Cities for Climate Protection Australia
Adaptation Initiative

Local Government Climate Change Adaptation Toolkit

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Local Governments for Sustainability

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Introduction

Over 220 councils in Australia are actively pursuing strategies to reduce their corporate and community greenhouse gas emissions through the Cities for Climate Protection[1] (CCP) program. While councils have devoted significant time and resources over the past decade to reducing anthropogenic greenhouse gas emissions, they have only recently begun efforts to apply internal risk management systems to prepare for predicted climatic change and variability.

Acknowledging complexity and uncertainty as relevant dimensions in policy and decision-making regarding the management of climate change impacts requires a high level of sophistication from the risk management process and those involved. Although councils have systems to deal with change in the short term, planning rarely incorporates predictions for climatic variations in the medium to long term.

Adaptation is not just about the risks to be endured due to climate variability. As the climate is changing so too is the operating environment for councils. Council decision-making processes (e.g. decision matrices, planning processes and cross-council teams) need to support and strengthen the capacity of staff to identify inherent opportunities that arise from change, as well as the risks. This will ensure that council staff are not passive observers with reactive responses to emerging climate change impacts, but are proactively building capacity to harness opportunities and mitigate risks. ICLEI Oceania has been working with councils to build such capacity through the delivery of its CCP Adaptation Initiative, which benefits from the learnings of the CCP Program and the Australian Government's risk management work.

ICLEI Oceania, in delivering the CCP Adaptation Initiative, has focused on developing councils' capacity to apply a risk management process in order to plan for the impacts of climate change. The focus of the initiative in its first year was to examine internal processes that councils rely upon to make decisions to ensure they are well suited to process and act upon the complex, changing and uncertain data involved with climate change projections and scenarios. This focus was due to:

- The acknowledgement that new information – given the increasing attention being paid to the local impacts of climate change and the significant commitment of funding for scientific research in this area – will emerge regularly throughout the coming decades.
- The understanding that councils are currently ill-equipped to make decisions based on data ranges with varying levels of confidence, qualitative inputs and outputs, projections rather than historical/current data, and a lack of perfect information.

The result of the first year's work on the initiative is this toolkit, which includes tools and exercises tested by five pilot councils (Bayside City Council; Hornsby Shire Council; Shire of Serpentine Jarrahdale; City of Sydney; and Townsville City Council, including the former Thuringowa City Council) and reviewed by several observer councils. The tools and exercises are designed to help councils navigate through an enhanced risk management process (see Sections 2–7), or adaptive management process, in a way that helps them identify aspects of their internal decision-making processes that need to be enhanced to appropriately and routinely plan for the impacts of climate change, as well as to generate and implement a plan to manage the risks and harness the opportunities identified as

[1] Cities for Climate Protection (CCP) Australia: implementing greenhouse action through a collaboration between the Australian Government and ICLEI Oceania. The CCP Australia program is funded by the Australian Government.

priorities for their municipalities. Councils are free to utilise any or all of these tools and exercises as they progress through the adaptive management process. It is important to note, however, that the process outlined in this toolkit will require a significant input of time and commitment from the councils using it as it is designed to build capacity throughout council with high levels of involvement and interaction.

The process in this toolkit challenges councils to learn how to operate in a changing, complex and uncertain environment. Councils using the toolkit are encouraged to adopt and commit to the following set of guiding principles:

- **Balance of immediate and long-term needs:** Acknowledge that climate change impacts will continue to take shape over the long term based on our actions today, but they are already emerging. Councils must, therefore, ensure their approach is one that finds a balance between immediate and long-term needs.
- **Interaction must be supplemented with action:** Acknowledge that the transboundary nature and complexity of climate change impacts means that many stakeholders will need to act to develop a robust approach to managing those impacts, yet the coordination of a large number of stakeholders can be daunting. Councils must, therefore, commit to driving this initiative by identifying and following through on the actions they can undertake themselves or directly influence without getting sidetracked by the role or held back by the inaction of other stakeholders.
- **Commitment to act in the face of uncertainty:** Acknowledge the tendency to not act until perfect information is available, and the reality that perfect information on the impacts of climate change will never truly be available as climate change scenarios are being revised and improved regularly. Councils must therefore commit to an approach that enables staff to make decisions in the face of uncertainty.

As these guiding principles suggest, individual capacity building is an important aspect to this process alongside council capacity building. The CCP Adaptation Initiative instituted an individual development component, *The Art of Being Adaptive*, alongside the council capacity building component. Although it requires an expert facilitator (see Section 8), this individual development component is encouraged for the creativity, clarity and courage that it embeds in council staff working through the adaptive management process.

This toolkit is intended to build councils' capacity to make decisions using, rather than to generate, scientific data/projections or climate change impact models. Councils using the Toolkit are advised to access scientific data/projections and climate change impact models that are relevant to their municipality through other initiatives, such as the Australian Government's *Integrated Assessments*.

Glossary

Term	Definition
Adaptive management	Adaptive management integrates research into action through testing assumptions in order to adapt and learn. Testing assumptions refers to systematically trying different actions to achieve a desired outcome. The first key is systematically – it's not trying actions on a trial-and-error basis. Rather, it's looking at the underlying root of the issue and placing that in the council's context, and developing a set of assumptions based on that context – in this case a set of assumptions on how climate change will impact your municipality and what you can do to manage those impacts. Council staff can then test those actions and monitor the results, comparing them against the initial assumptions. The second key to adaptive management is to practise adaptation – it's to be adaptive. That means taking action based on observations and revisiting assumptions to determine if they are right or wrong or if the context has changed. The third key – learning – prevents adaptive management from becoming a trial-and-error approach. Documenting learning helps to avoid making the same mistakes multiple times, as well as to draw linkages between actions and results to constantly improve approaches.
Assumption	An assumption is a proposition that is taken for granted or is treated, for the sake of a given discussion, as if it is known to be true. In business planning and business plans, an assumption is an assertion about some characteristic of the future that underlies the current operations or plans of an organisation.
Ideal outcome	This is the state that you want your council to achieve if the adaptation project is successful. For example, council is resilient/adaptive to increased intensity of extreme weather events. Used in conceptual models.
Issue	Issues, in this case, are overarching changes predicted to be brought on by climate change. Examples include: sea-level rise, increasing temperatures, decreasing rainfall and increasing intensity/occurrence of extreme weather events.

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Tool 5: Adaptive Management Scoping Worksheet
Tool 6: Social Contract Template
Tool 7: Issue Brief and Direct Impacts
Tool 8: Conceptual Modelling Exercise and Example
Tool 9: Support Letter
Tool 10: Barriers Document
Tool 11: Risk Assessment Scenario Worksheet
Tool 12: Action Planning Workshop Template
Tool 13: Assumptions Worksheet
Tool 14: Action Plan Template

1 Background

1.1 The Cities for Climate Protection Adaptation Initiative

As the climate is changing so too are the challenges facing councils. In this changing world, councils need to enhance their capacity to anticipate and respond to this change, harness opportunities and manage risks, while helping their communities adapt to the impacts of climate change. The Department of Climate Change, formerly the Australian Greenhouse Office, has developed a risk management guide, *Climate Change Impacts & Risk Management: A Guide for Business and Government* (CCIRM), which details a process for councils to use to adapt to the local impacts of climate change.

ICLEI Oceania has used the CCIRM risk management process as the basis for the Cities for Climate Protection (CCP) Adaptation Initiative. The initiative is focused on helping councils navigate the complexity and uncertainty inherent in making decisions based on climate change impact scenarios in order to plan for and manage the impacts of climate change.

The initiative specifically helps council decision-makers understand and apply the information provided in climate change scenarios to assess a wide variety of risks/opportunities. It is designed to build internal capacity of both the council and its staff to manage the local impacts of climate change. This capacity includes the ability to:

- Make decisions and plan in the face of complexity and uncertainty
- Identify, assess, prioritise and manage risks related to climate change
- Engage their communities in risk management processes
- Ensure transparency in making and communicating decisions on risk treatment options and implementation plans
- Foster leadership and culture change in council to ensure the development of a strategic approach to managing high-priority risks/opportunities.

ICLEI Oceania has added some components to the CCIRM risk management process in recognition of the complexity of the issues that councils will encounter when dealing with the environmental, social and economic impacts of climate change. The process outlined in this document based on those added components is an adaptive management process. The main additions are:

- A focus on not just risks but also on identifying, analysing and evaluating opportunities
- A layer of building in and testing assumptions that will ensure councils examine the information and internal processes they use to determine if they are well suited to identify, assess and treat the risks/opportunities relevant to their municipality
- Adaptive management considerations that provide a robust perspective for adapting and learning throughout the adaptive management process
- A parallel process (The Art of Being Adaptive) to the adaptive management process that focuses on cultivating the adaptive qualities of mind of council staff that influence how they are placed to adapt (or not) to complex, ambiguous problems such as climate change.

Acknowledging that councils are not, in themselves, climate or environmental experts, the initiative has created a network that links councils with topical experts, who will inform the climate change impact scenarios and options for managing the identified risks/opportunities.

Five councils – Bayside City Council, Hornsby Shire Council, Shire of Serpentine Jarrahdale, City of Sydney and Townsville City Council (including the former Thuringowa City Council) – have tested this adaptive management process by participating in the Adaptation Initiative pilot project (2007–08). Throughout the pilot project these councils have adhered to a set of guiding principles (Exhibit 1.1), added shape and context to the adaptive management process and provided valuable information regarding the development of tools to be utilised alongside the process. The tangible output of their participation in the pilot project, and of the CCP Adaptation Initiative as a whole, is this toolkit.

Exhibit 1.1: CCP Adaptation Initiative guiding principles and individual skills

The initiative includes a set of guiding principles that are integral to councils' success:

- ***Balance of immediate and long-term needs:*** This acknowledges that climate change impacts will continue to take shape over the long term based on our actions today. And yet some of the impacts are being seen today. Therefore, councils need to ensure that their approaches strike a balance between immediate and long-term needs.
- ***Interaction must be supplemented with action:*** Because climate change impacts 'are not restricted to simple council or municipality borders, adaptation approaches demand that councils interact with a range of stakeholders. The initiative focuses on councils' role. Acknowledging this focus, councils must commit to driving the process. This means that councils will identify and follow through on the actions they have the leverage to undertake.
- ***Commitment to act in the face of uncertainty:*** Although climate change and impact scenarios are being improved regularly, they will always contain some level of uncertainty. Therefore, councils must commit to developing and following approaches that enable them to make decisions in the face of uncertainty.

Skills that council staff need to develop to apply these principles are:

- ***Clarity****:* Of what they want to accomplish and how they plan to get there
- ***Creativity****:* In how they deal with the complexity of climate change impacts
- ***Courage****:* In terms of their ability to take action in the face of uncertainty.

Additional skills that have proven extremely useful for councils undertaking this process include:

- ***Collaboration:*** In terms of how open staff are to seek out and utilise others' knowledge
- ***Learning:*** In terms of examining the council's underlying assumptions and outcomes and identifying opportunities to improve its approach
- ***Leadership:*** In terms of the staff's ability to provide strategic guidance when decisions are difficult, and strong governance throughout the process.

1.2 Climate Change Impacts & Risk Management *guide*

The Australian Government has stated that councils have an important role to play, in partnership with the private sector and communities, in adapting to the impacts of climate change. This is evidenced by the National Biodiversity and Climate Change Action Plan, which is endorsed by the Australian, state and territory governments. The Australian Government's National Climate Change Adaptation Programme supports work in the areas of understanding implications, identifying the impact of climate change from a planning and operational perspective, and developing options to manage vulnerability.

ICLEI Oceania supports the commitment of the Australian Government to identify and understand the risks/opportunities facing councils as a result of climate change impacts, as well as the commitment to developing options for managing vulnerability. This toolkit supports councils to undertake risk assessments and develop and implement action plans relevant to the priority risk and opportunity areas identified by councils. The toolkit also supports the Australian Government's policy and commitments by ensuring the included materials complement the Australian Government's publication, *Climate Change Impacts & Risk Management: A Guide for Business and Government*.

The CCIRM guide and other resources can be found on the Australian Government Department of Climate Change (DCC) website.

- **Australian Government Department of Climate Change website:** www.climatechange.gov.au/impacts/index.html

- ***Climate Change Impacts & Risk Management: A Guide for Business and Government*** **(publication):** www.climatechange.gov.au/impacts/publications/pubs/risk-management.pdf [Risk-management.pdf – 677 KB]

- **Climate change projections for Australia:** www.climatechange.gov.au/impacts/projections/index.html

- **Historical climate trends:** www.climatechange.gov.au/impacts/trends/index.html

- **Likely climate change impacts:** www.climatechange.gov.au/impacts/overview.html

- ***Climate Change Adaptation Actions for Local Government*** **publication:** www.climatechange.gov.au/impacts/publications/pubs/local-government.pdf [Local-Government.pdf – 1021 KB].

1.3 The Toolkit

Councils across Australia are expanding their focus on climate change mitigation to consider adaptation as they are witnessing the impacts of climate change in their, or neighboring, municipalities. The impacts they are seeing have a significant bearing on resource management, infrastructure, emergency preparedness and community services such as health and economic development. These are all areas in which local government has a significant role and influence. It is clear that local government must be able to identify and understand the risks/opportunities in their municipalities associated with climate change, assess those risks and learn how to best manage, or even benefit from them. Many councils share the concern that adapting to the impacts of climate change will require them to plan, make decisions, set policies and implement actions based on complex and uncertain scenarios. Fostering this ability in councils requires a sophisticated adaptive management process and creative and courageous staff to carry out the process.

The adaptive management process that is presented in this toolkit merges the Australian Government's risk management framework with the capacity building frameworks that ICLEI Oceania has developed over the years of supporting CCP councils. As noted in the Introduction, the process in this toolkit is designed to build councils' capacity to make decisions using, rather than generating, scientific projections or climate change impact models. The capacity to make decisions includes:

- Councils' internal processes and tools that support their staff when making decisions
- The internal council leadership to support the development of coordinated and strategic approaches to the management of high-priority risks
- Council staff's individual ability to deal with complexity and uncertainty, to apply information to understand and manage risks/opportunities, to engage internal and external stakeholders in adaptive management processes and to act in a transparent manner
- Council's ability to capture lessons from the implementation and review of its adaptation action plans and to enhance the internal processes and tools that led to the development of those action plans based on those lessons.

This capacity should encompass the full range of council responsibilities when planning for climate change impacts, including resource management, land-use planning, infrastructure and transport planning, local economic development, environmental management, community issues and emergency services.

This toolkit, which should be used alongside the *Climate Change Impacts & Risk Management* guide, outlines an adaptive management process and provides a set of tools and exercises meant to assist councils as they work through the process. These resources are established to assist councils to:

- Establish an interdisciplinary approach to information gathering for the development of climate change scenarios
- Identify their current risk management systems in light of how appropriate they are to guide decisions in an environment with complex, changing inputs
- Examine climate change scenarios and projections to understand the potential impacts climate change may have on councils and their communities, and the associated risks/opportunities

- Analyse, evaluate and prioritise the risks/opportunities identified by council according to its local and regional context, adaptive capacity and the likelihood and consequence of each risk/opportunity
- Explore treatment options for the prioritised risks/opportunities to develop an adaptation action plan
- Establish strategies for monitoring the implementation of the adaptation action plan and reviewing its outcomes
- Build the personal capacity of participants to deal with complexity and uncertainty.

