead to the identification of several options for responding to hazards, and with stakeholder and community involvement, can be used to develop local coastal hazard plans. These plans outline what actions will be implemented, e.g. re-vegetating dunes or engineering solutions such as sea walls. Retreat or relocation, and 'no action' are sometimes viewed as the most appropriate responses.

The Strategy's coastal 'Principles' cover coastal values, public safety and private property through to the role of council and their coastal management role. The principles are not prescriptive, enabling flexibility for councils to develop responses that suit their local coastal issues and resources.

The Strategy may be downloaded at: https://www.stca.tas.gov.au/rcci/our-projects/our-changing-coastline/

CoastAdapt (coastadapt.com.au)

The CoastAdapt web site has a comprehensive range of useful information and planning tools, for example: data and graphics on inundation and coastal erosion; estuaries and sea level rise; local scale risk assessment guidelines; legal risk; and adaptation options for planning, engineering, environment and community.

Sea level rise planning allowances (SLRPAs) for Tasmania

SLRPAs were implemented by the Tasmanian Government in 2012 to promote consistent decision making concerning future land use and development and to reduce the level of uncertainty around the management of future sea level rise. Based upon emissions scenario RCP 8.5, the sea level planning allowance for Sorell is 0.23 m for 2050 and 0.85 m by 2100.

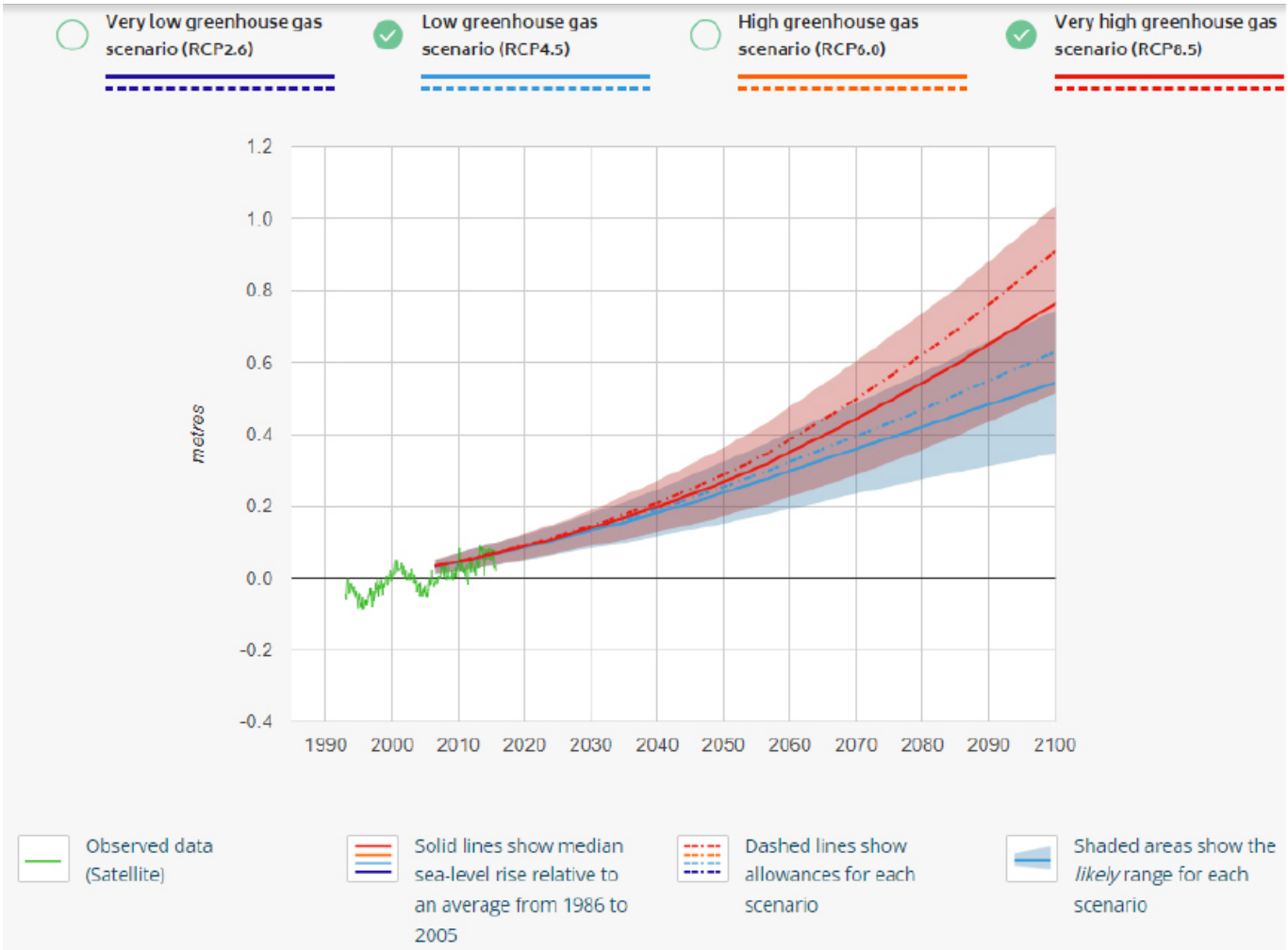
The Tasmanian Government has developed a 'Coastal Hazards Package' in response to the risks posed by coastal erosion and inundation. The Package provides guidance for the management of coastal hazards in terms of land use planning and development resources and can be accessed at: www.dpac.tas.gov.au/divisions/osem/coastal_hazards_in_tasmania

