

Victorian Centre for Climate Change Adaptation Research

Project: Governance models for natural disaster risk management: legal, regulatory, institutional and financial risk mechanisms

Final Report

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Project Overview

The Governance Models project has examined the way in which law and governance arrangements shape climate change adaptation in Victoria. The project has focused on enhancing the risk management of extreme events such as flood, bushfire, heat stress, and storm surge by considering how relevant legal and regulatory frameworks, institutional arrangements and regulatory models might be effectively developed to meet the challenge of climate change adaptation.

The focus on law and governance has enabled the project to examine a wide range of drivers and mechanisms that influence adaptation around extreme events and drawn attention to the many different actors involved in shaping how climate risk is managed in Victoria, including businesses, households, local and state governments.

Governance arrangements are the formal and informal mechanisms, processes and structures that influence the behaviour of those actors.¹ The term refers to the formal rules – law and regulation, both legislation as well as case law principles – and informal processes such as the relationships between different institutions, financial drivers and constraints. Governance arrangements influence adaptation and resilience to climate risk at all scales.²

The project has provided research and delivered toolkits and options for the Victorian Government, to assist policy development around the role of law and institutions in adapting to extreme events, and the impacts of extreme events and disasters.

Project Outputs

The project has delivered the following major reports, which are published on the VCCCAR website.

Governance Arrangements for Climate Change Adaptation and Natural Disaster Risk Management in Victoria (September 2013)

This report comprises an initial identification of relevant legal and regulatory frameworks in respect of selected climate risks and extreme events. It examines general legal, institutional and governance implications in terms of fostering effective adaptation to climate change impacts and for the management of natural disaster risk within Victoria.

Part A provides background to why climate change adaptation and responses to extreme weather events are a challenge for legal and regulatory frameworks specifically, and governance more generally.

Part B explores how relevant laws and governance arrangements provide for adaptation and the management of the risks associated with extreme weather events.

Part C uses an example of the governance arrangements for managing flood risk to highlight the complexity involved in climate risk management.

¹ See Catrien Termeer et al, 'The Regional Governance of Climate Adaptation: A Framework for Developing Legitimate, Effective, and Resilient Governance Arrangements' (2011) 2 *Climate Law* 159, p 161.

² Ibid, 167-8. Heleen L P Mees, Peter P J Driessen and Hens A C Runhaar, 'Exploring the Scope of Public and Private Responsibilities for Climate Adaptation' (2012) 14 *Journal of Environmental Policy & Planning* 305, p 312.

Legal Tools and Measures for Adaptation and Managing Climate Risk in Victoria (April 2014)

This report focuses specifically on the legal aspects of these arrangements. It aims to provide an overview of the ways in which different legal measures and tools work and their general relevance for adaptation and efforts to respond to climate risks.

Part II provides an overview of the legal system and the role that legal tools can play in climate change adaptation.

Part III highlights the different legal tools and measures that each area of law can provide.

Part IV considers the way in which legal tools can incorporate and communicate information about climate risks.

Three case studies in **Part V** show the range and combination of legal tools and measures that can operate in a single context. The case study areas – Flood Risk Governance, Legal Tools for Reducing Bushfire Risk and Managing Climate Risks to Victoria’s Seaports – are the subject of more technical examination and analysis within the broader research project.

Suite of Technical Papers

Three technical papers have been delivered, available on the VCCCAR website, which provide an in-depth examination of climate change adaptation issues as they relate to particular issues – critical infrastructure, managing risk, and planning law.

Governance and Legislative Issues for Critical Infrastructure Adaptation to Climate Change : A Case Study – Ports

This paper explores whether the existing governance and legislative frameworks that apply to Victorian ports facilitate climate change adaptation by the ports. The case study extrapolates the learnings for ports to critical infrastructure more broadly to assess whether there are synergies in applying governance and legislative frameworks across critical infrastructure.

Managing the Risks of Climate Change and Natural Hazards

This paper explores legal, information and insurance issues that arise in the context of managing the inherent uncertainty and risks of climate change and its impacts. The paper examines legal tools, mechanisms and principles for risk management. It explores the interface between information and technology, including the use of multiple datasets to provide tools to manage emergencies such as fire and flood. Insurance is examined as an example of a sector which is able to utilise climate and hazard data to drive adaptation by government as well as individuals. The paper explores potential liability issues that may arise for government authorities from the use or non-use of climate information.

Governance Models for Adaptation : Planning Law and Related Measures

This paper explores adaptation planning that can potentially play a role in supporting the adaptation of Victorian settlements to climate change impacts, as well as the legal and institutional arrangements for their implementation. It identifies the broad range of available planning measures that can support adaptation to climate hazards and examines other legal models for adaptation that can work in conjunction or as alternative models to spatial planning. The paper considers how these measures might be employed in Victoria and highlights that there is scope to better design and implement these measures to more effectively support hazard management objectives. The paper identifies key potential legal, regulatory and financial measures to further develop planning as a climate change adaptation tool.

Journal Publication

Law, Governance and Risk: Deconstructing the Public-Private Divide in Climate Change Adaptation

This article was published in the University of New South Wales Law Journal in 2013 as part of the project.³ The article examines the interaction of law and regulation that has emerged around climate change adaptation by focusing on two trends that have been identified as producing complex interactions between the public and private spheres. The first trend is the shift to the ‘New Regulatory State’. This is characterised by a growing privatisation and marketisation of government functions, accompanied by a simultaneous increase in the regulation of private actors, producing a new hybrid governance role for government.⁴

The second trend is the pervasiveness of the risk management model in the governance of modern society. The analysis of how risk paradigms are working in climate change adaptation contexts also suggests that a further step has occurred. The risk management model does not operate neutrally, but may relocate risk across sectors – typically to the private sector individual. The confluence of the two trends, designated as ‘new governance’ and ‘risk management and individuation’ respectively, is apparent in the management of extreme events exacerbated by climate change, such as bushfires and floods. Legal responses to such events operate in multifaceted ways and draw upon diverse areas across the public–private law spectrum, from tortious liability and insurance laws to public law regimes, such as statutory planning.

Report Overview

This report summarises:

- how legal and governance arrangements can enable more effective adaptation or pose barriers; and

³ Lee Godden, Francine Rochford, Jacqueline Peel, Lisa Caripis and Rachel Carter, ‘Law, Governance and Risk: Deconstructing the Public-Private Divide in Climate Change Adaptation’ (2013) 36(1) *UNSW Law Journal*, 224.

⁴ John Braithwaite, ‘The New Regulatory State and the Transformation of Criminology’ (2000) 40 *British Journal of Criminology* 222.

- the main legal measures and tools that can be used to adapt to climate change impacts and to assist in risk management for extreme events.

This report includes a series of six appendices which have been designed as short policy briefs that encapsulate the key messages, observations and options that are detailed in the three technical papers. These briefs are intended as stand alone documents, that can effectively operate as executive summaries of the technical papers. Audiences seeking further detail can refer to the relevant technical paper or papers, which are referenced in the briefs. The topics of the appendices are:

- A. Engaging Ports in Climate Change Adaptation
- B. Critical Infrastructure and Climate Change
- C. Natural Hazards, Climate Change and Legal Liability : Considerations for Government
- D. Embedding Consideration of Climate Change in Legislative Frameworks and Governance Arrangements
- E. Planning Law and Climate Change Adaptation
- F. Dissemination and Application of Hazard Information
- G. A Decision-Making Model to Incorporate Adaptation

Climate Change and Adaptation

The economic, social and environmental costs of extreme weather events and disasters are immense. Recent events in Victoria are testimony to the disruption and destruction that such events can cause. The changing climate is predicted to exacerbate and change the frequency and severity of extreme events. These events put at risk major infrastructure, property, communities, agricultural and business activities and ecosystems. It is therefore very important to take steps now to ensure that Victoria can cope with the risks that climate change has already introduced and will continue to introduce, and to ensure that Victoria can continue to address vulnerability and build resilience in a changing climate.

The *Victorian Climate Change Adaptation Plan* (Adaptation Plan) sets out the Victorian Government's key strategies to build Victoria's climate resilience, including the measures in place to build resilience in key sectors and manage climate hazards (namely, bushfires, heatwaves, floods and storms, sea level rise and coastal inundation, and drought).⁵

A basic premise of this project's research is that the laws and governance arrangements which range across, and are integral to, the operation of government, business and the community sector will play an important role in managing climate impacts and the enhanced risks of extreme events. To date, there has been limited research on how legal, institutional and regulatory frameworks can support and facilitate effective adaptation and responses to climate risks.

The importance of building resilience and adaptive capacity in the private sector has been highlighted in recent policy settings.⁶ While many factors influence resilience and the capacity to prepare for, respond to and recover from extreme events such as flood and bushfire, legal and regulatory

⁵ Victorian Government, *Victorian Climate Change Adaptation Plan* (2012) Parts 4 and 5.

⁶ Ibid; Victorian Government, *Victorian Emergency Management Reform* (2012).

frameworks remain significant drivers of behavioural change and capacity building in the community and in the private sector.

This project provides a research platform to assist policy development designed to enhance government preparedness for climate change risk and build the adaptive capacity and climate resilience of Victorians.

Uncertainty and Climate Change Adaptation

There is a significant degree of uncertainty about the specific effects of climate change and the precise consequences they will have in any given location. Scientific evidence has indicated that events such as flooding and heat waves will be influenced by climate change,⁷ but as the Victorian Government has acknowledged,⁸ varying degrees of scientific uncertainty exist about the exact magnitude, geographical distribution and timing of these kinds of events.⁹ Furthermore, there are some impacts that may be largely unforeseeable due to a lack of precise scientific knowledge of these future events at the current time.¹⁰

One source of this uncertainty is the complexity of the systems affected – due to the connections and relationships between various sectors, feedback loops and tipping points – which means that the exact consequences of a particular climate event or impact can be difficult to predict. Cascading, or ripple effects, can occur due to the interdependencies between systems.¹¹ For example, flooding may damage roads and rail tracks which has flow-on economic and social effects, for example by slowing or halting the movement of goods in and out of ports.

Governance Arrangements for Managing Climate Risk

Given the number of actors involved in the adaptation challenge, the relationships between them and the different processes and mechanisms governing their behaviour – including legal, regulatory and financial factors – it is appropriate to talk about *governance arrangements* for adaptation. More specifically, this project refers to governance arrangements for *managing climate risks*. This view of the problem is consistent with the Adaptation Plan, developed pursuant to the *Climate Change Act 2010* (Vic), and national policy statements and inquiry reports which frame the challenge of adaptation as one of managing risks.¹²

⁷ Victorian Government, *Report on Climate Change and Greenhouse Gas Emissions in Victoria - as required under Section 17 of the Climate Change Act 2010* (2012), p 23. See also Climate Commission, *The Critical Decade: Extreme Weather* (2013).

⁸ Victorian Government, *Adaptation Plan*, p 6.

⁹ See Roger N Jones and Benjamin L Preston, 'Adaptation and Risk Management' (2011) 2 *WIREs Climate Change* 296; Ross Garnaut, 'The Science of Climate Change' (Garnaut Climate Change Review – Update 2011, Update Paper 5, 2011), p. 12.

¹⁰ Timothy R Carter, Roger N Jones and Xianfu Lu, *Impacts, Adaptation and Vulnerability: Working Group II Contribution to the Fourth Assessment Report of the Intergovernmental Panel on climate Change* (Cambridge University Press, 2007) 779, p 799.

¹¹ See for example, IPCC, *Managing the Risks of Extreme Events and Disasters to Advance Climate Change Adaptation – Special Report* (Cambridge University Press, 2012), p 39.

¹² See for example, Select Committee on Climate Change (SCCC) of the Council of Australian Governments (COAG), 'Roles and responsibilities for climate change adaptation in Australia (for community discussion)' (2012), Productivity Commission, *Barriers to effective climate change adaptation* (2012). On different ways of framing, that is, seeing and understanding climate change adaptation, see Hartmut Fünfgeld and Darryn McEvoy, *Framing Adaptation in the Victorian Context* (VCCCAR Research Paper, April 2011).

Risk management has partly evolved as a technique to incorporate and manage uncertainty in decision making. The *Climate Change Act 2010* contains guiding principles which have also been used in the development of the Adaptation Plan. These are principles for informed decision making and one of the principles is risk management. More generally, risk management approaches have been adopted to support government operations, evident for example, in the inclusion of the ISO 31000 Risk Management Standard in the Victorian Government Risk Management Framework (2011). The Victorian Government has committed to implementing a ‘risk-based approach’ to the management of bushfire and flood.¹³

This project has sought to highlight particular issues that arise in the process of seeking to manage the risks associated with the effects of climate change, in conjunction with other sectors in society. Industries and sectors such as agriculture, infrastructure, finance and insurance have always operated and made decisions under conditions of uncertainty due to the necessity of managing risk. These sectors have developed tools and systems to facilitate risk management that could provide potential models for planning adaptation responses.