This toolkit is organised according to the adaptive management process (see Sections 3–7), with each section covering a different phase in the process. It outlines how and when to use each of the included tools as a complement to the adaptive management process. As the tools are voluntary components of the adaptive management process and each tool is designed for specific needs, individual councils will need to determine which of the tools are appropriate for its particular use. The tools range from simple and self-directed templates to more complex exercises that are best delivered by an experienced facilitator, whether within or external to council. They are as follows:

1. Council Questionnaire *(self-directed)*
2. Planning Workshop Template *(facilitator required)*
3. Tools Worksheet *(facilitator encouraged as part of planning workshop)*
4. Stakeholder Identification Worksheet *(facilitator encouraged as part of planning workshop)*
5. Adaptive Management Scoping Worksheet *(facilitator encouraged as part of planning workshop)*
6. Social Contract Template *(facilitator encouraged as part of planning workshop)*
7. Issue Brief and Direct Impacts *(self-directed)*
8. Conceptual Modelling Exercise and Example *(facilitator encouraged)*
9. Support Letter *(self-directed)*
10. Barriers Document *(self-directed)*
11. Risk Assessment Scenario Worksheet *(self-directed)*
12. Action Planning Workshop Template *(facilitator required)*
13. Assumptions Worksheet *(facilitator highly encouraged)*
14. Action Plan Template *(self-directed)*

The toolkit includes information on the purpose, type (delivery method) and considerations for each tool (see Sections 3–7) in order to help each council select the appropriate tools.

2 Overview of the Adaptive Management Process

2.1 Enhanced Adaptive Management Process

This toolkit is designed to complement the risk management process outlined in the Australian Government's *Climate Change Impacts & Risk Management* (CCIRM) guide. Additional components – Identification/Assessment/Evaluation of Opportunities, Adaptive Management (including Assumptions) and Conceptual Modelling – are added to the process outlined in the CCIRM guide in recognition of the complexity and uncertainty that councils will encounter when dealing with and planning for the environmental, social and economic impacts of climate change. Two additional components are added to the process for the purposes of this toolkit and the included resources. The Opportunities component was added primarily to acknowledge that the impacts of climate change might actually create some positive opportunities and systems must be developed to harness those. The Adaptive Management, Assumptions and Conceptual Modelling components are largely drawn from various conservation/sustainability arenas where practitioners regularly manage complex, changing environments.

2.1.1 Opportunities

Councils using this toolkit are encouraged to expand the scope of their risk management process to include not just the identification, analysis and evaluation of risks, but also of opportunities that may emerge as a result of climate change impacts in particular municipalities. The inclusion of opportunities is in recognition that there may be some benefits that emerge from or are inherent with the impacts of climate change, whether that exists through technological or economic development or from better suited ecosystem services. The opportunities may be external or internal; environmental, social and/or economic; and may range from enhanced habitats to economic development gains to greater community support/presence to a strong sense of collaboration and commitment to strategic vision across council.

This component is important in that the benefits gained through harnessing opportunities can be useful to keep momentum and spirit up at councils through what is often a daunting and sombre process. This is a relatively simple component in that, whenever council identifies or assesses risks, it is encouraged to also consider opportunities. The relevant risk identification/analysis tools included in this toolkit include prompts for consideration of opportunities.

2.1.2 Adaptive management

Adaptive management has been used in conservation circles for years and is similar to step-by-step processes such as risk management processes, the CCP Milestone Framework and council-based processes for emergency preparedness. Adaptive management, which was developed in areas where nature, subsistence lifestyles, local economy and social structures are intertwined, provides a structure by which to examine complex issues in a robust manner and to make decisions when faced with uncertainty.

Adaptive management centres on three key principles: developing and utilising assumptions, being adaptive and learning. [2]

> *'Adaptive management incorporates research into … action. Specifically, it is the integration of design, management, and monitoring to systematically test assumptions in order to adapt and learn.*'
>
> Adaptive Management: A Tool for Conservation Practitioners

Developing and utilising assumptions

Testing assumptions within adaptive management includes systematically trying different actions to achieve a desired outcome; 'systematically' is the key, as it does not include implementing actions on a trial-and-error basis. The word 'assumptions' can sometimes be confusing. In the case of this adaptive management process, there are four types of assumptions that come into play.

- **Context assumptions:** These assumptions are used during the context and identification steps to set out why councils have chosen particular scenarios or information to use as the basis for their decision-making and why.
- **Process assumptions:** These assumptions are employed from the context step through the evaluation step to examine the applicability of councils' decision-making tools and processes for consideration of projection-based risks/opportunities.
- **Control assumptions:** These assumptions are employed during the analysis and evaluation steps, as well as at the action planning step, to identify where councils have direct and/or indirect leverage within the larger context of a particular impact in their municipality or region.
- **Action assumptions:** These assumptions are used during the option and action plan development steps to investigate what conditions need to be in place for particular actions to lead to specific ideal outcomes.

Using assumptions to establish context includes clearly identifying what scenarios councils will be using to identify and analyse the risks/opportunities. For instance, councils may choose a mid-level scenario from the most recent CSIRO/BoM report because it marries an 'acceptable' level of certainty from a respected scientific body or a high-level scenario from a local university that includes impacts already emerging in councils' municipalities. Whichever scenarios councils select, they should include the reasoning behind those selections as the reasoning will be an important factor when transferring knowledge, and in showing that councils acted in good faith when making decisions if its actions are ever questioned.

Process and control assumptions are focused on ensuring councils understand the constraints and opportunities inherent in their attempt to plan for the impacts of climate change. Many existing, internal council decision-making processes do not provide the appropriate level of support or guidance to assist council staff to make decisions based on projections using a mix of qualitative and quantitative data that encompasses environmental, economic and social considerations. Councils must be aware of the constraints of their processes (e.g. insufficient weightings, no guidance on what constitutes

[2] These principles are outlined in a conservation guide, *Adaptive Management: A Tool for Conservation Practitioners*, developed by the Biodiversity Support Program (WWF) and The Nature Conservancy and written by Nick Salafsky, Richard Margoluis and Kent Redford. A copy of this guide is available online at www.worldwildlife.org/bsp.

'environmental impact' and planning thresholds that go out only 30 years for infrastructure projects that will last 70+ years) so that they may improve them and, in the meantime, plan around them. Assumptions can further be used to keep councils from getting overwhelmed by the complexity of climate change impacts in that councils (using the conceptual models, as described further in this section) can identify where they have direct and indirect leverage to influence (the response to) a particular impact. This is important when limiting the scope of work to the areas with the greatest chance for success.

Assumptions also come into play when establishing an action plan. These assumptions should outline the knowledge used to design individual actions; specifically, how will that action lead to the intended outcome. This involves not only drawing the immediate connection between the action and outcome, but also drawing out all of the intermediate steps/outcomes that need to happen in between the initial action and ideal outcome. One example would be that adoption of new drainage infrastructure standards would lead to a drainage system that can handle the runoff from four to six major rain events per year. However, the underlying assumptions would include that the standards are appropriate for the selected scenario, the engineers use the appropriate plans that meet the standards and the builders build the drainage system according to those specifications. Should the action fail to generate the ideal outcome, the problem may not be with the initial action and a simple review of each of the underlying assumptions would help isolate which are incorrect. The incorrect assumptions should help point to a solution or revised action to achieve that ideal outcome. The more intermediate steps or outcomes between the action and the ideal outcome, the more important it is to capture the underlying assumptions.

Assumptions allow councils to act at much lower confidence levels regarding information and decision-making inputs than the levels they have traditionally employed. Assumptions also allow them to establish actions based on outcomes rather than just relying on familiar approaches.

Being adaptive

'Adapting' within adaptive management means taking action based on observations and revisiting assumptions to determine how appropriate they are (e.g. are they right or wrong, were they executed effectively and is the overarching context the same). Adapting allows councils to focus on the root of particular issues rather than just the symptoms, and to change their assumptions and actions as new information becomes available, rather than being locked into a set of actions.

Learning

'Learning' within adaptive management is what prevents the process from becoming a trial-and-error approach. It requires councils to systematically document the process they go through and the results they achieve along the way and to map those against the underlying assumptions that are established at each step. This internal learning component is designed to help councils avoid making the same mistakes again. Learning helps to draw linkages between actions and results so that councils will constantly improve each time they practise it. Capturing internal learning is especially important in

guaranteeing continuity when turnover occurs – a condition that affects a significant number of councils. The external learning component, which encourages councils to share their learnings with other stakeholders in a similar context, enables the regional/national/global discourse on planning for climate change impacts to advance and new solutions to emerge based on shared knowledge.

Adaptive management principles

Dealing with and utilising assumptions, being adaptive and learning are core principles of the adaptive management process. As they may be new for many people, it may take a period of time before feeling comfortable with all of the related exercises. The following values, which can be referred to throughout the adaptive management process, may help during the transition period.

- **Do adaptive management yourself:** Be adaptive and ask this of all those who participate in this project.
- **Promote curiosity and innovation:** Create a space where staff feel free to share their ideas.
- **Value failures:** Make sure everyone involved knows that learning is important and that failures are valuable to learning.
- **Expect surprise (capitalise on crisis):** Trust in the system you develop. It will help you deal with surprises along the way.
- **Encourage personal growth:** Ensure you don't just gather information, but that you communicate with others throughout the process to help them learn along the way and value their inputs.
- **Create learning organisations and partnerships:** Don't just schedule in learning. Approach this entire process and each of the steps with the aim of learning; and build that into council wherever you can.
- **Contribute to global learning:** Lessons you learn through this process will be of use to others, just as you may rely on others for examples of best practice. Share your lessons with others in a similar context and capture information from them in return.
- **Practise the art of adaptive management:** Practise managing the adaptive management process according to all of these principles and let what you learn through it seep out into other parts of your work.

Endeavouring to follow these principles will place councils in a strong place to reap the benefits inherent with adaptive management, as outlined in Exhibit 2.1.2.

Exhibit 2.1.2: Environment for adaptive management

Building adaptive management into the risk management process is important because the conditions in which adaptive management works best align with the conditions inherent in planning for the impacts of climate change. Adaptive Management is most appropriate when dealing with the following conditions:

- **Complex systems:** The Earth's climate is a complex system that can be extremely difficult to understand, especially when considering how many aspects influence climate directly and indirectly. Adaptive management requires examining a range of factors (e.g. geophysical, social, political, economic and institutional) to understand the role of influences over the system and identify the best points for leverage. Adaptive management works well when immediate action is required. This is a major issue as there is still much to learn about climate change and its impacts, but to stem some issues and prevent the impacts from getting worse, appropriate actions need to be initiated now.
- **Constant and unpredictable change:** The impacts of climate change are, and will be for the foreseeable future, presented as ranges with varying levels of confidence that are revised (enhanced) on a regular basis. Adaptive management is useful when faced with constant and unpredictable change because it focuses on understanding a council's context rather than the change itself. The process and tenets of adaptive management are designed to capture lessons throughout, which enables making changes quickly yet in an informed manner. It provides room to look across various timelines (short- and long-term) and to make assumptions based on factors over which you exercise little, if any, direct control (e.g. political and social change).
- **'Competitors' changing and adapting:** New players are emerging in the climate change adaptation field. The adaptive management focus on individual or organisational context helps focus action, while maintaining room to engage relevant stakeholders and revise that context when opportunities emerge. The other 'competitive' component is that, although climate change adaptation is on everyone's lips at the moment, there may be another hot topic (e.g. emissions trading or the economy) that emerges and captures the attention of councils and key stakeholders. The focus of identifying stakeholders and an overarching context within adaptive management builds the relevant stakeholders – potential competitors – into the context as they emerge, which enables valuable linkages to be created rather than barriers.

Adaptive management's design is focused on learning by doing, so through taking action knowledge is enhanced. Although it is unlikely that anyone will have a full understanding of the entire climate system and what this means economically, environmentally and socially for specific municipalities, Adaptive management encourages action based on educated assumptions without having to wait until every last bit of information is available. It focuses on capturing lessons and assumptions to make decisions, take action and revise approaches along the way. The challenge is to stimulate novelty and build in flexibility to the process as success depends on the degree to which lessons influence behavior and action.

2.1.3 Conceptual modelling

Conceptual modelling is an exercise used by many people who practise adaptive management to help them understand their particular context as it relates to what they wish to manage. A conceptual model is basically a mind map that incorporates existing information on a particular topic – in this case, a particular climate change impact – including direct and indirect factors that influence the topic. For adaptive management processes, the conceptual models are maps of each impact and what environment would need to exist to ensure adaptability to the risks (and opportunities) that impact carries.

Conceptual models include an ideal outcome, the components of that ideal outcome, direct factors, indirect factors and general conditions. Arrows are drawn to show relationships between the factors/components and are based on assumptions that councils are making. This diagram/map will help councils identify where they have direct and indirect leverage, as well as little or no leverage, to influence the ideal outcome. This is a key to identify the scope of what actions councils can take.

Conceptual models are developed step-by-step, much in the same way that mind maps are generated. The first step is to identify the ideal outcome. This should focus on a particular impact and associated risks and what it would mean to overcome those risks. The next step – this is often the hardest – is to identify the components of that ideal outcome. Components are those things, whether physical or not, that need to be in place to achieve the outcome. The next focus is on including the direct and indirect factors. Direct factors are those things that directly influence or enable each component. Indirect factors are those things that influence the direct factors. These conceptual models often expand like a tree diagram, with the ideal outcome as the base of the tree and the indirect factors as the branches. The final addition to conceptual models are conditions, which are the larger, macro systems that can't be directly linked as an influence to any of the factors but that have some influence over the ability to reach the ideal outcome nonetheless. These will often be where the social conditions of the municipality or region emerge, such as poverty or sense of pride or public environmental awareness. The conditions would be the sky or ground in that tree diagram. The conceptual models often grow quite large, as they are not constrained solely to what councils have control over, but rather attempt to generate a robust view of what adaptability to the particular impact at the centre of the ideal outcome looks like.

Relationships between factors, components and the ideal outcome are extremely important in conceptual models. Arrows are drawn to show the relationships between indirect and direct factors, components and the ideal outcome. As individual factors may influence more than one other factor or component, multiple arrows may emerge from these factors. Stars are used to identify the points on the conceptual models in which councils have direct leverage, and indirect leverage points are marked with other symbols. The finished conceptual models – although they are often works-in-progress, growing over the course of an adaptive management process as more becomes known about particular impacts – can assist staff when visually communicating what a particular impact means to their councils. They are also useful in identifying, through the various symbols of leverage, where councils should focus their actions. More information on conceptual models can be found in Section 3.2.4.

Conceptual models help councils understand the scope of particular impacts while identifying where their particular leverage is in influencing them. They also help to identify factors for consideration and other stakeholders that can or should be engaged to work towards the desired outcome.

2.1.4 Other considerations

Although they are not core to the implementation of an adaptive management process, learning networks and individual development programs should be considered as parallel or complementary processes to enhance the effectiveness of council's adaptive management process.

