



PRACTICAL AND THEORETICAL ISSUES: INTEGRATING URBAN PLANNING AND EMERGENCY MANAGEMENT

**First Report for the Integrated Urban Planning for Natural
Hazard Mitigation Project**

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END-USER STATEMENT

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Land use planning is a complex area of public policy, and potentially most effective form of mitigation for many natural hazards.

In its first year, this project has demonstrated its enthusiasm for engaging with end users to ensure the scope of the project meets their needs. The scope of the project has shifted in response to end user issues raised. This establishes the project to ensure that it has the best chance of utilisation by end users as it progresses.



INTRODUCTION

This report examines selected examples of integration between urban planning and emergency management in Australia. It seeks to identify initial issues to implementation at National and State level. Overall, this report argues that an integrated approach will require a coordinated framework at the strategic, tactical and operational levels, across functional areas and stakeholders, to establish an effective integrated governance approach that offers desired societal outcomes when faced with extreme events.

The key purpose of urban planning is to bring about improvements and avoid problems in human settlements that would not be achieved without intervention, organization and facilitation (Hall, 2007). While urban planning can occur in various forms and can use many mechanisms that seek a range of goals, its actions are primarily oriented to the physical characteristics of cities, towns and regions. This combines with the characteristics and distribution of people and the interactions and activities they undertake in various locations as the outcomes of planning.

Emergency management is oriented to the successful treatment of risks by establishing systems that reduce vulnerability to hazards and avoid or cope better with disasters (NEMC-LUPBCT, 2012), making it a key contributor to the overall goal of natural hazard mitigation. While historically oriented to response activities, such as firefighting, sandbagging or rescue, emergency management now seeks to act across a much wider spectrum of stages in the "disaster cycle" to prevent, prepare for and recover from hazards and any subsequent events (Wamsler, 2014).

The location and physical arrangements of any town, city or region are key drivers of its risk profile. These drivers interact with the hazards emerging from the natural environment with which human settlements interact, and the characteristics of their social, economic and environmental context. For example, a small town located in a bushfire prone area with limited transport options, communications, response and warning systems is likely to be more vulnerable than a similar community that has actively developed fuel reduction, building maintenance, community and household plans, warning, evacuation and response capabilities. While the integration of emergency management and urban planning includes notable historical highlights such as the imposition of planning and building controls in London after the Great Fire of 1666, or the relocation of Concepcion, Chile after the devastating 1751 tsunami (March & Leon, 2013), it remains problematic to consistently draw these disciplines together to achieve the greatest risk reduction outcomes, because of their wide scope and apparent static qualities compared with inherent dynamism and complexity. Emergency management tends to develop strategies that assume the built environment is static, while urban planning usually only has impact via permit processes when change is occurring, otherwise having little choice but to accept the existing built environment in its current state. Further, planning faces multiple demands from competing forces, often leaving risk assessment and treatment aside or as secondary to other concerns. The context of changing or emergent hazards and risk profiles, climate change, technologies and dynamic growth and change in human settlements continue to challenge the management of risks.

To examine the challenges and opportunities of integrating and coordinating the activities of urban planning with emergency management processes this report documents and summarises key findings relating to Stage 1 of the Bushfire and Natural Hazards Cooperative Research Centre project: *Integrated Urban Planning to Natural Hazard Mitigation*. In summary, it sets out findings in relation to four main areas, below:

1. understandings and theories on the main challenges and opportunities for the integration of urban planning and emergency management for improved natural hazard mitigation;



2. an assessment of current approaches to typologies of risk, resilience and hazard in urban planning and consequent identification of gaps that hinder or stimulate particular alignment pathways between emergency management and urban planning;
3. a preliminary understanding of the potentials and impediments of urban planning for disaster risk reduction and urban planning's adaptive capacity for resilient processes, including economic, social and environmental goals; and
4. a preliminary appraisal of the relative importance of identified challenges and opportunities for the integration of urban planning and emergency management, as a starting point for subsequent research and investigation.

As background to the matters set out above, the report first establishes the main methods used to undertake this assessment.



METHODS AND DATA

This report presents the main findings of qualitative research carried out on two fronts: a literature review of theoretical approaches to the integration of urban planning and natural hazard mitigation – including the identification of basic definitions; and an initial policy review of state and national case studies illustrating approaches to integration (States of Victoria and South Australia, and the Australian Commonwealth).

The literature review draws on concepts of Urban Planning – UP, Emergency Management – EM, Natural Hazard Mitigation – NHM and Disaster Risk Reduction – DRR to explore current understandings of the way natural hazards and risks can be dealt with when it comes to the built environment. It also explores the concept of integration in light of theories of challenges to integration in urban planning.

Case studies were used to identify practical approaches of integration as they allowed comprehensive understanding of the way processes of integration take place. While emphasizing the state level and describing current ways in which Urban Planning and Natural Hazard Mitigation are integrated in Victoria and South Australia, the research also considered the national level. The Commonwealth Government was identified as an important influence when it comes to the translation of international frameworks and agreements into changes in State and local levels. It is also an important potential means of national coordination in scenarios where natural hazards ignore administrative boundaries. Commonwealth-state arrangements to co-finance natural hazard mitigation in local areas and the resilience of critical infrastructure were also considered.

Overall, a complex adaptive systems approach was used to map practical integration of UP and NHM. This guided the identification of different system elements including: concepts, terms and definitions currently used by practitioners; assumptions and knowledge associated with the domains of EM, UP and NHM; values and priorities guiding agency in these fields; existing agencies and platforms for communication and collaboration; current policy, legislation, regulation and administration in place; and existing decision-making processes and arenas.

Data collection for the identification of practical approaches to integration included access to: parliamentary acts and associated regulations and provisions; commissioned reports and program implementation reports; meeting communiqués and media releases; government websites; strategic and policy statement documents and frameworks; and standards and codes. The mapping of current integration was also informed by general meetings with all end-users (18th October and 20th November 2017) for understanding the national level and focused workshops with end-users from Victoria (5th and 13th March 2018) and South Australia (14th March 2018) targeting state approaches to integration. Overall, discussions carried out in these workshops and meetings allowed the identification of issues that will inform the next stages of the project, in which specific aspects of integration will be looked at in more detail.



BACKGROUND

NATURAL HAZARDS IN THE BUILT ENVIRONMENT

The Built Environment

Even while human life is supported by and inextricably linked with the natural world, constructed human settlements are now core to most of our activities, our successes, failures and challenges. Humans are inherently social animals, deriving considerable benefit from living in groups and using systems of connections providing mutual advantages that typically outweigh the disadvantages of living in groups. Putting aside nomadic lifestyles, an enduring physical manifestation of humans living in groups has been the construction of increasingly permanent buildings and infrastructure to support their activities (Hall, 1998). These human settlements might range from a single structure that provides shelter and supports the gathering and production of food, raising of children and protection from harm; through to large towns or even mega cities that occupy large tracts of land and include complex support infrastructure and other systems.

Over time, humans have increasingly lived in settlements of greater size and complexity, usually linked with processes of technology uptake and greater wealth - even if this wealth is not evenly distributed. Lewis Mumford, the renowned planning scholar and historian, in the *City in History* describes the growth of human settlements, villages, towns and cities as a series of progressions and decline processes over time (1961). As humans interact with their environment, use new technologies, engage in trade, politics, theology and war, history is also replete with human settlements as the core manifestation of civilisation, even while this story is matched with the histories of decline, destruction and ruin (Mumford, 1961). There is a need to manage these change processes to deal with emergent risks as a core aspect of urban planning.

The built environment refers in general to all of the things in humans' settlements that are made or are the product of human "creation" (Crowe, 1997). The built environment is understood to be the buildings, spaces and places that have been made and modified by humans. These may include roads, infrastructure, houses, schools, bridges and so forth. "More specifically, it is everything humanly created, modified, or constructed, humanly made, arranged, or maintained" (Haigh & Amaratunga, 2010). The disciplines that directly relate to this endeavour in modern settings include: architecture, landscape architecture, building science and engineering, construction, landscape, surveying and urban planning.

Following Haigh & Amaratunga (2010) and Bartuska (2007), the built environment has certain features that are extremely important in terms of implications for natural hazards risks. Built environments are now extensive and are the setting in which almost all human activity occurs (Bartuska, 2007). By approximately the year 2010 more than half the world's population resided in urban areas - and many of those areas were subject to the adverse impacts of climate change, natural hazards and unfettered human growth and movement (IPCC, 2013). Further, the built environment, for all its failings, is human conceived and made - the result of human purposes, oriented to human needs - it directly embodies in all its complexities these values and wants. Amongst its other goals, one key purpose of the built environment is to protect and mediate the wider environment's impacts, including an orientation to improved standards of living and health, aesthetics, comfort, general well-being and protection from hazards. Bartuska (2007) argues that every element of the built environments is the result of context (including peoples' understandings) and in fact has been shaped by a range of contextual factors. All these interact to influence the quality of the built environment, including the risk profiles they represent.



Natural Hazards

A *hazard* is, a "source of potential harm or a situation with a potential to cause loss" (EMA, 2015, p. 32). Natural hazards are potentially dangerous phenomena that have their origins at least partly in the natural world and which have the potential to cause harm and significant social, economic, or environmental losses, damages or disruptions (UNISDR, 2009, p. 17). Natural hazards include sudden events, such as earthquakes, storms, wildfires, tsunamis, land slips, heatwaves, floods and storm surges. They are distinguished from human made hazards such as technological impacts – e.g. radiation or biological spills; those that are intentional, such as terrorism; or social, such as displacement due to famine or war (Coppola, 2011). Hazards can also change over time, such as flood and water insecurity due to drought and land use changes and degradation, and loss of biodiversity and ecosystem services. This approach to defining hazards is based on developing an understanding of their origins (David E. Alexander, 1999), but also includes recognition of the role that human activities play in deliberately or unintentionally bringing about greater exposure (Haigh & Amaratunga, 2010).

A key challenge of the interaction of natural hazards in the built environment is the range of time scales and risk profiles that exist between in any settlement, its gradual change over time, and the changes that occur as a result of climate change and of social, economic and cultural contexts, including the built environment itself. Accordingly, dynamically changing natural hazards, interacting with built environments that are also independently changing challenge these constructs and the potential to assess and treat them meaningfully.

Global and Australian Hazard-Related Losses in the Built Environment

Natural hazards events are increasing in frequency globally, as can be seen in FIGURE 1 below, in which 750 events were recorded in 2016. In 2017, in the US alone, hurricanes, wildfires, drought and tornadoes have led to the highest damage costs ever, \$US306 billion (Associated Press, 2018). Importantly, these events are occurring in ways that directly impact upon the built environment.

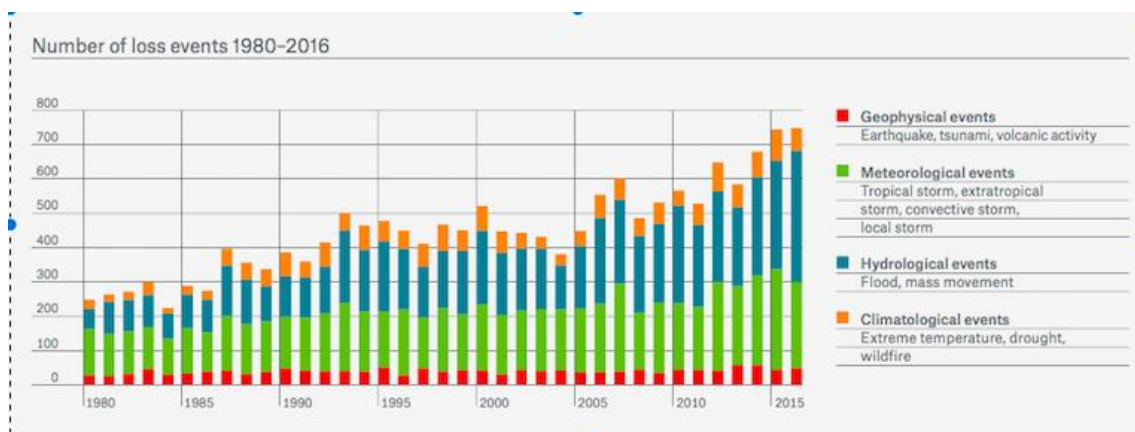


FIGURE 1. NUMBER OF LOSS EVENTS 1980-2016 (MUNICH RE, 2017, P. 56)

For a second year in a row, the 2018 World Economic Forum lists extreme weather events as the top global risk, in terms of likelihood (World Economic Forum, 2018). Also noted is concern about the increasing risks associated with other hazards, such as biodiversity loss at mass-extinction rates, agricultural systems under strain, and pollution of the air and sea, as increasing threats to human health. Natural hazards in the form of extreme weather events predicated by climate change, are projected to worsen in Australia (Steffen, Hughes, Alexander, & Rice, 2017). In particular these hazards take the form of extreme heat accompanied by a longer length, intensity and frequency



of heatwaves. Last year (2017) Queensland and NSW experienced their warmest years ever (McGowan, 2018). Drought is projected to increase, especially in southern Australia, as is the risk of wildfires, and the chance of extreme rainfall events and coastal flooding are greater. Australia is the most vulnerable developed country in the world for heat and bushfire events (Steffen et al., 2017). By way of example, Sewell, Stephens, Dominey-Howes, Bruce, and Perkins-Kirkpatrick (2016) found that 207 disasters affected NSW between 2004 and 2014. Bushfires were the most common, responsible for 108 disaster declarations, followed by storms (55) and floods (44). These extreme events have 'knock-on' effects impacting the health and wellbeing of the more vulnerable people, in particular. They impact the economy, with effects that may not only directly relate to loss of infrastructure, but also productivity, tourism etc. They also adversely impact the environment, through biodiversity loss, loss of productive land and environmental amenity.

NATURAL HAZARD MITIGATION AND EMERGENCY MANAGEMENT

Description and Definition

An emergency can be understood as "an event, actual or imminent, that endangers or threatens to endanger life, property or the environment, and requires a significant and coordinated response" (EMA, 2015). In turn, emergency *management* is the organisation and management of resources and responsibilities for addressing all aspects of emergencies, including prevention, preparedness, response and recovery (EMA, 2015). The characteristics of emergencies are such that there is a general expectation that emergencies are usually able to be managed and contained by typical and relatively routine risk treatment processes¹. Accordingly, even while there may be some negative outcomes such as injury, loss of life and of property, these are within "normal" parameters of operating systems. Examples of emergencies would include grassfires that are contained by emergency response crews, flooding that was predicted and for which effective sandbagging occurred, or storms which well-designed code compliant buildings can withstand. In contrast, it is generally understood that *disasters* are fundamentally greater in scale and consequences, including significant loss of life, property destruction, and long-term impacts on mental health, economic systems and/or the environment. Further, the nature of a disaster is that associated hazards are of such scale and impact that human and biophysical systems are overwhelmed and existing treatment approaches are unable to cope with the event (Mileti, 1999). The nature of any disaster relates to a system's exposure and vulnerability to a hazard; this refers to people, properties or other elements present and susceptible to impacts in areas (Coppola, 2011; UNISDR, 2009). While disasters can be classified according to the hazard that brings them about, distinctions may be problematic in some cases because the effects of these hazards can merge. For example, in Japan's 2011 tsunami, an earthquake and a tsunami triggered nuclear radiation fallout (Benton Short & Benton, 2013, p. 194) among other social and biophysical shocks.

Development over Time: Towards Disaster Risk Reduction

Emergency management and natural hazard mitigation have evolved as technologies and scientific knowledge improved, and societal expectations have changed, including appreciation of the benefits of risk management. The benefits of coordinated action are apparent, as are expectations for governments to actively take responsibility. These require increased and ever-increasing investment. The origins of modern response services are associated with industrialisation and urbanisation.

¹ See next sections for full definitions.



The Sendai Framework (UNISDR, 2015b) (formerly the Hyogo Framework (ISDR, 2005)) seeks to draw together the wide diversity of drivers and actions needed to deal with the risks associated with natural disasters, using an approach termed Disaster Risk Reduction (DRR). In parallel, emergency management has shifted from a focus on response and recovery oriented around single hazards, to concern with the wider elements of planning, preparation, response and recovery. This is complemented by seeking to improve upon exposure and vulnerability, as well as hazards themselves. The framework seeks a wide and coordinated approach to managing the risks associated with natural hazards, encompassing the full range of actors necessary to manage risks, particularly in built environment settings and situations requiring collaboration. It has four main priorities:

1. Understanding disaster risk
2. Strengthening disaster risk governance to manage disaster risk
3. Investing in disaster risk reduction for resilience
4. Enhancing disaster preparedness for effective response and to "Build Back Better" in recovery, rehabilitation and reconstruction (UNISDR, 2015a).