This project has examined select Victorian laws and governance arrangements to assess their pertinence for adaptation efforts. Appendix A summarises the main messages from the research detailed in the technical paper *Governance and Legislative Issues for Critical Infrastructure Adaptation to Climate Change : A Case Study – Ports*.

Regulatory Tools to Shape and Drive Adaptation

Governments, individuals and businesses can use legal measures to manage the risks they face from climate change. A broader range of legal tools and mechanisms is available to government to enable them to play a coordinating role to manage climate risks to society as a whole. While both government and individuals, for example, can enter into contracts that specify the level of acceptable risk in circumstances relating to extreme events, only governments can prescribe legally enforceable planning and development controls to give effect to strategic planning policy goals in respect of adaptation relating to land use and development.

Legal tools

Each of these areas of law offers legal tools that are highly relevant to adaptation and efforts to manage climate risk (see **Table 1**). To this list of conventional areas of law we can add a suite of other legal measures such as voluntary industry-based codes, market mechanisms and information-based tools. Rather than prescribing what can or must be done and how, these tools regulate behaviour using a lighter touch.

All of these areas of law influence or ‘regulate’ behaviour in one way or another.

¹³ Victorian Government, *Environmental Partnerships* (2012), p 17.

Table 1 Examples of legal tools for adaptation

Type of legal tool	Details	Examples
Conventional legal tools	Targeted legislation setting up a framework for climate change adaptation	<ul style="list-style-type: none"> • <i>Climate Change Act 2010</i>, Parts 2 and 3
	Legislation (Acts, regulations and delegated legislation)	<ul style="list-style-type: none"> • <i>Climate Change Act 2010</i>, s 14 • Planning instruments contained in Victorian Planning Provisions (VPP) cl 13.01.
	Legal tools related to matters that will be directly impacted by climate change (e.g. managing the risks of extreme events)	<ul style="list-style-type: none"> • VPP 13.02-1 Floodplain management • Amendment of Part 6 of the <i>Terrorism (Community Protection) Act 2003</i> to embed an ‘all hazards’ approach to critical infrastructure resilience.
	Judge-made law ¹⁴	<ul style="list-style-type: none"> • Negligence (what risks should those taking action consider?). • Contract (how are risks assigned between parties e.g. in construction and insurance contracts).
Other legal measures	Information – based tools	<ul style="list-style-type: none"> • Vendor disclosure requirements for the sale of properties in bushfire prone areas: <i>Sale of Land Act 1962</i> (Vic) s 32.
Other legal measures	Market and financial mechanisms	<ul style="list-style-type: none"> • <i>Ecotender</i> a voluntary, market-based scheme that creates incentives for landholders to manage and conserve native vegetation on their properties.
	Voluntary schemes	<ul style="list-style-type: none"> • Sustainability Covenants under the <i>Environment Protection Act 1970</i> (Vic).

¹⁴ This area of law is sometimes called the ‘common law’. This term also refers to the type of legal system in Australia.

Type of legal tool	Details	Examples
Community participation tools	<p>May be mandated by law or emerge as a 'bottom up', partnership process</p> <p>To build community resilience</p> <p>To enhance transparency around government decisions</p>	<ul style="list-style-type: none"> • <i>Victorian Local Sustainability and Adaptation Accord</i> - to support councils to work with their communities to become more sustainable and resilient to climate change.

Legal tools can help deal with the challenges presented by climate change in the manner set out in **Table 2**.

Table 2: Challenges and opportunities

<i>Uncertainty and complexity</i>	<ul style="list-style-type: none"> • Providing information about extreme events • Ensuring risks are accounted for in decision-making • Providing flexibility and guidance to decision-making to account for uncertainty • Setting up legally binding strategic planning processes • Allocating who will bear the risks in the event of certain circumstances arising
<i>Context specific impacts</i>	<ul style="list-style-type: none"> • Creating a framework for integrated and holistic decision-making • Enabling roles and responsibilities for managing risks to be defined and legally binding
<i>Unevenly distributed impacts</i>	<ul style="list-style-type: none"> • Creating opportunities for community participation • Ensuring the distributional effects of decisions are fair

Legislation relevant to adaptation

Generally, adaptive responses to climate-induced extreme events and disasters have not developed into a purpose-built legal framework designed to address climate risks specifically. Rather, adaptation measures to date have typically developed through the legal system generally; underscoring the importance of measures such as the Victorian Government's specific planning response in the Adaptation Plan.

In a number of ways, the Victorian legal system already contains many mechanisms for managing the risks of extreme events and disasters. These take a number forms, as outlined in **Table 3**. Purpose built' legislation and policy may provide specific models of governance and management for adaptation to climate change. Alternatively, obligations to require certain actions to be taken in

relation to climate change impacts, or which require consideration by decision-makers of matters that will be affected by climate change, may be imposed through express or implied provision in legislation or regulation.

Table 3: Legislation relevant to adaptation

Purpose-built legislation or legislative instruments	<ul style="list-style-type: none"> • Provisions relating to the Adaptation Plan in Parts 2 and 3 of the <i>Climate Change Act 2010</i> (Vic)
Express provision in legislation and legislative instruments	<ul style="list-style-type: none"> • Actions taken and decisions made under Acts listed in Schedule 1: <i>Climate Change Act 2010</i> (Vic), s 14. Victorian Planning Provision (VPP) 13.01-1 Coastal Planning Strategy
Implied provision in legislation and legislative instruments	<ul style="list-style-type: none"> • VPP 13.02-1 Floodplain management • VPP 13.05-1 Bushfire risk
Private law mechanisms	<ul style="list-style-type: none"> • Allocation of risk and legal liability in contract drafting – eg through the use of force majeure clauses • Liability in the tort of negligence • Liability in the tort of nuisance

Contracts and climate risks

Collaboration between the public and private sectors through contractual arrangements such as public private partnerships (PPPs)¹⁵ are relevant to climate risk in a number of ways.

Tenders and project agreements, for example, can specify infrastructure or maintenance requirements to reduce the impacts of climate change by prescribing adaptive or mitigation behaviours.

Consideration of the impacts of climate change, and which party may ultimately bear the risk of those impacts is a factor that is significant for the drafting of project agreements. The *National PPP Guidelines* offer guidance as to government's preferred risk position for a myriad of risk events, including site conditions, late completion or poor performance of the asset/services and, significantly in the context of this report, *force majeure* events.¹⁶ The 'optimal' risk allocation is expressed as being that 'risk will be allocated to whoever is best able to manage it, taking into account public interest considerations.'¹⁷

Appendix B includes an overview of the opportunities provided by contract to embed adaptation strategies, in a discussion about critical infrastructure and climate change, which draws upon the technical paper *Governance and Legislative Issues for Critical Infrastructure Adaptation to Climate Change*.

Breaches of Duty and Climate Risk

The law of negligence can both promote and hinder climate change adaptation by government and non-government actors. It can promote it by encouraging laggards in a particular sector to meet minimum standards imposed on them by law, because they fear future liability to actions in negligence if they fail to act. In the alternative, it may hinder action by discouraging actors from using innovative methods for adapting to climate change for fear of being found negligent should the action have uncertain flow-on effects.

Fear of being sued and found liable in negligence, may result in over-cautious and thus expensive adaptation responses. Concern about legal consequences has been identified as a major barrier to many local governments taking actions or releasing information in relation to prospective climate change impacts.¹⁸ In this sense, it is the *apprehension* of legal consequences, which may not actually be borne out in law,¹⁹ that drives behaviour.²⁰ See Appendix C for further information about climate change and legal liability considerations for government.

¹⁵ For an overview of the different contractual arrangements, see Maddocks, *The role of regulation in facilitating or constraining adaptation to climate change for Australian infrastructure* (January 2012) pp 37-8.

¹⁶ See *National Public Private Partnership Guidelines* Volume 7 ('Commercial Principles for Economic Infrastructure' – 2011).

¹⁷ Infrastructure Australia, *National Public Private Partnership Policy Framework* (2008) p 10.

¹⁸ Productivity Commission, *Barriers to Effective Climate Change Adaptation* (September 2012), 166-9. COAG Select Council on Climate Change, *2012 Work program for management of the coastal zone*, Communiqué (16 November 2012), <http://www.climatechange.gov.au/2012-work-program-management-coastal-zone>.

¹⁹ See Nicola Durrant, *Legal Responses to Climate Change* (2010, Federation Press), chapter 20, where the author argues that while local authorities are still subject to the law of negligence and may still be found liable under it, reform to the *Wrongs Act 1958* (Vic) have limited that liability extensively.

²⁰ A report was commissioned to shed light on local government liability in the context of adaptation to climate change: Baker & McKenzie, *Local Council Risk of Liability in the Face of Climate Change – Resolving Uncertainties* (22 July 2011).

The Role for State Government

The Victorian Government has an important role to play in taking measures itself, and in facilitating other actors to meet the challenge of adapting to a changing climate in Victoria.

The Adaptation Plan articulates six key strategies to define the Victorian Government's critical roles and responsibilities.²¹ These strategies are outlined in **Table 4**.

Table 4: Adaptation strategies

Adaptation strategies for the Victorian Government contained in the Adaptation Plan	
<p>Managing risks to public assets and services managed by the Victorian Government – including embedding climate change considerations into risk management and business planning for assets and critical service delivery.</p>	<p>Improving access to research and information for decision-making – by supporting coordinated research and information provision to assist all parties to adapt.</p>
<p>Managing risks to Victoria's natural assets and natural resource-based industries – including developing overarching policy settings and direction for addressing climate risks to biodiversity, soils, waterways and land, coastal and marine ecosystems.</p>	<p>Supporting private sector adaptation – by developing policy settings that support appropriate risk allocation, remove barriers to effective adaptation and promote business innovation.</p>
<p>Building disaster resilience and integrated emergency management – including reviewing and reforming emergency management arrangements.</p>	<p>Partnering with local government and communities – including providing a basis for ongoing engagement with Victorian councils and their communities</p>

Tools that government may use to help embed consideration of climate change in legislative frameworks and governance arrangements are outlined in Appendix D, which draws from material in the technical papers *Managing the Risks of Climate Change and Natural Hazards* and *Governance and Legislative Issues for Critical Infrastructure Adaptation to Climate Change*.

Planning for Adaptation

While formal land-use planning sits at the core of planning for adaptation, other policy and legal instruments can shape land use and development for better adaptation. Researchers have identified specific measures to work in conjunction with land-use planning systems.²²

While many measures operate conjointly with, or can be partially implemented through statutory land-use planning regimes; they generally rely on alternative sources of law and governance structures for their implementation. For example, in Victoria possible hazard

²¹ Victorian Government, *Victorian Adaptation Plan*, p 10.

²² See for example, A. Macintosh, A. Foerster and J. McDonald, *Limp, leap or learn? Developing legal frameworks for climate change adaptation planning in Australia* (Final report, National Climate Change Adaptation Research Facility, 2013).

information provision via land registration (see information instruments) relies on the *Land Transfer Act 1958*, (external to the *Planning and Environment Act 1987* (P & E Act)), but typically operates in conjunction with land use planning at a practical level.

However, moves to provide integrated legal and regulatory frameworks for strategic planning; development control and hazard assessment to develop effective adaptation often confront the problem that such integration will need to cross legal, administrative and jurisdictional boundaries. Potential barriers to integration point to the challenge of working across legal frameworks and institutional responsibilities involving different levels of coordination and integration with planning laws. Many of the strategies set out above in **Table 4** can be partially implemented by, or are closely related to, spatial planning measures.

Appendix E provides an overview of planning measures that are discussed at depth in the technical paper *Governance Models for Adaptation: Planning Law and Related Measures*.

Information and Climate Change Adaptation

Adaptation and managing climate risk depends critically on information about extreme events and the vulnerability and exposure of communities, sectors and activities to those events.

Information about climate risks is required to enable government decision makers to make informed decisions and to enable households and private sector actors to identify and manage risks to their assets and make their own adaptation decisions.²³

Access to and an ability to understand information about climate risks is essential for effective risk management. Prudent risk management will increasingly require robust governance processes for the production of information and care in the provision of such information to reliably inform decision making.