Learning networks/communities of practice

Learning networks are groupings of organisations and individuals whose members act as a group (not as individuals) and work towards a common purpose. The members of the network agree to collect, share and analyse information relating to that common purpose – in this case adaptation strategies for climate change impacts. Working together across organisations encourages a higher level of learning and innovation than would emerge from an individual council's project.

While learning, network members receive several benefits, including:

- Guidance and capacity-building opportunities relating climate change adaptation strategies, adaptive management and impact scenarios. This includes input into how to manage, implement, monitor and analyse the progress of the process.
- Access to external support and resources that are developed by each network member.
- The opportunity to pool resources for a common interest or to implement a common action.
- The ability to contribute to a larger process, which will continually be improved, applying new context. As a clearinghouse for relevant practitioner guidance and timely adaptation information, the network should continually improve the process of identifying, analysing and managing climate change impacts.

The idea of a community of practice is a similar concept. It essentially is the process of group learning based on the collaboration of participants with a common interest. The goal of a community of practice is to share ideas, develop solutions to common problems and promote innovation.

As adaptive management processes often require councils to make decisions in ways that are completely new and unfamiliar to them, learning networks and communities of practice are beneficial in that they link councils together to share knowledge and navigate the process together. They can be instituted with other councils in their region or with a similar context, or their principles can be applied to cross-council teams to ensure commitment and a shared vision among all the involved staff. More information on the learning networks – through the use of a social contract – can be found in Section 3.2.2.

Parallel Learning

Parallel learning is useful when employing adaptive management frameworks in order to ensure that creativity in decision-making and adaptive thinking are not hampered. Parallel learning requires access to processes that stimulate creative thinking while utilising the traditional risk management framework. ICLEI Oceania, in consultation with Natalie McDonagh of McDonagh Designs, developed a parallel learning component, The Art of Being Adaptive. This is a (voluntary) process that can run parallel to the adaptive management process, developed in view of the importance of encouraging behaviour change when dealing with the complexity and uncertainty inherent with climate change impacts. More detail on this parallel learning process can be found in Section 8.1.

2.2 Process Outline and Diagram

The following is a simple, step-by-step overview of the process. A description of each of the steps of this adaptive management process is available in Sections 3–7 of this toolkit, as well as in the CCIRM guide.

Step 1: Establish the context

The first step in this process is to establish the context. This includes:

- Defining the objectives of the adaptive management process for council
- Identifying the relevant internal (council) and external stakeholders to engage throughout this process
- Establishing what success would look like to council as a result of undertaking the adaptive management process
- Identifying which climate change issues are of relevance to council to lay the groundwork for prioritising risks/opportunities in later steps.

This step is important in terms of establishing both the strategic vision that will serve as a guide for those involved in this adaptive management process and the operational plans that will ensure the accountability and thorough nature of the process.

Step 2: Identify the risks and opportunities

Once the context has been established, the risks/opportunities can be identified by examining the impacts facing a particular council, municipality or region. The council should begin this step by determining the appropriate climate change impact scenarios to use as a basis of this adaptive management process.

Step 3: Analyse the risks and opportunities

After identifying the risks/opportunities, analysis can be performed by:

- Examining the existing methods used at council for managing risks and harnessing opportunities; and
- Researching each of the risks/opportunities to better understand their social, environmental and economic costs and benefits.

This step is likely to involve consulting external stakeholders to provide information on the nature of the identified risks/opportunities.

Step 4: Evaluate the risks and opportunities

The information collected during the analysis step is used to evaluate the risks/opportunities. The analysis includes:

- Assigning each risk (and opportunity) a likelihood and consequence
- Establishing the highest-priority risks/opportunities using likelihood–consequence scales.

Additional layers, such as vulnerability or adaptive capacity, can be added as filters to the likelihood–consequence scales during the analysis step to better determine priority risks/opportunities.

Step 5: Develop options

Once the priority risks/opportunities are assigned, examine them further and develop assumptions on how each can be influenced:

- What factors might mitigate the risks?
- Who has direct and indirect control over the risks/opportunities?
- What would the assumed impact be of particular actions to treat the risks and harness the opportunities?

These assumptions should lead to the development of various treatment options for the risks (and opportunities) that are assigned a high priority in Step 4.

Step 6: Develop action/treatment plan

The thought processes of developing assumptions should be used to develop an adaptation action plan to treat risks and harness opportunities. Ensure various options for achieving ideal outcomes related to each risk and opportunity are considered and a clear implementation path is established. Each action should include guidance as to who will implement each action, what resources are needed and when each action should be implemented.

Step 7: Implement the adaptation action plan

Once the adaptation action plan has been established, endorsed by the chief executive officer and approved by the council, implement the actions according to the schedule set out in that plan.

Step 8: Review progress

This step will overlap somewhat with the implementation phase. It is important to monitor progress towards ideal outcomes throughout the implementation process as set forth in the monitoring and review section of the adaptation action plan.

Step 9: Revise the adaptation action plan

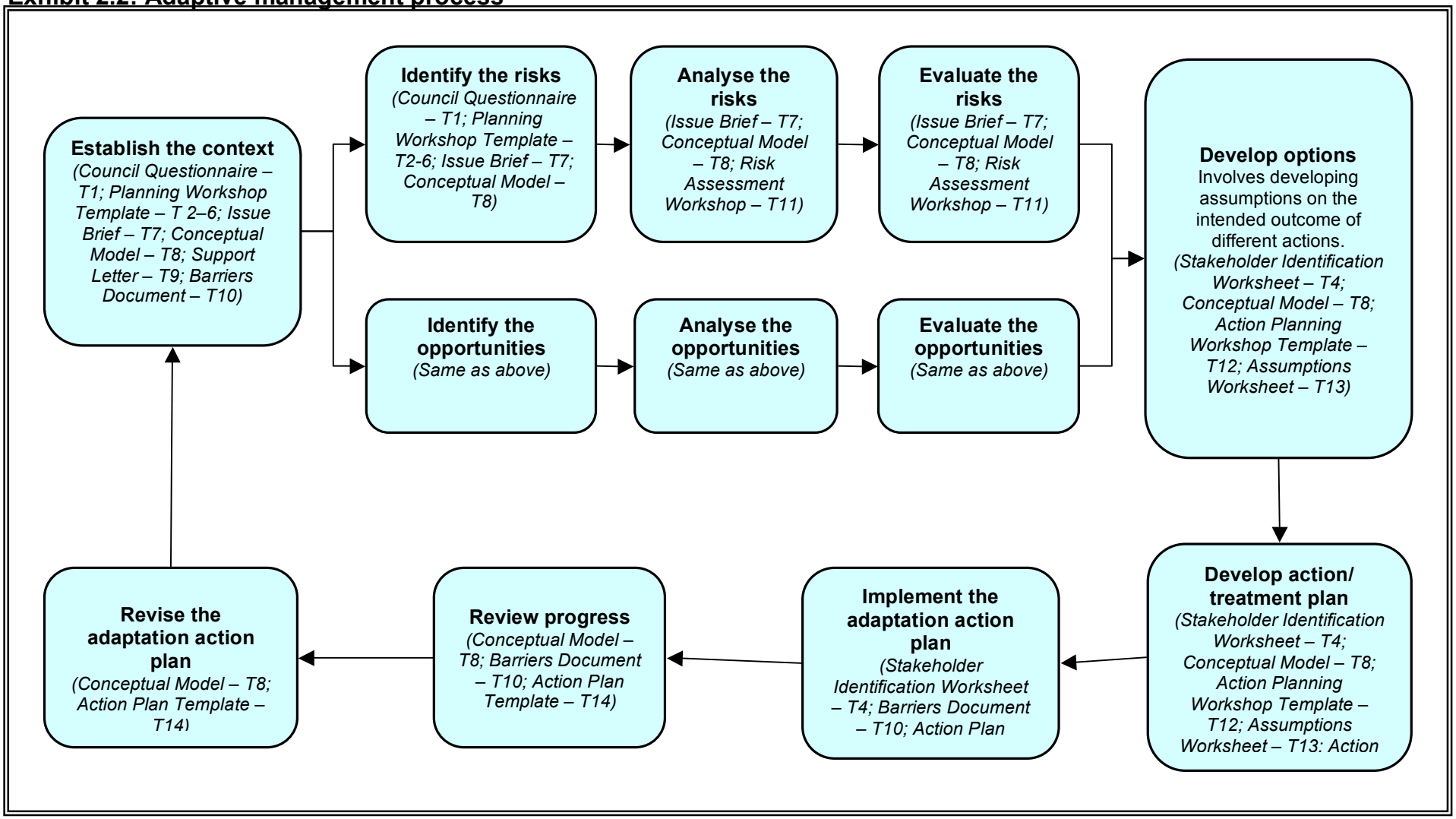
Take what you learn from the progress review and revise your adaptation action plan as necessary. For those actions that have not been successful in achieving the desired outcome, revisit the relevant assumptions when considering how to revise each action.

Repeat

This process should become a cycle. The priority of risks/opportunities may change over time, so making this type of process business as usual will help ensure council isn't caught off guard.

The diagram in Exhibit 2.2 illustrates the adaptive management process inspired by the CCIRM guide.

Exhibit 2.2: Adaptive management process

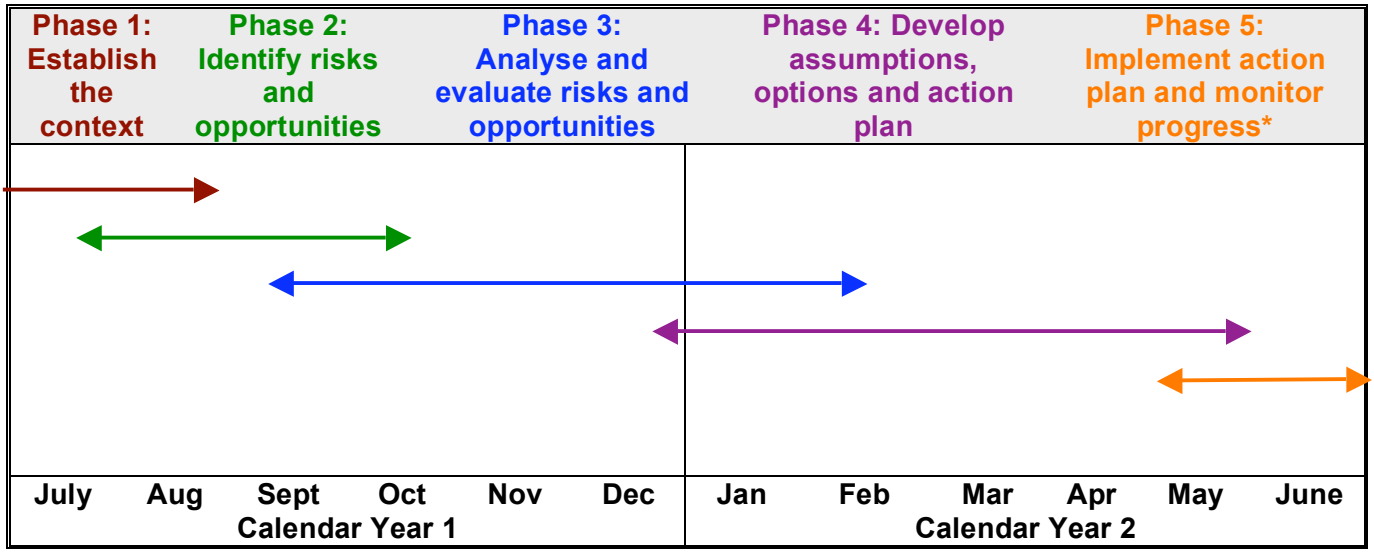


The text in italics refers to the tools that can be used at the particular step. The T number refers to the number of that particular tool.

2.3 Example Scope and Timeline

As several of the steps listed in Section 2.1 overlap, the overarching process used by councils participating in the CCP Adaptation Initiative pilot project collapsed the steps into five phases of work, as shown in Exhibit 2.3. This is a sample timeline based on the time it took for the pilot councils to work their way through the adaptive management process and should only be used as a guide. The amount of information available, previous work on related projects and internal resources available would all affect how long this process will take to complete for individual councils.

Exhibit 2.3: Adaptive management process sample timeline



** The implement action plan and monitor progress phase will go well beyond the first year of the process. This varies by council and is guided by the individual council action plans.*

2.4 Resources Checklist

The following is a brief list of resources that are useful for councils wishing to undertake this adaptive management process. It provides an indication of the key inputs for this process:

- A strategic vision and operational plan for the adaptive management process that includes an outline of where the appropriate responsibility and authority rests
- Dedicated staff from both the environment and risk/asset management departments to lead the adaptive management process
- High-level commitment (from CEO, mayor or council) highlighting the importance of – and supporting cross-council contribution to – the adaptive management process
- Dedicated resources for conducting workshops to bring key stakeholders together at key points throughout the process
- Discretionary funds available for securing localised information (e.g. impact scenarios, computer models and data files) and other inputs to the process
- Examples of all internal decision-making processes and tools (e.g. decision matrices, weighting matrices) related to risk management and adaptive management
- Access to climate change impact scenarios (e.g. *Climate Change in Australia* by CSIRO).

2.5 Lessons to Remember

The process and tools in the toolkit have been tested and reviewed by pilot and observer councils. Several lessons emerged from the testing of these resources, which are useful for other councils to review before starting their own adaptive management process. The main lessons learned can be split into several categories, including scenarios, decision-making or information management, state and local links and the overarching adaptive management process.

Scenarios

Initially the councils have difficulty in determining which scenarios to use. Although CSIRO has taken the IPCC projections and made them more specific to Australia, there is still significant variance from the least extreme scenario at the highest confidence level and the most extreme scenario at the lowest confidence level. Given that minimal precedents are established related to the liability issues surrounding climate change impacts in Australia, councils – especially individuals within council – are reticent to select one particular scenario upon which to base their decisions. Until a recognised body promotes the use of particular scenarios for local planning purposes, local governments will need to establish grounds and a process by which they can select particular scenarios as the basis for their decisions and planning. They will also need to build their capacity to identify and analyse new impact projections, models and scenarios so that the appropriate information can be used to enhance their decision-making.

Decision-making

Although councils are familiar with risk management and have regular systems in place for decision-making, those systems are not comprehensive enough for adaptation approaches. This is true even in councils using best practice triple-bottom-line processes. Often the planning thresholds for strategic plans and infrastructure development don't go out far enough to properly consider some of the long-term impacts, such as differing flood events due in the next 10–20 years versus the next 50–75 years. This is especially true when a number of such events might occur a few times in the current planning threshold, but might extend to frequent occurrences in the long term. Getting planning thresholds right is important when developing actions that will have a long life (e.g. major infrastructure developments).

Decisions are often made using historical or current data rather than projections. This is often because of the desire to use tested and true data, rather than what is seen as a 'guess'. However, especially in the case of major infrastructure investment, using historical data without factoring in projections could easily lead councils down the wrong path. A related decision-making aspect is weighting criteria. This is one area where councils vary considerably. For all of them, economic factors make up the bulk of weighting. However, they do consider environmental – and to a lesser extent, social – factors to varying degrees. Yet, the guidance on what constitutes those social and environmental factors is often patchy or non-existent.