For the purposes of this report, DRR is understood to mean wider and comprehensive approaches to natural hazard management and treatment, encompassing the full cycle of activities necessary to risk reduction.

Processes of Risk Management

Emergency management, now with a wider view beyond response activities alone, encompasses PPRR in ways encouraged by a DRR approach, underpinned by the concepts and processes of risk management. While many variations exist, fundamental procedural steps are now widely accepted as essential to effective risk management as a wider field, and specifically to the aspects relevant to natural hazard risk management. As set out in the National Emergency Risk Assessment Guidelines - NERAG (EMA, 2015), the Australian companion document to ISO 31000:2009 Risk management – principles and guidelines (Australian Standards & New Zealand Standards, 2009), there are three main elements to risk assessment: risk management principles; risk management framework; and, risk management processes (EMA, 2015, p. 10).

Risk management principles are intended to provide a common set of understandings that guide thinking and activity. Key principles include: creation of value; integration; evidence-based decisions; dealing with uncertainty; systematic and fit for purpose; transparent; responsive; and, continuous improvement (EMA, 2015, pp. 12-13). In conjunction, the **risk management framework** seeks to "assist in the integration of risk management and its outputs into mainstream governance, business systems and activities". It sets out the need for an effective framework that establishes a mandate to act in an integrated manner, with appropriate programs for action and sources of legitimacy and power to define and act on risk ownership. This is shown diagrammatically on FIGURE 2.

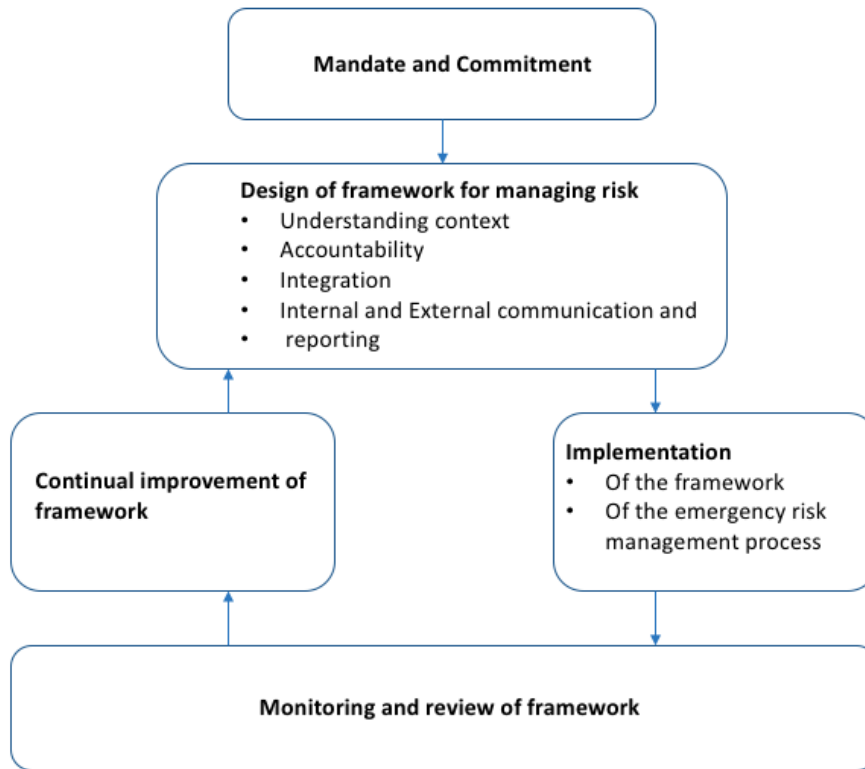


FIGURE 2. RISK MANAGEMENT FRAMEWORK (EMA, 2015, P. 10)

In an emergency context, risk management is a process outlining inter-related activity phases that systematically work towards dealing with community risks arising from emergency events. The process is shown in summary form in the figure below.

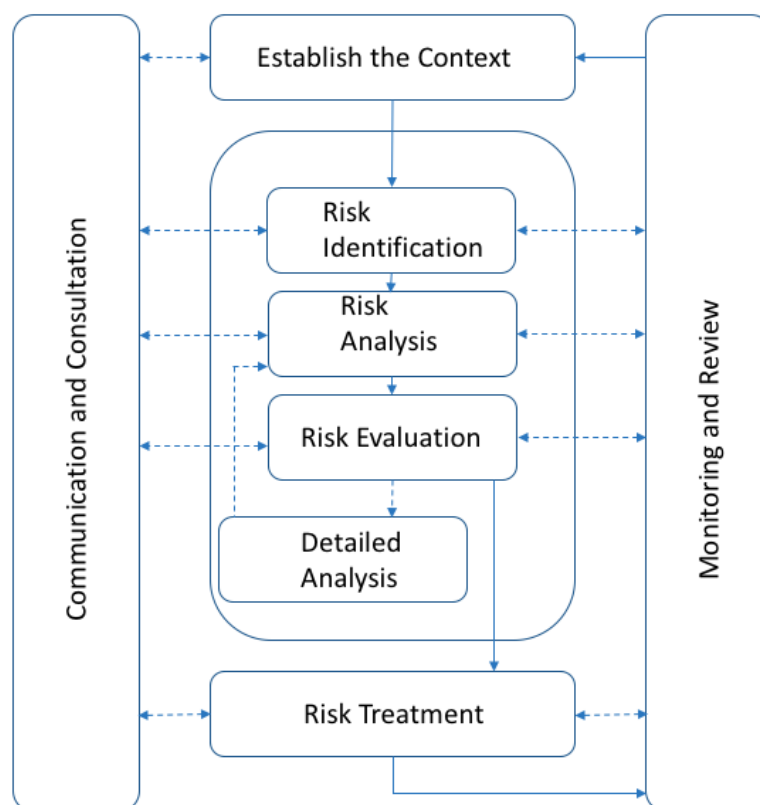


FIGURE 3. EMERGENCY RISK MANAGEMENT PROCESS (EMA, 2015, P. 17)

Risks, Consequences, Treatments and Natural Hazard Mitigation

Consequences are the outcome or potential outcome of an event: the consequences to people, the economy, the environment, public administration and the social setting (EMA, 2015). Negative consequences are the result of the exposure of human settlements to natural hazards that exceed their capacity to withstand impacts. This can lead to negative consequences such as destruction of structures, loss of crops and products, injury or loss of life, emotional impacts, displacement, economic impacts, environmental damage and other negative outcomes.

A few definitions of risk exist and are used in particular ways. Spatially, risk is understood as the outcome of interactions between exposure to a hazard (or hazards) and the specific vulnerability of an area within a specific context. In a risk management and assessment sense it can be defined as the effect of uncertainty on objectives (EMA, 2015) and can be understood as a function of likelihood and consequence. *Risk Analysis* is the process through which the level of risk and its characteristics are determined. This determines comparative levels of risk to help decide priorities for risk treatment. Analysis involves consideration of possible consequences, the likelihood that those consequences may occur and any existing controls that modify the risk. It provides information to inform the development of treatment options, if required. In turn, risk identification is the identification of risk sources, events, their causes and their potential consequences. *Risk Management* is the range of coordinated activities that direct and control an organisation with regard to risk that can be summarised as follows:

- establishing the context, risk assessment, communication and consultation;
- treating risks; and
- monitoring and review (EMA, 2015).

The **treatment** of risk in terms of emergency management are the processes that seek to modify risk. These can involve the avoidance of risk, perhaps by stopping or modifying activities; deliberately and consciously taking certain risks to achieve opportunities; removing risk sources; changing likelihood or consequences; sharing or shifting risks; or accepting risks after due consideration (EMA, 2015).

The treatment of risks can take many forms, can occur at a range of spatial and time scales and may be undertaken by a range of parties. While sometimes contested, the view of disaster as cycles comprising four inter-related phases (David E Alexander, 2015) of Plan, Prepare, Respond and Recover is a useful starting point for understanding the range of treatment options available. If risk treatments were to occur in the **plan** phase, this might include the gathering of data about bushfire risks and changes to vegetation growth and curing rates over time, its analysis, the establishment of options or alternatives and consultation. The **prepare** phase would include the establishment of responsibilities and actions that assist later response activities such as establishing water storage facilities in advance of an actual fire, improved training and equipment for firefighters and education of the wider community about how to prepare for an upcoming fire season. Treatment in the **response** phase includes active firefighting, evacuation, distribution of information and coordination, and the provision of first aid and medical services. The **recovery** phase seeks to deal with the aftermath of an event such as a destructive fire, while seeking to improve risk profiles during this process, such as rebuilding to higher standards. It is now well understood that while elements of the plan, prepare, respond, recover "cycle" are sometimes discrete, it is common that many actors will commonly be working across these phases to achieve risk management outcomes. In addition, as shown in FIGURE 4, the treatment of risks needs to occur within the wider context of climate change and human activities.

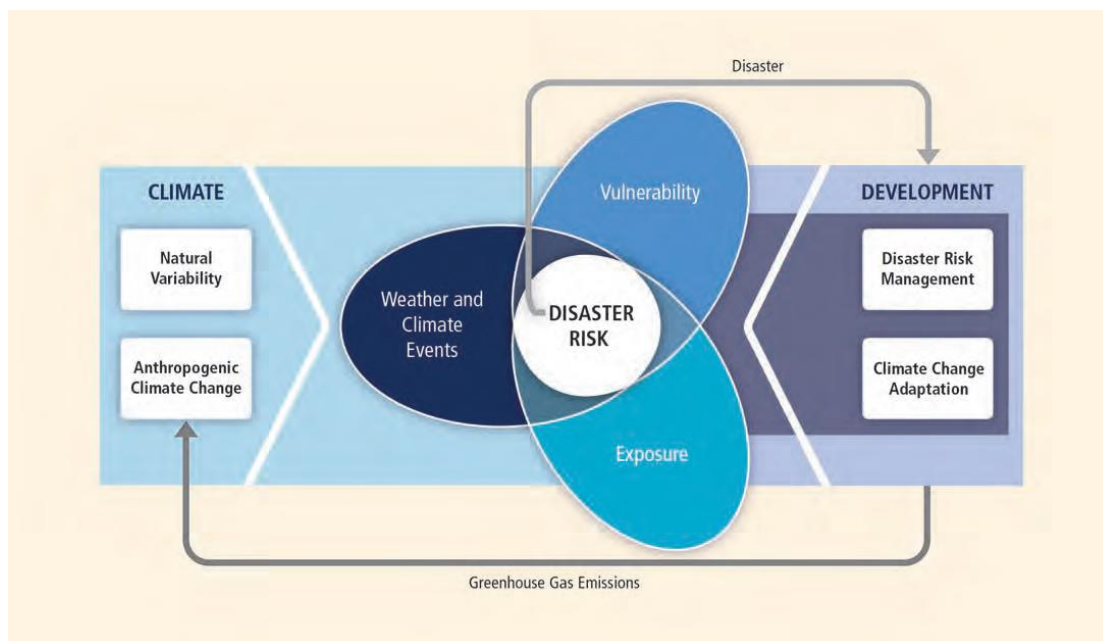


FIGURE 4. DISASTER RISKS IN WIDER CONTEXT OF CLIMATE CHANGE AND HUMAN DEVELOPMENT (IPCC, 2012, P. 4)



URBAN PLANNING

Description and Definition

The ongoing purpose of urban planning is to bring about improvements to and avoid problems in new or existing human settlements that would not otherwise be achieved without intervention, organization and facilitation (Hall, 2007). While urban planning can occur in various forms and can use diverse mechanisms for a range of goals, its actions are usually oriented initially to the physical characteristics of cities, towns and regions. This combines with the characteristics and distribution of people and the activities they undertake in various locations to achieve social, ecological and environmental outcomes.

Urban planning is sometimes known as town planning, city planning, town and country planning or is sometimes described by its subsets including master-planning, transport planning or community planning. Urban plans themselves go by many names, but generally focus on having influence upon settlements and regions' physical form and function via spatialised decision systems. On the whole, these take the form of maps and regulations that influence the physical and functional arrangements of human settlements towards pre-determined goals. Accordingly, planning seeks to achieve various social, economic, and ecological goals via improved arrangements of roads, locations of housing, schools, parklands, employment, retail, water catchments and so forth (Hall, 2007).

At its core, a plan can be understood as "a decision that should be made in light of other concurrent or future decisions" (Hopkins, 2001, p. 8) with the intent of achieving agreed upon outcomes. However, while plans do generally set out visions of the future, it is also true that the level of certainty is highly variable. This is due to a range of factors, including the influence of markets (Gleeson & Low, 2000), the difficulty of accurate forecasting and the incomplete, abridged and imprecise qualities of plans themselves in the context of many other systems that are out of planners' control (Rittel & Webber, 1973).

Internationally, there are a diversity of planning tools at the disposal of planning agencies. However, Lewis Hopkins (2001) suggests that these can be distilled to five fundamental types, shown below.

	Agenda/ Projects	Law, Policy & Regulation	Vision	Design, Masterplan	Strategic
Definition	Actions list and often match expenditure budgets and allocations	If - then rules for actions or proscription to guide decisions	Shared vision of desirable future	Description of fully worked out outcome	Contingent actions are taken in organised way, including changes to meet new emergent challenges and opportunities
Examples	Capital improvement projects Funding allocations	If bushfire overlay, structure built according to BAL	Social equality, economic prosperity	Master plan, site plan, building design (may be more or less "binding")	Public transport is designed and constructed in way that meets community need in timely, fair and economic way as growth occurs

FIGURE 5. FUNDAMENTAL PLANNING TOOL TYPES (ADAPTED FROM HOPKINS, 2001)



Governance: Tiers & Agencies

Governance is the term used for a wider view of collective action that encompasses the formal agencies of government, including wider influences and processes of decision making and including stakeholders. Urban planning, for all its professional, technical and pragmatic functions is primarily a function of government that has its basis in legally established agencies and which exists in a system of tiers of governance (March, 2007). While exact systems of planning governance vary considerably internationally, they can be broadly understood through the matrix shown below.

Governance Tier	Planning Type	Main Focusses and Intent	Examples and Comments
International	International Agreements	Environmental, Social or economic goals.	Kyoto Agreement, or Ramsar Convention for wetland protection.
National	Depending on nation size, higher order policy, and sometimes financial mechanisms. In some places it may provide the basic planning processes and legislation.	Achievement of overarching national goals.	Wider policies oriented to achieving strategic outcomes across wider national community, such as redistribution and equity, prosperity, or ecological goals.
State/ Provincial	Broad establishment of planning processes, laws, agencies and decision rules.	Establishment of primary regulatory mechanisms and allocation of roles and powers to a range of parties	Planning and Environment Act, Planning Scheme Acts.
Regional	Establishment of middle-tier directions for growth and coordination, catchment management, often around location of main infrastructure, industry, and population location.	Coordination and influence of broader flows of investment, population movement, well-being, life opportunities and ecological impacts.	Regional Growth Plan.
Local	Detailed democratic representation and application of planning goals and direct provision of services appropriate to communities.	Detailed mechanisms for control of development, conservation, heritage, location of key development sites.	Town Planning Scheme.
Neighbourhood	Focussed attention to specific needs of specific areas' particular needs and opportunities.	Dealing with opportunities or challenges that are specific to a particular neighbourhood or locale.	Urban Design Plans, heritage Precinct Plan.
Individual sites	Seeking to achieve specific outcomes for a single site	A range of mechanisms could be employed to achieve goals as appropriate.	Major Projects, site contamination remediation,

FIGURE 6. GOVERNANCE TIERS (AUTHORS' SUMMARY)

Processes

Urban planning, while inherently focussed towards *outcomes*, achieves these via a range of processes. While there have been a number of debates about the efficacy of focussing on one or other - it is clear that both are necessary components (March & Low, 2004). While a range of different approaches exist across a broad division of plan making and implementation, the Rational Comprehensive Planning process remains the most enduring (Sandercock, 1998) and adapted (Friedmann, 1998) approach. The main steps of rational comprehensive planning are set out below (Taylor, 1998).