The development of legal tools like planning instruments relies on scientific data and information such as hazard mapping and vulnerability assessments. Accurate, current information about climate change scenarios and modelling of impacts is important information for government, private and community sectors. Appendix F discusses the dissemination of hazard information in more detail, drawing upon the technical paper *Managing the Risks of Climate Change and Natural Hazards*.

The availability and affordability of insurance is a factor that influences an individual's awareness of, and response to, climate change risks.²⁴ In the absence of up-to-date and as robust as possible information, insurers tend to price risk conservatively. The better the information, the greater the certainty insurers have in valuing the risks that they are to cover. This can improve the accuracy of the valuations and lower the cost of insurance premiums in

²³ See also, L. Williams, *Review of the Climate Change Act*, p 23; Productivity Commission, *Barriers to Effective Climate Change Adaptation*, pp117-146.

²⁴ Productivity Commission, above n17, p 298.

some circumstances.²⁵ Insurance premiums may act as drivers for private adaptation measures.

Incorporating information and expertise into decision-making

While the uncertainty and complexity associated with climate change impacts pose considerable challenges to governance and legal and regulatory frameworks, the law has developed specific principles to guide decision-making under conditions of uncertainty, such as the precautionary principle. The theory and practice of adaptive management can also provide a framework for decision-making under conditions of uncertainty.

Legal tools can also ensure that information, either in general terms or as part of specialist expertise, is incorporated into decision-making by making its inclusion a mandatory consideration.

The challenge is to mainstream climate change adaptation across government, private and community sectors so that it is fully integrated into business planning, risk management systems and operational programs.

A model for incorporating climate change considerations into decision-making processes is at Appendix G, which indicates that a climate change ‘filter’ could be built into legislation such as the *Climate Change Act* (modelled on the *Environment and Protection of Biodiversity Conservation Act*). The mooted framework could be related to development approvals under the *Planning and Environment Act*.

Conclusion

This project has explored many aspects of governance models for natural disaster risk management in the context of climate change adaptation, examining a mix of legal, regulatory, institutional and financial risk mechanisms.

The project has delivered papers that include overarching discussions of the range of legal, regulatory and governance models and tools that are available to shape climate change adaptation by various institutions. The project has undertaken a detailed exploration of how land use planning has a central role to play in maximising good adaptation outcomes. The importance of facilitating adaptation by critical infrastructure has been demonstrated, to ensure the economy is not adversely impacted by extreme weather events. The important role played by information as a crucial enabler of adaptation has also been verified, in particular the need for good governance frameworks to ensure the timely dissemination of data to inform risk management strategies. This has particular relevance for the emergency management sector.

The project has delivered a substantial research platform in the area of legislative and governance frameworks for climate change adaptation, and provided a wide range of papers that are available on the VCCCAR website or in peer reviewed journals. The papers provide

²⁵ Of course there are other factors that will affect the cost of insurance, including the measures taken by individuals to mitigate and prepare for certain risks by clearing vegetation (in the case of bushfire) and ensuring their houses are designed and built appropriately to withstand relevant hazards.

a strong body of work for the Victorian government to build upon and use in the development of policies and strategies that further the resilience of the government, private and community sectors in Victoria in the face of climate impacts.

APPENDIX A - ENGAGING PORTS IN CLIMATE CHANGE ADAPTATION

This policy brief summarises the main take out messages from the research detailed in the technical paper *Governance and Legislative Issues for Critical Infrastructure Adaptation to Climate Change* which is available on the VCCCAR website.

Public and private roles

The *Victorian Climate Change Adaptation Plan* (the *Victorian Adaptation Plan*)¹ places responsibility on private sector entities to manage risks to their private assets and activities, on the basis they are best placed to do so.² However, it recognizes that interruptions to activities at ports have ‘significant flow-on implications across the state with operations compromised by delays in moving goods which impacts businesses and communities’.³ To the extent that port functions can therefore be identified as providing a public good, there is a role for government to play, as private entities are not exposed to the full costs to society of infrastructure failure – for example, cascading costs incurred by the freight and logistics sectors if ports are not fully operational for a period of time due to extreme weather.

The mix of commercial government owned ports (Melbourne and Hastings) and privately owned ports (Portland and Geelong) in Victoria presents challenges as they operate under governance and legislative regimes which, whilst there are some commonalities, also have points of difference. Privately owned and government owned ports have a commercial focus but government ports also have a broader public focus. The focus on returning a profit to shareholders will become predominant as the trend to privatise critical infrastructure continues. The technical paper compares their different governance arrangements and assesses whether these facilitate, impede, or are silent about climate change adaptation strategies.

Legislative framework

There are two overarching pieces of legislation that regulate ports in Victoria - the *Port Management Act 1995* (the PMA) and the *Transport Integration Act 2010* (the TIA).

The Port of Melbourne Corporation (PoMC) and the Port of Hastings Development Authority (PoHDA), which are statutory authorities responsible for their respective ports, are ‘transport bodies’ for the purposes of the TIA.⁴ In that capacity are required to have regard to the transport system objectives set out in the TIA when exercising their powers and performing their functions under any transport legislation.⁵ The most relevant are ‘economic prosperity’,⁶

¹ Victorian Government, *Victorian Climate Change Adaptation Plan* (March 2013).

² Ibid 11.

³ Ibid 18.

⁴ TIA, s3.

⁵ TIA, s24.

‘environmental sustainability’,⁷ and ‘efficiency, coordination and reliability’.⁸ ‘Environmental sustainability’ includes preparing for and adapting to the challenges presented by climate change.⁹

The objectives reflect a whole-of-government perspective and are relevant to the commercial ports as they constitute crucial components of Victoria’s freight networks. However, the privately owned and operated commercial ports at Portland and Geelong are not required to have regard to the TIA objectives. This means they can operate in a manner to maximise their economic performance, without consideration of the factors embodied in the objectives.

Safety and Emergency Management Plans

The PMA requires commercial and local port managers to prepare Safety and Emergency Management Plans (SEMPs) for the whole of the port area which the manager controls or manages.¹⁰ SEMPs must be prepared in accordance with Ministerial Guidelines.¹¹ SEMPs must identify the area or areas of port lands and waters to which they apply. The description must highlight any key facilities and infrastructure in the port that are vulnerable to extreme climate events.¹²

The Guidelines require port managers to undertake a comprehensive hazard and risk identification process that identifies the nature and extent of hazards and risks within the port area, including the hazards and risks that could result in an emergency that may be of high consequence.¹³

The Guidelines note that port managers are expected to take reasonable steps to engage with, and influence, within the bounds of their legal and commercial powers, tenants, licensees and service providers to ensure that operations in areas of the port for which those parties have primary control are covered by SEMPs.¹⁴ ‘Reasonable steps’ may include the incorporation of SEMP related requirements into current/new tenancy agreements, ‘common user agreements’, licences and other relevant commercial/access agreements.¹⁵

⁶ TIA, s9.

⁷ TIA, s10.

⁸ TIA, s12.

⁹ TIA, s10(e).

¹⁰ PMA, s91C.

¹¹ PMA, s91D(3).

¹² Victorian Government, *Ministerial Guidelines: Port Safety and Environment Management Plans*, November 2012, 14.

¹³ Ibid 14.

¹⁴ Ibid 21.

¹⁵ Ibid 22.

Options to drive incorporation of climate change issues in port environments

1. Legislation can enable assessment of climate change risks and the development of adaptation strategies, either explicitly, or by being broad enough to encompass consideration of climate change issues. The Victorian *Terrorism (Community Protection) Act 2003* is an example of legislation that focuses on a single risk factor – terrorism – and could be used as a model to require owners of ports and other critical infrastructure to include assessments of climate change risks in their general risk profiles, and require adaptation plans to be developed following the assessments.
2. The *Climate Change Act 2010* requires decisions made under certain scheduled Acts to ‘have regard to the potential impacts of climate change’¹⁶ but neither the TIA nor the PMA are scheduled Acts. As the overarching climate change legislation in Victoria, it may be desirable to expand the list of scheduled Acts to require the transport sector to consider climate change impacts.
3. The PMA requires commercial ports to prepare a Port Development Strategy (PDS) at four yearly intervals.¹⁷ The PDSs could be required to encompass climate change adaptation pathways.
4. The PoMC and the PoHDA are required to perform their functions consistently with State policies and strategies for the development of Victorian ports and freight networks.¹⁸ Overarching government policies setting out the future directions for ports could include specific requirements about the resilience of port infrastructure and assets in the face of extreme climate events.
5. Ports need to work with the operators of other key infrastructure sectors to ensure there is a co-ordinated approach to climate change adaptation. There are existing critical infrastructure Security and Continuity Networks (SCNs) and the Trusted Information Sharing Network (TISN), auspiced by the Victorian government. The PoMC and Port of Geelong are members of the SCN for Roads, Ports and Freight. These types of networks provide opportunities for infrastructure operators to engage with government on issues concerning climate change, to facilitate support for adaptation measures.
6. The port maintenance requirements in contractual documents need to be very specific, while not encouraging ‘gold-plating’ maintenance standards which will increase charges imposed by ports on their customers with no demonstrated value in return.

¹⁶ *Climate Change Act 2010* (Vic), s 14.

¹⁷ PMA, s 91K.

¹⁸ TIA, ss141E(2)(a) and 141T(2) respectively.

7. SEMP's could be a strong tool to facilitate climate change adaptation as they are a legally-mandated instrument that require an integrated and coordinated plan across the whole of a port area. SEMP's are a high level document but the focus on coordination cascades down into documents and plans of operators and tenants in a port. For example, Port User Operating licences are a tool that can be used to encourage environmental awareness and responsibility for personnel operating on port land.
8. The discussion in the Ministerial Guidelines about hazard and risk identification can, and should, be interpreted to include climate risks in port areas.
9. Operation and management plans can be required to incorporate climate change issues. As an example, the 2012 Ministerial Guidelines for the SEMP scheme require port managers to identify facilities and infrastructure in the port that are vulnerable to extreme climate events. These Guidelines could be strengthened to require port managers to also outline adaptation measures to be taken to address those vulnerabilities and risks.

Adaptability to climate change is an important factor to be considered in current and future port expansion and development projects. If it is not embedded into ports' business, operational and risk management frameworks, the risk is that extreme weather may threaten the ability of ports to operate at their optimum level. They may be exposed to short and/or medium term shut-downs to deal with damaged infrastructure and roads, with cascading impacts on freight and logistics networks.

APPENDIX B – CRITICAL INFRASTRUCTURE AND CLIMATE CHANGE

This policy brief highlights the tools identified in the technical paper *Governance and Legislative Issues for Critical Infrastructure Adaptation to Climate Change* (available on the VCCCAR website) that are available to develop the resilience of critical infrastructure to the impacts of climate change.

The need for resilience

Critical infrastructure interdependencies are significant in the context of adaptation, as they influence resilience. For example, ports rely on other transport modes such as road and rail for the movement of goods and to enable staff access. Cycles of drought followed by flood can damage roads and rail track, slowing or halting the movement of goods in and out of ports. Ports also rely on the availability of electricity to power their own operations and to provide services to visiting vessels. Other port interdependencies include ICT for management of services and drainage infrastructure to prevent flooding. Similar interdependencies exist for all forms of critical infrastructure. There is limited benefit if one operator builds resilience to climate change if its interdependent sectors are not also considering the issues in a collaborative manner.

Roles and responsibilities

As outlined in the *Victorian Adaptation Plan*, the Victorian Government has critical roles and responsibilities to perform to enable adaptation to a changing climate, including managing risks to public sector assets and services managed by the government and supporting private sector adaptation.¹

While primary responsibility for critical infrastructure resilience resides with infrastructure owners, there is an expectation that government will take appropriate measures to ensure that owners and/or operators manage their risks and that vital service delivery is not interrupted, as recognised in the Victorian government's *Critical Infrastructure Resilience Interim Strategy*.²

The challenge is to mainstream adaptation across critical infrastructure sectors so that it is fully integrated into business planning, risk management systems and operational programs.

¹ Victorian Government, *Victorian Climate Change Adaptation Plan* (March 2013) 10.

² Victorian Government, *Critical Infrastructure Resilience Interim Strategy* (December 2013) 1.

Regulatory tools

Regulatory tools can include legislation, operation and management plans, codes of practice, standards, contracts and licensing arrangements. These tools are not mutually exclusive and multiple tools may apply simultaneously, depending on the circumstances.

Contracts are a legal mechanism to assign risk between contracting parties. In the context of climate change, risk may be allocated for a range of matters including:

- identifying risk factors for critical infrastructure components,
- undertaking risk assessments,
- preparing and updating adaptation plans, and
- building and maintaining assets to a standard designed to withstand types of extreme weather events.