Councils should ensure there is a process to provide clear guidance on what constitutes social, economic and environmental criteria for decision-making, how to weigh the criteria appropriately and how to identify successful outcomes. Councils will also need to learn how to adjust the way they measure and communicate impacts from purely quantitative outputs/outcomes to a mix of quantitative and qualitative outcomes.

One of the biggest barriers for councils is managing and processing information. Either councils don't feel they have enough information and hold off on making any decisions, or they have too much information or it is too complex and they become overwhelmed. Councils need to determine which information they will trust and what/how much information they actually need to make a proper decision.

Finally, there is a sense that full commitment of staff to the adaptive management process and the resulting decisions might not be appropriately supported across council because there is often a culture of work being guided by clearly measurable key performance indicators rather than by the actual outcome, which may be qualitative/hard to measure. Councils have indicated that they could benefit during this process from room for innovation being built into their roles.

State–local links

Council experience in environmental planning leads to some apprehension. Legislation, planning roles and guidance are not always consistent between local and state levels. Therefore, local government might be taking what it considers to be a strong adaptive approach in its planning, but this may be reversed by state authorities. This is mostly an issue of planning regulations and powers, but does highlight a need for a strong collaborative process between councils and state governments to ensure a shared planning vision.

Funding is another barrier at the nexus of local and state, as well as federal, levels. Although local government budgets have traditionally been expected to cover many of the things that will emerge from adaptation action plans – especially infrastructure improvements – the changes that will be necessary will exceed what they have traditionally been given. This highlights the need for advocacy and a strong relationship between state and local governments to ensure funding is efficient and effective and key actions can be implemented.

Overarching process

In addition to the lessons that emerge at specific phases of the adaptive management process, several lessons emerge from the overall process. The adaptive management process – unlike the traditional CCP Milestone Framework – needs a different timescale from traditional risk management processes. As climate change scenarios and projections change and new information becomes available regularly, councils will not have the luxury of taking a long time between gathering information and making decisions. From establishing the context to setting out an action plan that needs to happen quickly (e.g. six months) or it won't happen; councils taking longer will get stuck in an information loop. These plans can be adjusted – in fact that is the purpose behind building in the adaptive management components – but they do need to be established. Getting from the inventory to the action plan in CCP would normally take 1–3 years. However, the implementation can often happen faster in CCP as opposed to on adaptation. So, although councils should be acting on mitigation and adaptation at the same time, the steps that councils go through will not be parallel.

Councils indicate a strong need to have integration and involvement across all or most of council throughout this process. Getting individuals to the table from such a wide range of departments across the councils has been difficult initially, but once they are at the table

staff make the connection to the work they are doing and sometimes they even become champions. The integration is especially important at key points in making sure everyone is consulted and bringing them in the room together for key discussions. This integration leads to robust responses and an understanding of the connections to be made across council. It is especially important because:

- It manages expectations when the involved stakeholders understand the immensity of preparing for climate change impacts while understanding the role they play within the wider council response
- It provides an opportunity for individuals to share what they actually do/are responsible for, leading to a renewed sense of pride and spirit of cooperation and ownership
- It allows individuals to share strategies for getting around departmental barriers.

A positive and unexpected outcome happens in that individuals think they might actually be able to get past barriers that have existed in their role for quite some time due to this process.

Councils highlight that it is not enough to just work through a step-by-step process in an isolated manner. They appreciate guidance from external stakeholders and a process that challenges them to develop an approach that is as robust and robust as possible.

3 Phase 1 – Establish the Context

3.1 Introduction

Establishing the context is an important phase to ensure that the adaptive management process is robust, thorough and accurate, and that the resulting adaptation action plan is targeted and straightforward to implement. It sets out the mandate for the process within council's strategic vision so as to secure a high level of support and integration across council. It also creates a clear vision of success and a common understanding of the process necessary to achieve that success.

The main purpose of establishing the context is to identify which impacts of climate change the council deems of primary importance and to lay the groundwork for identifying the priority risks/opportunities that might result from those impacts. This can be accomplished by undertaking the following tasks.

- Establish a team to direct the adaptive management process. This team should be given an understanding of what their responsibilities and authority are to direct the process. The high level of interaction across council dictates that the team should have the appropriate authority to secure participation. The potential implications for the way council operates in terms of changes to decision-making and other fundamental internal processes requires a commitment to accountability and strong governance from the team.

- Identify (at an initial level) existing council and community resources, including:
  - Internal stakeholders with responsibility for management of climate change impacts such as infrastructure and the built environment, public communications, natural resources, sports grounds, economic development and emergency services
  - Council priorities related to climate change impacts, as indicated in guidance documents like strategic and annual plans, or in public statements by the council (elected officials), mayor and CEO
  - Council decision-making processes, such as decision matrices and weighting guidelines
  - Existing research, such as local/regional climate change impact scenarios, strategic plans, risk management studies and plans and geographic information system (GIS) models of natural processes (e.g. flood levels and bushfire paths)
  - Existing relationships with external stakeholders, such as regional alliances of councils, environmental and other community groups, universities, local businesses, industry associations, insurance agencies, scientific research bodies and other levels of government.

  This can be done using numerous methods, including staff surveys and internal research. The material should be captured and collated in an easily accessible form for use throughout the process.

- Identify gaps in existing resources and additional research into the nature of those gaps: which (priority) gaps need to be resolved before starting the adaptive management process and strategies to close those key gaps. Ensure that a limit is established as to how much information is actually required at each phase of this process. Additional information can always be collected as it becomes relevant, but stay focused to avoid being overwhelmed by information.

- Identify or develop a method or tool to capture valuable lessons, strategies and assumptions throughout this process. This information should be easily accessible to all staff working on this process.

- Decide whether this (climate change adaptation) adaptive management process should build on existing council processes, or whether it should be treated as a separate process. Either way, a clear plan for the process should be established, including:
  - The individuals within council who have responsibility for driving the process
  - The timeline for completion of the process, including specific milestones for each phase
  - The inputs that are to be used throughout the process
  - The council resources available to be used during the delivery of the process
  - The departments/individuals to be engaged throughout each phase of the process.

- Develop communications to inform staff, council leaders and key stakeholders about the process and why it is of relevance to them. This could involve simple tools such as announcements in council newsletters or information briefs, or more intensive tools such as information sessions and workshops or task forces.

Outputs

The potential outputs for this phase include:

- An adaptive management process communications brief (informal or formal). There might be multiple versions of this depending on the needs of each audience.

- A list of existing resources, including the relevance of each resource and how it can be accessed.

- A lessons and/or resources database/tool.

- Draft versions of the council questionnaire, issue briefs, conceptual models and a letter of support from the elected officials/chief executive officer.

3.2 Tools

To assist council to establish its particular context, the following tools have been developed. Examples taken from the CCP Adaptation Initiative pilot project are included for some of the tools based on where pilot councils have indicated examples are beneficial.

Note that these tools should accompany the guidance provided in Section 4 (pages 26–42) in the *Climate Change Impacts & Risk Management* guide. Section 8 (pages 61–65) of the guide may also be useful during this phase.

3.2.1 Tool 1 – Council Questionnaire

Purpose: The Council Questionnaire (Tool 1) is a simple tool to use in the lead-up to a launch or planning workshop (see Section 3.2.2). It is designed as a preliminary examination of council's context in relation to the impacts of climate change. The questionnaire includes sections on council expectations, an initial identification of potential local impacts and an examination of those impacts and the council's internal planning and decision-making processes.

Type: Off-the-shelf/Self-directed

Considerations: This questionnaire should be used as an input to the planning workshop so that council-specific examples can be presented. In order to be used in this manner, it should be distributed to participants approximately 2–3 weeks prior to the workshop with a due date of 1 week prior to the workshop.

The questionnaire allows an initial examination of potential impacts and internal decision-making structures/processes. The responses should be based on the knowledge already held at council, as opposed to being based on an intensive phase of research. The questionnaire should take only a couple of hours to complete, at most.

Additional tools such as Issue Briefs (see Section 3.2.3) and Conceptual Modelling (see Section 3.2.4) have been created to lead council through a more in-depth examination of the impacts and decision-making structures and processes following the planning workshop.

3.2.2 Tool 2 – Planning Workshop Template

Purpose: The Planning Workshop Template (Tool 2) is the pdf version of a presentation to be used as an introduction to the adaptive management process. It provides background on the approach and scope for conducting an adaptive management process, as well as several activities to get council started.

Type: Facilitator-led. The facilitator may be a council staff member or an external facilitator. This person should have the ability to convey ideas and lessons to a diverse audience and should be familiar with adaptive management, mind mapping/conceptual modelling and/or spheres of influence/stakeholder identification.

The Facilitator has the ability to pick and choose from sessions that use the following tools:

Tool 3 – Tools Worksheet: This activity (Tool 3) is designed to identify existing and potential tools that can be used during the adaptive management process. It takes council through the process of identifying barriers to progress and potential strategies to overcome those through the use of resources.

Tool 4 – Stakeholder Identification Worksheet: This activity (Tool 4) is designed to help council identify who to engage both throughout the adaptive management process and during the implementation of the adaptation action plan. The Worksheet uses a 'sphere of influence' diagram to lead a council through establishing tiers of stakeholders and assigning each a level of influence and impact. Questions are posed to encourage council to think creatively about who could be possible stakeholders and to identify existing relationships that can be leveraged.

At the centre of the sphere is the council (either the entire council or a subset/team within the council). This centre is generally where council's control, responsibility and authority are highest. The next layer out would be those people and organisations that council has a close relationship or partnership with – and often shares common goals with – but over which council does not have direct control. The subsequent layer includes those individuals and organisations that have some affect on the work council undertakes, but that council has even less control over. The outer layer is the general macro environment in which council operates, but in which in which it has minimal, if any, control. Additional layers can be included, as appropriate. The important guide is that, when moving closer to the core of the sphere, council's influence increases but the overall impact decreases. The diagram may be split into sections (e.g. pie slices) that focus on sectors (e.g. financial, social and environmental stakeholders) or impact areas (e.g. flood management, health and economic development).

Tool 5 – Adaptive Management Scoping Worksheet: This activity (Tool 5) is designed to help council identify the scope of their adaptive management process. It was initially used to design the scope for the pilot project, but can be adapted by council for internal use. This worksheet is best used at an internal workshop in which council staff can be split into teams to consider the various phases of an adaptive management process. The questions in the worksheet are designed to prompt council to think about the most effective design for the adaptive management process, given their particular context.

Tool 6 – Social Contract Worksheet: This activity (Tool 6) is relevant to a council that will be undertaking a multi-stakeholder process to conduct their adaptive management process, and could be adapted to develop the terms of reference for regional approaches or cross-council teams. Social Contracts establish the parameters for the creation and operation of a learning network or community of practice. They are informal contracts that govern how members work together and function and set out the group's vision, an outline of its activities and a list of the obligations and benefits of being a member. Social contracts also describe how decisions are made and, given the participation of multiple organisations, how intellectual property rights will be handled. Although social contracts aren't legal documents enforceable in a court of law, they are commitments or promises among

the members of the team. Social contracts are formed by all parties by engaging them in the development of the 'contract', their roles and responsibilities.

The worksheet is separated into sections that mirror the components of a social contract (or a community of practice): vision, goal, core values, benefits and obligations, decision-making criteria and intellectual property considerations. This is especially useful in cases where there will be significant regional or community interaction throughout the adaptive management process.

Considerations: The workshop template can be adapted to the context of an individual council. Images of slides are available, each with speaking notes to explain the content.

The presentation includes an introduction to several activities that are useful throughout the adaptive management process. It will be important for council to consider the purpose of the workshop or presentation when deciding whether or how to adjust the content. If the presentation is being used primarily to gain support for and give a general introduction to the process, several of the activities (e.g. Tools Worksheet and Social Contract) should be removed and presented them later to the individuals responsible for driving this process.

The Planning Workshop presentation also includes an introduction to Conceptual Modelling and conducting a Risk Assessment. These tools are described separately below as the use of conceptual modelling is encouraged throughout the adaptive management process, risk assessments are specific to the third phase (Analyse and evaluate risks and opportunities) and as they can both be delivered independently.

The presentation is encouraged for conducting a test run of the workshop before presenting it to a wide audience, especially if external stakeholders are to be involved. As the activities can be delivered often either using large or small groups, or even as individuals, practising will provide an opportunity to determine the best delivery method for the audience.

The workshop, as referenced in Exhibit 3.2.2, has been designed for an audience at the manager level within council, although it would easily apply to an officer level, as well. The material is general enough that it would be understood by any of the departments within council, although it would benefit from specific topical content being added if it is to be used on a department-by-department basis. Ideally, this workshop would bring together a good cross-representation from council, including asset or risk managers, environmental managers, engineers, communication managers and representatives from the CEO's or mayor's offices.

The result of the planning workshop should be the establishment of: the scope of the adaptive management process; a draft list of the tools and materials that council has, and those that need to be sought from stakeholders; a list of stakeholders to engage during the process; and an initial draft of the communications brief and/or conceptual models.

Exhibit 3.2.2: CCP Adaptation initiative pilot project launch

The CCP Adaptation Initiative Pilot Project was launched at a Planning Workshop in Lancemore Hill, Kilmore, Victoria on 23–24 July 2007. The workshop was held with representatives of the five pilot councils in attendance:

- Bayside City Council
- Hornsby Shire Council
- Serpentine Jarrahdale Shire
- City of Sydney
- Thuringowa City Council (now Townsville City Council).

The first day of the two-day workshop focused on:

- Goal setting
- Introductions to adaptive management
- Council contexts
- Scoping of the pilot project
- Conceptual modelling
- Art-based creativity exercises.

The second day focused on:

- Finalising the scope
- Discussing key stakeholders
- Investigating the development of relevant tools
- Establishing a learning network/community of practice
- A review of the timeline and next phases for the pilot project.

The workshop successfully introduced the pilot councils to the scope and approach of the pilot project and resulted in the development of many of the materials included in this toolkit.

3.2.3 Tool 7 – Issue Brief

Purpose: This activity (Tool 7) is designed to guide council through the examination (assessment) of issues (e.g. sea-level rise and drought) identified as being of significance for its municipality. The brief includes sections on background information, a listing of impacts, relevant departments, considerations and responsibilities for each impact and leverage points.

Type: Off-the-shelf/Self-directed

Considerations: The brief can be completed individually or in a group (preferably at a workshop) with advice boxes provided to indicate how each section can be modified. This can be a useful tool to develop or outline assumptions and should be revisited and revised throughout the adaptive management process. The information gathered using this worksheet will be fed into the prioritisation of risks/opportunities using the Risk Assessment Scenario Worksheet (See Section 5.2.1).

The brief provides a brief introduction to conceptual modelling and links to the Conceptual Modelling Exercise (See Section 3.2.4). An example of a completed brief can be found in Exhibit 3.2.3. Note that any models developed through that Exercise can be used for the Issue Brief.

Exhibit 3.2.3: CCP Adaptation Initiative issue briefs

The following information has been taken from the issue briefs of one of the pilot councils. This is a sampling of the information found in two of the six briefs prepared by the council.

Issue: Increase in temperature

What are the impacts of most concern to you regarding this issue?

