

Climate Ready Coasts Foundation Project

Coastal Adaptation Planning Benchmarking Review

prepared for

Local Government Association of South Australia
In partnership with the Department for Environment and Water
and the South Australian Coast Protection Board

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Executive Summary

The Climate Ready Coasts (CRC) Foundation Project is the first stage of the South Australian Climate Ready Coast program. This stage focusses on understanding the status of coastal adaptation in SA, evaluating needs, establishing methods and acquiring data. A key component of the Foundations Project is the development of Coastal Adaptation Planning Standards for South Australia.

To support this work, a research and benchmarking review has been undertaken to understand industry best practices in coastal adaptation planning methods, governance and implementation. The review focused on the following lines of inquiry:

- Framework and governance
- Engagement
- Scoping and establishing coastal context
- Hazard assessment and mapping
- Risk assessment
- Adaptation options assessment
- Implementation

The review was also supported by interviews with the interstate policy officers who are responsible for supporting local and state government with adaptation planning.

This report presents:

- Overview of the frameworks review (Section 2)
- Summary of the key learnings from interstate interviews (Section 3)
- Comparison of the guidelines across states (Section 4)
- Considerations for the development of the South Australian adaptation guidelines (Section 5)

The key learnings for the areas of focus are summarised below.

Framework and governance

Adaptation plans and guidelines typically build on the directions of the broader coastal planning policy and Acts.

Typically, the adaptation plan itself is **'owned' and the process is undertaken by local government**. However, it is largely acknowledged the adaptation planning process is the **responsibility of a diverse group of land and asset owners** and managers **across public and private land**. The success of this is largely driven by **strong working relationships** across local and state government with emphasis on establishing the **governance model** within the scoping and preparation phase.

The factor which has supported **greater consistency and confidence** across adaptation plans and the adaptation planning process is the supporting framework for **quality control**. That is, a **consistent approach to the review of adaptation reporting outputs**, and **personnel (with the necessary strategic or technical skills)** providing advice on scoping and reviews.

Typically, adaptation reporting outputs are reviewed at key points of the adaptation planning process by **technical experts** (e.g. planners and engineers) within relevant state government departments or by an independent body.

The **form and function** of adaptation planning frameworks and guidelines is considered a strong influencing factor to its success and uptake. Areas of consideration include:

- Clear **definitions** and explanation of adaptation planning **terminology**.
- Guidance provided on **how to use the framework** and **who it is relevant to**.
- **Extended guidelines, and technical compendiums** providing greater detail outside of the main guidelines with hyperlinks to supporting reference documents, relevant policy documents or coastal data.

Engagement

Across all states, it is common practice to prepare an **engagement plan** at the commencement of the adaptation planning process. This is considered a critical early step of any coastal adaptation planning. The engagement plan typically captures the **purpose of engagement** across the whole project as well as for particular phases of work. The plan also maps out **project stakeholders** and **their level of influence/involvement** within each project phase.

A key stage of adaptation planning where the **level of influence** of the community and stakeholders is important is during the adaptation **option assessment** process. Typically, the multi-criteria analysis of options, **weighting** of criteria and **scores** for adaptation options is often **workshopped with representatives from the community and key stakeholders** (e.g. reference group).

The maturity in **First Nations engagement** within adaptation planning varies from state to state. Engagement with First Nations communities should **not be limited to consideration of cultural heritage** and sites but also regarding the **project as a whole** and how they **would like to be involved** in adaptation planning and implementation.

It has been common practice across other states to establish a **co-ordinated network** within the coastal community (i.e. decision makers, policy officers, interested parties) for the intended purpose to **build capacity** and promote **good working relationships** across local and state government and beyond. These networks provide an opportunity to share and build knowledge through ongoing forums and workshops. The co-ordination of the network is most often undertaken by a **dedicated person/role providing a conduit** between LGAs and state government agencies.

Scoping and establishing coastal context

Greater emphasis on scoping provides the opportunity to build a solid foundation for future stages, while gaining buy-in from project partners. The scoping stage also provides the opportunity to consider whether all stages of the adaptation process are required (particularly important where funding is constrained). **Prompting questions** at the scoping phase can support a **'fit for purpose'** and **'value for money'** approach.

A **project plan** is a typical deliverable for the scoping phase of adaptation. The project plan can provide **clarity** on the **need for action**, the **study area** (e.g. beyond jurisdictional boundaries), the **governance model** and **scope per stage**. Leading practice is to have all **project partners** or members of the **steering committee endorse** the project plan.