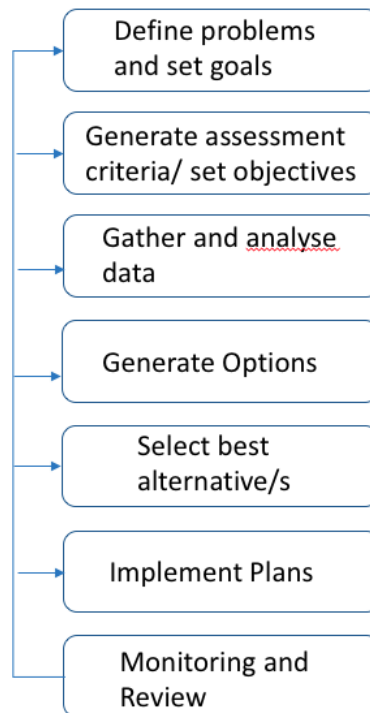


FIGURE 7. RATIONAL COMPREHENSIVE PLAN (ADAPTED FROM TAYLOR, 1998)

Of course, the generic model above represents an ideal view - variants and challenges abound. A number of different approaches exist, all of which have validity. **Systems Planning** emerged in the mid 60s seeking to develop numeric modelling approaches, and was often linked with nascent cybernetics (McLoughlin, 1969). It became unpopular in the early 1970s when difficulties of handling the complexity of data, limits to computing technology of the time and the limits to planning itself typically rendered it unworkable. **Advocacy Planning** (Krumholz & Forester, 1990) sought to encourage professional planners to actively represent underprivileged communities when it became clear that planning was often favouring the interests of the well off. **Incrementalism** (Braybrook & Lindblom, 1963) was adapted from corporate business models, suggesting that planners "muddle through" when data and information were incomplete, rather than make no decisions or to set inflexible plans that typically became quickly redundant. Finally, **Collaborative Planning** (Healey, 1998) seeks to develop systems that encourage the development of dialogue and information exchange in ways that are the most rational, including moral, technical and grassroots views - ideally bringing about well informed, evidence based and more widely accepted planning outcomes. Overall, the complexity of planning systems means that most ongoing action exists in the implementation phase, with only minor monitoring and adjustments occurring to the remainder of the system at any given time.



TOWARDS INTEGRATION

Typical Planning Practices and Mechanisms in the Australian Context

In terms of the main mechanisms used in urban planning in Australia, there is a strong emphasis upon local planning undertaken by democratically elected local governments. This occurs within the broad policy and statutory frameworks established by state governments, acknowledging that little to no planning occurs at national level due to the makeup of the Australian Constitution (March & Goodman, 2008). Accordingly, considerable energy and resources are spent on the implementation of local planning schemes, oriented to development control and permit or refusal processes. This makes achievement of some other goals such as social, cultural or risk management difficult in the Australian context, which often relies on development and projects by key agencies outside of planning combined with the private sector to achieve its goals (March, 2010; March & Low, 2004). Australian local government is relatively limited in its financial ability to fund actions and tends to maintain relatively limited levels of service provision in comparison to its counterparts in western liberal democracies (Gleeson, 2008). This translates to relatively limited strategic or forward planning, combined with the use of mainly regulatory planning approaches in most local authorities.

Urban and Regional Planning Practices and Mechanisms for Natural Hazard Mitigation

Conceptually, there are five fundamental approaches used to treat natural hazard threats via urban planning. These approaches might occur across one or more stages of the disaster cycle and are often the result of planning in conjunction with governance programs, funding or capabilities derived from other influences, and may be applied at various spatial scales. Drawing on the work of diverse scholars (David E. Alexander, 1999; David E Alexander, 2015; Godschalk, 2003; Wamsler, 2014, pp. 69-79; Watson & Adams, 2011; Wetmore, 2013; Wisner, Blaikie, Cannon, & Davis, 2004), these approaches have been described here as areas for potential action across all hazards. These actions may be undertaken via an array of mechanisms, and may include social, economic, environmental, governance and private sector aspects. They include:

1. avoidance of exposure to hazards;
2. reduction of hazard, or exposure to it *in situ*;
3. reduction of vulnerability or increase in resistance *in situ*;
4. improvement of response;
5. improvement of recovery.

In urban planning, there are a range of tools that can be used to achieve one or more of these aspects to better manage risks. These aspects are illustrated in brief in the table below that uses the example of flood.



	Agenda, Projects	Law, Policy & Regulation	Vision	Designs, Masterplan	Strategic
Avoidance of exposure to hazards	Relocation project to move existing dwellings from floodplain	Zoning prevents new structures from being built in high risk areas	Overarching flood risk vision accepted by wide range of agencies and community.	Certain land uses can be designed to be flooded that are low risk, such as car parks or sport fields	Wider integrated plan to redirect growth and investment to suitable area.
Reduction of hazard impacts or exposure in situ	Upstream and onsite water catchments and slowing projects	Require cumulative effects measures in projects assessments	Acceptance that individual projects impact elsewhere - responsibility needs to be taken across "whole system"	Water volume velocity, quality and treatment projects appropriate to locations	Wider strategic action that models overall water systems in advance and as conditions change
Reduce vulnerability or increase resistance in situ	Projects and funding to improve household flood defences, such as water-tight door barriers	Regulations requiring that structures can deal with flood impacts, or not be built	Shared belief that all new growth must achieve a certain standard	Design of structures reduces impacts, such as building on stilts	Establish new directions to improve existing dwelling quality over time, while revising flood maps as run-off rates change
Improve response	Flood warning and sensor system established	Minimum standards minimum evacuation times regulated	Establish of shared responsibility principles for response and evacuation	New road system and bridges that improve capacity for evacuation, particularly for vulnerable elements.	Re-direct growth to areas that are likely to be more easily evacuated as growth and investment occurs over time.
Improve recovery	Build key infrastructure elements that can be quickly re-started, despite impacts	Establish minimum standards of structural durability in flood areas to allow re-occupation of flooded structures	Establish shared acceptance of normal and extreme flooding impacts and disruption.	Establish post events scenarios and rule systems for design and location of post-event scenarios	Establish process for ongoing re-evaluation and re-direction of settlement patterns and treatments as ongoing events occur.

FIGURE 8. EXAMPLES OF POSSIBLE PLANNING MECHANISMS FOR FLOOD. (SOURCE: AUTHORS)

INTEGRATION BETWEEN EMERGENCY MANAGEMENT AND URBAN PLANNING: A FRAMEWORK

Integration

There is a general consensus, in high level policy at least, that there is a need to improve the integration of urban planning and natural hazard mitigation. The Hyogo Framework (ISDR, 2005)



and the updated Sendai Framework (UNISDR, 2015b) contain numerous references to the need for urban planning to be integrated with Natural Hazard Mitigation - however it is notable that actual mechanisms to do this are largely absent. This theme, of seeking conceptual understandings and practical methods for integration is common, as is the need to find context specific solutions in parallel with overarching and "connected" frameworks of action and governance (Godschalk, Kaiser, & Berke, 1998).

The Oxford Dictionary defines *integration* in its noun form as "[t]he making up or composition of a whole by adding together or combining the separate parts or elements; combination into an integral whole: a making whole or entire'. This whole-of-system view of integration suggests that effective action can only occur when all actors take into account natural hazards risks and ensure that actions complement and reinforce risk management. The Productivity Commission (2014, p. 30) reports a:

"... growing awareness of the need to integrate natural disaster risk management into all aspects of the land use planning process, but this is not always achieved in practice. Inquiry participants expressed concern that development continues to be approved in high-risk areas, or that good local government decisions are being overturned".

NERAG 2015 states that the application of risk assessment methodology needs to ensure that emergency-related risk management:

"... integrates into all organisational processes – risk management is a mainstream activity that is most effective when integrated into standard business practices of organisations, governments and communities" (EMA, 2015).

In urban planning terms this would require a wide understanding of all elements and decisions of the planning system addressing risks, comprehensively matching it with an evidence base appropriate to the decisions being made (Godschalk et al., 1998). There is a long legacy of urban planning seeking to integrate activity to achieve a range of goals across various processes. Further, there is a need for processes to be systematic and inclusive, understanding that failures to include key elements will lead to ineffectiveness (Wamsler, 2014). A wide range of relevant parties need to be involved in the most effective ways possible.

Therefore, an approach to **integration** must include, in combination, the following elements:

1. intra organisational / agency integration, horizontally and vertically;
2. inter organisational / agency integration, horizontally and vertically;
3. comprehensive coverage of all hazards;
4. full use of all planning treatment options;
5. integration of a wide range of other relevant parties;
6. procedural integration;
7. integration across PPRR;
8. goals, objectives and terminology integration;
9. treatments integration;
10. acknowledgement of local, cultural, social, economic and ecological matters; and
11. management of legacy and emergent risks in the built environment (Source: The Authors).



Integrated governance

There is a growing recognition in many fields that the best decisions come from high quality governance arrangements that are 'accountable, transparent, follow the rule of law, [being] responsive, equitable, inclusive, effective and efficient and participatory (Good Governance Guide, undated, in Stanley, Stanley, & Hansen, 2017). Integrated governance implies joint work among players along a horizontal line (across government departments and other players at a particular level) and/or a vertical line (integration between levels of government, local, state and federal, and the community).

There is some international and Australian government recognition that an integrative perspective is needed. Such a perspective was reinforced in the Victorian government submission to the Parliamentary Inquiry into Fire Season Preparedness (Environment and Planning Committee - Legislative Council, 2016), where it was noted that:

All agencies, departments, industry, business, all levels of government and community need to work together to achieve a sustainable and efficient emergency management system that reduces the likelihood, effect and consequences of emergencies: 'we work as one' (Government submission quoted in Environment and Planning Committee - Legislative Council, 2016, p. 75).

The Parliamentary Inquiry also outlined the principle of an all-hazards, all-agencies approach built on networked arrangements, greater interoperability and a stronger emphasis on risk mitigation (Environment and Planning Committee - Legislative Council, 2016, p. 76). However, a process to achieve this was not outlined.

However, traditional governance arrangements and power structures that seek to make clear the distribution of tasks between sectors and across the levels of government, as well as organizational culture and priorities, prove difficult to change in order to achieve a 'work as one' outcome, especially when decision-making is also shared with communities. Van de Velde (1999, p. 148) identifies a three-level planning hierarchy, as outlined in the figure, below.

Decision level	General description
Strategic Long term (5 years)	<i>What do we want to achieve?</i>
Tactical Medium term (1-2 years)	<i>Which services can help to achieve these aims?</i>
Operational Short term (1-6 months)	<i>How to produce these services?</i>

FIGURE 9. THREE LEVEL PLANNING HIERARCHY (VAN DE VELDE, 1999, P. 148)

Strategic level planning is involved in the formulation of general aims, the major stakeholders, budgets etc. Tactical level planning is about making decisions on acquiring means that can help



reaching the general aims, or the design of the services. The Operational level guides the day-to-day service and makes sure that this happens in an efficient and effective way. As noted in the figure, each of these levels has a different time scale, allowing for greater flexibility in approach at the operational level.

It is argued in this report that the adoption of such a planning and decision-making structure to integrate urban and emergency planning would facilitate a number of desired outcomes, such as:

- clarify the goals across the impact spectrum of land use, sustainability, resilience, equity, health and safety, economic productivity and protection of the environment;
- identify the points of agreement and conflict as a first step in the decision-making process, offering 'a place to start' where there is agreement;
- improve the cost/effectiveness of service design by avoiding duplication, identification of priorities and sharing of resources; and
- facilitate evaluation of the effectiveness of the operational side and allow for change where the service can be improved.



INTEGRATION AND GOVERNANCE

AUSTRALIAN NATIONAL INTEGRATION

While there is no provision in the Australian Constitution for the Commonwealth Government to carry out urban planning in Australia², with statutory planning being legislated exclusively at the state level, there are many instances in which urban planning is influenced by policy stemming from the National level, being subject to related legislation enacted by the Parliament of Australia – such as in the case of the Environment Protection and Biodiversity Conservation Act 1999 (Parliament of the Commonwealth of Australia, 1999). A similar situation occurs with Emergency Management, which is not explicitly stated as a Parliament of Australia legislative power and is mostly exercised at the state level.

However, the Constitution also provides for the Commonwealth level to act on matters that are of an international nature and of national interest. When it comes to natural hazard mitigation and disaster risk reduction, these can have a potential national impact and be derived from national and international contexts. The risks associated with Climate Change are an example of these situations.

Increased rainfall, heatwaves, sea level rising, droughts and risk of bushfires are some of the natural hazards associated with a certain national and international context, their mitigation being influenced by specific international treaties, agreements and frameworks of which, in many instances, the Australian Commonwealth is a signatory, a participant and/or an adopter.

To understand how the Australian national integration of Urban Planning and Natural Hazard Mitigation takes place, it is useful to identify the instances in which Commonwealth, State and Local levels interact and the processes in place for the formulation of policies and agreements that cross-cut different levels and sectors of governance.

The Council of Australian Governments – CoAG is the key platform to deliver this integration. While its core membership brings together the Prime Minister of Australia, State Premiers, Territory Chief Ministers and the president of the Australian Local Governments Association – ALGA, its structure also establishes 8 focused Councils that formally support CoAG. These councils respond directly to CoAG and are composed by ministers responsible for portfolios that relate to these councils' foci.

² An exception being the Commonwealth Territories, governed by Commonwealth representatives.

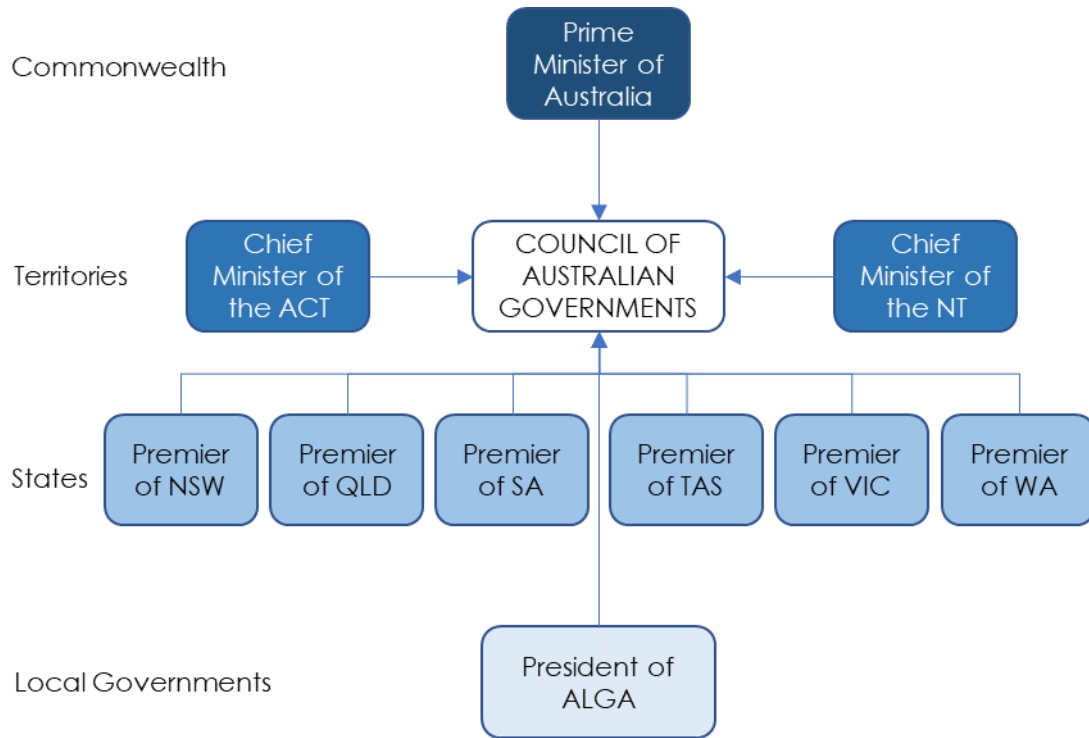


FIGURE 10. COUNCIL OF AUSTRALIAN GOVERNMENTS - COAG MEMBERSHIP

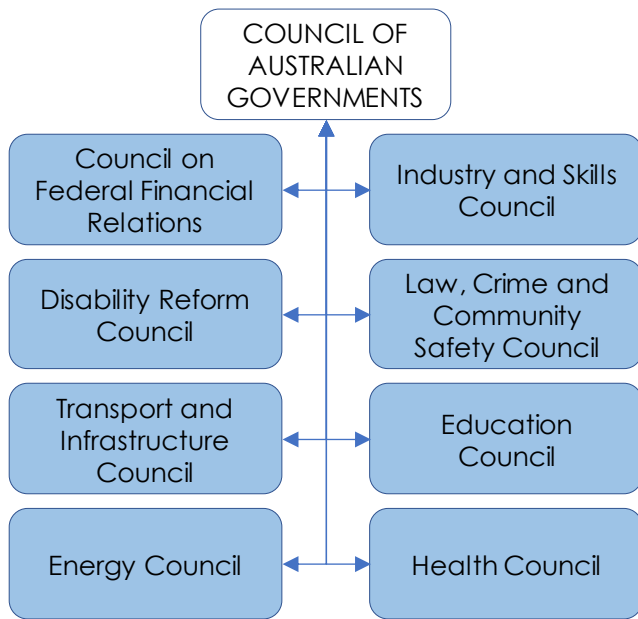


FIGURE 2. COAG STRUCTURE OF SUPPORTING COUNCILS

Overall, this inter-governmental council structure is meant to facilitate reform, regulation and greater alignment between different levels and sectors of public governance in Australia as well as between different departments on matters that are cross-cutting.