Risk is costed in contracts. If government enters a contract whereby the contractor is allocated the greatest share of the project risk, the cost to government will be greater than if the government shares the risk equally or bears the greatest burden itself. It is therefore important for government to enter contracts concerning critical infrastructure with a considered understanding of the potential impacts of climate change, so that the risk is allocated, and therefore the costs structured, in a manner commensurate with the scope, scale and climate vulnerabilities of the project.

Government can influence the incorporation of adaptation principles and requirements into a range of tools, including:

- new infrastructure project plans;
- funding agreements;
- output specifications,
- standards;
- asset management plans;
- price review processes for essential services;
- decision making guidance;
- legislation;
- resilience planning.³

Opportunities for government to drive critical infrastructure resilience to climate change

1. Model leading risk management practices by embedding climate change considerations into the risk management and business continuity arrangements of publicly owned infrastructure.

³ HM Government, *The National Adaptation Programme: Making the Country Resilient to a Changing Climate* (July 2013) 38-9.

2. Mandate the inclusion of adaptation requirements into commercial and contractual arrangements when investing in or procuring new infrastructure projects. For example, incentives may be reflected in the length and terms of contracts/leases and agreements.
3. Fitness for purpose obligations can be incorporated within procurement contracts to stipulate that infrastructure be designed and built to withstand current and future climate change risks.
4. Contracts may incorporate the new standard *Climate Change Adaptation for Settlements and Infrastructure – A Risk Based Approach* as a risk management tool to identify climate change risks for particular infrastructure, and determine appropriate adaptation measures. The standard includes a climate change exposure and infrastructure sensitivity matrix, which includes infrastructure sectors.⁴ It provides a framework that can be applied in the context of the commissioning, design, planning, approval, construction, maintenance, management, operation and decommissioning of infrastructure.
5. The *Critical Infrastructure Resilience Interim Strategy*⁵ proposes that government departments will custom design assessment methodologies to assess the criticality of Victorian critical infrastructure in their sector. The methodology will consider all hazards and a range of risks consistent with AS/NZS ISO31000 *Risk Management-Principles and Guidelines*. The development of these methodologies provides an opportunity to ensure that climate change is considered within the ‘all hazard’ risk framework.
6. Provide climate risk information to the private sector to help drive adaptation measures, as recognised in the *Victorian Adaptation Plan*.⁶ In 2012 the Victorian government issued new Victorian Coastal Inundation Maps and Dataset to provide information for the whole of the state’s coastline on the potential for flooding from sea level rise and storm tides.⁷ Private organisations need data to make decisions about the risks that climate change may pose to their businesses. The specific risks need to be identified so that appropriate adaptation strategies can be developed.
7. Critical infrastructure operators need to work with the operators of other key infrastructure sectors to ensure there is a co-ordinated approach to climate change adaptation. There are existing critical infrastructure Security and Continuity Networks (SCNs) and the Trusted Information Sharing Network (TISN), auspiced by the Victorian government. These types of networks provide opportunities for infrastructure operators to

⁴ Standards Australia, *AS 5334-2013 Climate Change Adaptation for Settlements and Infrastructure – A Risk Based Approach* (2013), Tables A1, A2 and A3, 43-8.

⁵ Victorian Government, *Critical Infrastructure Resilience Interim Strategy* (December 2013).

⁶ Victorian Government, *Victorian Climate Change Adaptation Plan* (March 2013) 32.

⁷ Ibid 51.



victorian centre for climate change adaptation research

engage with government on issues concerning climate change, to facilitate support for adaptation measures.



APPENDIX C – NATURAL HAZARDS, CLIMATE CHANGE AND LEGAL LIABILITY: CONSIDERATIONS FOR GOVERNMENT

This policy brief summarises parts of the research detailed in the technical paper, *Managing the Risks of Climate Change and Natural Hazards: Legal, Information and Insurance Issues* which is available on the VCCCAR website.

Information on climate and hazard risk has emerged as an important driver of adaptation. There remain a number of challenges to the provision of targeted and accessible information on climate risk due to inherent uncertainties. Government provision of information and advice relating to risks associated with adverse climate change effects has the potential to give rise to liability under tort law if it is provided negligently (e.g. it has breached the standards set under negligence laws). Information provision that meets the standards under tort law, generally speaking, will not attract liability.

An expectation that a service will be performed or that information will be provided may, in some circumstances, give rise to a duty of care. Negligence operates on the basis of whether due diligence is exercised in light of the information available at that point in time and provided in good faith. Governments make decisions by balancing and weighting multiple information sources and these factors play a role in determining whether standards have been met.

It is important that the risks of potential liability are set in context against the wider public interest in developing resilient communities and effective responses to hazards given the attendant loss and damage that natural disasters can cause to communities and the financial costs for governments and individuals of dealing with natural hazards.

Government advice can vary from guidance, to which response is voluntary, to codes or standards that may be mandatory to follow. Government provision of climate risk information and its legal consequences is an evolving area which is yet to be fully settled. Whether any specific actions or omissions will give rise to liability requires careful evaluation. The following information should not be regarded as necessarily applying to specific situations.

Potential risks in information provision

The general areas where liability for the Crown and statutory authorities conceivably may arise or alternatively is unlikely to arise is demonstrated by the examples in Table 1. The listing is indicative only and a non- exhaustive list.

Generally, activities in the first column in Table 1 will not attract a duty of care when carried out by a government instrumentality. They have a policy aspect, and a number of court

judgments have held that public authorities could not be liable for damage arising out of a policy decision.¹ However, the scope of matters excluded in this manner is narrow. The activities in the second column could give rise to liability depending on the relationships between the parties and the surrounding circumstances. In this category, liability for oversight of other agencies, such as councils, may also arise. The third column involves matters which could attract liability when carried out (or omitted to be carried out)² in a negligent fashion.

Table 1 Potential risks in information transmission

	Planning	Oversight	Operations
Inundation risk	<ul style="list-style-type: none"> Floodplain mapping Zoning Overlays 	<ul style="list-style-type: none"> Permitting Inappropriate planning decisions Conditions on building Inspection Supervision of agencies 	<ul style="list-style-type: none"> Levee construction and maintenance Habitation flood warning Emergency service mobilisation Ingress/egress Safe havens Road condition information Advice on floodwater contamination
Fire	<ul style="list-style-type: none"> Building regulation Vegetation clearing regulations 	<ul style="list-style-type: none"> Permitting Conditions on building Inspection Emergency services planning and management Safe haven certification 	<ul style="list-style-type: none"> Fire condition information Emergency services information Evacuation warnings Road ingress and egress information Road detour and road closed advice Safe haven signage Representations re service delivery
Water quality and availability	<ul style="list-style-type: none"> Water quality regulation Water infrastructure 		

¹*Sutherland Shire Council v Heyman* (1985) 157 CLR 424 and *Parramatta City Council v Lutz* (1988) 12 NSWLR 293. Counsel for the State of New South Wales argued this in *Prisoners* (1994) 75 Crim R 205, 212. See Ian Malkin, 'Tort Law's Role in Preventing Prisoners' Exposure to HIV Infection while in Her Majesty's Custody' (1995) 20 *Melbourne University Law Review* 423, 442.

²*Ghantous v Hawkesbury City Council* and its companion case *Brodie v Singleton Shire Council* (2001) 206 CLR 512; [2001] HCA 29.

	Planning	Oversight	Operations
Extreme weather events	<ul style="list-style-type: none"> planning and resourcing Water reticulation service development Pricing oversight 		
	<ul style="list-style-type: none"> Infrastructure planning Emergency service planning and resourcing 	<ul style="list-style-type: none"> Infrastructure approval (e.g. levees, dams, channels, storm water drains, road and rail bridge design) Emergency service agency oversight (e.g. SES, CFA, third party contractors) Emergency communication agency oversight (e.g. 000, GPS operations, mobile phone coverage, emergency app design) 	<ul style="list-style-type: none"> Infrastructure construction, maintenance and inspection (e.g. bridge inspection, road culvert maintenance, storm water pipe inspection, dam stability inspection) Emergency service provision (first response agencies, communication with residents, evacuation implementation and advice, road closure information) Emergency communication operation
Built environment	<ul style="list-style-type: none"> Road, bridge and public transport planning Sewerage and storm water planning 	<ul style="list-style-type: none"> Road design Bridge design Sewerage design Connections approvals Third party operations oversight (e.g. storm water harvesting) 	<ul style="list-style-type: none"> Road maintenance and inspection Bridge maintenance and inspection Sewerage maintenance and inspection.
Power outages	<ul style="list-style-type: none"> Electricity generation and distribution planning 	<ul style="list-style-type: none"> Electricity infrastructure design Oversight private infrastructure operators Inspection of 	<ul style="list-style-type: none"> Advice on power outages Communication breakdown Emergency facility breakdown

	Planning	Oversight	Operations
Health risks	<ul style="list-style-type: none"> • Hospital infrastructure and resource planning • Ambulance infrastructure and resource planning • Air pollution regulation • Water pollution regulation • Building design/regulation 	infrastructure <ul style="list-style-type: none"> • Building design permitting (air conditioning, air filtration, passive design) • Agency inspection and permitting of private operations • Agency oversight 	<ul style="list-style-type: none"> • Air pollution information promulgation • Water quality information • Ambulance scheduling and availability • Emergency medical availability • Heat risk management in public buildings

Mechanisms for managing liability

Table 2 demonstrates the typical mechanisms for managing liability. Some of these equate to the devices used in the private sector – insurance, contractual disclaimers and scope of service provisions, and some devices are peculiarly available to public sector agencies. Statutory immunities and clear articulation of statutory powers and duties enable those authorities to more effectively manage risk. The technique for risk management, however, depends on the source of the liability – e.g. primary³ or vicarious liability⁴.

Table 2 Examples of Management of liability

	Primary	Vicarious
Prevent duty arising	<ul style="list-style-type: none"> • ‘Scope of service’ statement (managing expectation and preventing duty arising) • Clarify statutory authority (particularly ensuring that there is no duty to act) • Statutory Immunity • No representation of service provision (preventing inadvertent undertaking of duty to act) 	

³ Primary liability refers to an obligation, task or duty for which a party is directly responsible.

⁴ Vicarious liability refers to the imposition of liability on one party for the negligence of another to whom the former has entrusted, or delegated, the performance of a task on their behalf.

	Primary	Vicarious
Proactive Defences	Privatisation (outsourcing liability)	
	Risk statement (e.g., signage)	
	Disclaimer	
Risk management	Insurance	Insurance Indemnity

Potential liabilities of hazard mapping

Hazard risk mapping has consequences for those relying on the risk maps to make decisions either to do or not to do something (see technical paper for further details). Those decisions may be made by public or private bodies and there may be actions taken on the basis of the mapping that give rise to other risks; for instance, the construction of infrastructure or the management of dams. Another consideration will be whether the decision maker was required to take the maps into account as part of the decision making process.

Table 3, without intending to be exhaustive, illustrates a *range of potential liabilities* and the different outcomes that *could* apply in relation to hazard mapping. It is stressed that these analyses are general and should not be regarded as definitive as the particular facts of each situation need to be taken into account before any liability is determined.

Table 3 Examples of Potential Liabilities and Outcomes

	Risk of damage	Potential action	Potential loss	Potential defendant
Mapping incorrectly carried out	Reliance on mapping in construction of public assets which then fail as a result of mapping	Negligence on the basis of the negligent mapping, negligence for failure to oversee the mapping, negligent reliance on the mapping, negligent construction.	Property loss, personal injury or economic loss as a result of the failure of the infrastructure	Authority adopting the mapping, body undertaking risk mapping, authority maintaining assets, construction company.
	Reliance on publicly available mapping in	Negligence (of the mapper, possibly	Property loss, personal injury	Authority adopting the

	Risk of damage	Potential action	Potential loss	Potential defendant
	construction of private assets which suffer damage (e.g., house construction)	mediated by contract), limited by scope of duty and remoteness principles	or economic loss as a result of the damage to the assets	mapping, body undertaking risk mapping, construction company.
	Use of mapping to formulate planning rules which result in lowered property values	Potential claims in negligence very close to the policy/operational distinction	Pure economic loss	Local council, state government
	Use of mapping to make planning decisions	Administrative action	Economic loss	Local Council
Mapping incorrectly used	Risk to public infrastructure or to private infrastructure constructed in reliance on mapping	Potential claim in negligence either for the construction or for the information leading to construction of private infrastructure	Property loss, personal injury or economic loss as a result of the damage to the assets	Authority using the mapping, authority giving mapping advice, construction company.
Failure to undertake mapping	Risk to private or public infrastructure	Negligence on the basis of failure to use commonly used instruments, negligence for failure to adopt normal risk management, construction of assets without appropriate risk	Property loss, personal injury or economic loss as a result of the damage to the assets	Authority responsible for construction, authority responsible for overseeing construction, authority giving advice, construction company.