Coastal vulnerability mapping

Coastal hazard layers are available through LISTmap

- Coastal Erosion Hazard Bands 2016
- Coastal Inundation Hazard Bands 2016

Figure 4. Projected sea level rise for Sorell – image from CoastAdapt



Sea level rise outlook for Sorell Council under various emissions scenarios – from CoastAdapt

Tasmanian Coastal Adaptation Pathways Project (TCAP)

The TCAP project aimed to assist Tasmanian communities and decision makers (including councils) to adapt to climate change impacts. Reports have been prepared for several sites in the Southern Region: Kingston Beach, Lauderdale/Roches Beach, and Nutgrove/Long Beach. The Communities and Coastal Hazards Project built upon TCAP with further work undertaken in Kingborough and Glamorgan Spring Bay.

Identified and rated risk statements in relation to the sea level rise hazard in Sorell are presented in the Table 5. As identified in the staff workshop, sea level rise along Sorell's coastline is likely to lead to environmental and financial implications in the short term, and ultimately consequences for infrastructure and service delivery.

Table 5: Identified risk statements, ratings and management for sea level rise and storm surge

Risk ID	Risk Statement	Primary business area impacted	Primary risk category	Secondary risk category	Risk rating in light of increasing climate change threats (primary risk category)			Existing Controls	Risk Treatment Options	Target risk level	Responsibility	Timeframe	Key External Stakeholder
					Likelihood	Consequence	Risk rating	Controls and treatments (existing)	Proposed additional treatments – draft adaptation actions				
SEA LEVEL RISE													
15	Changes in sea level and the frequency of coastal/estaurine inundation events will require regular review of planning procedures and controls to ensure new development isn't in harms way and that Council is not vulnerable to future litigation stemming from current decision making.	Planning	Financial	Community and lifestyle	**Rare**	**Moderate**	**Low**	Coastal Erosion Hazard Code. Coastal erosion hazard area overlay. Sea level rise benchmarks.	Fill gaps in coastal inundation mapping for several parcels of council owned land to better understand the risks.	**Low**	Planning management	Short term	
16	Rising sea level and higher storm surges increasing the frequency of coastal and estuarine inundation events will result in more frequent damage to assets, (stormwater outfalls are currently affected) and higher maintenance costs.	Infrastructure Assets Roads & Stormwater	Financial	Service delivery	**Possible**	**Moderate**	**Medium**	None	Impacted assets will ultimately require maintenance, or be relocated if they can no longer be protected. Managing community expectation of council.	**Medium**	Infrastructure and assets management	Monitor and act accordingly	

Table 4: Identified risk statements, ratings and management for sea level rise and storm surge (continued)