Hazard assessment and mapping

To promote consistency across adaptation plans, it is common for minimum **planning horizons** to be recommended within guidelines (typically **present day, 2050, 2100**). Alignment of **sea level rise increments** to **time horizons** are in accordance with **state policy documents** and typically prescribed.

For the **quantification of coastal hazards**, the following are typical minimum requirements:

- Consideration of **geomorphic setting and coastal compartments** to define which hazards need to be assessed.
- Where **coastal erosion** is identified as a hazard for a sandy shoreline, the assessment requires the consideration of **short term erosion, long term shoreline change** and **erosion due to sea level rise**.
- The assessment approach for **coastal inundation** varies across states. Typically this requires the consideration of both inundation from the **regular tidal cycle** and **storm tide inundation** from **temporary events (e.g. 1% AEP)**.

Supporting **technical compendiums** (to supplement the primary guideline document) outlining the **detail** of the how coastal hazards should be **assessed (analysis and mapping)** can provide guidance to a technical audience and promote consistency.

Additional hazards may be relevant in some areas and should be included if/as required to address place-based adaptation needs. They may include **offshore sediment dynamics, estuary dynamics, sand drift, coastal acid sulphate soils, stormwater impacts** and **catchment generated flooding**.

Risk assessment

Identification of assets exposed to coastal hazards typically considers both **direct tangible impacts** (e.g. damage to houses, roads etc.) and **intangible impacts** (e.g. environmental values, cultural values etc.)

Consideration should be given to **indirect tangible impacts** (e.g. displaced tourism, emergency costs, business service disruption etc.) and whether these warrant being captured.

For the process of identifying assets, it is best practice to include **consultation with relevant stakeholders** and seek **approval from all project partners**.

Risk assessment frameworks are typically based on the relevant **Australian Standard** (currently AS ISO 31000:2018). The **adaptive capacity** of an asset (ability to respond to risk) is typically considered to determine the overall **vulnerability to the hazard**.

It is common practice that assets identified at a **risk classification of 'High'** or greater will **require mitigation** action.

Adaptation options assessment

It is typical for adaptation options to be considered and assessed against an **adaptation hierarchy**. The most common adaptation hierarchy is :

- 1. Avoid or non-intervention**
- 2. Retreat**
- 3. Accommodate**
- 4. Protect or defend**

Recent guidelines include **nature based measures and solutions** to be considered within the **hierarchy**. As nature-based methods become more mainstream it will be important to delineate between nature-based methods that are undertaken through restoring the habitat alone (**'soft' approach**), or in combination with hard structures that support habitat establishment (**'hybrid' approaches**).

To support greater consistency in adaptation planning across the state, it is common practices for the following **steps** to be included in the adaptation options assessment:

1. Compiling an **exhaustive list of viable adaptation actions** within each adaptation pathway.
2. **Screening methodology** (typically MCA, with priority options assessed further via economic assessment tools e.g. BDA, CBA)
3. Preparation of a **pathways plan** outlining recommended **adaptation actions, timing, and triggers** for change.

Implementation

Clarity should be provided on adaptation **actions, timing, ownership, costs, and how each action will be funded**.

Greater support and focus on **change management** within the implementation phase is needed. Change management refers to the methods taken to **prepare and support organisations to alter their internal and external processes**, including **funding actions**.

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Acronyms

BDA	Benefit Distribution Analysis
CASS	Coastal Acid Sulphate Soils
CBA	Cost Benefit Analysis
CHARP	Coastal Hazard Adaptation and Resilience Plan
CHAS	Coastal Hazard Adaptation Strategy
CMM	Coastal Management Manuel
CMP	Coastal Management Programs
CM SEPP	State Environmental Planning Policy (Coastal Management)
CRC	Climate Ready Coasts
DECCA	Department of Energy, Environment and Climate Action (VIC)
DES	Department of Environment and Science (QLD))
DLGRMA	Department of Local Government, Racing and Multicultural Affairs (QLD)
DoT	Department of Transport (WA)
DPLH	Department of Planning, Land and Heritage
IPCC	Intergovernmental Panel on Climate Change
LGAQ	Local Government Association of Queensland
MCA	Multi Criteria Assessment
MERI	Monitoring, Evaluation, Reporting and Improvement Plan
RaSP	Regional and Strategic Partnership
SLR	Sea Level Rise

1. Introduction

The Climate Ready Coasts (CRC) Foundation Project is the first stage of the South Australian Climate Ready Coast program. This stage focusses on understanding the status of coastal adaptation in SA, evaluating needs, establishing methods and acquiring data. A key component of the Foundations Project is the development of Coastal Adaptation Planning Standards for South Australia.