	Risk of damage	Potential action	Potential loss	Potential defendant
		assessment.		

APPENDIX D - EMBEDDING CONSIDERATION OF CLIMATE CHANGE IN LEGISLATIVE FRAMEWORKS AND GOVERNANCE ARRANGEMENTS

This policy brief highlights the tools identified in the technical papers *Managing the Risks of Climate Change and Natural Hazards* and *Governance and Legislative Issues for Critical Infrastructure Adaptation to Climate Change* (available on the VCCCAR website) that can be used to help embed consideration of climate change in legislative frameworks and governance arrangements.

The challenge is to mainstream climate change adaptation across government, private and community sectors so that it is fully integrated into business planning, risk management systems and operational programs.

Regulatory tools for considering climate change

Precautionary principle

The precautionary principle is well-entrenched in Australian and international environmental law. In Victoria it is found in legislation such as the *Environment Protection Act 1970* and the *Climate Change Act 2010*, as well as in regulatory instruments such as State Environment Protection Policies. The precautionary principle calls for actions to address serious or irreversible threats of damage to be implemented without delay, despite the absence of conclusive scientific proof of harm. Case law in Australia has articulated a two-part threshold test for application of the precautionary principle, both elements of which must be satisfied: (1) the existence of a threat of serious or irreversible environmental damage; and (2) scientific uncertainty as to the environmental damage.¹

Integrated decision making

The complexity of potential adaptation risks and the possibility for their interaction emphasises the need for integrated decision-making processes to deal with this complexity. Different models and tools are available for improving the level of integration of climate change considerations into broader decision making exercises.

Court judgments

The Victorian Civil and Administrative Tribunal (VCAT) has dealt with several cases (detailed in the technical paper *Managing the Risks of Climate Change and Natural Hazards*) that explicitly raised the potential for climate change-exacerbated impacts and the role of the

¹ *Telstra Corporation Ltd v Hornsby Shire Council* (2006) 146 LGERA 10, at 38. These tests have been endorsed by the Victorian Supreme Court in *Environment East Gippsland v VicForests* [2010] VSC 335 and applied by VCAT in cases such as *Alanvale v Southern Rural Water* [2010] VCAT 480 and *Dual Gas v Environment Protection Authority* [2012] VCAT 308.

precautionary principle in addressing uncertainties and information gaps. The cases demonstrate how courts try to apply principles to actual facts. Government can use court judgments to inform policy and guidance documents to shape future directions.

Adaptive management

Another tool that exists to deal with information deficits and uncertainty is adaptive management. Adaptive management is often described as an approach of ‘learning while doing’ or ‘policy experimentalism’.² An activity with uncertain impacts is allowed to proceed, but with systematic monitoring of results and feedback processes in place that allow ongoing decision adjustments.³ For adaptive management to be effective, it is also critical that the regulatory framework under which decisions are made allows opportunities for adjustment. Laws that call for a single decision, not open to later reconsideration, will not provide a suitable institutional environment for adaptive management.⁴

Another way in which adaptive management might be put into practice is through the use of limited approvals for activities likely to be exposed to climate change risks over the long term. For example, approval for coastal development facing risks of sea level rise and inundation might be issued on the basis that buildings are capable of relocation at a future point in time. This allows the potential for reassessment of the sustainability of the activity at regular intervals, in light of emerging information regarding climate change risks.

Opportunities for government to embed climate change considerations

1. The *Climate Change Act 2010* is an example of an integrated decision making tool, as it specifies that climate change risks are a matter to be taken into account in decisions made under legislation dealing with other sectors. Section 14 of the Act requires decision-making under other specified (scheduled) statutes to ‘have regard to’ the potential impacts of climate change relevant to the decision. The current list of scheduled acts is limited.

As the overarching and critical piece of climate change legislation in Victoria, this decision-making requirement could usefully be extended to other legislation, including the *Planning and Environment Act 1987*, which is the principal Victorian statute relevant for land use planning, the *Environment Effects Act 1978*, the *Transport Integration Act 2010* and other selected statutes. Extending the range of Acts scheduled in the *Climate Change Act* would be a very useful mechanism as it would give a legal underpinning to embed climate change considerations in decision-making processes.

² Carl J. Walters and C.S. Holling, ‘Large-Scale Management Experiments and Learning by Doing’ (1990) 71(6) *Ecology* 2060; Holly Doremus, ‘Precaution, Science and Learning While Doing in Natural Resource Management’ (2007) 82 *Washington Law Review* 547.

³ Holly Doremus et al, ‘Making Good Use of Adaptive Management’ (Center for Progressive Reform, 2011).

⁴ Jacqueline Peel, *The Precautionary Principle in Practice: Environmental Decision-making and Scientific Uncertainty* (2005, Federation Press, Sydney).

2. Risk management has become increasingly applied to climate change adaptation, given the significant uncertainty about future impacts and the inability to rely on historic data as a basis for current action.⁵ The Victorian *Climate Change Act 2010* requires the preparation of a four-yearly Adaptation Plan that must be underpinned by the principle of risk management, and include a risk assessment.⁶ The Victorian Adaptation Plan, in turn, recognises the need to embed climate change considerations into risk management and business planning for assets and critical service delivery across government portfolios.⁷

The *Victorian Government Risk Management Framework*⁸ (the Framework) is applied by government agencies to apply a common risk management standard as part of their business practices. Climate change is listed as one of many categories of risk in the Framework.⁹ Careful monitoring should occur to ensure that climate change is, in practice, being incorporated into risk management and business planning across the government sector. As the Framework is designed for compliance by government agencies, consideration may be given to extending its reach to private entities by incorporating it by reference in contractual arrangements.

3. Government can shape the commercial agreements that it enters into with private entities, including infrastructure contracts, licensing and funding arrangements, and through these legal tools may incorporate terms that deal specifically with climate change risks and adaptation measures.
4. Consideration might be given to establishing a state government agency with the purpose of collecting, managing and disseminating climate change information across the public and private sectors. One entity (or a dedicated division of an existing department) could provide a focussed and streamlined data service. It could ensure that climate change information is distributed to those departments, agencies, local governments, businesses and communities where the information will be most relevant. The availability of a clearly available and accessible source of information may help develop a culture of considering climate change across a broad range of government, private and community sector decision making processes.

⁵Lee Godden, Francine Rochford, Jacqueline Peel, Lisa Caripis and Rachel Carter, 'Law, Governance and Risk: Deconstructing the Public-Private Divide in Climate Change Adaptation', 36(1) *UNSW Law Journal*, 224, 235.

⁶ *Climate Change Act 2010* (Vic) ss 10 and 16.

⁷ Victorian Government, *Victorian Climate Change Adaptation Plan* (March 2013) 10.

⁸ Department of Treasury and Finance, *Victorian Government Risk Management Framework*, March 2011.

⁹ *Ibid* 25.

APPENDIX E – PLANNING LAW AND CLIMATE CHANGE ADAPTATION

This policy brief summarises the main take out messages from the research detailed in the technical paper, *Governance Models for Adaptation: Planning Law and Related Measures* which is available on the VCCCAR website.

Planning as a legal and regulatory tool for adaptation

Planning laws offer a useful model for adaptation. These laws already are used in Victoria to manage natural hazard risks such as fire, flood and coastal erosion. Integration of planning with areas, such as emergency management systems is occurring.

Spatial planning is a critical tool for climate change adaptation. By shaping the nature and distribution of land use and development activities, planning laws can reduce the exposure and vulnerability of settlements and infrastructure to natural hazards likely to intensify as a result of climate change. Planning models can operate in conjunction with a range of legal instruments that provide a suite of measures to facilitate adaptation.

An important step is to translate general adaptation tools for hazard management into legal and regulatory mechanisms. Community participation in the planning process is important. Overall, there is a need for, ‘transforming planning systems from passive to proactive’.¹

The research identified generic planning approaches and investigated how they can underpin legal and regulatory models geared towards adaptation planning. It examined institutional questions around the roles and responsibilities of agencies, such as local government, within the adaptation planning context. The research integrated considerations of planning for private and public land.

Legal framework

The overarching legislation that gives effect to planning in Victoria is the *Planning and Environment Act 1987*. Other relevant legislation includes the *Climate Change Act 2010* and environmental assessment laws.² Measures contained in associated legislation, such as the *Land Transfer Act 1958* potentially may be applicable. The Court and Administrative Tribunal system are another important source of legal rules for adaptation planning.

Key Findings of the Report

The report highlights that current practice for adaptation planning:

¹ A. Hurlimann and A. March, ‘The role of spatial planning in adapting to climate change’ (2012) 3(5) *WIREs: Climate Change* 477.

² For example the *Environmental Effects Act 1978* and the federal *Environment Protection and Biodiversity Conservation Act 2009* (C’t).

- relies on a core set of predominantly regulatory planning measures which focus on new development and shaping future land use.
- planning law and associated measures which address adaptation in existing settlements are comparatively little used and under-developed.

The report identified potential legal, regulatory and institutional changes of varying degrees; including to strategic and statutory planning processes, to assist in adaptation to natural hazards under climate risk. Core suggestions include:

- a stronger role for integrated strategic planning to guide the incorporation of climate risk considerations across the planning framework;
- wider use of strategic measures such as planning schemes and overlays to identify areas of transitions; and where development controls need to respond directly to natural hazard risks;
- adaptation measures to manage natural hazards incorporated into planning systems in a coherent and integrated manner; and
- further development of innovative and flexible planning measures to assist adaptation in existing development.

Translating Adaptation Strategies

A central challenge for legal and regulatory frameworks is to translate general adaptation response concepts into specific legal and regulatory mechanisms.

Table 1: Adaptation strategies for climate hazards as legal and regulatory measures³

Adaptation Strategy	Application to climate hazards	Potential Legal and Regulatory Measures
Avoid hazard risk	<p>Site or relocate vulnerable land-uses (e.g. residential, schools and hospitals) away from hazard prone areas.</p> <p>Adopt a precautionary approach to new residential or infrastructure development, to avoid hazards.</p>	<p>Identification of hazard prone areas via zones, overlays or incorporated hazard mapping in strategic planning with cognate planning policies (preferably at state/ regional level)</p> <p>Statutory planning - prohibitions and/or restrictions on vulnerable land-uses in hazard prone areas or where high risk from a coastal hazard.)</p> <p><i>Appropriate for new land-use and existing development (where possible)</i></p>
Prevent or reduce the effects of climate hazards	Siting, design and other risk-reduction measures that reduce or eliminate the harmful effects of	<p><i>For new development:</i></p> <p>Development controls -siting and design requirements (e.g. coastal and flood set-</p>

³ The concept draws upon research by A. Macintosh, A. Foerster and J. McDonald, *Limp, leap or learn? Developing legal frameworks for climate change adaptation planning in Australia* (Final report, National Climate Change Adaptation Research Facility, 2013).

Adaptation Strategy	Application to climate hazards	Potential Legal and Regulatory Measures
<p><i>Accommodate</i> strategy for continued use and development in hazard prone areas.</p> <p>Often associated with a defend strategy.</p>	<p>climate-related threats.</p> <p>Urban design concepts that reduce climate risk e.g. infrastructure and design standards that mandate porous surfacing in urban development.</p> <p>Contingent development approval models</p>	<p>backs; defensible space for bushfire)</p> <p>Corresponding construction standards (e.g. fire level rating; flood floor levels)</p> <p>Subdivisional and other design controls for emergency access.</p> <p><i>For existing development:</i> Encourage or require retro-fit of houses or other risk-reduction measures (e.g. creation of wider floodway/ storm surge space around dwellings, green infrastructure to reduce heat stress etc)</p> <p><i>Applies to existing development.</i></p>
<p>Change use or change location</p> <p>Often associated with a <i>retreat</i> strategy.</p>	<p>Move vulnerable land-uses from hazard prone areas.</p> <p>Convert hazard prone land to non-vulnerable uses such as recreational reserves or open space zones.</p>	<p>Rezoning of land or prohibitions to move vulnerable uses away from hazard prone areas.</p> <p><i>Applies to new and existing development</i> Imposition of differential rates and levies to prompt land use change to less vulnerable uses.</p> <p>Acquisition of land for buffers and reserves.</p> <p>Adoption of easements and covenants for areas where buildings retained (may be interim).</p> <p><i>Applies to existing development.</i></p>
<p>Inform of potential hazard exposure</p>	<p>Disseminate hazard information to relevant stakeholders to facilitate private adaptation.</p> <p>Require hazard self-assessment</p>	<p>Mandatory disclosure of hazard information in planning certificates or via land title registrations.</p> <p>Publicly available hazard mapping to identify hazard prone areas.</p> <p><i>Applies to new and existing development.</i></p>
<p>Develop flexible approaches</p>	<p>Seek to match the timeframe or incidence of the natural hazard/ climate risk to planning measures</p>	<p>Set defined period development approvals or trigger event development conditions of approvals</p>
<p>Share Costs and Transitions</p>	<p>Facilitate the sharing of costs associated with preparing for and responding to climate hazards across the community.</p>	<p>Regulate insurance for certain land-uses in hazard prone areas.</p> <p>Hazard-targeted taxes, charges and levies.</p> <p><i>Applies to new and existing development.</i></p>

Planning for Adaptation

Planning definition: Planning is a form of strategic organization across public and private sectors encompassing land uses, various spectrums of rights and interests, economic and social management, and collaborative and community-based measures.⁴ Spatial planning covers a range of statutory, regulatory, market and voluntary measures.