Risk ID	Risk Statement	Primary business area impacted	Primary risk category	Secondary risk category	Risk rating in light of increasing climate change threats (primary risk category)			Existing Controls	Risk Treatment Options	Target risk level	Responsibility	Timeframe	Key External Stakeholder
					Likelihood	Consequence	Risk rating	Controls and treatments (existing)	Proposed additional treatments – draft adaptation actions				
SEA LEVEL RISE													
17	Changes in sea level and the frequency of coastal/estaurine inundation events placing pressure on council to protect private assets, manage expectations, and find acceptable solutions.	Planning	Governance	Community and lifestyle	**Almost certain**	**Insignificant**	**Medium**	The STCA document – Regional Strategy, Adapting to a Changing Coastline – is a useful guiding resource for approaches to addressing this issue.	Technical and legal expertise is needed to advise appropriate response. There is a compliance element as well in terms of people undertaking unauthorised coastal protection works.	**Low**	Planning management	On a needs basis	
18	Changes in sea level and the frequency of coastal erosion and inundation events will result in increased frequency of tidal inundation leading to coastal erosion and call for environmental rehabilitation work to protect important biodiversity assets.	Planning	Environ-mental	Community and lifestyle	**Almost certain**	**Minor**	**Medium**	Natural Hazards Risk Register. Collaborative approach to shared natural assets is appreciated.	Collaborative remediation work when issues are identified and a source of funding secured.	**Medium**	NRM	On a needs basis	NRM South

4.0 STRATEGIC ACTIONS AND SUMMARY ACTIONS FOR COUNCIL BUSINESS AREAS

4.1 STRATEGIC ACTION PRIORITIES – INCORPORATION INTO OTHER DOCUMENTS AND PROCESSES

Strategic priorities are broad level climate change adaptation actions that increase council's climate governance and cross numerous Council service areas. Having these in place enables and facilitates the inclusion of climate consideration across council's corporate strategic and operational functions increasing council's climate resilience and mitigating exposure to potential liability. Success of such actions is dependent on management support. Implementation of strategic actions will provide Council with a solid framework in climate change adaptation and will build an internal culture that supports the implementation of the specific adaptation options listed earlier. Strategic priority examples are provided in Table 6.

Image: Glenorchy City Council Staff

Table 6: Broad level climate change adaptation actions that may be implemented across Council (Strategic Priorities)

Strategic Priority Description	Reasoning
Integrate climate change risk management into existing Council wide risk assessment framework.	Climate change risks should be incorporated into Council's existing risk management processes. From a process point of view this will ensure that climate change risks continue to be properly addressed.
Assign a climate change officer to oversee implementation of this Plan.	A representative from Council is recommended to be assigned to oversee the implementation of actions outlined in the Plan.
Consideration of climate change risks and impacts during the development of other Council strategies, policies and plans.	The climate change impacts and risk process outlined throughout this adaptation action plan should be considered in the development of future plans, policies and strategies to ensure that these issues are incorporated throughout all of Council's service areas. This will also ensure there are mechanisms for actions to be implemented.
Integration of this adaptation action plan and greenhouse gas mitigation measures to prioritise projects that have dual benefits.	Ensure that future emissions are considered in the decision making process of prioritising adaptation actions. Often dual benefits can be achieved for climate change mitigation and adaptation.
Report on climate change adaptation progress into any future publicly available documents or reports.	Reporting on climate change adaptation progress will assist in engaging the community and informing other Councils on Council's progress.
Consider developing climate change related KPIs.	Climate change related Key Performance Indicators (KPIs) which would be reported on through Council's annual report will incentivise continuous improvement.
Ensure that the projected impacts of climate change are properly considered in Council's emergency management planning.	Emergency response plans should be investigated, developed and implemented considering the best available climate change projections. Up to date emergency response procedures can minimise consequences when extreme events occur.
Where required, support the implementation of Regional Councils Climate Change Adaptation Strategies.	Administered through the STCA, the Regional Councils Climate Change Adaptation Strategy aims to drive adaptation in local government for the region and deliver on a number of common actions that are relevant to its member councils. The success of this strategy is dependent on a high level of buy in from each of the Councils across Southern Tasmania.