CoAG dates back to 1992 – stemming from the proposal for the creation of a Council of the Federation put forward by the Premiers and Chief Ministers Meeting of 21-22 November 1991 in Adelaide. While it has kept its same core membership structure from the start, its structure of



supporting councils has changed considerably over time, especially that which is mostly related to Urban Planning and Emergency Management / Disaster Risk Reduction.

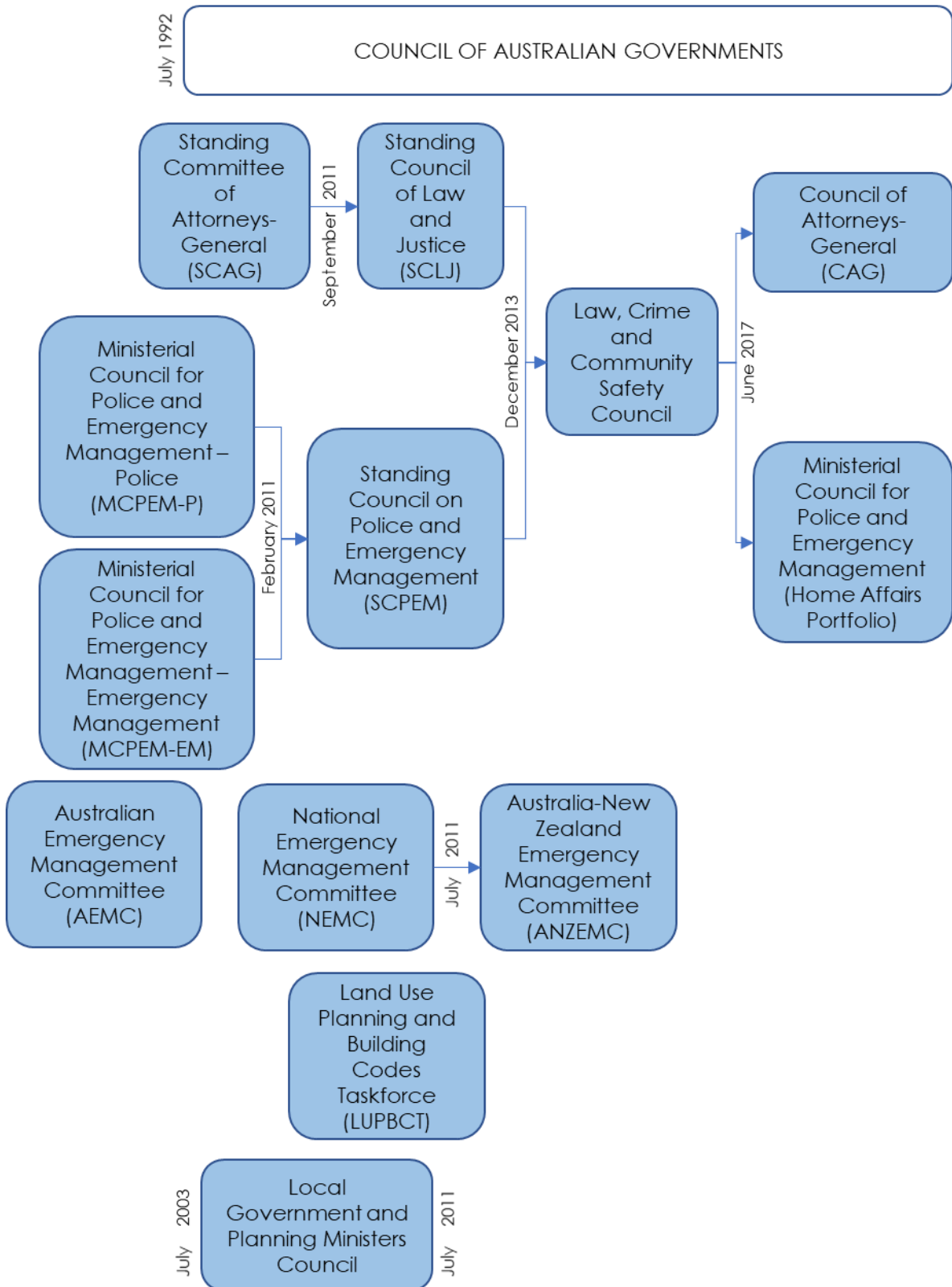


FIGURE 11. CHANGES IN THE COUNCIL STRUCTURE AFFECTING LAND USE PLANNING AND EMERGENCY MANAGEMENT



Prior to the establishment of CoAG, specific ad hoc Ministerial Councils already existed³. These started to be streamlined as they became supporting councils to CoAG⁴.

Prior to the last restructuring started in June 2017, the Law, Crime and Community Safety Council was COAG’s body most related to Emergency Management and Disaster Risk Reduction.

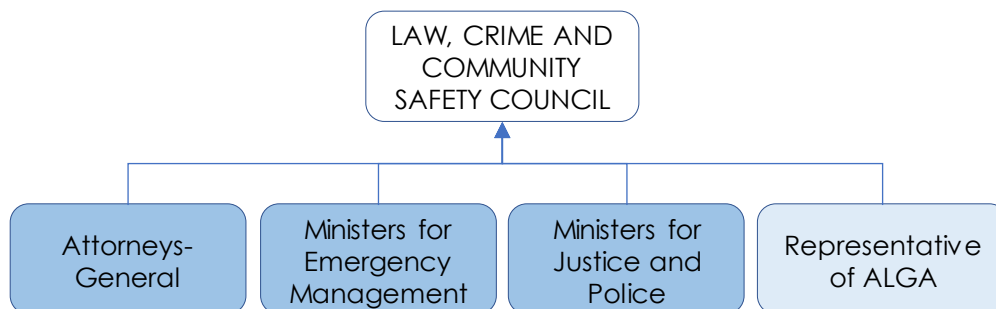


FIGURE 12. COAG LAW, CRIME AND COMMUNITY SAFETY COUNCIL MEMBERSHIP

However, in anticipation to the formal establishment of the Commonwealth Department of Home Affairs on 20th December 2017, that incorporated Emergency Management and National Security as part of its portfolio (along with border control, immigration and transport security), LCCSC has been replaced by the newly established Council of Attorneys-General in June 2017 and by a Ministerial Council for Police and Emergency Management – at time of writing yet to be implemented under the umbrella of the Department of Home Affairs.

Since the loss of the Local Government and Planning Ministers’ Council on 30th June 2011⁵, Urban Planning related issues have been redirected to other CoAG existing councils, with no specific council congregating the Ministers for Planning of all States and Mainland Territories. However, some councils have members who have planning or closely related areas as part of their portfolio, this being more evident in the CoAG’s Transport and Infrastructure Council.

CoAG’s relevance for the integration of Urban Planning and Natural Hazard Mitigation at the National Level becomes more evident when the National Strategy for Disaster Resilience is analysed.

“The Ministerial Council for Police and Emergency Management – Emergency Management (MCPEM-EM) agreed on 6 November 2008 that the future direction for Australian emergency management should be based on achieving community and organisational resilience” and proposed a National Disaster Resilience Framework to articulate a “high level disaster resilience agenda” that included the development of a Disaster Resilience Strategy led by the Attorney-General’s Department (AEMI, 2015).

On 7th December 2009 the CoAG National Disaster Resilience Statement was released and in 2011 a National Strategy for Disaster Resilience – NSDR was made public. NSDR’s Priority 6 of Reducing Risks in the Built Environment speaks directly to the integration of Urban Planning and Natural Hazard Mitigation. To develop “a national action plan and identify the key barriers to change”, a taskforce of state and territory planning officials led by Queensland and Victoria (Land Use Planning and Building Codes Taskforce - LUPBCT) developed and presented the Enhancing Disaster Resilience in the Built Environment Roadmap to SCPEM’s National Emergency Management

³ The Tourism Ministers Council, for example, held its first meeting in 1981.

⁴ In its inaugural meeting, CoAG members agreed that common protocols for the operation of these councils should be developed and the scope, distribution and number of Ministerial Councils should be reviewed.

⁵ As part of the CoAG System of Ministerial Councils Reform.



Committee - NEMC⁶ in June 2012 (Attorney-General's Department, 2012). On 29th June 2012, SCPEM Ministers acknowledged the importance of the roadmap to "improve consideration of natural disaster hazards in land use planning and building code regulation [...] [and committed] to work with their planning and local government colleagues to obtain agreement on the roadmap's implementation within their respective jurisdictions [...] [noting] that successful implementation [would] lead to significant long term improvements to the resilience of Australian towns and cities" (SCPEM, 2012, pp. 4-5). From that moment, the roadmap started being dealt with on a state by state case⁷.

The integration of Urban Planning and Natural Hazard Mitigation can also be identified in Commonwealth funding directed to state prevention, preparedness and recovery initiatives under the former Regional Flood Mitigation Program (RFMP – 1999-2007), the Bushfire Mitigation Program (BMP – 2004-2007), the Natural Disaster Mitigation Program (NDMP – 2003-2007), the National Bushfire Mitigation Program (NBMP 2014-2017) and the National Partnership Agreement on Natural Disaster Resilience and its associated Natural Disaster Resilience Program (NDRP – from 2009 onwards) and the National Disaster Relief and Recovery Arrangements - NDRRA⁸.

SOUTH AUSTRALIAN INTEGRATION

To describe the level of integration between emergency management and planning, initial overviews of each discipline in South Australia are provided, before offering a comparative commentary on how the integration could be strengthened, especially under the current reform process of the SA Planning System.

Natural Hazard Mitigation

Mitigation activities in South Australia are underpinned by the Emergency Management Act 2004 (State Parliament of South Australia, 2004). Part 1.2 of the Act is an addition effective 1/7/2016 that outlines the objectives of the Act, including: to establish an emergency management framework for the State that has provisions for comprehensive and integrated planning in relation to emergencies, and promotes community resilience. The 01/07/2016 update of the Emergency Management Act 2004 (State Parliament of South Australia, 2004) also introduced guiding principles, which under the Act state that arrangements must, "be based on an all hazards approach in addressing emergency prevention, preparedness, response and recovery (PPRR); and reflect the collective responsibility of all sectors of the community including both State and local government, the business and non-government sectors, and individuals" (State Parliament of South Australia, 2004, s. 1.2). These inclusions now provide significant emphasis that was previously absent regarding concepts such as resilience, all of government interaction, and interaction with Local Government, a key element in natural hazard mitigation and urban planning in South Australia. This emphasis is critical to enhancing integration between disciplines in South Australia as it potentially enables the inclusion of a wide range of relevant parties and better supports inter-organisational integration.

⁶ On 25 July 2012, with the addition of New Zealand as a permanent member, NEMC became the Australia-New Zealand Emergency Management Committee – ANZEMC (ALGA, 2012).

⁷ Concerns about integrating Land Use Planning and Building Codes into an all-hazards mitigation program was not new and had already appeared as a formalised goal in the Australian Emergency Management Committee Work Plan in April 2008 (AEMC, 2008).

⁸ Examples of projects funded by these streams and that integrate land use planning and natural hazard mitigation are discussed further in section focused on state level integration.

Focusing on agencies involved in natural hazard mitigation is a critical aspect when considering integration, given the need for shared goals, objectives and terminology, and inter/intra-organisational efforts. Emergency management relationships and roles in South Australia are also outlined in the Emergency Management Act 2004 (State Parliament of South Australia, 2004) which gives effect to the Emergency Management Council (EMC), a committee of Cabinet chaired by the Premier, and the State Emergency Management Committee (SEMC), which reports to EMC providing oversight to emergency management planning in the State. Providing input to SEMC are several State Advisory Groups, importantly including the State Mitigation Advisory Group (SMAG). FIGURE 13 shows these groups, and their hierarchy, along with representative membership of each group / committee⁹. This highlights the broad level of cross-government involvement in emergency management roles within the state, especially when considering agency involvement in advisory groups. A method for strengthening integration across sectors would be increasing the influence of such advisory groups and ensuring continued engagement from all stakeholders in groups and committees.

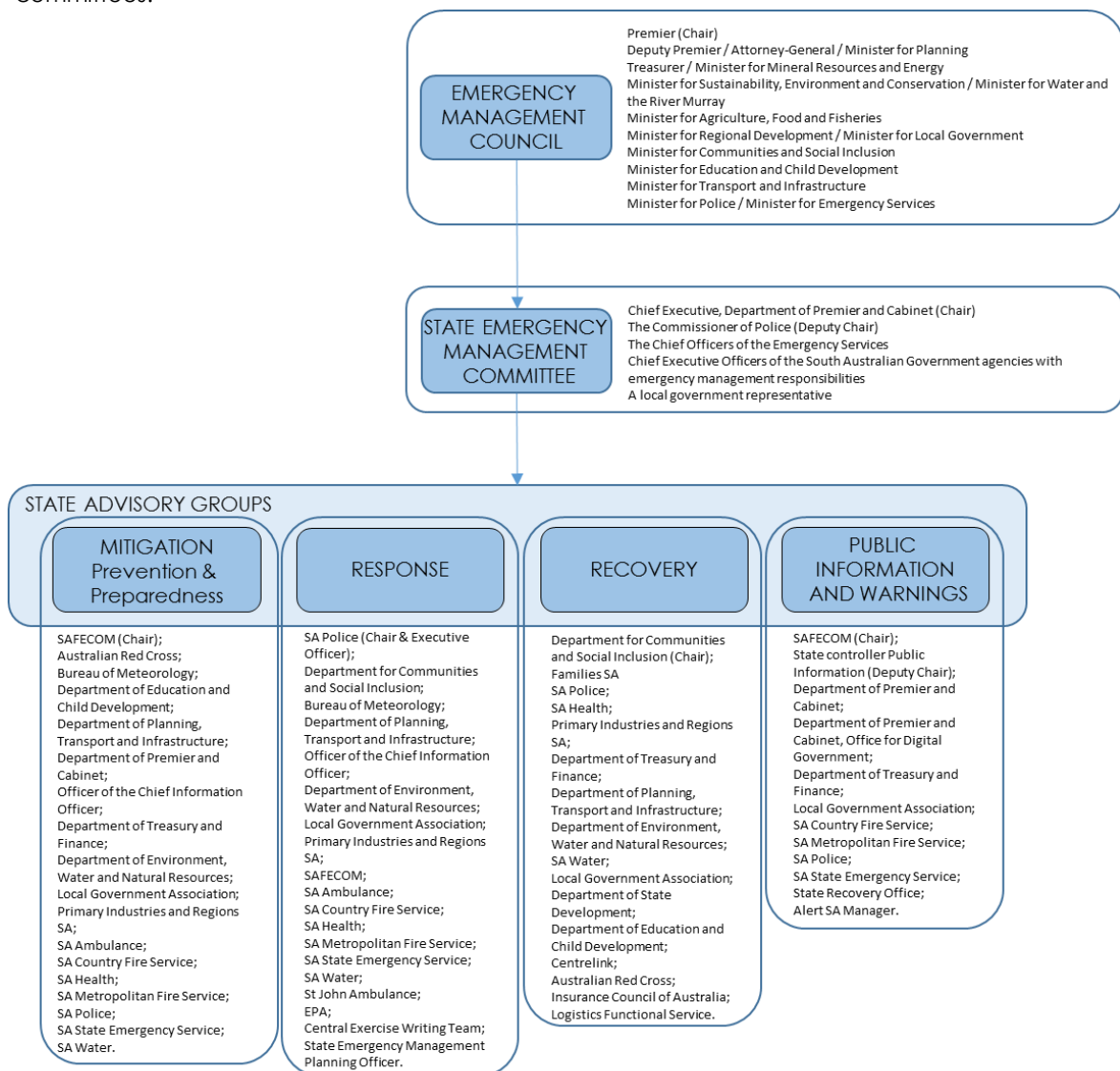


FIGURE 13. SA EMERGENCY MANAGEMENT ARRANGEMENTS AND ADVISORY GROUPS

⁹ Agency inclusion in advisory groups is representative only and may not reflect current membership. Departments and agencies named may also be out of date following the State election on 18/03/2018.