Spatial planning includes *formal* land-use planning law, (statutory land-use planning regimes). Land-use planning has two sub-areas: strategic and statutory planning. Table Two provides examples of how such planning and associated measures might be used. Planning also works in conjunction with measures that have the source of their legal authority and implementation in other legislation or the common law.

Table 2: Adaptation Planning Models and Instruments

Type of Measure	Legal and Related Models	Example
Strategic Planning	<ul style="list-style-type: none"> Strategic policy setting within legal frameworks. Strategic impact assessment and regional planning 	<ul style="list-style-type: none"> Victorian Adaptation Plan State Planning Policy Framework (developed under the <i>Planning and Environment Act 1987</i>) Municipal Strategic Statements in Planning Schemes
Statutory planning	<ul style="list-style-type: none"> Planning schemes containing zones, overlays development controls 	<ul style="list-style-type: none"> <i>Planning and Environment Act 1987</i> – standard zones and overlays provided by the Victoria Planning Provisions <i>Environmental Effects Act 1978</i> for major project development
Courts and Tribunals	<ul style="list-style-type: none"> Victorian Civil and Administrative Tribunal (VCAT) Victorian and federal courts (common law actions) 	<ul style="list-style-type: none"> e.g. case law on coastal adaptation Statutory duties, tort laws Statutory ‘shield’ mechanisms
Institutional roles and responsibilities		
Information, land registration	<ul style="list-style-type: none"> Property purchase disclosure requirements Notifications on land title 	<ul style="list-style-type: none"> Section 32 <i>Sale of Land Act 1962</i> requires notification of bushfire-prone area.
Regulations, standard setting and codes	<ul style="list-style-type: none"> Building regulations and building codes; industry codes 	<ul style="list-style-type: none"> Reg. 6.2 of the Building Regulations Victoria (minimum floor level)
Land acquisition and purchase	<ul style="list-style-type: none"> Statutory- based acquisition of rights and interests 	<ul style="list-style-type: none"> <i>Land Acquisition and Compensation Act 1986</i> S 173 Agreements: <i>Planning and</i>

⁴ See E. Wilson and J. Piper, *Spatial planning and climate change* (Routledge, 2010) 14.

Type of Measure	Legal and Related Models	Example
Property/ market-based instruments	in land for public purposes	<i>Environment Act 1987</i>
	<ul style="list-style-type: none"> Easements and covenants 	<ul style="list-style-type: none"> Rolling Easements
Public land management	<ul style="list-style-type: none"> Usufructs, licences 	
	<ul style="list-style-type: none"> Crown land and associated agency responsibilities 	<ul style="list-style-type: none"> Crown land reservations
Public 'rights' and 'interests'	<ul style="list-style-type: none"> Public access to Crown land 	<ul style="list-style-type: none"> Public beach access reservations. P & E Act Heritage overlays permit requirements –
	<ul style="list-style-type: none"> Heritage 'interests' 	<ul style="list-style-type: none"> Amend <i>Aboriginal Heritage Act 2006</i>
	<ul style="list-style-type: none"> Aboriginal heritage protection 	
Financial and incentive-based (Voluntary)	<ul style="list-style-type: none"> Taxes and levies Pricing regimes 	<ul style="list-style-type: none"> Fire Services Levy Differential charges for land affected by hazards.
	<ul style="list-style-type: none"> Insurance (private sector) 	<ul style="list-style-type: none"> Differential Insurance premiums in hazard areas
Collaborative and agreement- based measures	<ul style="list-style-type: none"> Planning forums; contracts and agreement 	<ul style="list-style-type: none"> Community partnerships on climate adaptation

Options to drive incorporation of climate change issues in Planning

1. Strategic Planning and the Climate Change Act 2010

Spatial planning is likely to remain the central legal and regulatory framework for adaptation to natural hazards exacerbated by climate change. Given the importance of planning to adaptation to hazard risks, The *Climate Change Act* could specifically reference key decisions made under the *Planning and Environment Act 1987* as decisions where the decision-maker is required to take into consideration climate change hazard risks.

2. Integrating Adaptation to Hazard Risks

A significant point for integrating climate risk assessment and planning frameworks is for an explicit inclusion of natural hazard adaptation into existing legislative impact and risk assessment processes. More targeted identification of climate risk/natural hazards as matters to be taken into account can ensure these factors are directly incorporated into decision-making and impact assessment frameworks. [A suggested model is given in the Technical Paper].

Adaptation Planning for New Development: The new development context focuses principally on planning measures which are implemented through formal statute-based land-use planning regimes. *New* development refers to both greenfield development (e.g. new urban residential areas) and infill development.

3. New Development: Regulatory Controls – and beyond.

For new development, including infill, there remains heavy reliance on planning law development assessment and approval processes for natural hazard management (i.e. permit requirements – hazard risks managed principally through conditions on approvals). There are advantages to using such legal and regulatory frameworks [see Technical Report]. These processes rely on robust information and decision-making at local levels. Adjustments to these processes to provide more guidance for local decision-makers may increase consistency of adaptation planning.

Potential Measures: Precautionary Legal Models

This approach could involve:

- adjusting the strategic planning process to identify areas in advance of development processes that are particularly hazardous– i.e. to develop AND APPLY zonings which do not permit vulnerable land-uses in high risk areas, or where development occurs only on the basis of pre-set conditions;
- opportunities exist to identify alternative land uses such as open space or recreational spaces that can ‘absorb’ periodic hazards e.g. extended floodway areas;
- wider use of innovative development approval types could occur in certain hazard contexts (i.e. coastal where approvals could be limited in time or change in given circumstances); and
- broader consideration of how emergency management requirements are integrated into statutory planning processes at a strategic level, as well at the development control stage - (also possibly expand process to cover heatwave).

Existing development: Addressing the flexibility challenge

Within existing development areas more flexible legal and regulatory instruments are needed to meet complex adaptation challenges.

Scope already exists for a gradual transition of land use over time, initiated through strategic and statutory planning measures. This framework might be augmented by progressive introduction of tighter design and siting standards and/or financial incentives such as graded rates and charges to foster transition. (A cost benefit analysis of retrofitting building stock in hazard prone areas may be advantageous).

The report canvassed instruments to work in conjunction with, or in addition to, planning. These measures face economic, social, political barriers to their adoption as detailed in the technical paper.

4. Information-based instruments Such instruments could operate in legal regimes associated with planning laws, such as land transfer and registration systems; and in contract laws (e.g. disclosure requirements for sale of land). These types of instrument could perform a general facilitative function in promoting private adaptation and information provision to the private sector. There are administrative, cost and capacity constraints to be evaluated. (Information instruments do not necessarily prevent purchase of land in hazard prone areas).

To be most effective, information-based measures need to be embedded in, or otherwise aligned with, spatial planning processes that provide broader land use controls.

5. Property and market-based mechanisms Typically these mechanisms involve some exchange of land (or rights and interests in land) or purchase of ‘at risk’ land or parts of land. At one end of the spectrum is compulsory acquisition of land and at the other end models that ‘layer’ various levels of land use to provide flexibility to address hazard risks, such as easements, covenants and s173 agreements (P& E Act). Generally, these mechanisms are well established and legally secure, but are politically and socially sensitive, as well as resource intensive. Further evaluation is required.

Such models may work in conjunction with, or replace, technological and physical infrastructure approaches such as flood levees or shoreline protections. Relative cost/ benefit considerations of options is needed. Property-based and market measures may offer feasible alternatives to large scale infrastructure responses to natural hazards where flexibility of land use is required. For example, the instruments could institute controls over land use for a defined period of time or over parts of a property subject to hazard risk

Use of land acquisition and property models is likely to be limited to areas where hazard risks are most severe or where there are no feasible alternatives. Strategic planning can assist in developing proactive planning for these areas.

6. Financial and incentive-based approaches: These approaches, such as increased charges in hazard risk zones, potentially are most useful in areas where they can facilitate progressive land use and activity changes as responses to increased natural hazard risk.

These models are under-utilised and further evaluation can assess whether they could be more widely deployed in a targeted way in situations where change can be initiated over a longer time frame. Strategic planning can identify target areas.

Public Land Access and Management

Crown land plays an important role in securing a range of benefits for the Victorian community, including access to places of social and cultural value such as beaches and

waterways, and in preservation of cultural heritage. Stronger incorporation of legal and regulatory models for adaptation to the risks posed to these values through the planning system could be considered as a means of coordination.

7. Identify synergies of adaptation between public and private land: The planning system, especially at a strategic level, already identifies areas of high amenity value, such as public open space, and it assesses how areas may be impacted by hazards. The planning system might be more effectively utilised for securing public interest values and public access in situations of accelerated natural hazard risk by strategic planning that consistently addresses climate risk considerations for public land.

Managing public lands – there is scope to explore measures to facilitate adaptive management of public lands through the planning system (e.g. role of recreational spaces) which also offer opportunities to build community resilience to climate/hazard risks.

Further research and experimentation is required to identify mechanisms to protect and manage public land and secure public access, such as rolling easements.

There is potential for the development of specific statutory regimes to protect and manage at risk public areas – for example, in the UK, legislation imposes a duty to secure at risk coastal walking trails as an adaptive planning measure.

8. Integrated Approaches

Collaborative Models and Management: Measures are needed to effectively integrate consideration of climate risk adaptation planning for natural hazard mitigation across the Victorian planning system. This coordination could be achieved in several ways.

A dedicated planning forum: Such a forum could promote the targeted and integrated consideration of adaptation measures for new and existing development. Existing statutory regimes could be utilised (e.g. Planning and Environment Act, Planning Panels, Climate Change Act), or through specialist regimes that provide regional or integrated approaches (e.g. through Coastal Management Act).

9. Institutional Models: Planning for adaptation to climate change to address natural hazard risks and build community resilience has depended principally on existing legal and regulatory models based in the planning law system. Integration of emergency responses into planning systems has been developed progressively, typically building on recommendations arising from major inquiries following natural disasters, such as the 2009 Black Saturday fires.

- Currently the *Climate Change Act* provides some coordination for adaptation planning but many institutional agencies and structures are not formally engaged in the adaptation planning process on a statutory basis. Scope exists to examine how

institutional structures might be more effectively aligned to promote adaptation planning.

- Examination is needed of the feasibility of developing potential institutional models and responsibilities for coordinating the implementation of legal, regulatory and financial measures for adaptation to climate risk and exacerbated natural hazards across the planning system.

APPENDIX F - DISSEMINATION AND APPLICATION OF HAZARD INFORMATION

This policy brief highlights the issues identified in the technical paper *Managing the Risks of Climate Change and Natural Hazards* (available on the VCCCAR website) that concern the dissemination and application of natural hazard information.

Laws and institutions can be shaped to facilitate or require the collection and distribution of information. They can also require information about climate change risks to be embedded in policies and practices to enhance the level of adaptation decision making by individuals, businesses and governments.

As climate change alters the frequency, intensity and likely location of natural hazards, it is important that governance arrangements for hazard and risk information have the fluidity to respond to new data and inject that clearly into the public arena.

Roles and responsibilities

There is a role for government to perform in collating and disseminating climate-related data to the private sector and other levels of government. This would provide consistent and current information across sectors. To provide greater clarity to the governance of climate change information, consideration might be given to establishing a state government agency with the purpose of collecting, managing and disseminating such information across the public and private sectors. One entity (or a dedicated division of an existing department) could provide a focussed and streamlined data service. It could ensure that climate change information is distributed to those departments, agencies, local governments, businesses and communities where the information will be most relevant. The entity would be the clear ‘go to’ authority for current climate change data, modelling and hazard mapping.