4.2 INFRASTRUCTURE, ASSETS, ROADS AND STORMWATER

Council's Infrastructure team is responsible for overseeing the construction, maintenance and replacement of property and infrastructure assets, including roads, drains and culverts, bridges, stormwater infrastructure, council owned buildings and recreational infrastructure such as walking tracks. For councils, effective asset management is about understanding the required level of service and delivering it in the most cost effective manner. Managing this objective is core business for local government and is key to ensuring council sustainability. The projected impacts of climate change threaten conventional asset management both in terms of financial modelling, as well as the level of service that is acceptable or even achievable.

Projected increases in the intensity and frequency of extreme events directly impact on council's asset base with significant and unpredictable financial and service delivery implications. Council's stormwater system for example is designed for historical climate and with projected climate change, will possibly become under-capacity in places. Council will therefore need to consider the additional cost of managing stormwater at the current acceptable level of service and either fund that cost or accept that a greater frequency of inundation events is likely. This may result in public inconvenience, safety issues, and potentially legal liability for damage to property from poorly performing council infrastructure.

Further to the projected increases in extreme events, incremental changes to the climate such as increasing average temperatures or reduced average rainfall will also have implications for council's capacity to deliver its infrastructure based services. Such changes may result in accelerated structural fatigue in council's infrastructure. Design standards based upon past climate data and patterns may need to be reconsidered for new or replacement infrastructure to account for incremental climate change projections.

Table 7: Infrastructure, assets, roads and stormwater – actions and treatments for highest rated risks

Risk ID	Risk statement	Primary risk category	Risk rating	Existing treatments	Adaptation Action	Timeframe
1	A trend towards heavier rainfall events and unprecedented flooding resulting in infrastructure damage or failure (e.g. road surfaces and bridges).	Financial	High	Reactive clean up effort and cost. Investment in infrastructure improvements and upgrades –10 year capital program based upon condition. Review level of service provision.	Continuation of current controls. Have a budget contingency in asset management plan and ensure there is extra capital in the long term financial plan.	Ongoing
3	Increase in the frequency and magnitude of flood events leading to road inundation and increased call on emergency response resources to ensure affected roads are signed and closed.	Public safety	High	Deployment of signage on effected roads. Current proplem areas have been documented.	An escalation procedure is in place – extra resources to improve logistics and efficiency with response.	Ongoing
4	Increase in heavier rainfall events, and greater likelihood that stormwater infrastructure will fail, resulting in overland flow and localised flooding.	Financial	High	Council's Stormwater System Management Plan lists vulnerable locations. Current asset upgrade program is in place. Stormwater policy for new developments.	Ensure projected rainfall data for climate change is incorporated into future flood modelling to comprehensively understand emerging risks to assets. Improve high intensity rainfall harvest by improving storage capacity and implementing Water Sensitive Urban Design principles where possible.	Immediate
5	Increasing frequency of damage from heavy rainfall events (eg washouts, spread of debris, and damage to buildings) requiring more resources to attend to clean up and repair.	Service delivery	Medium	Proactive effort to clear culverts before forecast events. Improvements to stormwater infrastructure to cope with flash flooding. Tree Management Policy – inspections and treatment of high risk trees.	Identify vulnerabilities to storm damage in existing building stock and build resilience where appropriate.	Immediate
8	Increasing temperatures, longer dry spells and more severe droughts will result in impacts on street trees (e.g. loss of limbs, ingress of roots into moist areas, death) having implications for tree maintenance, species selection and planting technique (e.g. tree cells).	Financial	Medium	Reactive and proactive inspections in both urban and rural areas. Tree surgeon inspects and advises on higher risk assets.	Investigation of using tree cells for new plantings in urban areas.	Ongoing
14	Increasing high fire risk conditions resulting in a higher probability of fire starts on council land that impact the property of others – resulting in litigation.	Financial	Medium	Fire abatement policy and schedule for council reserves.	Continuation of current controls.	Scheduled into annual works program
16	Rising sea level and higher storm surges increasing the frequency of coastal and estuarine inundation events will result in more frequent damage to assets, (stormwater outfalls are currently affected) and higher maintenance costs.	Financial	Medium	None	Impacted assets will ultimately require maintenance, or be relocated if they can no longer be protected. Managing community expectation of council.	Monitor and act accordingly

4.3 CORPORATE AND FINANCE

Sorell Council has an important role in community and economic development, particularly through encouraging investment and job growth, and enhancing liveability and environmental attributes which may influence individual's decisions to live in the municipal area.