Considering the levels of integration between urban planning and natural hazard mitigation, key activities and reports developed through groups listed above are used to discuss the level of integration, and inclusion of urban planning. The 2014 South Australian State Emergency Risk Assessment (State Government of South Australia, 2014) was produced under the framework of the National Strategy for Disaster Resilience (Australia, 2011) to provide a risk assessment of the 10 identified State Hazards following the principles and methodology of NERAG10 (EMA, 2015). The risk assessment also outlined key Government activities in risk mitigation identified across the 10 categories of hazard. It is notable that there is limited recognition of the application of urban planning to mitigate risks across hazards in terms of Government actions. Only Storm includes mention of land use planning as an activity to mitigate risk currently being undertaken, with the activity noted as, “considering storm impact in land use planning strategies”. However, no follow-up actions are documented, and storm is not mentioned in the planning reform process or regional strategies (as discussed below). There is no further mention of urban planning activities or principles as mechanisms to mitigate the identified risks, apart from building compliance and standards (Storm and Earthquake).

SEMC recently launched an updated strategic framework, State Emergency Management Committee Strategic Framework: 2017-2022 (SEMC, 2017a), this strategy continues the State's shift to a focus on resilience and multiple sector involvement in emergency management with the SEMC vision stated as, “A safe and strong South Australia through a shared commitment to resilience”. The Strategic Framework: 2017-2022 (SEMC, 2017a) was accompanied by the SEMC Strategic Plan: 2017-2022 (SEMC, 2017b) which includes specific strategic tasks to enhance integration of emergency management and natural hazard mitigation activities with urban planning, such as increased linkages between land use and emergency management through incorporation of hazard management objectives into the Planning and Design Code (to be developed), and through the use of strategic land use policy to reduce emergency management risks and consequences. SEMC allocates responsibility for these tasks to the planning department via their planning reform process. There are also specific tasks to strengthen engagement with climate change policy, another avenue for strengthening integration between disciplines via a cross-cutting theme (climate change), further discussed below. Importantly these tasks fall under Strategic Theme 5 – Emerging Risks which makes explicit reference to the integration of future and emerging risks. This emphasis could provide significant scope for urban planning at the vision and strategic level to provide for natural hazard mitigation and resilience outcomes and aligns many of the elements required to combine for integration as outlined earlier, such as management of emergent risks in the built environment, treatment integration and comprehensive coverage of all hazards. The implementation of these tasks however remains a critical component to be undertaken over the next 5 years.

Urban and Regional Planning

Urban and regional planning in South Australia is underpinned by the Development Act 1993 (State Parliament of South Australia, 2014) along with the Development Regulations 2008 (State Government of South Australia, 2018) that provide building rules for development in the State. Giving direction under the Act are seven planning strategies for regions, including strategic plans such as the 30-Year Plan for Greater Adelaide (DPTI, 2017). This hierarchy is outlined below in FIGURE 14. For South Australia, in comparison to Victoria, planning decisions mainly rest with local government level, with Development Plans developed by each council (72) that are the statutory

¹⁰ All hazards except terrorism were assessed following NERAG principles, terrorism risk assessment followed the National Approach to Counter Terrorism.

plan that provides zone provisions, and overlays for development controls on elements such as heritage and bushfire provisions.

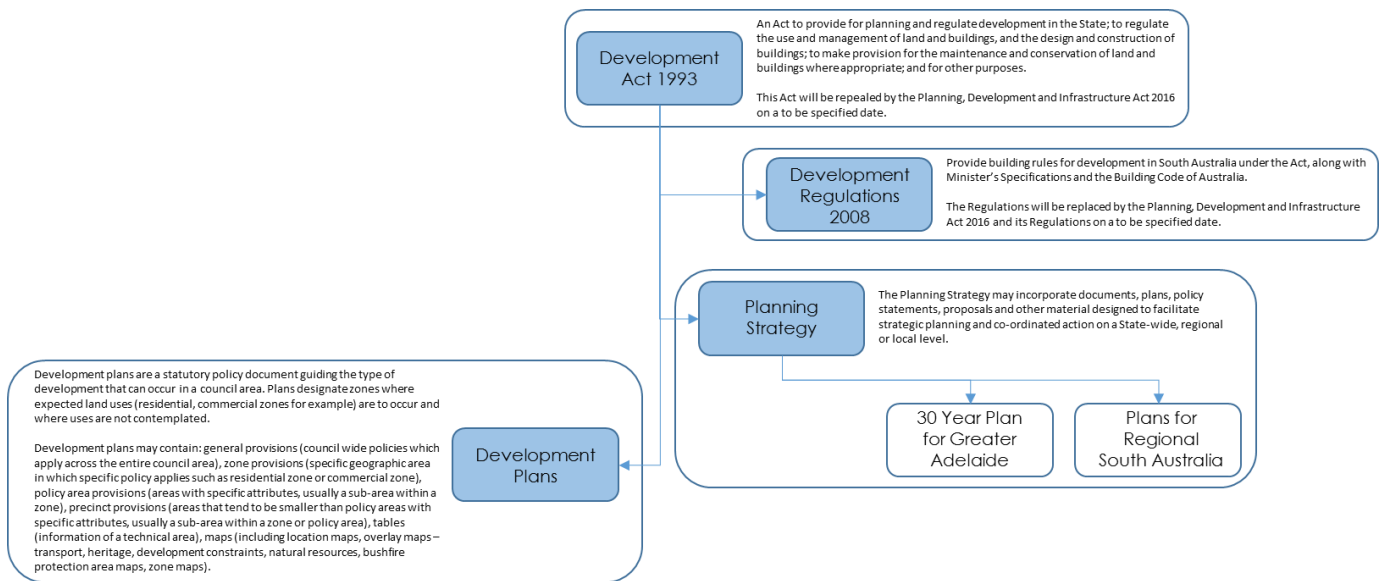


FIGURE 14. OVERVIEW OF SA URBAN PLANNING POLICIES AND PLANS

The South Australian State Government is currently undergoing a planning reform process that will remove the current relative autonomy of development plans from local government and replace these with consistent state-wide definitions. This will include land use zones and development overlays for specific protection and regulation issues, such as natural hazard mitigation being defined at state level. The reform process offers significant scope for the integration of natural hazard mitigation into planning processes and development approvals, however challenges exist in the consistent development of overlays for hazard mitigation and the requirement for hazard information to be spatialized. The degree to which this is possible is likely to be hazard dependent and could contrast with the aims of the Emergency Management Act 2004 (State Parliament of South Australia, 2004) on all hazards.

Strategic planning in the State through the Planning Strategies offers another avenue for stronger integration, however considering the current 30 Year Plan for Greater Adelaide - 2017 Update (DPTI, 2017) the degree of integration remains limited only to particular planning mechanisms and hazards. Policies outlined in the strategy highlight the value of integration with acknowledgment planning can minimize risk to people, property and the environment from exposure to hazards through avoidance, adaptation and protection, and that the integration between disaster risk reduction, hazard avoidance policies and land use planning should be improved. Actions considered to achieve these policy objectives focus on the planning reform process with the development of overlays through mapping hazards to be included in the Planning and Design Code for flood, bushfire and coastal hazards - there is no mention of managing storm through urban planning in the region as outlined in the 2014 South Australian State Emergency Risk Assessment (State Government of South Australia, 2014) and to develop consistent, risk proportionate policy responses for all hazards in the Planning and Design Code.



Integration

Compared to the Victorian Case (below), in which the planning system has been standardised across the state from the late 1990s, the South Australian planning system is still fragmented and decentralized, with local government defining their own sets of zones and overlays. To address this, the Planning Reform is currently underway, with a new Planning, Development and Infrastructure Act – PDI Act (State Parliament of South Australia, 2017), replacing the current Development Act 1993 (State Parliament of South Australia, 2014) and Development Regulations 2008 (State Government of South Australia, 2018). The process of reforming the Act opens up opportunities for a more comprehensive integration of Natural Hazard Mitigation into the South Australian Planning System that would impact planning across local governments in a more consistent way. The reform process also provides the opportunity to establish and strengthen communication channels among urban planning and Emergency Management agencies focused on Natural Hazard Mitigation.

The need for an all-hazards approach was identified by the group of end-users as an important element of integration that is still lacking state-wide institutional arrangements, there currently being different levels of attention to different hazards, according to the different likelihoods of impact they pose and how easily the risk impact can be mitigated. Overall, the different tiers and instruments of Urban Planning (Visionary, Strategic, Statutory, etc.) do not seem to be integrated when it comes to Natural Hazard Mitigation. At a broad level, there seems to be a limited horizontal and vertical integration.

An overarching framework for multi-level planning covering state, regional and local levels is in place in South Australia both within the domains of Urban Planning and Emergency Management Planning. However, these are not necessarily connected at all relevant points. Most planning and development decisions still occur at local government level. This can result in ancillary solutions to manage risk such as Water Sensitive Urban Design (WSUD) carried out by private developers instead of an integrated approach to natural hazard mitigation. Overall, end-users understand that some roles are still blurred, leading to gaps and overlapping of tasks that need to be addressed in integrating Urban Planning to Natural Hazard Mitigation.

The recognition of resilience concepts and its incorporation into the objectives of the Emergency Management Act 2004 (State Parliament of South Australia, 2004) is understood as an opportunity for greater integration of Urban Planning and Emergency Management through Natural Hazard Mitigation. Similarly, Climate Change is also understood as encouraging integration as a cross-cutting challenge requiring action from emergency management and urban planning disciplines and policies. This can be seen in FIGURE 16 that provides an overview of State policies and planning strategy across disaster risk reduction and urban planning, along with other relevant policies external to these domains. It is clear that the policies that offer the greatest overlap of domains and hence possibilities for integration are initially at the strategic vision level for each domain - i.e. SEMC Strategic Framework (SEMC, 2017a) and Plan (SEMC, 2017b) and 30-Year Plan for Greater Adelaide (DPTI, 2017) and policies with an emphasis on resilience and climate change as cross-cutting integrative themes such as plans sitting under the Emergency Management Act 2004 (State Parliament of South Australia, 2004) – e.g. relevant SEMP chapters and climate change policies such as the Climate Change Adaptation Action Plan. Also evident is the role of stormwater management and WSUD policies that are used at the development level, assessed by councils during development approvals at cutting across multiple domains.

The Planning Reform process, as previously noted, provides significant scope for improved integration between disciplines due to the standardisation of zoning policy, and policy responses for hazards. FIGURE 15 outlines the shifts proposed in legislation, regulation and policies, in contrast to the current process shown in FIGURE 14. The development of mapped overlays for hazard

presents opportunities and challenges in terms of natural hazard mitigation. Mapped hazard risk provides for improved opportunities to consider values and responses across environmental, planning, and emergency management agencies. In addition, opportunities for integration via the acknowledgment of local, cultural, social, economic, and ecological matters are more readily explored and acted upon at this level. However, any inconsistencies in mapping provide significant challenges. For example, the varied approaches to flood modelling that has occurred in South Australia make the development of a consistent planning layer to determine return periods relevant for decision making challenging. Further, translating these across hazards which are less spatially dependent such as storms is further complicated.

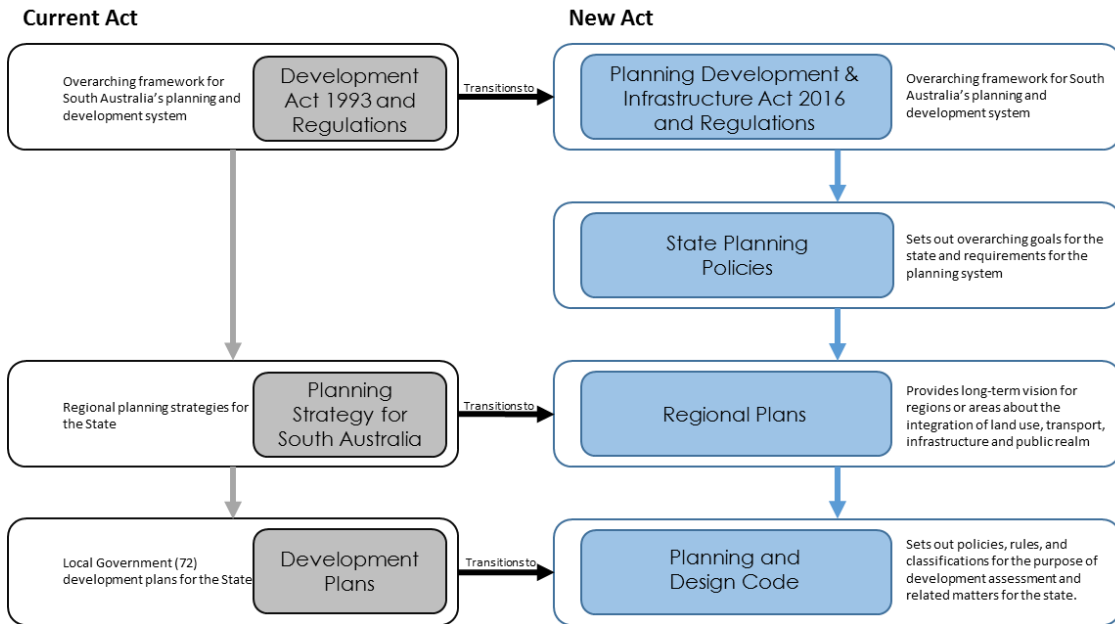
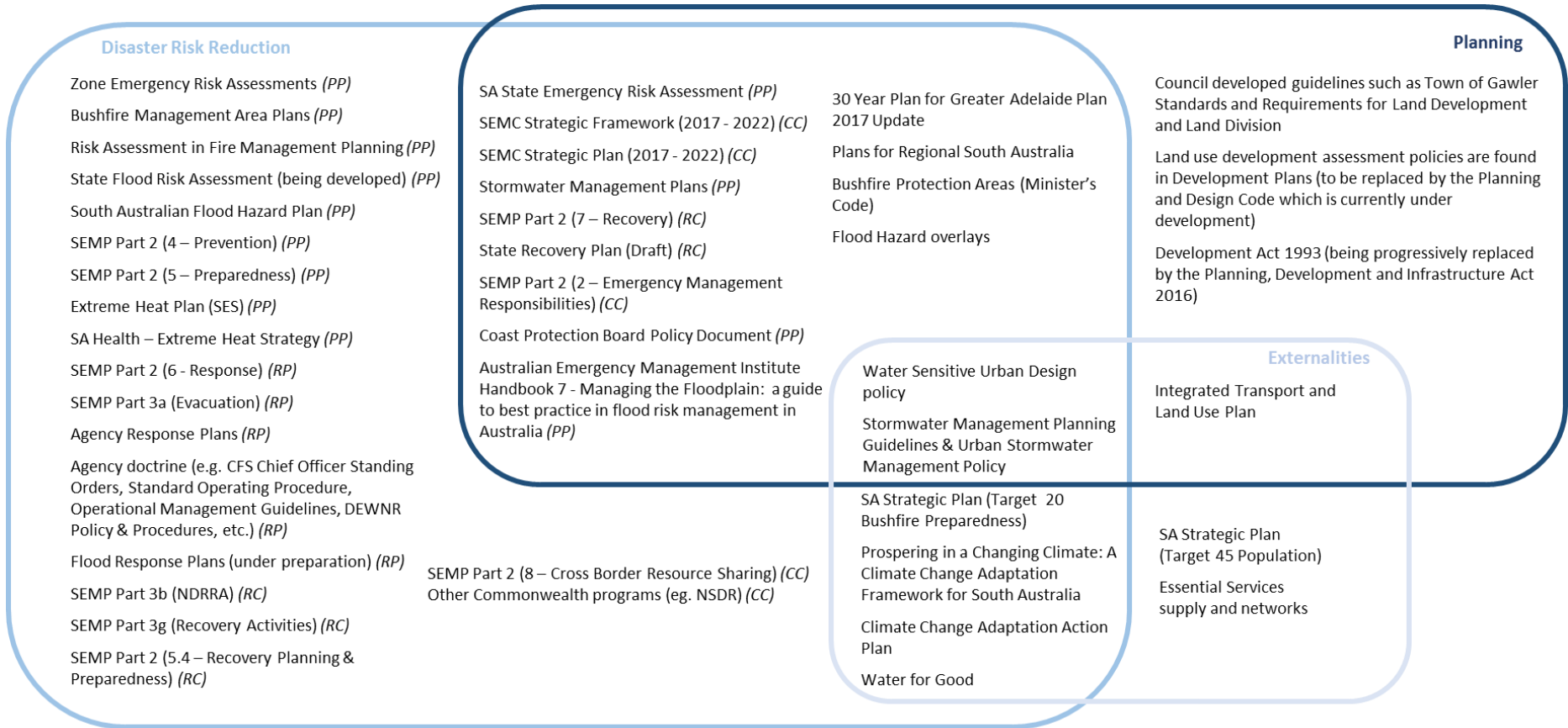


FIGURE 15. OUTLINE OF TRANSITION FROM SA EXISTING PLANNING SYSTEM TO THE NEW ACT

In parallel with methods based on spatial overlays as the basis for decision making significant consideration needs to be placed on accounting for a changing climate and for ongoing settlements growth and change. These typically have impacts on hazard likelihood and impact, such as continued development modifying catchment hydrology with increased impervious areas, or development contributing to urban heat impacts. There is an opportunity to consider these elements during the reform process, including the need use the full suite of planning mechanisms as outlined in FIGURE 8, rather than leaving these to subsequent and lower tier building level controls which cannot fully remediate impacts.