Models for providing hazard information

Models for providing and disseminating information sit within a spectrum of other issues that relate to the collection and distribution of information. This discussion focuses on instruments that can be used to provide information about hazards associated with climate change. Such information can come in different forms, including statutory (e.g. planning law) and non-statutory instruments. They can also be categorised according to their scope. Broad information instruments convey general information about hazards, mitigation strategies and/or management options. Narrow information instruments are designed to provide information at a property-scale or site specific scale and directly influence decision-making surrounding purchase and/or management of land (e.g. planning certificates provided

at the point of sale). Irrespective of the type of information instrument involved, they serve to encourage and support autonomous adaptation.⁵

Planning certificates under the *Planning and Environment Act 1987* are used to satisfy the requirements of the *Sale of Land Act 1962* which requires vendors to issue a vendor's statement (s 32 statement) to purchasers before they sign a contract for the sale of land. Following the 2009 Victorian bushfires, amendments were made to these laws to require explicit disclosure of potential bushfire hazard exposure. If land is in a bushfire zone within the meaning of regulations made under the *Building Act 1993*, the vendor's statement must include a specific statement that the land is in such an area.⁶

Such statements are not required for other climate related hazards, for example, in a coastal zone, as there is no standard planning overlay for coastal hazards in Victoria.⁷ This project's technical paper *Governance Models for Adaptation: Planning Law and Related Measures* 2014 provides more detail about these issues. The issue of what type of hazard information, in addition to bushfire, should be included in instruments such as s 32 statements warrants further investigation.

Opportunities for government to incorporate hazard information in strategic planning

There are several points within a planning system where hazard mapping and hazard risk assessment can be incorporated into strategic planning.

1. The *Victorian Coastal Strategy 2008* sets out the policy and strategic direction for responding to coastal hazard risks in the context of climate change. A new draft Strategy was released for public comment in September 2013. The Strategy is prepared under the *Coastal Management Act 1995*, which operates in tandem with the principal planning legislation to regulate coastal climate hazards within the planning framework. The Strategy reflects the policy that decision makers should 'apply the precautionary principle to planning and management decision-making when considering the risks associated with climate change'.⁸
2. In March 2014 the Victorian Government released a draft for a new *State Planning Policy Framework*. Draft clause 5 provides guidelines for decision makers concerning flooding and coastal inundation. Under the terms of the current clause 13 and draft clause 5, planning bodies are required to have regard to the Victorian Coastal Strategy.⁹ The final

⁵ Andrew McIntosh, Anita Foerster and Jan McDonald, *Limp, leap or learn? Developing Legal Frameworks for Climate Change Adaptation Planning in Australia*, National Climate Change Adaptation Research Facility (2013) 74-5.

⁶ Ibid 240.

⁷ Ibid 233.

⁸ Victorian Coastal Council, *Victorian Coastal Strategy* (2008) 38.

⁹ www.dpcd.vic.gov.au/planning/panelsandcommittees/current/state-planning-policy-framework-sppf/draft-planning-policy-framework-master-version.

version of the new Strategy has not been released but this document offers an opportunity to address:

- how natural hazards in Victoria can and could be identified;
- what information about those hazards could be provided, and the manner in which it can be disseminated, and
- how that information could be addressed in planning decision making processes.

To enable hazard areas to be embedded within municipal planning schemes (e.g. as an overlay) they will need to be comprehensively mapped. Embedding hazard data into spatially-based planning instruments has advantages as it:

- provides a clear trigger for development assessment processes;
- ensures that regulatory measures are targeted at, and tailored to, the areas most likely to be affected by the hazards; and
- communicates hazard information to decision makers and the general public, which promotes adaptation.

Challenges associated with the implementation such planning instruments include:

- relating hazard information to development controls;
- the availability of quality downscaled local hazard data; and
- costs associated with the production and dissemination of information.

Hazard information as a driver for adaptation

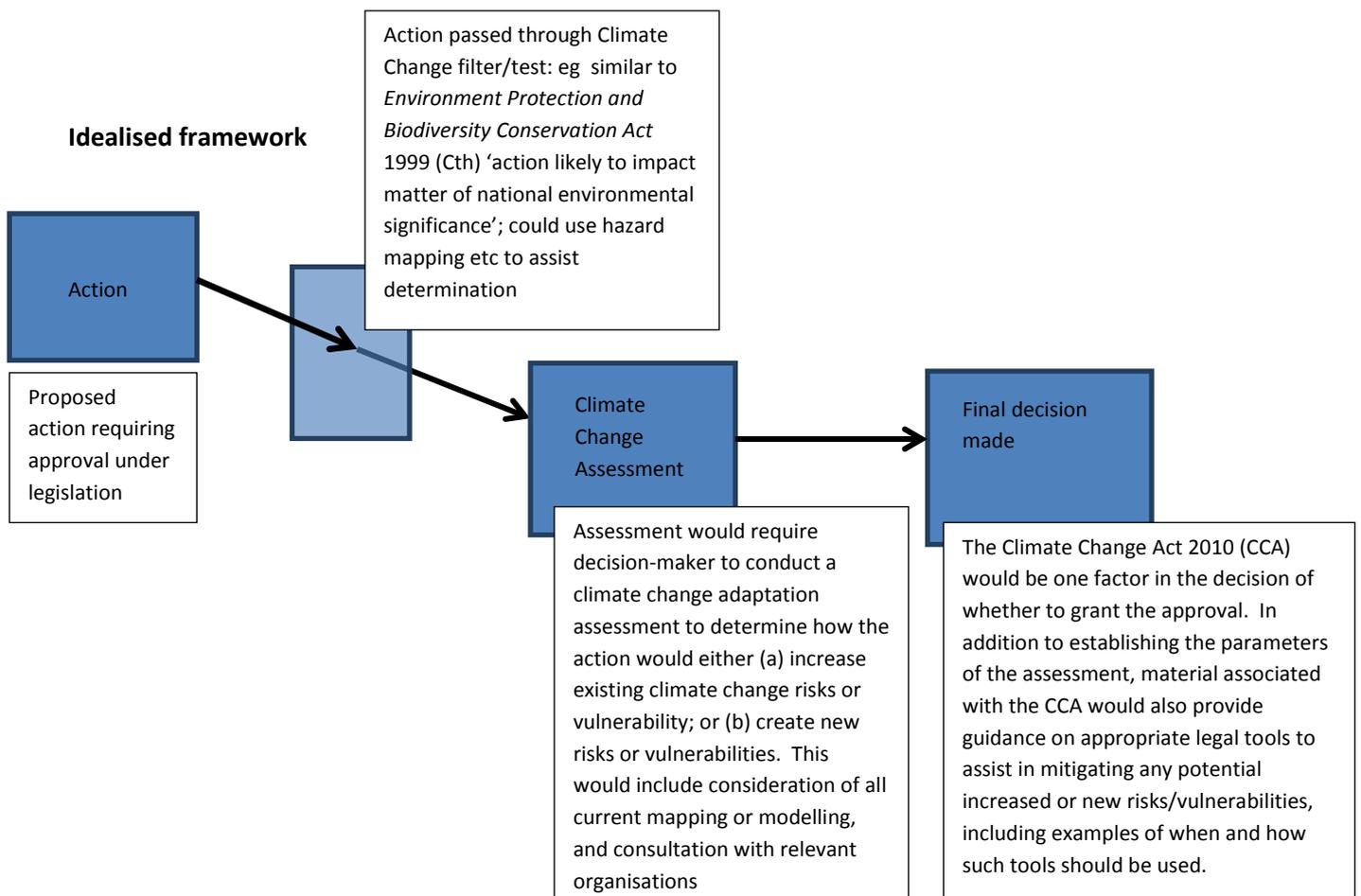
If information provision encourages greater adaptation efforts by individuals, the costs of providing emergency services may be reduced in the event of a natural disaster. If property owners are informed of the risks they face upon the purchase of a property, claims for government compensation after a natural disaster may be weakened.¹⁰ The ability of insurance companies to access detailed climate risk and natural hazard information enables the industry to price risk more precisely. The price signals then generated by insurance premiums may drive private adaptation efforts.

The need for flexibility to address the uncertainties of climate information does, however, need to be tempered with a need for consistency in decision making. This suggests that there remains a significant role for government to play in establishing policies, guidelines and standards to direct how climate change hazard information is to be incorporated into adaptation decision making processes.

¹⁰ Productivity Commission, *Barriers to Effective Climate Change Adaptation: Productivity Commission Inquiry Report No. 59* (19 September 2012) 140.

APPENDIX G - A DECISION MAKING MODEL TO INCORPORATE ADAPTATION

This brief highlights a model identified in the technical paper *Governance Models for Adaptation : Planning Law and Related Measures* (available on the VCCCAR website) that incorporates climate change adaptation for natural hazards into planning law decision-making and impact assessment processes.

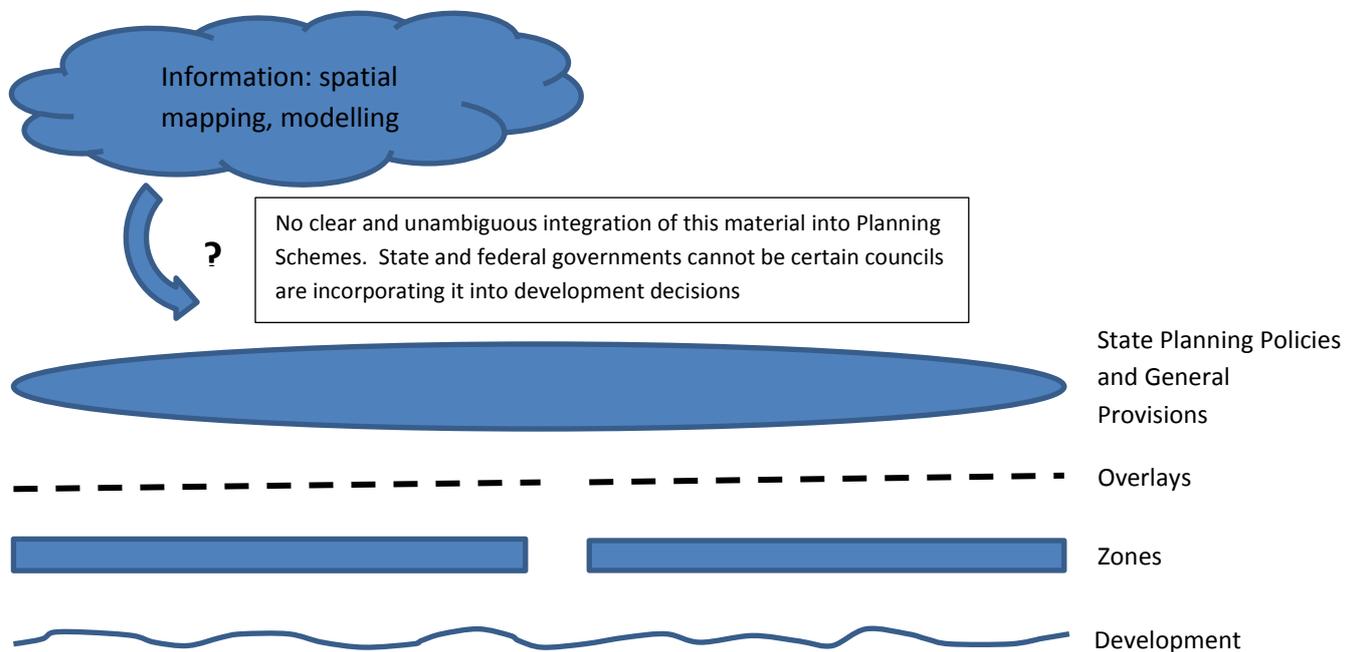


How this relates to Development Approvals under the Planning and Environment Act 1987 (P&E Act)