Maintaining assets that are fundamental to council operation and community services is an important role of councils. Increasing climate hazards have the potential to cause more frequent impacts on and damage to council buildings. Insurance premiums are likely to rise, as are repair and replacement costs if damage is sustained. Weighing up the value of the asset, the importance of the asset to the community, and the average annual cost of protecting and maintaining the asset are important considerations in determining where to allocate limited resources.

Councils also have an important role in creating healthy vibrant communities, in fact most of council's roles and functions have a bearing on the wellbeing of residents. Climate change, and its resultant range of hazards, is now a well-documented influencer of mental health and is beginning to regularly disrupt the fabric of communities. The majority of Australians (80%) have experienced some form of extreme weather disaster since 2019.[13]

If the community is not prepared for the impacts of climate change then Council may be required to invest increasing resources in community support to assist residents through tough times, including clean-up effort, and support due to disruption to local businesses. For rural councils, programs that Councils may consider referring local businesses and individuals to in challenging times are: Drought Ready Tasmania (www.droughtready.tas.gov.au) and Rural Alive and Well (www.rawtas.com.au).

There is a potential role for council in disseminating specific information to the community in relation to climate change to assist in preparing for changes that could be challenging.

There is also a toll on council staff in assisting the community through extreme events, particularly when their frequency is escalating. Council may be required to invest extra resources in the way staff are managed to avoid burnout, anxiety and fatigue.

Maintaining assets that are fundamental to council operation and community services is an important role of councils. Insurance premiums are likely to rise, as are repair and replacement costs if damage is sustained. Weighing up the value of the asset, the importance of the asset to the community, and the average annual cost of protecting and maintaining the asset are important considerations in determining where to allocate limited resources.

13 Climate Council (2023), Climate Trauma: The growing toll of climate change on the mental health of Australians. www.climatecouncil.org.au/resources

4.4 PLANNING AND REGULATORY SERVICES

Climate change risks have implications for council's role in planning and development approval, particularly in relation to possible litigation if risk to property from climate change related disasters are not adequately identified or communicated.

In relation to changes in flood and bushfire risk from a warming climate, planning scheme overlays should be updated if and where possible to incorporate modelled data to appropriately guide development. If there remain grey-areas, or uncertainty about potential impact from natural hazards, then additional information to guide decision making should be sought.

With increasing bushfire likelihood it may be useful to have the State Planning Provisions modified to require planning schemes to be informed by modelled fire data that could include: vegetation flammability; slope; ignition potential; and suppression capability.

The Bushfire-Prone Areas Code overlay covers the majority of the municipal area. It prompts thinking around appropriateness of developments in terms of location, access and water supply. For each development a detailed bushfire attack level (BAL) assessment is required as part of the planning assessment process. This assessment informs detail around positioning of buildings, buffer areas, construction technique, and appropriate building materials to minimise bushfire impact and flammability.

Identified Planning and Regulatory Services actions are listed in Table 8.

Image: Glenorchy City Council

Table 8: Planning and Regulatory Services – actions and treatments for highest rated risks