To support this work, a research and benchmarking review has been undertaken to understand industry best practices in coastal adaptation planning methods, governance and implementation. The review focused on the states of Victoria, New South Wales, Queensland and Western Australia given their maturity (in comparison to South Australia) in the adaptation planning space.

Lines of inquiry for the benchmarking review were discussed and agreed with the CRC program team prior to commencing the review, as follows:

- Framework and governance
- Engagement
- Scoping and establishing coastal context
- Hazard assessment and mapping
- Risk assessment
- Adaptation options assessment
- Implementation.

Review of the New Zealand adaptation planning guidelines identified valuable guidance and reference material specific to engagement, and hence has been included in the benchmarking for this focus areas only.

The review was also supported by interviews with the interstate policy officers who are responsible for supporting local and state government with adaptation planning. The intent of the interviews was to inform the focus area, framework and governance, and to capture any lessons learnt from their own experiences developing and implementing adaptation planning standards.

This report presents a summary of the key learnings from the interviews (Section 3) and comparison of the guidelines for each focus area for the lines of inquiry. The information has been presented in summary snapshots for each focus area (Section 4) and subsequent considerations for the South Australian landscape presented in Section 5.

The key considerations as set out in Section 5 were developed with the broader CRC program objectives in mind.

2. Reviewed frameworks and guidelines

The frameworks and guidelines reviewed in this study are summarised below.

Table 1: Reviewed frameworks

State/ Country	Framework
South Australia	Coastal Adaptation Guidelines The Local Government Association of South Australia.
Victoria	Victoria’s Resilient Coast – Adapting for 2100+ The State of Victoria Department of Energy, Environment and Climate Action (Adapting for 2100+)
Queensland	QCoast 2100 , The Local Government Association of Queensland and The Department of Environment and Heritage Protection (QCoast 2100)
Western Australia	WA Coastal hazard risk management and adaptation planning guidelines (CHRMAP Guidelines) , Department of Planning, Lands and Heritage (CHRMAP Guidelines)
New South Wales	NSW Coastal Management Manual , NSW Environment and Heritage (The Manual)
New Zealand	New Zealand Coastal hazards and climate change guidance for local government , Ministry for the Environment

2.1 The LGA SA – Coastal Adaptation Guidelines

In 2019-20, with funding support from the Local Government Research and Development Scheme, the LGA SA commissioned the development of the Local Government Coastal Adaptation Guidelines.

The Coastal Adaptation Guidelines (the Guidelines) aims to provide support to South Australian councils in assessing and quantifying the likely impacts to coastal councils from coastal inundation and erosion as a result of climate change.

2.2 Victoria’s Resilient Coast – Adapting for 2100+ Framework and Guidelines

Released in 2023 by the State of Victoria, Victoria’s Resilient Coast – Adapting for 2100+ provides a strategic approach to coastal hazard risk management and adaptation. This includes a framework, guidelines and support for local government, land managers and communities to:

- Enable place-based, best practice and long-term coastal hazard risk management and adaptation
- Build on the directions in the Marine and Coastal Act 2018 and Marine and Coastal Policy 2020.

2.3 QCoast 2100 - Developing a Coastal Hazard Adaptation Strategy: Minimum Standards and Guideline for Queensland Local Governments

Prepared by the Local Government Association of Queensland and the Department of Environment and Heritage Protection in 2016, this document provides guidance to coastal councils in preparing a Coastal Hazard Adaptation Study (CHAS). The guidelines set minimum requirements for a CHAS and provides information on leading practices.

A CHAS is the product of a series of studies that seek to:

- identify coastal hazard areas
- understand vulnerabilities and risks to a range of assets (including tangible and intangible assets)
- engage with the community to understand their preferred approach to adaptation
- determine the costs, priorities and timeframes for their implementation.

2.4 WA Coastal Hazard Risk Management and Adaptation Planning Guidelines (CHRMAP Guidelines)

Prepared by the Department of Planning, Lands and Heritage and the Western Australia Planning Commission in 2019, the Coastal Hazard Risk Management and Adaptation Planning Guidelines (CHRMAP Guidelines) are designed to assist statutory decision-makers, landholders and those conducting investigations on their behalf to develop and implement an effective CHRMAP. They provide an overview and explanation of:

- the process for undertaking CHRMAP
- determining appropriate content for CHRMAP
- assessing vulnerability of assets
- assessing options for appropriate risk management
- implementation of risk management.