Key

- PP – Prepare & Prevent
- RP - Response
- RC – Recovery
- BP – Best Practice Research & Knowledge
- CC – Coordination & Consistency

FIGURE 16. EULER DIAGRAM FOR SA POLICIES REGARDING DISASTER RISK REDUCTION AND URBAN PLANNING



VICTORIAN INTEGRATION

Emergency Management

In Victoria, *emergency management* is taken to be the overarching term used to describe actions to deal with emergencies and disasters generally. Following the definition provided by the Emergency Act (State Parliament of Victoria, 2016), and according to its section 3, an emergency means that which is:

due to the actual or imminent occurrence of an event which in any way endangers or threatens to endanger the safety or health of any person in Victoria or which destroys or damages, or threatens to destroy or damage, any property in Victoria or endangers or threatens to endanger the environment or an element of the environment in Victoria.

The Act sets out four main "types" of emergency: Major, Class 1, Class 2, and Major Fire. A wide view of emergency management is taken, seeking to "bring together in an integrated organisational network the resources of the many agencies and individuals who can take appropriate and timely action to prevent or mitigate, respond to and support recovery from emergencies" (Emergency Management Victoria, 2015).

The disaster cycle is approached in a specific way in Victoria, whereby the three inter-related phases of Prevention, Response and Recovery are seen as interlinked clusters of activity:

1. Prevention: the elimination or reduction of the incidence or severity of emergencies and the mitigation of their effects.
2. Response: the combating of emergencies and the provision of rescue and immediate relief services.
3. Recovery: the assisting of people and communities affected by emergencies to achieve a proper and effective level of functioning (Emergency Management Victoria, 2015).

The intention of Victoria's emergency management arrangements is to deal with *all hazards*, to be *integrated* and involve all people and relevant agencies, to be comprehensive and cover prevention, response and recovery, and to support *resilience* as set out in CoAG's 2011 strategy (Emergency Management Victoria, 2015).

Victoria has a clearly set out structure for emergency management based on a number of recent reforms. Based on the framework set out in the 2012 Victorian Emergency Management Reform White Paper, new governance structures, a new act, other changes to agencies and the allocation of responsibilities has occurred (Emergency Management Victoria, 2015). In 2013 the Victorian emergency management's peak body, the State Crisis and Resilience Council (SCRC) was established to "advise[...] the Minister for Emergency Services in relation to whole of government policy and strategy for emergency management in Victoria and the implementation of policy and strategy" (Emergency Management Victoria, 2015). This includes taking on the roles previously played by the Victoria Emergency Management Council (VEMC) and the Central Government Response Committee (CGRC). As shown in FIGURE 17 below, the Premier and the Security and Emergency Management Committee (SEMC) have oversight of the overall Emergency Management Planning and Operational Structure.

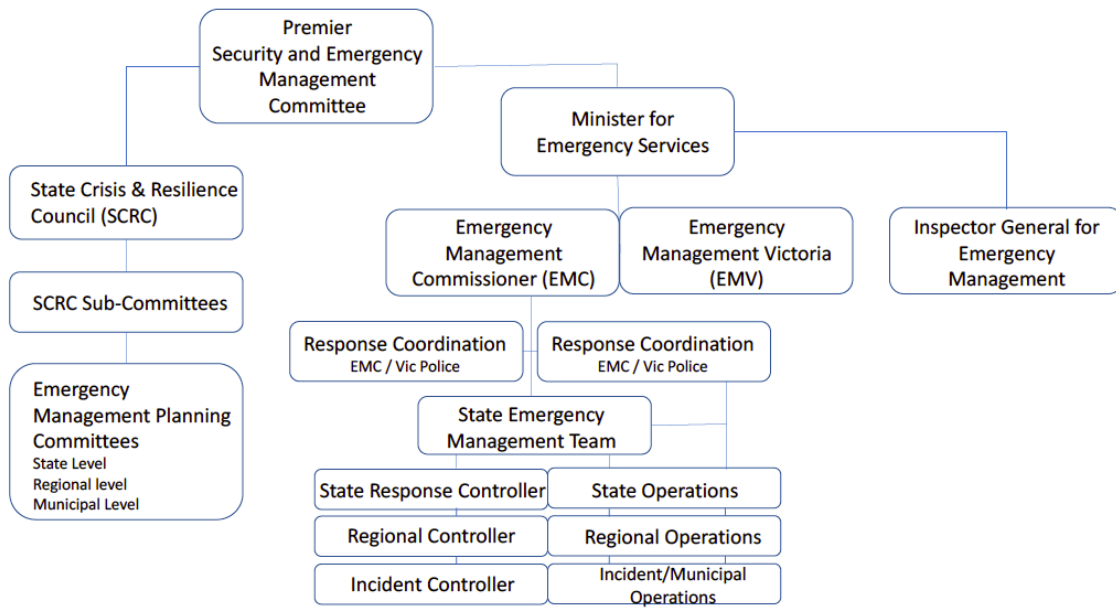


FIGURE 17. VICTORIA'S EMERGENCY MANAGEMENT PLANNING AND OPERATIONAL STRUCTURE (EMERGENCY MANAGEMENT VICTORIA, 2015)

In 2014 the Emergency Management Act 2013 (State Parliament of Victoria, 2016) came into force and empowers Emergency Management Victoria (EMV) as being responsible for coordination and development of whole of government policy for emergency management in Victoria. Other key elements of this Act include:

- establishing the role of the Emergency Management Commissioner (EMC), including an overarching management role for major emergencies
- establishing the Inspector General for Emergency Management (IGEM) to provide overview of Victoria's emergency management arrangements
- requiring the SCRC to develop three-year rolling strategic action plans with work plans for: Metropolitan Fire and Emergency Services Board (MFB), Country Fire Authority (CFA), Victoria State Emergency Service (VICSES), Secretary to the Department of Environment, Land, Water and Planning (DELWP), Emergency Services Telecommunications Authority (ESTA).

Prevention / Mitigation

In Victoria, prevention is understood as "the elimination or reduction of the incidence or severity of emergencies and the mitigation of their effects" (State Parliament of Victoria, 2014). Since the nature of emergencies inherently includes levels of unpredictability, this encompasses minimisation and mitigation approaches, in accordance with the 2002 CoAG Natural Disasters in Australia Report (DoTaRS, 2004). Mitigation is seen as a key subset of overall emergency risk management in Victoria, whereby it is understood that there is a high level of interaction between the terms mitigation, prevention and risk reduction, while being generally separate from acknowledgement of residual risk or planning and preparation for response and recovery. Accordingly, mitigation operates through the assessment stages of the degree to which the risk can be eliminated altogether, assessment of the degree to which the risk can be treated, and the implementation of risk treatments (Emergency Management Victoria, 2015). Oversight responsibility (but not implementation) for mitigation has been allocated to the State Emergency Mitigation Committee at a State-wide level.



Local government has considerable responsibility for mitigation in Victoria, particularly via Municipal Emergency Management Plans as shown in FIGURE 18 below.

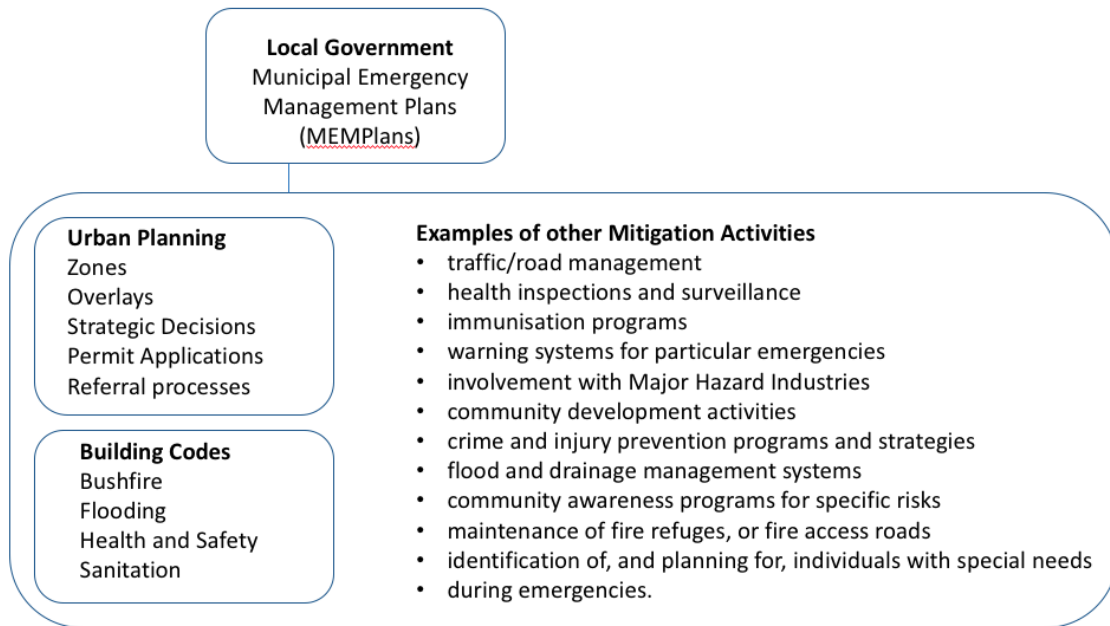


FIGURE 18. SUMMARY OF MUNICIPAL EMERGENCY MANAGEMENT PLANS (EMERGENCY MANAGEMENT VICTORIA, 2015)

Response

Response involves the combating of emergencies and the provision of rescue services to those affected. Detailed arrangements for the State Emergency Response Plan establish roles and responsibilities of key agencies. The strength of the Plan is its ability to draw upon a wide diversity of public and private organisations. The plan includes state and regional components, combined with municipal level aspects. It predetermines and establishes approaches and incident control in advance, so resources and personnel can be allocated quickly and efficiently. The State Emergency Response Plan (SERP) outlines these arrangements for coordinated response by all agencies with a role or responsibility in relation to emergency response. This is set out in the Emergency Management Manual Victoria (Emergency Management Victoria, 2016).

Under the SERP a number of priorities underpin decisions during emergencies. These include the following:

- protection and preservation of life is paramount and includes:
 - safety of emergency response personnel and
 - safety of community members including vulnerable community members and visitors/tourists;
- issuing of community information and community warnings detailing incident information that is timely, relevant and tailored to assist community members make informed decisions about their safety;
- protection of critical infrastructure and community assets that support community resilience;
- protection of residential property as a place of primary residence;



- protection of assets supporting individual livelihoods and economic production that supports individual and community financial sustainability;
- protection of environmental and conservation assets that considers the cultural, biodiversity, and social values of the environment.

A clear hierarchy of response activities is set out across state, regional and incident tiers. These are oriented to the efficient coordination of activities in response and the management of consequences, and to a limited extent to recovery as it relates directly to response. FIGURE 19 below shows the team structure approach employed at each tier during recovery.

	<i>Primary function supported by the team</i>			
	Control	Response coordination		Relief and recovery coordination
		Communications	Consequence management	
State tier	State Coordination Team			
	State Control Team	Emergency Management Joint Public Information Committee	State Emergency Management Team	State Relief and Recovery Team
Regional tier	Regional Control Team	Regional Emergency Management Team		Regional Recovery Planning Committee or equivalent*
Incident tier	Incident Management Team (major emergencies)	Incident Emergency Management Team (major emergencies)		Municipal Recovery Planning Committee or equivalent*
	Incident Emergency Management Team (non-major emergencies)			

FIGURE 19. TEAM STRUCTURE APPROACH (EMERGENCY MANAGEMENT VICTORIA, 2015)

Recovery

Recovery is defined in the 2013 Emergency Act (State Parliament of Victoria, 2016) as ‘the assisting of persons and communities affected by emergencies to achieve a proper and effective level of functioning’. Recovery requires cooperation between government, NGOs, community agencies, the private sector, the community affected and any emergent organisations. Recovery processes seek to consider the following:

- people and their emotional, social, spiritual, financial and physical wellbeing as individuals and communities
- economic environments
- built environments
- natural environments, and
- agricultural environments (Emergency Management Victoria, 2015).

The primary document setting out roles, responsibilities, and processes is the State Emergency Relief and Recovery Plan (SERP). This sets out arrangements for coordinated planning and management of emergency relief and recovery in Victoria. *Relief* is understood as the provision of assistance to meet the essential needs of individuals, families and communities during and in the immediate



aftermath of an emergency. Recovery is 'the assisting of persons and communities affected by emergencies to achieve an effective level of functioning' (Emergency Management Victoria, 2015).

Core Principles in the State Emergency Relief and Recovery Plan (2015) include an emphasis on response, relief and recovery occurring in parallel as understandings of the situation develop; relief and recovery being based on ongoing assessments of consequences; a community focus; shared responsibility; and, agencies and parties acting using their own recovery plans and capabilities.

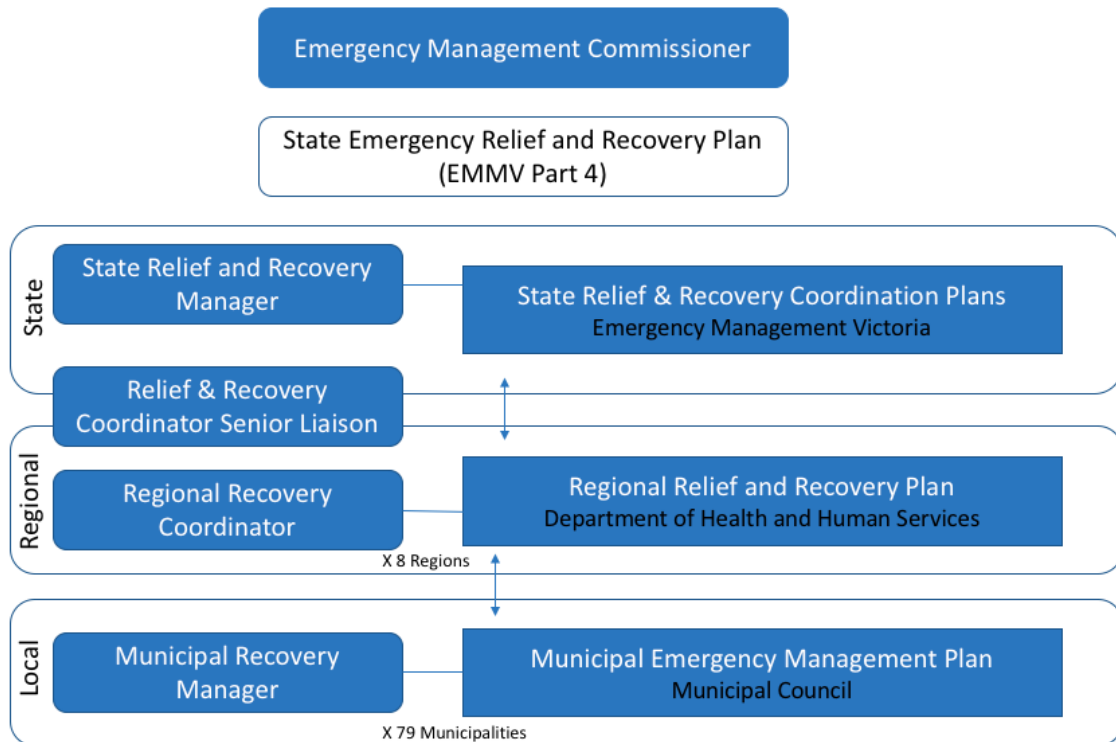


FIGURE 20. VICTORIAN LEVELS OF RECOVERY COORDINATION (EMERGENCY MANAGEMENT VICTORIA, 2015).

Functional areas provide a focus for recovery activities that is oriented to specific needs. They bring together related activities. The functional areas shown below in FIGURE 20, include functional areas and responsible agencies.