Risk ID	Risk statement	Business Area & Responsibility	Primary risk category	Risk rating	Existing treatments	Adaptation Action	Timeframe
4a	Increase in heavier rainfall events, and greater likelihood that wastewater systems will be inundated (e.g. Southern Beaches), resulting in localised contamination.	Regulatory services	Environ-mental	High	SAP – Southern Beaches Onsite Wastewater Plan.	Continuation of current controls	Ongoing
2	Increase in heavier rainfall events and unprecedented flooding meaning that new developments near waterways could be in harms way, requiring review of information for planning decisions to avoid impact on property and people and future litigation risk.	Planning	Financial	Medium	Issue is well accounted for with good mapping and update of the flood inundation overlay accordingly. Residual flood anaylsis reporting once subdivisions are completed.	Continuation of current controls.	Ongoing
7	Changes to mean temperature, increasing hot days and heatwaves will result in local biodiversity loss and favour introduced weed species having implications for council's NRM resources and priorities.	Planning	Environ-mental	Medium	Tree planting programs, biodiversity protection support initiatives and weed management program.	Continue to resource, or seek grant funding for, biodiversity protection and restoration programs. Potential allocation of extra resources for weed management.	On a needs basis
17	Changes in sea level and the frequency of coastal/estaurine inundation events placing pressure on council to protect private assets, manage expectations, and find acceptable solutions.	Planning	Governance	Medium	STCA document – Regional Strategy – Adapting to a Changing Coastline is a useful guiding resource for approaches to addressing this issue.	Technical and legal expertise is needed to advise appropriate response. There is a compliance element as well in terms of people undertaking unauthorised coastal protection works.	On a needs basis
18	Changes in sea level and the frequency of coastal erosion and inundation events will result in increased frequency of tidal inundation leading to coastal erosion and call for environmental rehabilitation work to protect important biodiversity assets.	Planning	Environ-mental	Medium	Natural Hazards Risk Register. Collaborative approach to shared natural assets is appreciated.	Collaborative remediation work when issues are identified and a source of funding secured.	On a needs basis

4.5 ENVIRONMENTAL HEALTH

Councils have a statutory role for the provision of environmental health services across their communities. In addition to these formal roles other functions may include: aged care, child health, special needs care, supported accommodation and counselling and support services. Climate change has many implications for community health. Gradual shifts over time in temperature, humidity and rainfall patterns can create ideal conditions for disease vectors, such as mosquitos, in areas where there was no previous exposure. Direct impact of extreme events such as bushfire and heatwaves can result in emergency services and community support services being stretched beyond their capacity. There is now an established link between extreme heatwaves and an increase in mortality in vulnerable sectors of the community.

Severe seasonal conditions such as drought lead to tough environmental and economic situations which can result in more widespread mental health challenges. Councils have an important community role in promoting and maintaining links to relevant support services in times of hardship.

4.6 NATURAL RESOURCE MANAGEMENT

Council's role in natural resource management (NRM) is focused on management of local reserves, protecting local biodiversity, managing threats such as weeds, and running community programs e.g. revegetation projects.

The natural environment is under pressure from climate change. The climate change we are now experiencing is occurring relatively rapidly. In natural vegetation communities this change is likely to favour some species and disadvantage others. A possible outcome is loss of vulnerable species and changes in structure, function and composition of vegetation communities. Additionally, exacerbated threat to vegetation communities may occur through proliferation of weeds which may be favoured by changing temperature and rainfall conditions. Direct physical impacts on natural systems may also be exacerbated under climate change, for example, rivers and streams are likely to experience flood flows at levels not seen before, creating vulnerability to erosion in riparian areas.

There may be a need to refocus NRM activities in the future away from addressing issues in isolation to a strategic approach that is well informed about landscape-scale ecological processes. This approach will enable limited resources to be deployed wisely and in ways that address several issues, for example, revegetation in conjunction with landscape connectivity priorities.

Sorell's Natural Hazard Risk Register[14] provides a detailed analysis of risks, ratings and management options in regard to the impact of emerging climate hazards on the natural assets of the Sorell community.

14 GHD 2021, Sorell Natural Hazard Risk Register Cover Report

4.7 RISK AND STRATEGY

Increasing frequency and magnitude of extreme events associated with climate change may result in resources for emergency management being stretched at times. Significant effort should be invested to ensure that relevant staff are well briefed to respond and that Emergency Management Plan and procedures are reviewed regularly so council's roles in emergency response run seamlessly.

Identified emergency management priority risks are listed in Table 9. An action to treat an extreme rated risk was a review of evacuation centres should be conducted to ensure they are fit for purpose and have backup resources to ensure continuity of power, communications and resources such as water.