#1 Impact: Heat-related stress and illness will impact the community on additional days that are very hot, particularly consecutive days when nights stay hot

#2 Impact: Increased risk of food-related sicknesses

#3 Impact: Increase likelihood of mosquitoes and other vectors (Dengue Fever and Ross River Virus). It could also increase the risk of new vector-borne diseases.

#4 Impact: Increases costs for community for increased energy demand for cooling and water use for watering gardens, etc. It has specifically been found that increased demand for energy has been associated with warmer climates.

#5 Impact: Implications on tourism industries, particularly those areas that rely on the natural environments that exist in a narrow climatic range and are sensitive to relatively small changes in temperatures, for example reefs and tropical rainforests – the appeal of a particular forest may change if hotter, drier conditions result in changes to the ecosystem.

#6 Impact: Increased costs for older buildings for inefficient buildings.

#7 Impact: Increased evaporation will increase demand of water affecting plant growth and productivity in agriculture. It may also change the area whereby cultivated pastures can grow.

#8 Impact: Vulnerability of biodiversity, e.g. potential impacts on upland rainforests and aquatic ecosystems. Geographic range of many species will change and some will move locations. Others could change the timing of their lifecycles (e.g. sex ratio of sea turtles is temperature-dependent and warming conditions could see a significant bias towards females in future populations. An increase of 2°C is likely to modify tropical near-shore communities from coral to algal dominated communities with major implications for reef biodiversity).

- The above changes will provide an opportunity for invasive weeds and other pests to move into new areas
- Reduction in commercial species such as prawns and fish from a decline in sea grasses and mangroves

#9 Impact: Increased coral bleaching

- Will force some marine tourism operators to relocate to less affected outer reefs. The more bleaching that occurs, the further out they will have to go. This will affect trip timetables, costs and possibly their variability.
- Loss of biodiversity that relies on coral systems.
- Changes in location of productivity zone (Foe example: mass die-off of sea bird chicks as parent birds have difficulty in obtaining prey fish).
- Decline in commercial and recreational fishing
- Decline in tourism, which is a $6 billion dollar industry annually.

#10 Impact: Implications for the built environment that has not considered sustainable designs such as climatic responsive design and energy- and water-efficient appliances

#11 Impact: Drier and hotter conditions will alter infrastructures longer-term performance and durability. For example, pavements.

#12 Impact: Reduced efficiency of energy generation and transmission.

#13 Impact: Water quality and quantity is expected to decline due to higher temperatures and increased evaporation. For example increases in temperatures combined with increased nutrient loading causes algal blooms, lowering dissolved oxygen concentrations.

#14 Impact: Implications will be focused on peak energy demand rather than on net demand, suggesting that there will be a need to install additional generating capacity over and above that needed for underlying economic growth.

Benefits: Potential for aquaculture industry to expand due to declining fish stock.

Departments
- Commercial and Economic Development (Building Certifiers, Economic Development, Fleet Services, Plumbing Certifiers, Council Water)
- Community Services (Community and Cultural Development, Health and Environment, Library, Parks, Council Waste)
- Corporate Services (Corporate Governance, Customer Service, Executive Office, Human Resources, Information Services, Public Relations, Records)
- Financial Services
- Infrastructure Services (Asset and Infrastructure Management, Development, Property Services, Transport and Stormwater Management)
- Planning Services

Issue: Decrease in annual rainfall

What are the impacts of most concern to you regarding this issue?

#1 Impact: Implications for water-intensive industry with heavy rely on water such as mining and agriculture (sugar cane and cattle)
- Increased costs for industry and businesses to implement water recycling schemes
- Increased costs for industry and businesses to pump water further distances
- Increased costs for industry and businesses with increased tariffs and tighter legislation on water use

#2 Impact: Affect individuals and community through water restrictions and increased tariffs
- Implications for supply and visitor water use
- Implications for how parks are maintained
- Need for increased infrastructure due to population growth, economic development, and an overall annual decrease in water supply

#3 Impact: Less rain and more evaporation will reduce available water and soil moisture for agriculture
- Reduced productivity
- Increased cost for landholders

#4 Impact: Implications for power generation as water is required for cooling

#5 Impact: Vulnerability of biodiversity. For example, potential impacts on upland rainforests and aquatic ecosystems.

#6 Impact: Reduced environmental flows
- Fisheries will be affected both upstream and marine due to change in habitat
- Increased algal growth lowering dissolved oxygen concentrations

Benefits: Opportunities to create water-saving and efficient technologies for businesses

Departments
- Commercial and Economic Development (Building Certifiers, Economic Development, Fleet Services, Plumbing Certifiers, Council Water)
- Community Services (Community and Cultural Development, Health and Environment, Library, Parks, Council Waste)
- Corporate Services (Corporate Governance, Customer Service, Executive Office, Human Resources, Information Services, Public Relations, Records)
- Financial Services
- Infrastructure Services (Asset and Infrastructure Management, Development, Property Services, Transport and Stormwater Management)
- Planning Services

3.2.4 Tool 8 – Conceptual Modelling Exercise and Example

Purpose: The Conceptual Modelling Exercise (Tool 8) is designed to assist council with setting the context for various climate change impacts and issues in its municipality. Conceptual Modelling is an exercise used by many people who practise adaptive management to help them understand their particular context as it relates to what they wish to manage. A conceptual model is a model in which council staff gather information they know on a topic, relevant factors and how those factors are related to the topic – for instance, whether they influence the topic directly or whether they influence it through some other factor. The tool provides a brief background to the idea of conceptual modelling and then outlines each stage in developing a conceptual model: preparation, scope, target condition, components, direct factors, indirect factors, conditions, leverage points and completion.

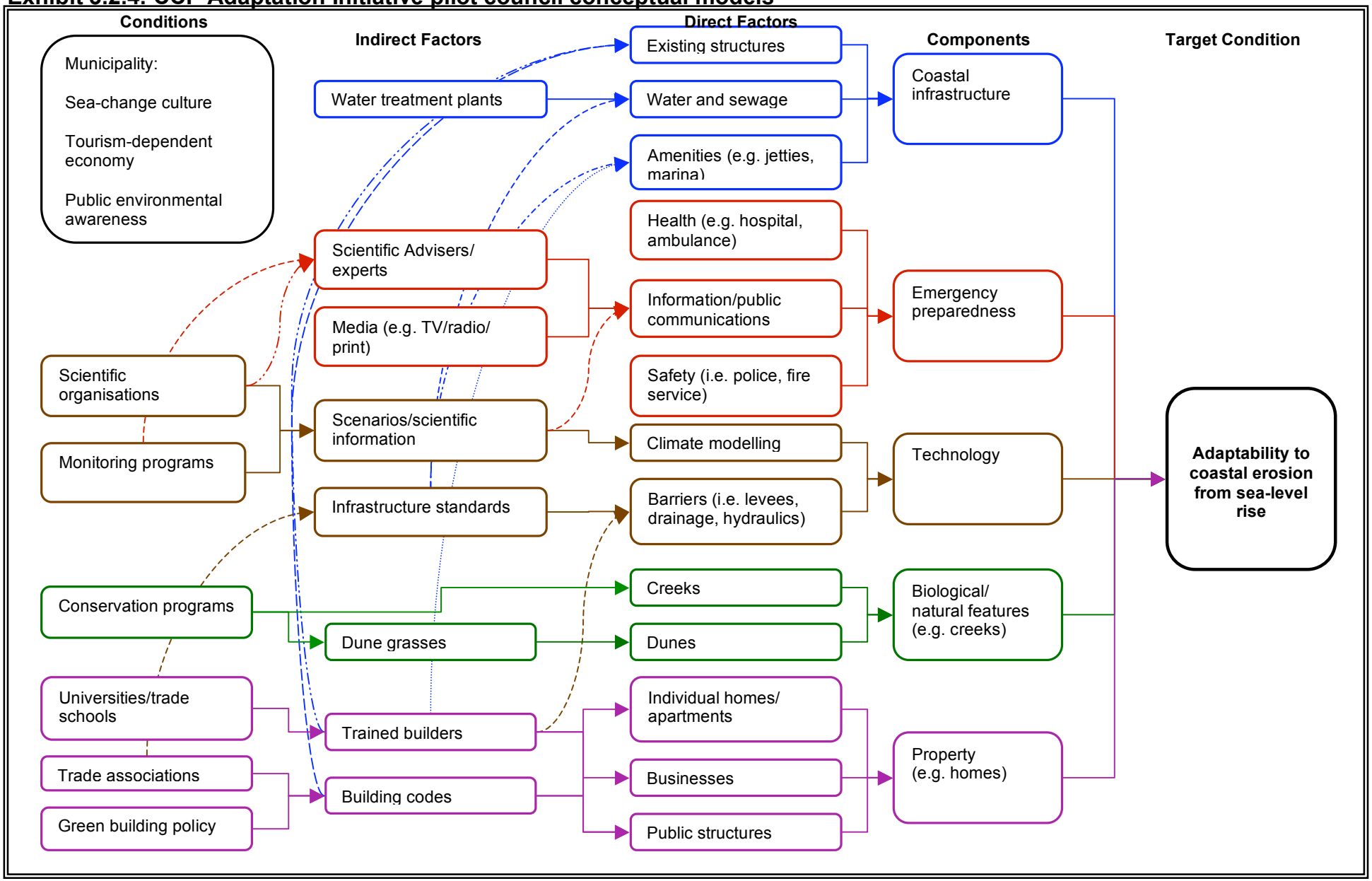
Type: Facilitator-led introduction. The facilitator may be a council staff member (e.g. risk manager or strategic planner) or an external facilitator. This person should have experience with mind mapping and/or conceptual modelling. The initial introduction should be led by a facilitator as it can be challenging for some individuals. Once council is familiar with developing conceptual models, they can use this tool without a facilitator.

Considerations: Conceptual modelling can often be difficult the first few times that council is involved with this. An example of a partially completed conceptual model has, therefore, been provided as a reference in Exhibit 3.2.4. The example is a simple version that may be used to get started. Often conceptual models are quite complex, taking up considerable space with several layers of indirect factors, factors

that influence multiple other factors and components, and a mix of direct and indirect leverage points.

Conceptual models are intended to be live documents that should be revised as new information becomes available, when new contexts emerge and as understanding of the existing context is enhanced. Conceptual models help council to identify where it has direct and indirect influence to act, as well as highlighting factors that are important to consider when developing plans based on those action areas. The models should be used as valuable inputs throughout the adaptive management process and as communication tools to visually convey the municipality's context.

Exhibit 3.2.4: CCP Adaptation Initiative pilot council conceptual models



Please note that this is not a complete version as only a portion could fit on the page.

3.2.5 Tool 9 – Support Letter

Purpose: The Support Letter (Tool 9) is designed to use for securing high-level support for conducting an adaptive management process. The letter includes a brief introduction to adaptation projects and adaptive management frameworks, a note on the outputs that are available to council/will result from this process, a list of the roles and responsibilities of the various stakeholders, a note on the governance structure used to oversee the adaptive management process, a list of the immediate next steps for action, and contact details for the individual running the process.

Type: Off-the-shelf/Self-directed

Considerations: The letter was originally designed for use in securing the commitment of pilot councils for the CCP Adaptation Initiative. Although many of the points within the Letter are directly related to the support provided as a part of the initiative, it can be modified and used by a council participating in a coordinated multi-stakeholder (regional) process.

A draft scope document is referenced in this letter. This would need to be developed by the individual or organisation in charge of the adaptive management process if the reference is included.

3.2.6 Tool 10 – Barriers Document

Purpose: The Barriers Document (Tool 10) presents a series of some of the most common barriers (questions, critiques, attitudes, etc.) to progressing through the adaptive management process, addressing each with either a simple response or suggestions for materials that could be used to formulate a more specific response. The barriers covered in the document include: availability and commitment of resources; legal liability; information availability and management; costs and benefits of adaptation actions; identification of relevant treatment options; internal council procedural shortcomings; and the drivers for action.

Type: Off-the-shelf/Self-directed

Considerations: The Barriers Document was developed in response to feedback from pilot councils, based on the barriers the councils faced while implementing the pilot project. A publication generated through an adaptation project at ICLEI USA, *Preparing for Climate Change: A Guidebook for Local, Regional and State Governments,* was also used as input. Although the input for the document came from specific councils in Australia and the USA, the barriers the councils identified are general enough to apply widely across the local government sector. The advice provided in the document, therefore, is general and provides direction on potential actions to overcome the barriers rather than dictating an absolute solution to the barriers.

The document is a guidance document based on observations and a general understanding of adaptive management in council settings. It is not meant to take the place of or overrule advice provided by legal or scientific experts. Rather it is intended to be used alongside such advice, as well as alongside other sources of topical expertise.

4 Phase 2 – Identify Risks and Opportunities

4.1 Introduction

Once the context is established, the risks/opportunities related to the impacts of climate change need to be identified. This should emerge from the establishment of the context. However, it is important to overlay a 'filter' of a council's focus or vision for conducting this adaptive management process. The identification of risks/opportunities may overlap with Phase 1 (Establish the context), depending on how much information is currently available at council regarding local climate change impact scenarios and risks, and with Phase 3 (Analyse and evaluate risks and opportunities), as some of the information captured during this phase will be examined further as council progresses through the adaptive management process.

It is important that the information captured in this phase is not limited by the specific awareness and expertise of those driving the process. Therefore, throughout this and the remaining phases of the adaptive management process, a high level of consultation and communication across council (vertically and horizontally) is encouraged. Consultation with external stakeholders may be required during this phase, primarily related to investigating the climate change impact scenarios for their applicability to the council's municipality. The tools to be used during this phase are designed to encourage consultation – primarily across council – as are several of the major tasks, as listed here:

- Identify the climate change impact scenarios council will be using to identify and analyse the risks/opportunities facing its municipality. The selection of scenarios should at least set a minimum level for consideration. Be sure to include the reasoning behind council's selection of each scenario so that the selection can be easily explained to various stakeholders and reviewed if scenarios are changed or improved. Including the reasoning behind council's selection is also an important factor in showing council acted in good faith when making decisions on how to manage its risks/opportunities, should its actions ever be questioned.

- Develop issue briefs that cover each risk and opportunity. The briefs should include the context/description for that risk/opportunity, relevant impact scenario information, relevant stakeholders affected and those to engage on this issue and what falls outside the scope of each risk/opportunity. To assist with this task, council should revise its existing Conceptual models and develop new models, as relevant, for each risk/opportunity. This can be accomplished by engaging individuals with particular expertise or through a group forum, such as a workshop, where individuals can work together on filling in the briefs. The type and style of engagement with each department should be equal and/or consistent to ensure a bias does not influence the results.

- Enhance the communications briefs developed in the Context phase with information from the issue briefs to strengthen the basis of council's mandate to undertake this process.

- Review the materials produced and update as necessary. The review should include the conceptual models and issue briefs, and should support the identification of appropriate climate change impact scenarios to use as a basis for the analysis and evaluation of risks/opportunities.

- Capture relevant information for use in other phases of the adaptive management process. As council investigates its risks/opportunities, it is likely to start to identify how to treat these risks or take advantage of these opportunities. Make sure council has a mechanism to capture these ideas, but don't start to implement them before council has examined and assessed the risks/opportunities in further depth in the next phase.