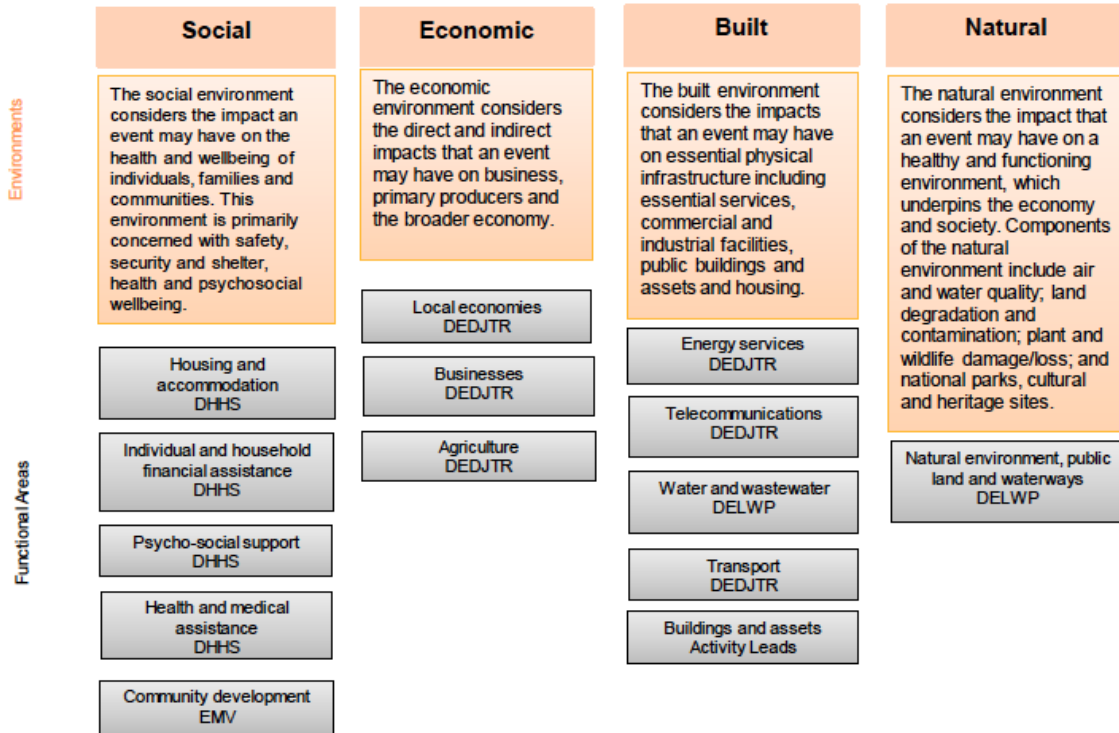


FIGURE 21. RECOVERY ENVIRONMENTS AND FUNCTIONAL AREAS (EMERGENCY MANAGEMENT VICTORIA, 2015).

Urban Planning

Urban planning in Victoria has its statutory basis in the Planning and Environment Act (State Parliament of Victoria, 1987). The act sets out powers and responsibilities that relate to urban planning and a range of related agencies and parties.

At state level, Urban Planning is one of 13 functions within the Department of Land, Environment, Water and Planning (DELWP). The Minister for Planning retains oversight and responsibility for the planning functions within DELWP. Other planning and related agencies in Victoria include local municipalities, which are allocated a range of powers and responsibilities via many acts, notably including the Planning and Environment Act (State Parliament of Victoria, 1987) and the Local Government Act (State Parliament of Victoria, 1989). The Victorian Planning Authority (VPA) is an Agency that collaborates with local government and other government agencies, landowners and developers to strategically plan and facilitate change in particular areas as diverse as inner and middle Melbourne, growth areas and in regional cities.

The Minister for Planning, as well as being responsible for Planning functions within DELWP, has a number of roles and responsibilities under the Planning and Environment Act (1987). Development Victoria is the state government's development agency. Regional Development Victoria (RDV) is the state's lead agency with responsibility for the development of rural and regional Victoria. Oversight of RDV is provided by the Minister for Regional Development. Victoria is divided into five regions, each with a Director and Strategic Growth Plans. Additionally, Plan Melbourne provides overall strategic direction for Melbourne.

A fundamental aspect of the planning system in Victoria is the deployment of a standard basis for all planning schemes described as the Victoria Planning Provisions (VPP) under section 4A of the Planning and Environment Act (State Parliament of Victoria, 1987). The VPP include eight key components: the State Planning Provisions (SPPF), Local Planning Provisions (LPPF), Zones, Overlays, Particular Provisions, General Provisions, Definitions and Incorporated Documents. The effect of this



is that there is considerable consistency across planning schemes, based on many elements being identical across municipalities, while the main differences between local authorities is in their choice to use various zones and overlays, even while these are largely pre-prepared at state level in any case. FIGURE 22 below shows the main elements of the VPP, including elements that may be varied to a limited extent.

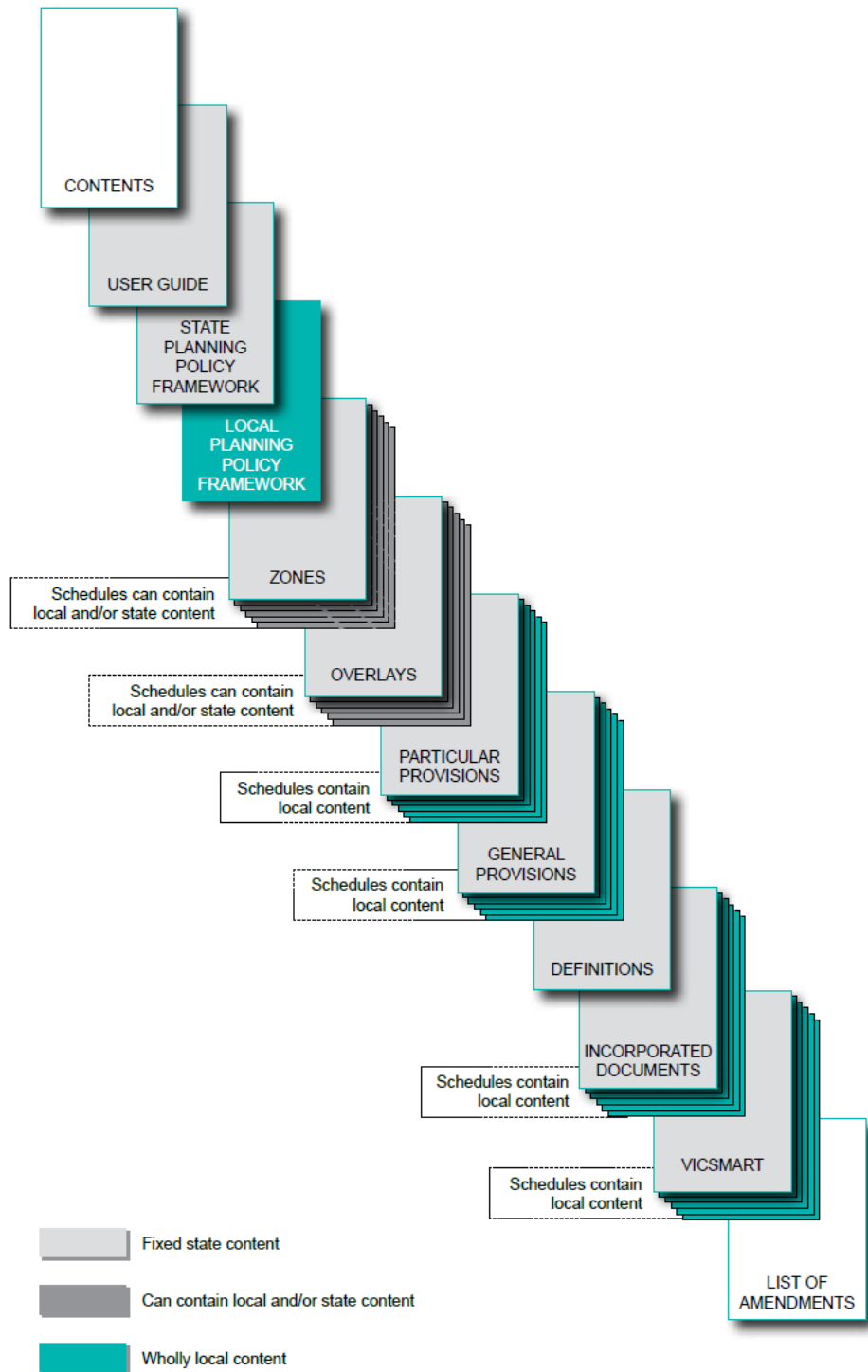


FIGURE 22. KEY COMPONENTS OF THE VICTORIA PLANNING PROVISIONS (STATE GOVERNMENT OF VICTORIA, 2015, P. 9)

All land in Victoria is affected by a planning scheme, the majority of which are administered by local governments. Planning schemes, when adopted by local government have two main




components. First, the text, which is based on the VPPs, adapted to local circumstances as appropriate. The second is the maps, which are required to include all land in a municipality in a Zone derived from the VPPs, and Overlays, which are optional, but may also be multiple as required by local need or circumstance. While the SPPF and LPPF are important policy documents, the primary "force" of decision making is dependent on the impacts that zones and overlays have on facilitating, modifying or prohibiting certain types of land use or development in any given location. Overall, zones are the basis for making decisions on the activities that may occur on land, and overlays determine the type of building, demolition, vegetation removal (or retention) and any other factors that involve modifying the appearance of the land.

Two main processes occur in urban planning, as set out in the Planning and Environment Act (State Parliament of Victoria, 1987). The first is the preparation and amendment of planning schemes; and, second is the processing and making of decisions relating to permit applications. Importantly, according to section 7 of the Act, all planning schemes must comply with the state government VPP format. This means that all Planning Authorities (usually local government) must comply with the state government framework. Second, in the processing of permits and enforcement of planning schemes, decisions must be made in accordance with the Planning Scheme. Accordingly, the responsibilities of local government are considerable, even while their level of autonomy is limited by state-imposed provisions, aimed at providing consistency and relative efficiency.

A number of key risk management elements are included in the urban planning processes and policy and regulations of Victorian Planning. These are shown in summary in FIGURE 23 below.

Hazard	Element
State Level	
All Hazards	<p>Planning and Environment Act (1987) 4 Objectives (1) The objectives of planning in Victoria are— ... (c) to secure a pleasant, efficient and safe working, living and recreational environment for all Victorians and visitors to Victoria ... (e) to protect public utilities and other assets and enable the orderly provision and co-ordination of public utilities and other facilities for the benefit of the community ... (2) The objectives of the planning framework established by this Act are— (a) to ensure sound, strategic planning and co-ordinated action at State, regional and municipal levels</p> <p>6 What can a planning scheme provide for? (2) Without limiting subsection (1), a planning scheme may— ... (e) regulate or prohibit any use or development in hazardous areas or in areas which are likely to become hazardous areas...</p>
All Hazards	<p>SPPF 10.01 Integrated Decision Making Planning authorities and responsible authorities should endeavour to integrate the range of policies relevant to the issues to be determined and balance conflicting objectives in favour of net community benefit and sustainable development for the benefit of present and future generations. However, in bushfire affected areas, planning authorities and responsible authorities must prioritise the protection of human life over all other policy considerations. 11.02-1 Supply of urban land - Decisions must acknowledge the limits of land capability and natural hazards and environmental quality. 11.06 Sustainability and resilience - Mitigate exposure to natural hazards and adapt to the impacts of climate change. 11.07-1 Regional planning. Climate change, natural hazards and community safety: Respond to the impacts of climate change and natural hazards and promote community.</p>
Flood, Coastal Inundation and Erosion	<p>11.02-2 Structure planning take into account floodplain risks 13.02-1 Floodplain management 13.01 Climate change impacts, including Coastal inundation and erosion Avoid development in identified coastal hazard areas susceptible to inundation (both river and coastal), erosion, landslip/landslide, acid sulphate soils, bushfire and geotechnical risk.</p>



Landslip & Erosion	13.03-2 Erosion and landslip
Soils	13.03 Soil Degradation 13.03-1 Use of contaminated and potentially contaminated land 13.03-3 Salinity
Noise & Air	13.04-1 Noise abatement 13.04-2 Air quality
Bushfire	13.05-1 Bushfire planning strategies and principles and Priority of Human Life
Zones & Overlays	
Food & Inundation	37.03 Urban Floodway Zone 44.03 Floodway Overlay 44.05 Special Building Overlay 44.04 Land Subject to Inundation Overlay
Bushfire	44.06 Bushfire Management Overlay
Particular Provisions	
Bushfire	52.17-7 Table of exemptions for permit (Bushfire Veg Clearing) 52.38 2009 Bushfire recovery 52.39 2009 Bushfire – replacement buildings 52.47 Planning for Bushfire- Bushfire Management Overlay (In parallel with the Building Control relating Bushfire Prone Areas AS3959) 52.48 Bushfire protection: Exemptions
Flood	56.07-4 Urban run-off management objectives
General Provisions	
Flood and Bushfire	65.01 Approval of an Application or Plan - General Consideration of: flood and fire to minimise hazard.
Bushfire	65.02 Approval of an Application to Subdivide Land (includes consideration of fire risk and spread)
Practice Notes, Codes, Guides and Ministerial Directions	
Flood and Coastal Issues	PPN11: Applying for a planning permit under the flood provisions PPN12: Applying the flood provisions in planning schemes PPN53: Managing Coastal Hazards and the Coastal Impacts of Climate Change
Soils	PPN30: Potentially Contaminated Land Ministerial Direction No.1 Potentially Contaminated Land Ministerial Direction No. 13 Managing Coastal Hazards and the Coastal Impacts of Climate Change
Bushfire	PPN64: Local planning for bushfire protection AN33: Amendment VC83 - Community Fire Refuge and Private Bushfire Shelter Exemptions AN39: Amendment VC83 - Bushfire protection - Vegetation Exemptions AN40: Amendment VC83 - Bushfire Protection Planning Provisions AN46: Bushfire Management Overlay Mapping Methodology and Criteria AN62: VC119 Bushfire replacement buildings AN68: Bushfire State Planning Policy VC140 Code of Practice for Bushfire Management on Public Land, 2012 VC101 Building in bushfire-prone areas - CSIRO & Standards Australia (SAA HB36-1993), May 1993

FIGURE 23. KEY NATURAL HAZARD INSTRUMENTS IN VICTORIAN URBAN PLANNING SCHEMES

Integration

The integration of Victorian urban planning and natural hazard mitigation is varied across hazards and agencies. It includes a range of aspects that are worthy of further corroboration, investigation and consideration.

Coverage of all hazards across NHM and Urban Planning in Victoria is not comprehensive. The traditionally recognised hazards such as bushfire and flood receive considerably more emphasis than the other hazards that are within the scope of this project: storm, cyclone, heatwave, earthquake and tsunami. While this is clearly an aspect of the risk profiles that have developed in Victoria over time, it does mean that a number of built environment aspects are not dealt with.

In comparative terms, numerous policies, regulations and treatments are offered for bushfire, many exist for flood, but heatwave, earthquake and earthquake receive no mention. Some limited high-level policy commentary is included within the Victoria Planning Provisions relating to erosion, climate change, landslip and storm surge, but this is not matched with comprehensive regulation or treatments.



The **integration of actions between and within agencies** during plan-making processes is largely undertaken on a project by project basis, based on historical legacy and the impetus provided by events such as the 2009 Victorian Bushfires. In the case of bushfire, the policy and permit processes manifest in the VPPs have been established and modified over time by project groups within DELWP (or previous equivalents) in consultation with other key stakeholders. Putting aside any commentary regarding the efficacy of the controls themselves, it is notable that in plan-making phases any changes to policy, regulation and processes have consistently been undertaken via "extraordinary" processes using Section 20 (4) of the Planning and Environment Act (State Parliament of Victoria, 1987). These are significantly truncated processes in terms of wider opportunities for consultation. Wider risk-based assessment processes and decision-making rationales are not published or explained in relation to these.

For bushfire and flood, during plan-implementation processes (assessment of subdivision and development permit applications) there are greater amounts of interagency integration, but it is largely undertaken on a site by site basis based upon formalised referral processes set out in planning schemes at Clause 66.03. For example, in the Urban Floodway Zone, Clause 37.03-5 "Referral of applications" states:

An application must be referred to the relevant floodplain management authority under Section 55 of the Act unless, in the opinion of the responsible authority, the proposal satisfies requirements or conditions previously agreed in writing between the responsible authority and the floodplain management authority.

It is noteworthy that the powers allocated to referral Authorities vary between Recommending (not binding on decision maker) and Determining (binding).

While there is currently little regional planning of note in Victoria, it is understood that there are developments currently being undertaken that seek to improve integration relating to risk management and urban planning. At local government level, it was noted in end-user discussions that there is significant variation between local authorities in terms of internal and external integration, often based on resourcing. In particular, it was noted that strategic (forward) planning considerations regarding risks were often not integrated with the range of other planning concerns and pressures for land release and protection of environmental values.