Table 9: Risk and Strategy – actions and treatments for highest rated risks

Risk ID	Risk statement	Business Area & Responsibility	Primary risk category	Risk rating	Existing treatments	Adaptation Action	Timeframe
10	Increased call on council's emergency response team in the face of the threat of unprecedented fire emergencies resulting in increasing pressure to ensure evacuation centre procedures are up to date to cover all potential scenarios, and that buildings are fit for purpose.	Risk & Strategy	Public safety	Extreme	Comfortable with current plans. SE Stadium is fit for purpose. A lot of experience and intellectual capital remains with council from management of previous events.	Continuation of current controls.	Ongoing
13	Increasing frequency and intensity of bushfires exacerbating the potential for evacuation and access issues on some council roads serving residents in remote and isolated areas.	Risk & Strategy	Public safety	Extreme	There is more than one way out for most areas.	Communication and engagement with residents about the risk and developing a plan. Audit of dead end roads to assist in better understanding vulnerabilities.	Immediate
6	Increasing temperatures, heatwaves and evaporation having implications for water storages (for both firefighting and localised supply), and hence council's role in emergency bushfire response.	Risk & Strategy	Public safety	Medium	Inter-agency issue, facilitation and advocacy role.	Endeavour to understand vulnerabilities in water supply for emergency response in discussion with NRE (register of dams). Continued advocacy and engagement with TasFire Service.	Commenced and ongoing

5.0 ADAPTATION PLAN IMPLEMENTATION AND REVIEW

The implementation of this Plan requires a co-ordinated approach, both across council business, in partnership with other councils, and with external stakeholders. Key components of implementation include:

- a process for adaptation plan endorsement by council;
- a logical way for incorporation of key local risks and adaptation actions into council documents and processes such as risk registers, strategic plans, annual plans or asset management plans; and
- an appropriate mechanism to implement sub-regional and regional adaptation actions either through advocacy or collaboration.

It is important that management play a role in Plan implementation by assuming responsibility for implementing adaptation actions. Implementation of adaptation actions may provide Council with a buffer to the challenges posed by climate change.

5.1 FINANCIAL AND RESOURCE REQUIREMENTS

Financial and resource availability are critical factors for enabling implementation of adaptation actions. The adaptation options identified in this Plan will come at varying degrees of cost and resource requirement. It is likely that Council will initially support implementation of those adaptation actions which are cost effective and align with current resource capacity and availability. As mentioned earlier in this document every dollar invested in adaptation typically yields net economic benefits ranging from $2 to $10,[15] hence implementation of prioritised actions may be viewed as a 'no regrets' approach.

Prioritising 'investment' in adaptation actions can be based upon factors such as risk priority and a cost benefit analysis. Weighing up the value of the asset, the importance of the asset to the community, and the average annual cost of protecting and maintaining the asset are important considerations in determining where to allocate resources. In some cases it may not be feasible to protect an asset and consideration of relocation may be the only option.

It is important to recognise that not all climate change action within Council will require its own funding, but will become embedded in the operational business of Council through appropriate governance arrangements, planning and policy. Notwithstanding this, some of the more complex adaptation options, such as road relocation or coastal fortification will require substantial financial support and resources. For these actions, pursuing grant funding and establishing partnerships for collaborative or common actions can be effective in reducing the overall cost of action for Council, enabling the full cost of action to be offset.

15 World Resources Institute 2023: Adapt Now: A global call for leadership on climate resilience.

5.2 STAKEHOLDER INVOLVEMENT AND COLLABORATION

Climate change is likely to impact either directly or indirectly on all aspects of council function. Further to this, impacts are likely to be felt throughout the community affecting other organisations that council has involvement with. A collaborative adaptation response between all stakeholders is therefore essential for council to maintain its service level in a changing climate. It is important that:

- linkages between organisations and commonalities of hazards and risks are identified;
- there is a clear understanding of roles and responsibilities in relation to management of identified climate change risks;
- there is awareness of what stakeholders are doing to manage climate change;
- recognition of opportunities to develop or strengthen existing collaborations and share resources; and
- duplication of efforts is avoided wherever possible.

Image: Graham Green

5.3 REGIONAL STRATEGY

The former Regional Councils Climate Change Adaptation Strategy (2013-17) for southern Tasmania, provided a policy platform and the parameters for cohesive and effective regional and sub-regional action(s) and, importantly, to strengthen the role of councils in adapting to climate change. Its underlying principles were:

- Climate change is a global issue requiring local solutions.
- Climate change action is a shared responsibility between local, state and Commonwealth governments, communities and the private sector.
- Local governments have an important role in leadership and educating communities at both the municipal and regional level on climate change and adaptation.
- Councils must prepare for and manage the impacts of climate change on its assets and services.
- Early climate change adaptation action is more cost effective than late action.
- Collaboration and cooperation on climate change adaptation actions by local government provides more effective use of resources.