2.5 NSW Coastal Management Manual

The NSW *Coastal Management Manual* was prepared by the State of NSW and Office of Environment and Heritage in 2018. It has two parts:

- Part A: Introduction and mandatory requirements for a coastal management program
- Part B: Stage 1 – Identify the scope of a coastal management program (CMP).

The coastal management manual has been prepared as a resource for local councils and public authorities to use when planning their future on the coast.

2.6 New Zealand Coastal Hazards and Climate Change Guidance for Local Government

New Zealand's Coastal Hazards and Climate change Guidance for Local Government was published in December 2017 by the Ministry for the Environment. It provides a step-by-step approach to assessing, planning and managing the increasing risks facing coastal communities, along with an updated synthesis of information and tools and techniques to underpin the process.

The New Zealand guidelines have a strong emphasis on the need to engagement and how it is embedded within the adaptation planning process. There is a specific focus on the need to incorporate engagement with First Nations communities early and ongoing throughout the adaptation planning process. Key learning and consideration specific to engagement have been captured in this report.

3. Interstate interviews

Hatch has undertaken interviews with our interstate networks to understand lessons learnt from the development of adaptation guidelines in other locations. Phone or in person interviews were held with key interstate decision makers and policy officer.

This was undertaken as preliminary framing for the benchmarking review process to follow. Discussions were focused on recent or current experiences in updating the relevant adaptation planning guidelines and standards and the process undertaken to do so.

Topics discussed include the following (but not limited to):

- Governance arrangements between state and local government
- Quality control processes for adaptation plans
- How projects and funds are prioritised
- Through the standards development process;
 - what would you do differently if you had your time again?
 - What were the challenges?
 - what do you think worked well?

The sections below have been presented in note form to reflect the interviews.

3.1 Resilient Coast – Adapting to 2100+ program (VIC)

- DECCA have recently updated the adaptation planning guidelines in 2023 [Victoria's Resilient Coast – Adapting for 2100+ \(marineandcoasts.vic.gov.au\)](https://marineandcoasts.vic.gov.au).
- Development of standards was intentionally a slow co-design approach, over a 12 – 18-month engagement period which with a large pool of rights holders and stakeholders. This was considered an iterative and collaborative process with up to seven co – design workshop with relevant stakeholders. This process whilst slow, was considered a great capability building exercise for all, and establish buy in for standards and process.

The co-design process included a pilot phase, where land managers (those involved in the co-design) were provided a pilot set of the guidelines for use and feedback over 6 – 12 months. Round 1 grants accompanied this period to fund a set of pilot projects. The intent of the pilot phase was to ensure feedback could be gathered based on use and testing of the guidelines, and to get strategic adaptation planning underway as soon as possible.

- Adaptation plan owners extend beyond Local Councils given the range of tenure arrangement along the Victoria coast (Traditional Owners, Crown Land, Ports, Community Managers). Subsequently the consideration of the governance arrangement and system to be captured within the plan was a key focus area in developing the guidelines.

- Coastal managers can access grant funding to support adaptation planning actions, the grants are administered by DECCA. The available funds are typically less than \$1M per annum, which is challenging to support all coastal managers and their subsequent needs.

Based on feedback from the co-design process, and the grants support available, an intentional decision was made in the development of the guidelines to allow coastal managers to 'start where they are at' (i.e. don't need to start at Stage 1 if earlier adaptation planning works are considered fit for purpose). The guidelines provide direction on best practice approach for strategic adaptation planning, including that each Stage must be endorsed by project partners (including DECCA). The guidelines focus on guidance and minimum expectations to ensure consistency in approach across the State, however do not prescribe detailed technical requirements (e.g. modelling and data specifics). This approach ensures flexibility in application at different scales and place based contexts, as was deemed important for Victoria's approach. Detailed technical guidance on relevant elements of adaptation planning (e.g. technical coastal hazard assessments, risk, economics etc.) is provided in compendium documents or other existing guidance.