Outputs

The potential outputs for this phase include:

- A communications and/or risk and opportunity scoping workshop.
- Draft versions of the issue briefs covering each relevant risk and opportunity.
- Conceptual models as part of, or independent to the issue briefs that map out council's context in relation to the various risks/opportunities.

4.2 Tools

To assist council to identify the risks/opportunities relevant to its municipality, it is recommended that the council use the following tools, which are discussed in Section 3.2.

Planning Workshop Template: The Planning Workshop Template (Tool 2) is used during this phase should council conduct a workshop to engage staff to populate the issue briefs or communicate the scope of the adaptive management process to the team responsible for directing the work. Of particular relevance for this phase are the workshop sessions on the background, pilot project scope, stakeholder identification and the social contract.

Type: Facilitator-led. See Section 3.2.2 for more details.

Council Questionnaire: The Council Questionnaire (Tool 1) is especially useful during this phase as a basis for populating the issue briefs. As some of the information is based on assumed knowledge, rather than directed research, caution should be used to ensure legitimate information is transferred to the issue briefs.

Type: Off-the-shelf/Self-directed. See Section 3.2.1 for more details.

Issue Briefs: Issue briefs (Tool 7) are important tools to use during this phase to gain a thorough understanding of each potential climate change impact, as well as to identify the associated risks/opportunities within a particular municipality.

Type: Off-the-shelf/Self-directed. See Section 3.2.3 for more details.

Conceptual Modelling (Exercise and Example): Conceptual modelling (Tool 8) can be used alongside the issue briefs to enhance the understanding of council's context related to various climate change impacts. It specifically serves to identify where council has leverage over each impact and what considerations should fall within council's scope during the adaptive management process.

Type: Facilitator-led introduction. See Section 3.2.4 for more details.

Note that these tools should accompany the guidance provided in Sections 5.1–5.3 (pages 43–45) and, to some extent Sections 4.2–4.4 (pages 26–32) and 4.6–4.7 (pages 41–42) in the *Climate Change Impacts & Risk Management* guide.

5 Phase 3 – Analysis and Evaluation of Risks and Opportunities

5.1 Introduction

Once the risks/opportunities related to the impacts of climate change are identified, council needs to analyse and evaluate these risks/opportunities. This phase combines two of the steps identified in the CCIRM guide – 'Analysing Risks' and 'Evaluating Risks' – as the activities within these steps overlap to a considerable extent. The analysis of risks/opportunities – so that the nature of each is thoroughly understood – lays the groundwork for prioritisation and action planning. The evaluation of risks/opportunities is important as a check of council decision-making and, when priorities are based on sound knowledge, can place council in the best position to achieve its desired outcomes. This phase involves identifying council's adaptive capacity for each risk/opportunity, what each risk/opportunity means in regard to council's regular operations and what are the legal implications of each risk for council regarding planning and development, as well as investigating of the nature of individual risks/opportunities as that may vary by council department and what criteria council uses to judge likelihood and consequence of risks.

As with the previous phase, it is important that the information captured during this phase – and the manner in which the information is used – is informed by the expertise across all of council, as well as from key external stakeholders. This and the next phase require the most intensive level of engagement across council. Both the tools and the major tasks for this phase are designed to encourage such consultation. The tasks are listed here:

- Review council's list of internal and external stakeholders to engage for each risk/opportunity, as identified in the previous phases, to determine if there are any gaps or errors in that list. As noted in the previous phase, ensure the process for engagement is consistent across council. It is especially important that those being called upon to engage are appropriate representatives for their department and have a sense of the accountability required for their input.

- Enhance the issue briefs so they outline each risk and opportunity using a common language and structure. This is important to ensure the prioritisation of these risks/opportunities is based on comparable data. Some of the information might need to be sourced or purchased from external stakeholders or developed by council utilising additional staff time and council resources.

- Assign a priority to council's risks/opportunities. This is the ultimate task for this phase and includes several sub-tasks:
  - Identify council's mitigation and adaptive capacity in regard to each risk/opportunity.
  - Engage all relevant departments across council on what each risk/opportunity means in regard to their business as usual.
  - Engage external experts (e.g. legal professionals, insurance industry representatives, climate scientists and industry associations) to give background on the interpretations of each risk/opportunity and the relevant exposure of the municipality or council to that risk/opportunity.

- Consider engaging a communications expert to put a common language to each risk/opportunity so that it can be understood across council (i.e. translate the council definition of individual risks/opportunities to general, non-technical language).
- Rate the risks/opportunities according to likelihood and consequence and prioritise accordingly. This might involve a review and revision of council's existing risk management decision matrices or the development of new likelihood and consequence scales.
- Review the analysis and evaluation of each risk and opportunity at the relevant levels of council. Note that this might involve two reviews – one with appropriate staff to ensure all information feeding into the prioritisation is accurate and another to senior staff to verify the prioritisation assigned to the risks/opportunities. Ensure that appropriate management time is set aside for the final review of priority risks/opportunities.

o Review other materials produced and update as necessary.

These sub-tasks are best managed using a cross-function team, headed by a leader skilled across functional areas, to ensure the analysis and evaluation of each risk/opportunity is objective and thorough.

Outputs

The potential outputs for this phase include:

o A set of final issue briefs covering council's risks/opportunities. These should include the context from the draft version of the briefs, as well as in-depth analysis and a prioritisation of each risk and opportunity.

o A prioritised list of the top climate change impact-related risks/opportunities relevant to council.

5.2 Tools

To assist a council to analyse and evaluate the risks/opportunities relevant to its municipality, it is recommended that it uses the following tools, which are identified and detailed in Section 3.2:

Issue Briefs: As in the previous phase, issue briefs (Tool 7) are important tools when developing a thorough understanding of each risk and opportunity associated with the impacts of climate change within council's municipality. Although draft versions are generated in the previous phase, this phase is where the vast majority of time will be spent in populating and finalising the briefs. The briefs will also be used as an input to the evaluation (including prioritisation) of the risks/opportunities during this phase.

Type: Off-the-shelf/Self-directed. See Section 3.2.3 for more details.

Conceptual Modelling (Exercise and Example): Conceptual modelling (Tool 8) can be used as a means of focusing the information provided in the issue briefs. This is useful for comparing the risks/opportunities as council applies priorities to each, especially if a layer of adaptability is added to the likelihood–consequence model.

Type: Facilitator-led introduction. See Section 3.2.4 for more details.

These tools should accompany the guidance provided in Sections 5.4–5.6 (pages 45–47) and Section 4.5 (pages 33–41) in the *Climate Change Impacts & Risk Management* guide. Section 7 (pages 54–60) of the guide may also be of relevance during this phase.

5.2.1 Tool 11 – Risk Assessment Scenario Worksheet

Purpose: The Risk Assessment Scenario Worksheet (Tool 11) is designed to help council assess and prioritise the climate change impacts it is facing. The worksheet provides a standard likelihood–consequence scale for determining priorities, as well as two standard success criteria charts for establishing the likelihood and consequences of particular risks/opportunities. These materials are taken from the CCIRM guide.

Type: Off-the-shelf/Self-directed when used with existing council risk management tools and/or the CCIRM guide.

Considerations: The tool itself does not have instructions for using the table and charts. Therefore, it should be used in conjunction with the guidance in the CCIRM guide in Sections 5.4–5.6 (pages 45–47) and Section 4.5 (pages 33–41), as well as the planning workshop. An example of how one council used the charts is included here as Exhibit 5.2.1.

As these materials are designed for a general council audience, the information provided within the scales, especially, is somewhat general. Therefore, council is encouraged to consider adjusting them specifically to reflect its local context.

Exhibit 5.2.1: CCP Adaptation initiative pilot council risk assessment results

Exposure types	
Business continuity	B
Legal/regulatory	L
Environmental	E
Financial	F
People	PE
Reputation and image	R
Property	P

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

Controls

A = Adequate

IR = Improvement required

RISK ***Assumption: that a supply of water is available for use***	**Exposure type**	**CONTROL DESCRIPTION** **Existing controls**	**Consequence**	**Likelihood**	**Risk rating**	**Control Result**	**Additional controls** **Accountabilities and timelines**	**Consequence**	**Likelihood**	**Residual risk rating**
Loss of rental income due to breach of contract by lessees refusing to pay rent while unable to fully use facilities (e.g. golf club and tennis club) Loss of service – loss of rent and regeneration of playing surface	F L R	Review contract obligations to confirm council's liability – contractual obligations and personal guarantees Confirm via CMT/council criteria for assessment of requests to council for financial assistance	4	C	**High**	IR	Research into approaches, networking with councils currently under Stage X restrictions Investigate alternative playing surfaces Long-term changes to management and facilities design and operations to be more efficient and reduce potable water use.	4	C	High
Impact of the introduction of higher levels of restrictions	B	Identify alternative water supplies Develop strategic plan	4	C	**High**	IR	Work with state sporting associations and sports advocacy groups to lobby state government Continue to investigate alternative water supplies	4	A	High

RISK ***Assumption: that a supply of water is available for use***	**Exposure type**	**CONTROL DESCRIPTION** **Existing controls**	**Consequence**	**Likelihood**	**Risk rating**	**Control result**	**Additional controls** **Accountabilities and timelines**	**Consequence**	**Likelihood**	**residual Risk rating**
Lack of funds to cover the increased cost to council of transporting water	F	Budget process – financial management framework, incorporating a regular monitoring process Quarterly review process – forecasting and review of expenditure/income (e.g. not painting a building in order to fund a water-saving project) Grant opportunities	4	A	**High**	A	Reprioritisation of expenditure/income and savings (due to, for example, less watering)	3	B	Med
Lack of funds to cover the increased cost to council of storing water	F	Budget process – financial management framework, incorporating a regular monitoring process Quarterly review process – forecasting and review of expenditure	4	A	**High**	A	Reprioritisation of expenditure: capital and operations	3	B	Med
Users of council's grounds without exemptions (75%) are resentful of the users with exemptions (25%)	R	Educate and inform users that restrictions are state-government-led and apply across the metro area, and work at regional level to ensure consistency within region Work with regional and state sporting associations	3	B	**Med**	A	Investigate reallocation of ground exemptions following delivery of capital works projects, e.g. installation/upgrade irrigation systems; sowing of drought-tolerant grasses, resulting in sustainable facilities	2	D	Low

This example is one part of a larger risk assessment. The initial review was conducted before the pilot council joined the CCP Adaptation Initiative. However, additional information and components were added to this review, which was re-examined as a part of the council's participation in the pilot project. Note that this phase can often use existing council processes and tools.

6 Phase 4 – Development of Options and Action Plan

6.1 Introduction

Following the establishment of priority risks/opportunities, council will be prepared to develop options and an adaptation action plan. The quality of the adaptation action plan developed at this phase is subject to the quality of the outputs from the third phase (Analyse and evaluate risks and opportunities), as well as the assumptions that are developed during other phases. The development of options is essentially identifying and selecting the best actions to treat priority risks and harness priority actions. However, this is also an ideal phase at which to ensure that the assumptions regarding scenario selection and the appropriateness of council's decision-making structures and processes are captured accurately. It is also important to develop assumptions about potential actions when developing the adaptation action plan. Developing assumptions refers to drafting and agreeing on what the council believes is at the root of each priority risk/opportunity and what factors have a direct or indirect influence over that risk/opportunity. This mandates that council starts this phase with clarity surrounding the context for each priority risk and opportunity.

Council should identify the leverage points where it has the ability to directly address each priority risk and opportunity, and where external support would be needed for leverage. Once the leverage points are identified, they can be fed into the development of an adaptation action plan to treat the priority risks and take advantage of the priority opportunities.

Representatives from relevant council departments should be engaged in identifying actions. Staff responsible for driving this process should ensure the chosen actions are designed to achieve a particular intended outcome and that each action is assigned a priority, responsibility, associated budget, required resources, sub-tasks and timeline. A process to monitor the progress towards implementing each action and to revise the adaptation action plan as necessary should also be included in the adaptation action plan in preparation for the final phases (Implement action plan and review progress). The development of the adaptation action plan can be undertaken through an intensive workshop process or the use of templates and existing cross-council teams. Whichever approach is taken, it is important to ensure elected members and executives are part of this phase to ensure that council commits to the adaptation action plan, giving support to staff to implement the plan. They can be engaged through direct participation in the process or with briefing sessions.

One major consideration that council will face during this phase will be whether to engage external stakeholders in the process. This would allow council to take advantage of opportunities (for action) where it do not have direct leverage, but would require additional tasks such as external communication development and an extra layer of review. Given external engagement, it is important to engage a cross-function team to filter information from the risk assessment and a strong leader to keep the action planning focused.

As with the previous phase, the development of options and action plan phase mandates an intensive level of engagement across council. The following tasks are designed to encourage such consultation, whether it remains council-specific or includes external stakeholders. Tasks might vary according to whether council is building on existing processes or developing a new adaptation action plan. The tasks included here are based

on the development of a new action plan, but are appropriate when utilising existing processes and building on an existing action plan. The tasks are as follows:

- Examine opportunities to build on existing resources and procedures.

- Develop a set of 'assumptions' statements that list the leverage points that council has developed for each priority risk and opportunity, and where external support is needed for leverage.

- Once the 'assumptions' statements are developed, they can be fed into the development of an adaptation action plan to treat the priority risks and take advantage of the priority opportunities.

- Engage representatives within each major council department so they take the priority risks/opportunities back to their department to develop actions and feed those actions up to a cross-function team for review. As noted earlier, each action should be accompanied by a priority, estimated time for implementation/completion, staff allocation and list of necessary resources (financial, tools, external support, etc.). Develop sub-tasks where necessary, indicating the relevant order for implementation where one task depends upon the successful implementation of another task.

- Consider assigning an 'independent assistant' to each department to help them work through the adaptation action plans and to answer questions about the risks/opportunities. The independent assistant could be someone from a strategic or environment team – someone not in the department to which they are assigned – or could be a temporary staff member brought on for this phase of work.

- Engage a cross-function team or individual to look across all of the adaptation action plans for complementary or redundant actions and departmental biases, as well as to identify and follow up on gaps. Ensure that actions are properly assigned and can be implemented. This team or individual should also develop a plan for how and when to monitor implementation progress.

- Consider holding workshops with external stakeholders to develop additional action strategies/options where their assistance is needed to leverage action.

- Once a draft version of the adaptation action plan has been developed, ensure that it gets sent to the appropriate level at council (e.g. managers then the CEO/mayor or elected officials) for review and approval.

- Communicate the approved adaptation action plan to staff to ensure commitment across council.

This list of tasks is not comprehensive, and additional tasks may be required to facilitate external stakeholder participation in this process.

Outputs

The potential outputs for this phase include:

- Clearly defined assumptions as described in this document.
- An adaptation action plan (or set of actions identified through other, existing processes and/or plans).