Implementation of the Strategy is ongoing through a regional working group (the Regional Climate Change Initiative) who develop and implement an action plan to progress shared risks and actions between councils through a 'regional register'. Regional actions relate to the following themes:

- education and awareness raising;
- advocacy to State/Australian Government/stakeholders;
- collaboration on regional strategy;
- collaboration on climate action;
- cost sharing on research, study and technical advice; and
- reviewing design standards.

Regional actions are prioritised by the RCCI in relation to considerations such as: level of urgency, resourcing requirements, staff availability, funding opportunities, strategic directions and policy settings.

Completion of the Southern Councils Climate Collaboration provides an opportunity to re-appraise the risks and actions in common across the southern councils that are best addressed collectively through the regional approach.

For example the following corporate actions in relation to legal liability could be most effectively pursued through collective advocacy to the State Government:

1. Amendment to *Local Government Act* (Tas) 1993, by the State Government, to insert an equivalent section to s733 *Local Government Act* (NSW) that exempts local governments from civil liability for the impacts of climate change where statutory powers, planning scheme provisions and assessment of development applications are done in good faith and in accordance with manual/s prepared by the State Government.
2. Formulation of State-wide codes to deal with climate change impacts to achieve a uniform set of provisions across the State that: contain specific development controls; removes discretionary decision making from technical assessments; does not require risk analysis; and identifies prescribed levels for sea level rise in developed coastal regions throughout the State.

5.4 EVALUATION AND REVIEW

Monitoring and evaluation of climate change adaptation is necessary to ensure a flexible response and effective allocation of resources. Despite increasing accuracy of modelling based upon the input of real-world data as time goes by, climate change is likely to deliver surprises and potentially unforeseen outcomes. This is because we are entering uncharted waters and it is often difficult to predict how infrastructure and the environment will respond to unprecedented, intensifying and intersecting climate driven hazards.

Monitoring and evaluation is important to evaluate the progress of adaptation actions; integrate new knowledge about climate change projections and potential impacts; keep abreast of legal implications and planning considerations; evaluate and incorporate new technology that can assist with defining hazards, exposure and risk.

Establishment of executive leadership and an appropriate staff team to conduct risk re-assessment involving staff from all operational areas is important. Staff who have local knowledge and influence over potential impacts, including ability to implement actions and allocate resources, must be involved in these assessments.

A component of the Southern Council's Climate Collaboration 2022-23 was a review of the risk tool and legal advice. The tool is a resource that enables comprehensive in-house review of the risk management process. Climate change adaptation tools that provide a guide to the whole process of adaptation planning are available at:

www.stca.tas.gov.au/rcci/our-projects/regional-council-climate-adaptation-project/

Image: Glenorchy City Council Staff

5.5 RELATED RESOURCES

Tasmanian Disaster Resilience Strategy 2020-2025
www.dpac.tas.gov.au/divisions/osem/tasmanian_disaster_resilience_strategy_2020-2025

Tasmanian Climate Change Action Plan 2023-25
https://recfit.tas.gov.au/climate/climate_change_action_plan

Of particular relevance to local government in the Action Plan:

- an undertaking to update the fine-scale climate projections for Tasmania;
- development of a state-wide Climate Change Risk Assessment;
- development of a consistent state-wide approach to managing the impacts of coastal hazards under a changing climate.

Detailed information from the Climate Futures Programme on the modelled future climate for Tasmanian sub-regions may be found here: **www.wineaustralia.com/climate-atlas**

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The Climate Change Adaptation Plan 2023 has been prepared under the auspices of the Southern Tasmanian Councils Authority, Regional Climate Change Initiative by the 12 Councils of southern Tasmania: Brighton, Clarence City, Central Highlands, Derwent Valley, Glamorgan Spring Bay, Glenorchy City, City of Hobart, Huon Valley, Kingborough, Sorell, Southern Midlands and Tasman.

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