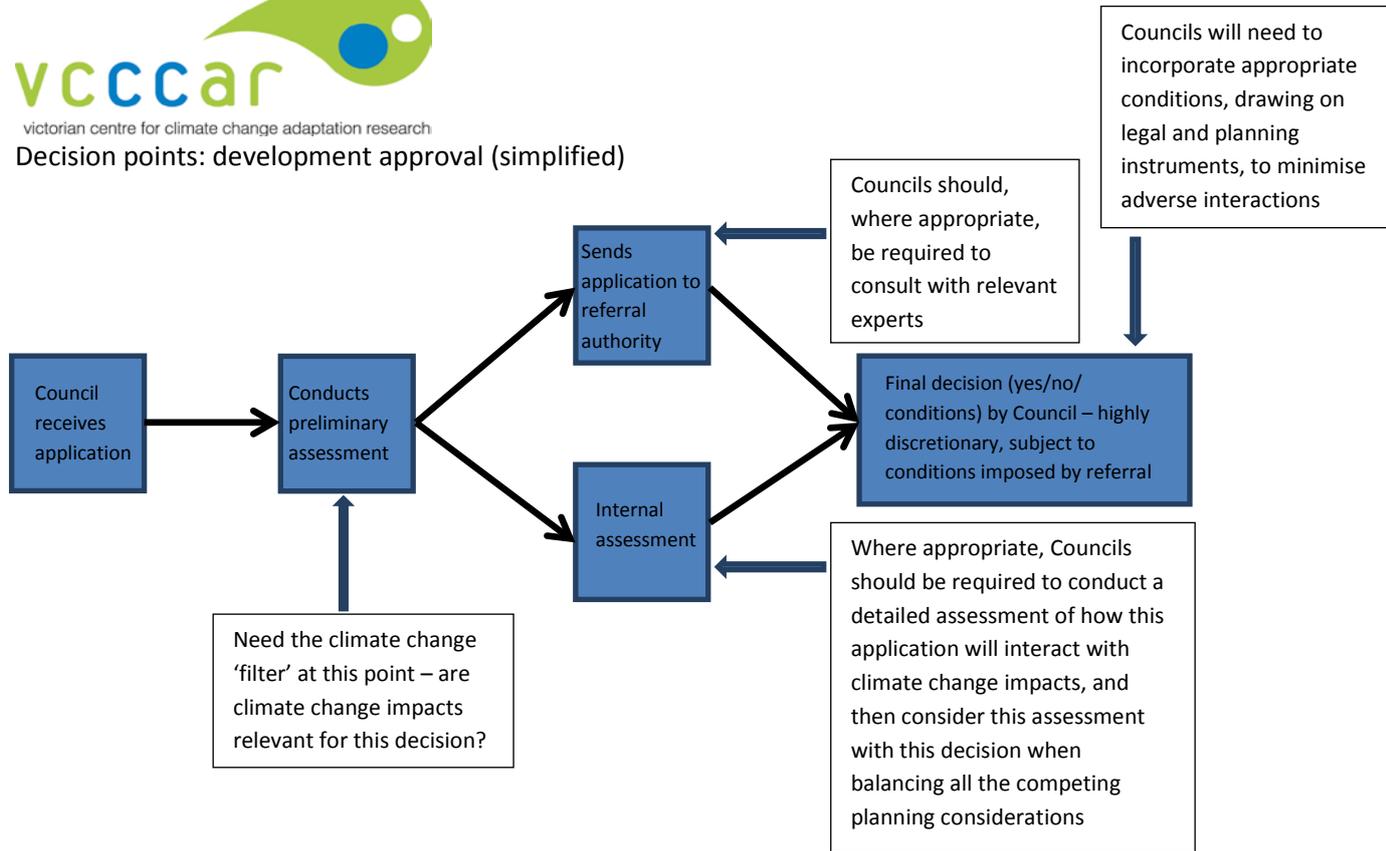
Two aims for this process:

- (1) Ensure that local councils consider climate change impacts in their decision-making in a comprehensive and systematic manner, drawing on the most up to date information
- (2) Integrate tools into the process to assist them to navigate the information and options

Current situation (simplified)



Decision points: development approval (simplified)



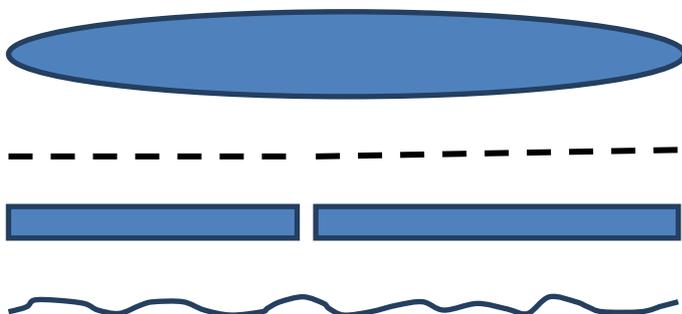
IS IT POSSIBLE UNDER EXISTING SCHEME TO CONSIDER CLIMATE CHANGE IMPACTS? (Simplified)

Decisions must be consistent with the State Planning Scheme

Objectives: To balance the present and future interests of all Victorians (arguably would support comprehensive incorporation of climate change impacts into current development approvals, and must be considered in planning decisions)

General requirements of planning scheme (s6(2)(e)): a scheme may regulate or prohibit any use or development in hazardous areas or in areas which are likely to become hazardous areas (some potential for incorporating future climate hazards) [but presumably only within the scope of tools/zones/overlays/policies prescribed?]

State Planning Policies (rough guide):



Supporting: 13: Environmental risks. 13.01 Climate Change Impacts – currently only covers coastal inundation and erosion [‘consider risks associated with climate change in planning and management decisions’]; 1.05: Bushfires: ‘Where appropriate, apply the precautionary principle to planning and decision-making when assessing the risk to life, property and community infrastructure from bushfire.’ AND ‘Apply the best available science to identify vegetation, topographic and climatic conditions that create a bushfire hazard.’ [could potentially apply to changed conditions and future risks?]

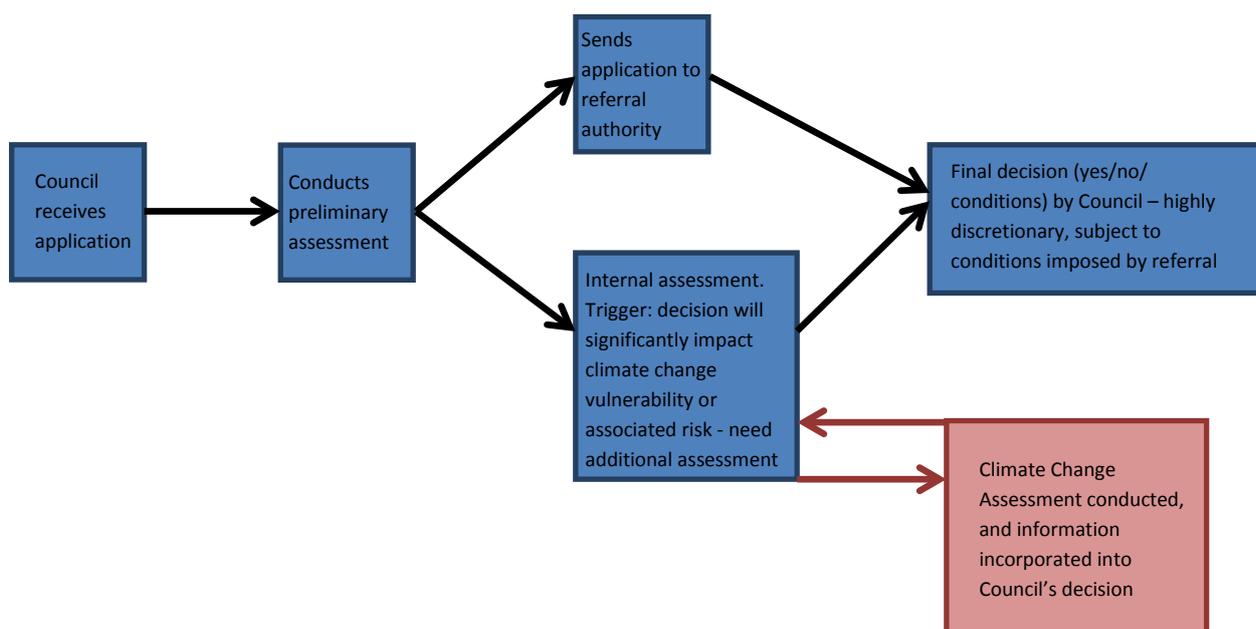
'Use' in definitions includes future considerations.

In terms of decision process, Councils are able to request technical advice from referral authorities/experts if they feel they have inadequate information to make a decision, even if this is not mandated through the requirements of a zone/overlay/general provision.

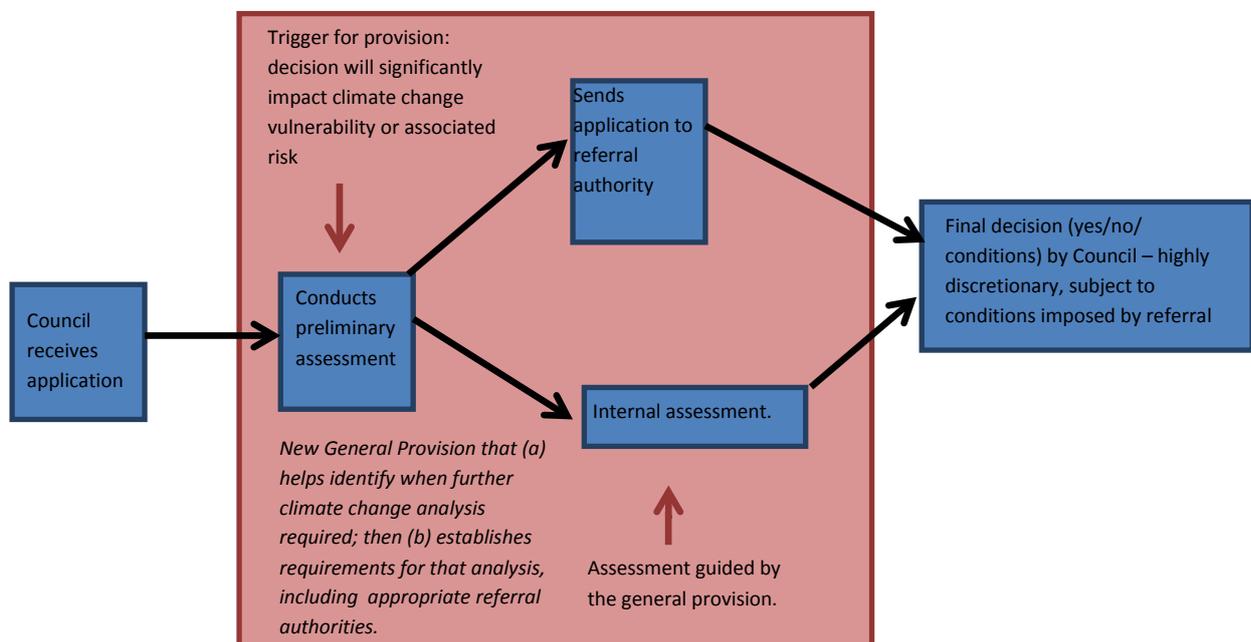
Concerns: A haphazard inclusion means that climate change consideration may get 'lost' in general 'noise' of planning scheme requirements. When a policy/requirement is stretched to include 'climate change impacts' as a consideration, the obligation often remains at very high level providing limited guidance to councils about *how* to achieve policy objectives. Again, this makes it harder to apply at the decision-making level, especially when competing against more concrete requirements. (Note: there is case law indicating that the apparent scope of relevant considerations is extremely broad, and as a consequence a decision-maker cannot realistically consider all relevant consideration required under Planning Scheme – often it may resolve down to one or two key considerations [Victorian National Parks Association Inc v Iluka Resources [2004] VCAT 20]). Also, currently there is no clear link between the information being generated by State and Federal Government and the planning schemes.

Potential Options: Largest legislative change: *Create an Environmental Effects Act equivalent, which sets out the requirements of a climate change assessment.*

- Guidance notes could be prepared to support Council when incorporating the results of the assessment into final Council decisions and to demonstrate the types of tools or policy/legal/planning instruments that could mitigate any negative interactions between application and climate change.
- This would provide a clear mechanism by which to consider all the material produced by relevant government agencies and departments relating to the relevant climate hazards and impacts.



Medium-level intervention: Create a new General Planning Provision, similar to the vegetation management provisions (52.17) that expressly requires an assessment of whether climate change impacts need to be considered in the decision (similar to the trigger required under the native vegetation provision), and then such a provision would provide guidance around the type of analysis then required. A single provision would assist, in that it would ensure that a broad suite of risks and vulnerabilities could be considered, however it might also create duplication and confusion where consideration of climate change impacts is required under other general policies or provisions (i.e. coastal erosion). Then again, coastal erosion policy could also cross-reference this, again to provide more support for councils on how to navigate the complexity.



Low-level intervention: Provide detailed assistance on development approvals with implications for climate change risks/vulnerability and the information/maps to assist these decisions included in Planning Schemes as an incorporated document.