Treatment Options

Internationally, a wide range of treatment options are available via planning and other mechanisms. In this report, these are categorised in terms of the two inter-related categorisations between types of planning instruments, and risk reduction approaches as summarised in FIGURE 24 below.

It is apparent that in the Victorian case, there are many areas of potential activity which are not maximised.

Victorian urban planning is inherently oriented towards consideration of future circumstances but currently seeks to do this mainly via regulatory mechanisms. In terms of actions across each phase of the Prevention, Response, Recovery (PRR) cycle urban planning and the Built Environment has limited representation and involvement. At state level there is careful allocation of roles across PRR at state, regional and local tiers of governance. However, there are few points at which urban planning or the built environment are allocated roles that could bring to bear the full potential of urban planning. It is significant that in each of the role allocation relating to urban planning, the built environment, DELWP (understanding the multiple roles played by DELWP) and Municipal Council, there are few opportunities for risk based PPR activities that do not assume the built environment to be static.



		Planning Instruments				
		Agenda, Projects	Law, Policy & Regulation	Vision	Designs, Masterplan	Strategic
General Risk Reduction Approaches	Overall assessment and example	Financial allocations to fund projects or actions. Eg mapping and research to identify flood risk	Zones, overlays and Buildings Codes	Evidence based development of overall agreed principles and approaches	Detailed design of a settlement's road patterns to achieve community resilience	Development & implementation of an overall risk assessment & management program that brings about ongoing improvement and change
	Avoidance of exposure to hazards					
	Reduction of hazard impacts or exposure <i>in situ</i>					
	<i>In situ</i> reduction or increased resistance <i>in situ</i>					
	Improve response					
	Improve recovery					

Assessment	Current Utilisation Level
Limited Use	
Medium Use	
High Use	

FIGURE 24. OVERALL ASSESSMENT OF POTENTIAL PLANNING MECHANISM USE.

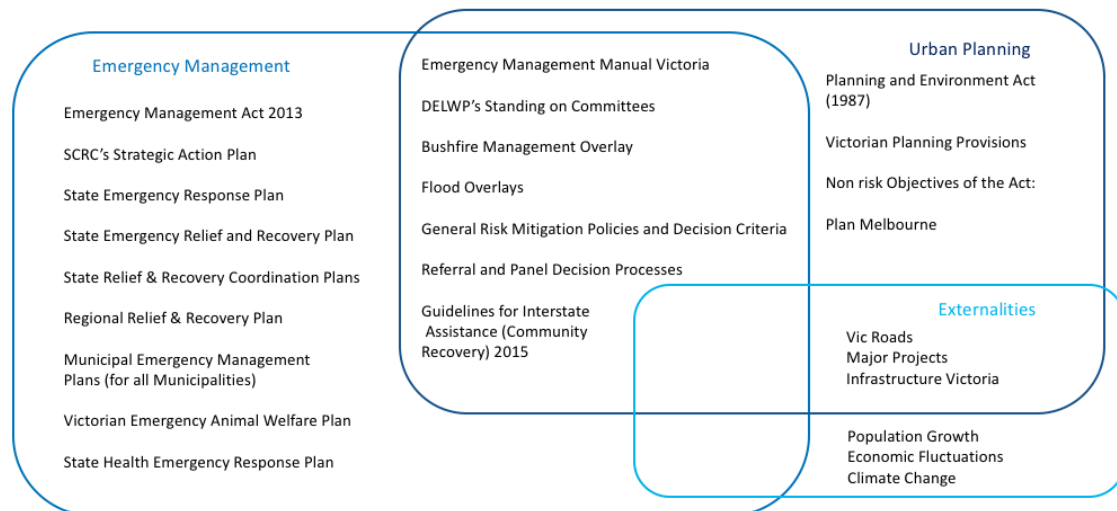


FIGURE 25. SUMMARY OF INTEGRATION OF EMERGENCY MANAGEMENT AND URBAN PLANNING. SOURCE: AUTHORS.



ISSUES

SUMMARY OF ISSUES

A range of issues, concerns and possibilities became apparent in this phase of the research. These are listed below.

- Finding ways to match planning and risk assessment processes of decisions making, determining acceptable risk, timing, decision criteria and terms of reference, so that key decision points converge, including within large agencies. This may also be associated with a lack of transparency.
- The need for forums at appropriate levels that provide opportunities to consider risks associated with a range of strategic directions and operations.
- A need to use a wider range of planning tools. Specifically, there is need to use: strategic planning, and for it to be sequenced more appropriately; financial approaches, to deal with issues such as buy-back in a comprehensive and planned way; *redesigned* overall settlement approaches that allow remediation of identified problems such as road patterns, lot sizes; Actions across the whole range of PPRR.
- Ensuring that key terms are common across NHM and Planning. Urban planning currently uses a range of terms such as hazard and resilience inconsistently.
- The removal from, or application of different planning and risk assessment treatments to, major, extraordinary, fast tracked or other large or significant projects.
- Funding allocation for projects not being coordinated between risk assessment, urban planning and treatments or projects.
- Long-term thinking about risks, the environment and human demographic changes not being included in key forward planning processes.
- A lack of ideals and overarching approaches to be used in urban planning that acknowledge risk assessment, strategic decisions and treatments.
- Uncertainty regarding the scope of capability and the "proper" role of local authorities or municipalities in risk management.
- A relative lack of attention to and consideration of equity and diverse levels of capability in risk profiles, in spatial, cultural and social terms.
- Exclusion of transport and infrastructure and other fundamental aspects of the built environment from consideration and input to processes across the spectrum.
- Challenges associated with increased political and ministerial executive control of urban planning and related agencies.
- Some hazards and risks-scapes paid less heed: heatwave, landslip, storm, food security, and environmental crisis.
- Incrementally increasing density settlements are not accounted for.



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APPENDICES

APPENDIX 1: WORKSHOP WITH VICTORIAN END-USERS IN MELBOURNE 5TH MARCH AND 13TH MARCH 2018: SUMMARY OF KEY FINDINGS

A recurrent topic that emerged during the workshops was the current **lack of a platform for collaboration and shared decision-making at the strategic level¹¹ that is formalised** and allows integration of Urban Planning and Emergency Management agencies. That was linked with a **lack of inter-agency and inter-groups communication** for the establishment and implementation of a shared vision for Natural Hazard Mitigation. There is apparently a **lack of ongoing conversation around integration** that seems to be linked with a **lack of understanding of the need to integrate** by some of the involved parties.

To end-users, **differences in time scales** for action within **urban planning (more long-term)** and **emergency management (mostly focused on immediate response)** also challenged integration, along with a lack of integrated values and priorities that also tend to change as governments change. Differences in **scope of responsibilities** and sometimes **differences in terminology and base definitions** upon which different agencies operate were also highlighted as relevant challenges. Differences in terminology are seen as interference, because **many concepts are taken for granted and may have different meanings for different agencies**. Overall, there seems to be different thinking frameworks in operation within urban planning and emergency management.

Within that scenario, the very **understanding of Natural Hazard Mitigation** was pointed by end-users as still lacking proper framing to accommodate concepts such as **shared responsibility in light of differences in vulnerability**. While **emergency management** traditional assumption of natural hazards as inevitable leads to greater **focus on response** and not so much on prevention, **urban planning's** conventional understandings of risk and hazard are not linked with strategic thinking, rather with operational issues, such as the location of fire stations and refuges.

Climate change effect on the frequency and severity of natural hazards and emerging **resilience thinking** and approaches shaping current policies were pointed as relevant **drivers** that could push agencies towards **integration**. They would highlight the **need of holistic** approaches that **expand understanding of agencies' roles in terms of natural hazard mitigation while emphasizing the need for all-hazards approaches**. In the case of emergency management agencies, resilience thinking seems to help reassure the need to further integrate prevention and build-back-better recovery with preparedness and response, hence emphasizing the importance of natural hazard mitigation. In the case of planning, it seems to hold the potential to integrate natural hazard mitigation into broader policies within the social, economic and environmental spectrums. Overall, climate change adaptation was regarded as an example of attempted integration.

Blurred roles and responsibilities in regard to natural hazard mitigation was also pointed as a challenge that needs to be addressed, deriving from its **multi-level nature and complexity**. Those, coupled with changes of government were identified as inhibitors to the progress of existing attempts to integration. It was suggested that the establishment of a **high level strategic body to champion integration of natural hazard mitigation in urban planning and emergency management**

¹¹ However, it was pointed that a greater level of integration between Urban Planning and Emergency Management tends to happen at an operational level, mostly within the State Emergency Management Team. Additionally, VCAT was recognized as an arena for the encounter of different agencies, although EM's PPRR does not influence what happens in VCAT, only planning regulations do.



would be a promising avenue to guarantee the development and implementation of a strategy for integration. End-users pointed the **shift from a National Strategy for Disaster Resilience into a National Vulnerability Strategy** arising from relocation of Emergency Management to the newly created Department of Home Affairs at the Commonwealth level as an example of possible **lack of continuity**.

In terms of being **multi-level**, natural hazard mitigation was understood as being most challenging at the **metropolitan level**, mostly due to the **lack of administrative arrangements** applicable to that level. On the other hand, the regional level was acknowledged as being dealt with by **regional emergency management arrangements**, although not necessarily aligned with urban planning ones.

The establishment of **integrated governance building on a shared vision and informed by a decision support system** was understood as a pathway to cope with a highly influential political overlay exercised by greater executive control of agencies by ministers. Decisions on land release for urban growth was cited as an example of this challenge.

Within Urban Planning, the acknowledgement that natural hazard mitigation requires different, but integrated approaches to **green field** and **developed areas** was also raised. Urban planning was also acknowledged as holding the potential to hold a broader view and act on areas that are crucial to **urban resilience** so as to decrease their **vulnerability to natural hazards** and therefore contain the potential for catastrophic outcomes such as the **food supply of metropolitan areas**. This would be especially useful when it comes to **multi-hazards and cascading effects** (e.g. on the workshop: combination of heatwave and power outage).

Current urban planning initiatives of which emergency management agencies would like to collaborate include: Bushfire Settlement Edge Project, Safer Together, Smart Planning, Ridge Areas?

Questions arising during the workshop include:

- Do **agencies' roles and functions need reviewing?**
- Is there a need for **models of integration?**
- Is there a need to establish **focal points for integration** in each agency?

Post 2009, the **Municipal Association of Victoria – MAV** gained prominence and got to be a member of the State Crisis and Resilience Council. More recently, the **Victorian Local Government Association** has regained proximity to **Emergency Management Victoria – EMV**.

Overall, agencies can be part of strategic, coordination and operation groups. According to participants of the workshop, the following are the main stakeholders related to Urban Planning and Natural Hazard Mitigation in Victoria: CFA, SES, MFB, Vic Police, EMV, LGV, MAV, DELWP, NGOs, Environmental organisations, State Crisis and Resilience Council, Departments of Infrastructure, transport and housing, and communities.

Challenges include how to **bring stakeholders together** in a **multi-level structure of state, regional and municipal areas**, especially those in the same levels. A related opportunity is the potential to use **soft and hard approaches to engagement** which is something already in place in some cases.

Overall, there is a perception that **roles need to be better defined** and integration, as dependent on ongoing engagement and communication, **suffers from government changes** that reflect on changes of policies and priorities. Integration seems to be highly dependent on political will. In terms of communication, the **media is perceived as having a relevant role** to play in the implementation of Integrated Urban Planning for Natural Hazard Mitigation.



While there is a perception of a **lack of an agent driving an all-hazards approach**, there are **operational forums that are EM focused and that integrate all-of-DELWP around all-hazards themes**. Albeit extremely important, actions on **the mitigation of cascading effects and multi-hazards are still on their infancy**. Overall, there is an **emphasis on bushfire and flood**. Another important platform for integration is the Department of Justice's **Risk and Resilience Committee**.

There is a perception that **EMV** is getting more active in policy areas and its **Regional Planning Forums are perceived as holding potential** to increase integration within the regional level.

Listed as a requirement by the Emergency Management Act 2013, **Emergency Management Planning Guidelines** are being developed by Emergency Management Victoria and constitute an important **opportunity** for the integration of Urban Planning and Natural Hazard Mitigation.

By focusing on the community and the emergency management sector itself, the **Community Resilience Framework for Emergency Management** helps to include natural hazard mitigation to the focus of Emergency Management, opening up opportunities for Integrated Urban Planning for Natural Hazard Mitigation by considering that "emergency managers should aim to strength and encourage [...] sustainable built and natural environment" (page 5) in communities among other resilience characteristics.

Integrated Urban Planning for Natural Hazard Mitigation is regarded as dependent on the **identification of high risk areas and critical infrastructure** that could drive the definition and implementation of **Restructure Overlays** that could guide processes of **infrastructure relocation and buy-back schemes**.

There seems to be a perception of a **lack of inclusion of planning agents in the discussions around Natural Hazard Mitigation in the Emergency Management Sector** and, **when it comes to DELWP**, that part of the problem is related to the **lack of Financial and Human Resources to attend meetings and be more involved**. This perception is also linked with whether planning is visible enough. Current **reviews of the effectiveness of planning** bring a potential for change that could better position planning as integrated to natural hazard mitigation in Victoria.

Also relevant to the integration of Urban Planning and Natural Hazard Mitigation in Victoria are the **National Disaster Resilience Program** funding as well as the **Victorian Fire Management Strategy**.

APPENDIX 2: WORKSHOP WITH SOUTH AUSTRALIAN END-USERS IN ADELAIDE 14TH MARCH 2018: SUMMARY OF KEY FINDINGS

Compared to the Victorian Case, in which the planning system has been standardized across state from late 1990s, the South Australian planning system is still fragmented and decentralized, with local government defining their own sets of zones and overlays. To address the question, a **Planning Reform** is currently underway, aiming for a new Planning, Development and Infrastructure Act – PDI Act. The process of **reforming the Act opens up opportunities** for a more comprehensive integration of Natural Hazard Mitigation into the South Australian Planning System that could reach local governments in a more consistent way. It also provides the opportunity to establish and strengthen communication channels among urban planning and Emergency Management agencies focused on Natural Hazard Mitigation. The **need for an all-hazards approach was identified by the group of end-users as an important element of integration that is still lacking state-wide institutional arrangements**, there currently being different levels of attention to different hazards, according to the different levels of risk they pose. Overall, the different tiers and instruments of Urban Planning (Visionary, Strategic, Statutory, etc.) do not seem to be integrated when it comes to Natural Hazard Mitigation. This way, there seems to be a **lack of horizontal and vertical integration** that needs to be addressed.



Reforms in the **Emergency Management Act** have meant that it now **incorporates Local Governments and gives State Emergency Management Plans the necessary legislative weight.**

Multi-level planning covering state, regional and local levels are in place in South Australia **both within the domains of Urban Planning and Emergency Management Planning.** However, these are not necessarily connected. An example is the **disconnection** between Greater Metropolitan and Regional Planning and Emergency Management Regional Assessment Boards.

As Councils normally **lack the financial resources** to invest in Natural Hazard Mitigation infrastructure, they tend to push for **decentralized solutions** such as Water Sensitive Urban Design to be carried out by private developments. Overall, end-users understand some **roles are still blurred**, leading to **gaps and overlapping of tasks** that need to be addressed in integrating Urban Planning to Natural Hazard Mitigation.

The **11 Emergency Management Zones** defined for South Australian Mitigation and Preparedness **do not necessarily align with related Urban Planning Zones and Overlays.**

Mapping of hazard risk is an area of great potential for integration between environmental, urban planning and emergency management agencies. As well as **a lack of consistency** in mapping approaches, there is also the question of **data interoperability** that needs to be looked into. This **misalignment** greatly interferes with the implementation of Natural Hazard Mitigation.

Infrastructure projects being **exempt from planning applications** pose a challenge to Natural Hazard Mitigation as some infrastructure can lead to new risks or increase existing ones at the same time they may be critical and subject to adverse impacts brought about by Natural Hazards.

Different **values** inherently linked with Environmental, Planning and Emergency Management Agencies can interfere with integration, the same being true for specific terminology and definitions used by these same agencies. The question of areas being mapped as **Bushfire Prone versus** the identification of **risk associated with bushfire** is an example of that.

The emergence of the concept of **resilience** and its incorporation into the charter of Emergency Management agencies is understood as an opportunity for greater integration of Urban Planning and Emergency Management through Natural Hazard Mitigation. In parallel, **Climate Change** is also understood as pushing for integration.

Finally, end-users acknowledge the relevance of the **National Level** in terms of **COAG, ANZEMC**, the **National Strategy for Disaster Resilience** and the Land Use Planning and Building Codes Taskforce in attempting to integrate Urban Planning and Natural Hazard Mitigation but agree that **the lack of a Planning Ministers' Council does not help the matter to advance further.**