6.2 Tools

In order to assist council to develop options and establish an adaptation action plan appropriate for its municipality, it is recommended that the council uses the following tools, which are discussed in Section 3.2:

Issue Briefs: As noted previously, issue briefs (Tool 7) are important tools when developing a thorough understanding of each priority risk and opportunity. Council has captured a considerable amount of information through the development of its issue briefs. The last few pages of the issue briefs pose some questions as to the nature of the risks/opportunities. Council can reference that information as it often points directly to particular actions. By using these tools council can decide what actions it is – and which actions it isn't – going to take. The finalised versions of the issue briefs from the previous phase should be checked for inherent assumptions and referenced during the development of the adaptation action plan.

Type: Off-the-shelf/Self-directed. See Section 3.2.3 for more details.

Conceptual Modelling (Exercise and Example): Conceptual modelling (Tool 8) gives council an idea of what it needs to do to effect real change. There are many potential actions council can take, but deciding what to do and which actions will have the desired result can be difficult. That's why council needs to highlight its leverage points in the models. These keep council focused on the actions over which it has significant control. The arrows that council drew help identify where it will be treating a direct factor and where it will be treating an indirect factor of a given risk or opportunity. The finalised conceptual models should be used as a means of determining where council has leverage to act, either directly or through engagement with external stakeholders, when establishing the adaptation action plan.

Type: Facilitator-led introduction. See Section 3.2.4 for more details.

Some of the other tools, such as the **Stakeholder Identification Worksheet (Tool 4)**, might be useful to identify others to consider engaging in the actions. In addition to those materials, tools are provided to assist council in establishing adaptation action plans to treat the high-priority risks and harness the potential opportunities identified in the adaptive management process.

Note that these tools should accompany the guidance provided in Section 6 (pages 48–51) in the *Climate Change Impacts & Risk Management* guide.

6.2.1 Tool 12 – Action Planning Workshop Template

Purpose: The Action Planning Workshop Template (Tool 12) is the pdf version of a presentation to be used as an introduction to the development of assumptions and adaptation action plans. It provides exercises for developing assumptions, as well as a 'Results Chain' activity to use when designing actions. The assumptions activity includes the use of an accompanying worksheet:

Tool 13 – Assumptions Worksheet: This activity (Tool 13) is designed to develop assumptions related to the information and scenarios used to understand various risks/opportunities ('Information and Scenarios Group') and the decision-making processes that enable council to appropriately consider those risks/opportunities when determining appropriate treatment actions ('Decision-Making Group'). The Worksheet poses questions to the workshop participants that are best addressed in a group setting to ensure a deep, thorough discussion.

Type: Facilitator-led. The facilitator may be a council staff member or an external facilitator. This person should have the ability to convey ideas and lessons to a diverse audience and should be familiar with adaptive management, mind mapping/conceptual modelling and/or action planning tools. The facilitator can pick and choose from sessions included in the workshop.

Considerations: The workshop template can be adapted to the context of an individual council. Images of slides are available, each with speaking notes to explain the content.

The presentation includes a review of the progress that the council has made to date on the adaptive management process, an introduction to adaptive management that will cover the development of assumptions and a session to start on the development of the adaptation action plan. The workshop is intended to be a start, but considerable work will need to take place following it to populate the assumptions and finalise the adaptation action plan. The workshop does not include a scientific session on climate change as it assumes the participants will have at least a passing knowledge of climate change based on what they have read or been exposed to in the media and at council.

The workshop is designed for an audience across officer and manager levels within council as the actions developed should reflect the departmental priorities that managers are privy to yet be straightforward for officers to implement. The workshop material is general enough to be understood by any department within council. This workshop should bring together a strong cross-representation from council to ensure the actions included in the adaptation action plan are comprehensive.

Although the presentation is relatively straightforward, a test run of the workshop is suggested before presenting it to a wide audience, especially if external stakeholders are to be involved. As the activities can be delivered often either using large or small groups, or even as individuals, practicing will provide an opportunity to determine the best delivery method for the audience.

6.2.2 Tool 14 – Action Plan Template

Purpose: The Action Plan Template (Tool 14) is designed to assist council to develop a set of actions to treat its priority risks and harness its priority opportunities. The template includes the following sections: CEO/Mayor Commitment, Executive Summary, Glossary, Introduction (Vision, Goals, and Context), Impacts & Issues, Assumptions, Action Plan and Monitoring & Review Plan.

Type: Off-the-shelf/Self-directed

Considerations: The template contains a considerable amount of text, made up of guidance notes document to explain the purpose and content for each section. The guidance notes may be removed once the section is completed or the advice is no longer needed.

Some of the sections are primarily for background. They are good sections to include, especially as there will likely be turnover at some point given the longevity of these plans and the number of departments they will touch. The CEO/Mayor Commitment is an important section to include if council intends to take this adaptation action plan up the elected officials for endorsement, adding weight to the plan. The Executive Summary provides a summary of the key purpose behind and actions contained in the plan, highlighting council's priority impacts and assumptions and establishing the goals for council to undertake this process. The Glossary is useful because some of the words used within the plan might be technical and, therefore, unfamiliar to some council staff responsible for implementing the actions. It is a good reference when individuals from a particular department express their ideas quite differently than another department.

The Introduction section has a few components to it, but the primary one is the goal development. Establishing goals is important to gain a consensus around what council is trying to accomplish by undertaking this adaptive management process and implementing the actions included in this plan. There is also a regional context component where council can indicate how this process can fit with or build upon existing regional initiatives.

The Impacts section is essentially a simplified issue brief for each of the priority risks/opportunities. Council should have all this information within its issue briefs and is encouraged to either cut and paste the information in or attach the issue briefs as appendixes. There is also room to include notes on any impacts that council has chosen not to focus on in the adaptation action plan, along with the reasons they are being omitted. There is room to include information on relevant climate change adaptation initiatives that council is already undertaking and to consider the cost–value comparisons that are useful when establishing the adaptation action plan. The cost–value chart is relatively simple and can serve as a starting point for considering which actions to include or exclude and assigning priorities to the range of actions.

The sections on Assumptions, Action Plan and Monitoring and Review Plan are the heart of the adaptation action plan. The Assumptions section asks for council to outline the assumptions it is making with regard to scenarios and the applicability of council's decision-making processes, as well as the desired outcome for the actions that council needs to set out in the following section. The Action Plan section is designed using action charts. Council does not have to present the information in this

format, but should include all of the components in the chart and link each action to the appropriate goal and impact. Despite all of the information required in this section, council has existing tools from previous phases to ensure it does not have to start from scratch. An example of how one of the pilot councils used the template for the development of its action plan is included here as Exhibit 6.2.2.

The final section is the Monitoring and Review Plan. The adaptive management process is meant to be cyclical. To ensure this council will needs to set out a monitoring and review plan to test regularly whether its actions are having the intended results and whether any of the content of its assumptions has changed. This section asks council to identify what it will be measuring to determine success, who is responsible for conducting the review, how it will do the monitoring and review, and how often that will happen.

Appendixes can be added if council deems it relevant to attach its issue briefs and other background documents like climate change impact scenarios, council's sphere of influence and decision matrices and relevant policy documents.

Exhibit 6.2.2: CCP Adaptation initiative pilot council action plan

The following action plan is an example from one of the pilot councils involved in the CCP Adaptation Initiative. As the actual action plan is quite extensive, only an excerpt is included. The pilot council has developed actions for all of the identified impacts for each of the priority issues listed below. Financial information has not been included as it is specific to the council and confidential. However, timelines/priorities and financial information should be added to each specific action to guide implementation.

Priority issues:

- Accelerated ecosystem loss
- **Bushfire**
- Extreme heat and health effects
- Extreme weather events
- Sea-level rise

Bushfire impacts:

- **Loss of life and injury**
- **Loss of property (private and public)**
- Damage/loss of essential infrastructure (water, electricity, gas)
- **Loss of transport modes (destruction of/damage to railway lines, roads)**
- Ecological impacts
- Carbon emissions
- Increased strain on emergency services (RFS and SES)

Impact: Loss of life and injury

Desired outcome	Assumptions	Sub-task	Actions	Indicators of success	Responsibility
Mitigate the loss of life and injury.	Bushfires intensity and prevalence will increase with climate change.	Continue to gather relevant data which determines the risk of bushfire within the shire.	Periodically update Bushfire Prone Map and gain endorsement of this from the state fire brigade. Research into economic and social impacts of different climate change scenarios specifically related to projections of property and life losses. Examination of council's current policies and strategies in light of local area projections.	Accurate maps of the municipality indicating bushfire risk.	Environment Division/Planning Division

Impact: Loss of life and injury (continued)

Desired outcome	Assumptions	Sub-task	Actions	Indicators of success	Responsibility
Enhanced community fire preparedness and a local community that is effectively prepared for bushfire incidents.	Increased population within and around bushfire prone areas leading to increased pressure on infrastructure during emergency events.	Determine the areas most at risk for targeting educational programs.	Facilitate increased level of awareness, ownership and individual action regarding preparing for bushfire events (e.g. property maintenance within at-risk locations). Provision/support/facilitation of programs that raise awareness, provide education into bushfire preparedness, facilitate/encourage/support on-ground activities and engender wider community support.	Confidence in fire preparedness across the community with high attendance at information sessions.	Strategy Division/Planning Division/Environment Division/state RFS

Impact: Loss of property (private and public)

Desired outcome	Assumptions	Sub-task	Actions	Indicators of success	Responsibility
Mitigate the loss of property under the control of council.	Council property is in at-risk locations within the shire.	Continue to map areas which are vulnerable to bushfire.	Showcase best practice in climate-sensitive building design in public buildings.	TBD	Works Division
Build up resistance to catastrophic events.	Council property is in at-risk locations within the shire.	Continue to map areas which are vulnerable to bushfire.	Conduct a risk assessment (in the preliminary stages) to ensure that new infrastructure is not placed in high-risk fire prone areas.	TBD	Works Division
Mitigate the loss of private property.	Private property is in at-risk locations within the shire.	Review *Planning for Bushfire Protection* 2006.	Increase local community knowledge of climate change and adaptation actions that can be implemented at home and that have ancillary benefits in addition to those associated with climate change (e.g. energy and water conservation measures), etc.	TBD	Planning Division

Impact: Loss of transport modes (destruction of/damage to railway lines, roads)

Desired outcome	Assumptions	Sub-task	Actions	Indicators of success	Responsibility
Establish lost transport modes in a timely manner.	Transport modes will be affected by bushfire.	Develop alternate transport modes for all vulnerable areas.	Incorporate the final transport modes into any review of council's Emergency Response Plan.	Transport within the community not significantly affected during bushfire.	Environment Division/Planning Division/Works Division/state rural fire service
Maintain access for emergency vehicles.	Access for emergency vehicles will be affected during bushfire.	Develop alternate transport modes for all vulnerable areas.	Incorporate the final transport modes into any review of council's Emergency Response Plan.	Movement of emergency vehicles not restricted by bushfire.	Environment Division/Planning Division/Works Division/state rural fire service

Priority issues:

- Accelerated ecosystem loss
- Bushfire
- Extreme heat and health effects
- Extreme weather events
- **Sea-level rise**

Sea-level rise impacts:

- **Damage/loss of essential infrastructure in coastal areas**
- **Saltwater intrusion into estuaries, rivers and aquifers**
- Increased vulnerability to coastal erosion, retreat and storms
- **Changes to coastal and estuarine habitat with rising sea level (i.e. tidal inundation)**
- **Other ecological impacts**
- **Economic Impacts**
- Inundation of coastal lowlands
- Reductions in water quality in coastal rivers within the shire
- Loss of private property
- Higher risk of flooding

Impact: Damage/loss of essential infrastructure in coastal areas

Desired outcome	Assumptions	Sub-task	Actions	Indicators of success	Responsibility
Mapping of infrastructure at risk.	Sea-level rise will occur within the shire.	Obtain LIDAR mapping data.	Map various sea-level rise scenarios within the shire.	Complete maps of sea-level rise scenarios indicating infrastructure that is at risk.	Works Division
Prioritisation of infrastructure at risk.	Sea-level rise results in infrastructure being at risk.	Undertake an assessment of individual infrastructure items at risk.	Produce a prioritised list of infrastructure items that are at risk of damage as a result of sea-level rise.	Prioritised list of infrastructure implemented as a target document for action.	Works Division
Identification of community/industry assets under threat.	Community/industry assets will be at risk as a result of sea-level rise.	Map various sea-level rise scenarios.	Develop management plan to address the impact on community/industry assets.	Management plan implemented for all community/industry assets.	Works Division

Impact: Saltwater intrusion into estuaries, rivers and aquifers

Desired outcome	Assumptions	Sub-task	Actions	Indicators of success	Responsibility
Understand the impact of increased salinity on the estuary.	The increased salinity of the estuary will move upstream past Wiseman's Ferry.	Monitor salinity across the estuary.	Update council's current water quality monitoring program to better examine the impact of increased salinity in the Lower Hawkesbury estuary.	Accurate data obtained to determine the impact of increased salinity on the estuary.	Environment Division
Map potential estuarine habitat loss and gain due to sea-level rise.	Sea-level rise will impact on estuarine habitat as a result of sea-level rise.	Undertake surveying of the estuarine habitat with the shire.	Produce maps indicating potential natural asset loss and gain.	Maps produced to aid in the planning of restoration works along estuarine areas of the shire.	Environment Division

Impact: Changes to coastal and estuarine habitat with rising sea level (i.e. tidal inundation)

Desired outcome	Assumptions	Sub-task	Actions	Indicators of success	Responsibility
Develop a plan of works to address the gain/loss of habitat in the estuary.	There will be habitat loss/gain due to increasing sea-level rise and salinity of the estuary.	Mapping of potential areas of loss/gain of habitat.	Produce a prioritised list of works required to address habitat loss/gain in the estuary with the implementation of restoration programs as appropriate that incorporates the protection of buffer vegetation in shore zones.	Prioritised list of works implemented as required to address habitat loss.	Environment Division

Impact: Other ecological impacts

Desired outcome	Assumptions	Sub-task	Actions	Indicators of success	Responsibility
Understand the impact of sea-level rise and rising salinity on the oyster industry.	Sea-level rise will result in a need to modify current practices in the oyster industry on the estuary.	Work with the oyster growers to identify potential risks and opportunities.	Develop a plan of management to assist the oyster industry in light of climate change effects.	Plan of Management developed and implemented with review and monitoring.	Environment Division

Impact: Economic impacts

Desired outcome	Assumptions	Sub-task	Actions	Indicators of success	Responsibility
Mitigate the impact of sea-level rise on oyster farming, fishing and tourism industries.	The sea-level rise will impact negatively upon these industries.	Investigate the potential for existing river settlements to be utilised for tourism development.	Consider the impacts of climate change on the oyster farming, fishing and tourism industries within the development of a tourism strategy for council.	Development of the tourism strategy with consideration given to climate change impacts.	Strategy Division

7 Phase 5 – Implementation of Action Plan and Review of Progress

7.1 Introduction

Once the adaptation action plan is reviewed and finalised, council can focus on implementing the actions. This phase should be relatively straightforward provided the adaptation action plan developed in the previous phase is thorough. The duration and resources needed for implementation will vary, sometimes considerably, from one council to the next.

The monitoring process, as set out in the adaptation action plan, should enable council to examine lessons at designated points during implementation to identify if the context of its risks/opportunities have changed or if any of the underlying assumptions are wrong, in which case triggering a review (and potential revision) of the plan.

Although the tasks in this phase will vary by council according to its adaptation action plan, there are points of guidance that are relevant to most, if not all, councils at this phase. These guidance points are as follows:

- Follow the conditions of the adaptation action plan (i.e. select the appropriate people to carry out the actions and secure their participation, ensure the actions are built into the relevant work plans and feed the relevant requests into the budget bidding cycle).
- Engage executives and external stakeholders to ensure continuing commitment to the implementation of actions.
- Monitor progress as set out in the adaptation action plan. Should implementation fall behind schedule, identify opportunities to either bring council back on schedule or revise the adaptation action plan.
- Communicate with staff about the accomplishments made and lessons learned throughout the process of implementation.
- Examine lessons at key designated points throughout this phase to identify if the context of council's priority risks/opportunities has changed or if any of the assumptions are wrong (e.g. if the actions are having unintended consequences). If contextual changes exist, consider whether they are significant enough to jump back to the Analyse and evaluate risks and opportunities phase.

Outputs

The potential outputs for this phase include:

- On-the-ground results (e.g. council capacity, behaviour change and enhanced resiliency)
- A list of lessons emerging from successes, barriers and challenges in implementing the adaptation action plan
- Dedicated resources (e.g. budget, policies and staff) assigned to dealing with adaptation on a regular basis at council.

7.2 Tools

In order to assist council to implement the prescribed actions and monitor/review its progress, it is recommended that they use the adaptation action plan, which is detailed in Section 6.2:

Adaptation Action Plan: An adaptation action plan details the set of actions council developed to treat their priority risks and harness their priority opportunities. The first section provides guidance as to what actions to implement, including who needs to implement them and when they need to be implemented. The second section establishes what to monitor as actions are being implemented and how to measure success.

Type: Off-the-shelf/Self-directed. See Section 6.2.2 for more details.

Some of the other tools, such as the **Barriers Document (Tool 10), Stakeholder Identification Worksheet (Tool 4)** and **Conceptual Modelling (Tool 8)**, might be useful to identify how to overcome barriers to implementation, external stakeholders that might be valuable to engage in the implementation of the actions, and to ensure no underlying assumptions or context has changed significantly.

8 Other Resources

The tools presented in Sections 3–7 of this toolkit were developed through the delivery of the CCP Adaptation Initiative pilot project to help council work through an adaptive management process, as detailed in the CCIRM guide. This section of the toolkit provides some information on additional resources that may be of use to the council.

8.1 The Art of Being Adaptive

The challenges and changes of adapting to the impacts of climate change are unprecedented in human experience. Action on adaptation often emerges from the perspective of risk management. Risk management processes, adaptive management processes, guidelines for action and policy frameworks are all useful tools for doing adaptation; yet they do not activate, implement or apply themselves. Nor do these processes naturally evolve or adapt to a changing context. The success of the process depends on the capabilities of mind of those engaging in it – the individual and collective capability to be flexible, insightful, imaginative and courageous. How well a council masters the art of being adaptive will ultimately determine how well council adapts to the circumstances it is facing.

As a response, ICLEI Oceania has employed the use of an expert-facilitated process, *The Art of Being Adaptive – Cultivating Personal and Professional Capabilities*, alongside the adaptive management process in its CCP Adaptation Initiative. The *Art of Being Adaptive* is a parallel process to the adaptive management process, and an integral part of the CCP Adaptation Initiative. It is designed to cultivate the adaptive qualities of mind in the council staff participating in the initiative and comprises a suite of tools delivered by an expert facilitator:

- A ThinkTank
- A ThinkTank Guide/Workbook
- A Creativity Clinic Workshop

These tools are designed[3] in recognition of the need to complement and parallel the risk assessment process with a module for individual behaviour change and creative thinking. This behaviour change is necessary to prepare a council to operate in the face of complexity and uncertainty (as is present in dealing with the impacts of climate change) by developing up three capabilities: clarity, creativity and courage.

The ThinkTank is an art-based tool that encourages council staff to examine the human mindset. It is a flexible non-linear, non-prescriptive system designed to be adaptive to all aspects of the adaptive management process outlined in the toolkit. It is a system of thinking that purposefully cultivates adaptive qualities of mind and heart that can increase

[3] Natalie McDonagh, of McDonagh Design, designed The Art of Being Adaptive in consultation with ICLEI Oceania. Natalie is devoted to cultivating new thinking through art and design-based methods that go far beyond what the mind can do using words. Natalie's highly distinctive approach originated in direct response to the limited, and very similar, ways of thinking she observed in the diverse range of businesses, organisations and institutions she encountered around the world in the first 15 years of her professional life as a design practitioner, teacher and consultant. The Intellectual Property (IP) underpinning The Art of Being Adaptive/ThinkTank remains with Natalie McDonagh/McDonagh Design www.mcdonaghdesign.com. For further information please contact info@mcdonaghdesign.com.

the efficacy of adaptive management activities. The ThinkTank contains a set of 30 cards (10 for each capability) and a selection of objects that act as catalysts to:

- Enhance the three particular individual and collective capabilities for being adaptive that equip individuals to better deal with the complexity and uncertainty of climate change and its impacts.
- Cultivate vitally important qualities of individual minds and hearts that influence and inform how well one will adapt (or not) to the impacts of climate change. And to do this in a way that is woven into council's work developing management strategies and procedures for adaptation.
- Activate and develop valuable modes of thought that are ideally suited to complex, ambiguous problems like climate change.

To get the most benefit from using the ThinkTank a council is strongly encouraged to use the tool regularly and consistently in its adaptation work. The brain is a muscle and, like any other, the more it is used the fitter it becomes. This ThinkTank is Prototype V1 produced exclusively for local councils participating in ICLEI Oceania's CCP Adaptation Initiative (Pilot Program 2007).

The ThinkTank Guide/Workbook is a notebook and set of exercise sheets containing instructions for individual, group and one-on-one use related to the adaptive management process, general activities aimed at developing thinking skills broadly and a framework of reflective questions for people to evaluate inner and outer world developments, progress, challenges and issues. The learnings from using the guide/workbook should feed into the Creativity Clinic Workshops.

The Creativity Clinic Workshops are designed to find creative pathways or solutions to actual dilemmas participants are facing in real time. They will develop participants' own thinking skills and confidence to use the ThinkTank tool and embrace other ways of adaptive thinking. It is a flexible workshop format where participants bring along actual problems, challenges and dilemmas they are facing in the adaptive management process. This can be something they are grappling with as an individual, as a team or whole council. The design ensures participants operate in real time, and address the issues most pressing for them. The workshops were initially led by Natalie McDonagh, who designed them to:

- Generate creative pathways/solutions to actual dilemma/issues participants are facing in real time
- Develop participants' own thinking skills and confidence to use the ThinkTank and embrace other ways of adaptive thinking.

The workshops extend modes of creative thinking into 'thinking through the hands' where participants make 3D conceptual models (small-scale abstract artworks) of their issue. Working in 3D, constructing visual metaphors of an issue, reveals rich data in a visible/tactile form able to generate great insight. It allows us to look at and see the problem in a radically different way. Natalie guides the participants but also applies thinking on their behalf, which adds to the mix and demonstrates by example how to make links, use metaphors and symbolic language to really investigate tricky issues.

The suite of tools, which are the intellectual property of ICLEI Oceania, require expert facilitation and cannot be delivered in an electronic format. Therefore, they are not publicly available or included with the toolkit. However, these tools are available to councils through participation in the CCP Adaptation Initiative. Councils wishing to learn more about

these tools should contact the CCP Adaptation Initiative Manager at adaptation-oceania@iclei.org.

8.2 Links to Relevant Organisations

The focus of this toolkit is to assist a council as it works through an adaptive management process related to the predicted impacts of climate change in its municipality. Its tools focus on implementing the adaptive management process at council, rather than on dictating the topical information used as an input to the process. Therefore, the council is encouraged to engage topical experts and organisations to secure that information. The following list – by no means a comprehensive list – provides some resources that may be useful for a council to engage.

- **Australian Business Roundtable on Climate Change**

  www.businessroundtable.com.au/index.html
  The Australian Business Roundtable on Climate Change is an independent entity with six corporate members – BP Australia, Insurance Australia Group, Origin Energy, Swiss Re, Visy Industries and Westpac – and the Australian Conservation Foundation. The roundtable focuses on promoting an understanding of business risks/opportunities associated with climate change and developing policy frameworks and market conditions for a low-carbon future.

  The Business Case for Early Action
  www.businessroundtable.com.au/pdf/F078-RT-WS.pdf [633 KB, PDF]

- **Australian Climate Group**

  www.wwf.org.au/news/n140
  The Australian Climate Group is convened by Insurance Australia Group and WWF – Australia and includes representatives from University of Queensland, Griffith University, CRC for Greenhouse Accounting, National Centre for Epidemiology and Population Health, CSIRO Atmospheric Research, and Centre for Sustainable Technology at Newcastle University.

  Climate Change: Solutions for Australia
  www.wwf.org.au/publications/acg_solutions.pdf
  This first report from the Australian Climate Group recommends a 60 per cent cut in emissions by 2050 and represents an unprecedented alliance between scientific and commercial experts with an aim to guide public opinion and government policy.

- **Commonwealth Scientific and Industrial Research Organisation (CSIRO)**

  The Climate Adaptation Flagship
  www.csiro.au/org/ClimateAdaptationFlagshipOverview.html
  The four research themes within the climate adaptation flagship are: pathways to adaptation; sustainable cities and coasts; managing species and natural ecosystems; and adaptive primary industries, enterprises and communities.

Climate Change Impacts
www.csiro.au/science/ClimateChangeImpacts.html
Links to overviews, news, science, business, multimedia, people and places, publications and other resources.

Climate Change in Australia
www.climatechangeinaustralia.gov.au/
Links to the report and online tools related to the report, which provides regional climate change impact scenarios for local governments, industry and the community.

o Griffith University

National Climate Change Adaptation Research Facility
www.griffith.edu.au/research/nccarf
Griffith University is hosting the National Climate Change Adaptation Research Facility, with $10 million funding over five years from the Commonwealth Department of Climate Change. The facility is one of only a handful of research institutions around the world focusing specifically on how to adapt to the physical impacts of climate change and climate variability. NCCARF is a partnership with the Queensland Climate Change Centre of Excellence, the Queensland Department of Emergency Services and eight universities across Australia: James Cook University, Macquarie University, Murdoch University, Queensland University of Technology, University of Newcastle, University of Southern Queensland and University of Sunshine Coast.

Climate Change: What Are Local Governments Liable for?
www.griffith.edu.au/__data/assets/pdf_file/0011/48566/urp-ip06-england-2007.pdf
This report, by Dr Philippa England, a senior lecturer in the Griffith Law School and member of the Urban Research Program at Griffith University, examines potential legal liabilities of local governments when making decisions about matters affecting climate change as well as matters affected by climate change.

o Insurance Australia Group Limited (IAG)

The Impact of Climate Change on Insurance against Catastrophes
www.acecrc.org.au/uploaded/117/797143_29iagclimatechange.pdf
IAG wrote a report on the projected impacts of climate change and their relevance for the insurance industry, which includes the following sections: Features of Weather-Related Losses, A Case Study – Hailstorms, Climate Change and Australia's Physical Assets, Climate Change is a Global Problem, IAG's Response, and Conclusion.

o Local Government Associations (LGAs)

Local Government Association of NSW and Shires Association of NSW (LGSA)
www.lgsa.org.au
Climate Change Programs
www.lgsa.org.au/www/html/1899-climate-change.asp

Local Government Association of the Northern Territory (LGANT)
www.lgant.nt.gov.au/
Natural Resource Management

www.lgant.nt.gov.au/home/member_services/natural_resource_management

Local Government Association of Queensland (LGAQ)
www.lgaq.asn.au
Adapting to Climate Change: A Queensland Local Government Guide
www.lgaq.asn.au/lgaq/publications/LGAQ_Climate%20Change%20Adaptation%20Guide.pdf

Local Government Association of South Australia (LGASA)
www.lga.sa.gov.au
Climate Change Adaptation Program
www.lga.sa.gov.au/site/page.cfm?c=14671

Local Government Association of Tasmania (LGAT)
www.lgat.tas.gov.au
Climate Change Programs
www.lgat.tas.gov.au/site/page.cfm?u=542

Municipal Association of Victoria (MAV)
http://www.mav.asn.au/

Climate Change Initiatives
www.mav.asn.au/CA256C2B000B597A/page/Policy+%26+Projects-SHP+Environment-SHP+Climate+Change?OpenDocument&1=55-Policy+%26+Projects~&2=40-SHP+Environment~&3=30-SHP+Climate+Change~

Victorian Local Governance Association (VLGA)
www.vlga.org.au
Sustainability Programs
www.vlga.org.au/webpage/issues/list-sustain.chtml

Western Australian Local Government Association (WALGA)
www.walga.asn.au
WALGA Eco-News
www.walga.asn.au/news-publications/publications/Eco-News%20Sept%2007.pdf/view

- **Sydney Coastal Councils Group (SCCG)**

SCCG homepage
www.sydneycoastalcouncils.com.au

SCCG Climate Change Adaptation Project
www.sydneycoastalcouncils.com.au/documents/AdaptationProjectSummarySheet2007.pdf
SCCG has partnered with two divisions of CSIRO, working in collaboration with the University of the Sunshine Coast on a project funded under the Australian Government's National Climate Change Adaptation Program, 'Systems Approach to Regional Climate Change Adaptation Strategies in Metropolises'. The goal of this project is to work with the 15 SCCG member councils to determine key vulnerabilities and their capacity to adapt to manage climate change issues at a regional scale.

o Western Port Greenhouse Alliance (WPGA)

WPGA homepage
www.wpga.org.au

Western Port Human Settlements Impacts and Adaptations Project
www.wpga.org.au/project_summary.asp?data_id=13
This project aims to increase the capacity of local governments to respond to climate change. Impacts such as sea-level rise, storm frequency and rainfall levels will be investigated to help councils and their communities anticipate and plan for the future changes that will occur.

Adapting to the Impacts of Climate Change in the Western Port Region 2005–2006 Projects
www.wpga.org.au/project_summary.asp?data_id=11
Over 2005–06, a scoping study was conducted to establish the knowledge needs for responding to climate change in the Western Port region.

9 Conclusion

The tools included in this toolkit have been developed by ICLEI Oceania, tested with Australian councils and reviewed by a steering committee (with representatives from the Department of Climate Change, CSIRO and ICLEI Oceania) through the delivery of the Cities for Climate Protection Adaptation Initiative pilot project (2007–08). Each tool was tested by the pilot councils and examined by a number of observer councils for its applicability to a wide range of councils across Australia, beyond just the well-resourced pilot councils. A commitment by council to stimulate creative thinking among staff that are employing this toolkit is encouraged.

The toolkit is publicly available, as a condition of the original grant from the Department of Climate Change (previously the Australian Greenhouse Office) to ICLEI Oceania, via the ICLEI Oceania website. Questions on the availability of this toolkit, as well as any questions regarding the content of this toolkit and the tools within it should be directed to the CCP Adaptation Initiative Manager at ICLEI Oceania at (03) 9639 8688 or adaptation-oceania@iclei.org.