- Regarding how funding and projects are prioritised, DECCA have a framework and criteria which presents a transparent process:
 - Funding is capped at \$200k per scope
 - Criteria is provided in the grant application guidelines
 - Can apply for funding relevant to any stage of the Adaptation Planning process (i.e. don't need to start at Stage 1 if earlier adaptation planning works are considered fit for purpose)
- Regarding quality control:
 - It is a requirement for grant recipients that DECCA form part of the governance model (Steering Committee or Control Board) and therefore sign off on each Stage. DECCA also have a Regional Coastal Adaptation and Planning team that provides statewide support to all adaptation projects across the regions. Ongoing upskilling (in a technical capacity) is likely to be required in-house.
 - DECCA provide resources and support (access to state resources time) with scoping, tender assessment and throughout the course of project
 - If DECCA funded, they need to be involved in the Steering Committee
 - Each stage needs to be endorsed by the Steering Committee before the next stage can proceed
 - On ground works (e.g. protection structures) will not be supported unless it has been identified via an adaptation plan

- Key success from developing their adaptation planning guidelines:
 - Capacity building across stakeholders, getting clear on adaptation planning terms and getting key stakeholders speaking the same language.
 - Establishing a network of coastal managers and key stakeholders (90 people). This proactive network meets every 2 months (projects are presented, guest are invited to speak).
 - A partnership approach with Traditional Owners, and greater focus on cultural values and adaptation needs.
 - Shifting language into a positive framing
- Areas of improvement, challenges or what DECCA would do differently:
 - Increased input from government planning stakeholders more in the co-design process, to build more capacity for land managers in understanding of the range of planning responses and examples of where and how these responses have been applied. Noting this was further picked up in the adaptation actions compendium developed as a supplement to the guidelines.
 - Include more technical references and supporting documents (were limited by funding). For example, providing adaptation planning templates per stage – noting this is ongoing and new materials are now being developed annual as informed by land manager needs and pending funding.

3.2 QCoast Program (QLD)

- The Queensland Government, more specifically the Department of Environment and Science (DES) provide the funding for the QCoast₂₁₀₀ Program and LGAQ administers the funds, adaptation plans are owned and undertaken by local councils.
 - \$4 million was committed per annum over three years, starting from the 2015/16 financial year. An additional \$1.234 million was committed at the start of 2020 to assist councils previously provided partial funding to complete the Program, bringing the total funding amount to \$13.234 million.
 - The Queensland Government made an election commitment to provide \$3 million over two years to expand the QCoast₂₁₀₀ program, to enable eligible local governments to develop and implement Coastal Hazard Adaptation Strategies (CHAS). The QCoast₂₁₀₀ 2.0 Program consists of four funding programs which commenced in 2021. The four funding programs focus on implementation (and guidance of implementation, first nations investigations and completion of CHAS documents).
 - In 2023, the Queensland Government committed a further \$4 million over two years to continue supporting implementation actions identified in a councils CHAS bringing the total funding amount to \$20.234 million for the program.

- The success of the QCoast Program is considered to be largely driven by the strong respectful working relationships of key stakeholders across state and local government. There is a sentiment coastal adaptation planning is a shared responsibility where all stakeholders have a part to play.
- Notwithstanding this, one of the biggest challenges in adaptation planning for QLD is considered to be the time and effort required to establish internal buy in from key decision makers within local Councils (e.g. Elected Members).
- The LGAQ have invested considerable time and effort into promoting the QCoast program through ongoing engagement activities. For example, the QCoast2100 Reference Group (QCRG) has been established to support the QCoast2100 Project Team to ensure the outcomes of the QCoast2100 2.0 program meet the needs of coastal councils. The QCRG meet regularly and LGAQ host a series of forums. The forums are well attended, involving guest speakers and round table discussions. Note: The QCRG was set up for a limited time to support QCoast 2.0 – this has now ceased.
- How funds and projects are prioritised:
 - Assessment and eligibility criteria is transparent
 - Submissions are scored against criteria and assessed by an assessment panel consisting of representatives from DES, LGAQ and the Expert Panel.
 - Recommendations, based on the assessment, are provided to the QCoast Board for approval. The Board is comprised of representation from DES, LGAQ and Department of State Development, Infrastructure, Local Government and Planning (DSDILGP)
- Through the more recent QCoast 2.0 program, it was acknowledged that first nations engagement is not really represented in the adaptation planning guidelines. Subsequently funding was made available for Councils to be a part of a consultant led First Nations Coastal Hazard Study to gain a better understanding of risk to cultural assets driven by engagement with First Nations stakeholders. Approach was to engage first nations officers, community leaders and elders to walk on Country with the consultant to map cultural assets (captured in GIS), hazards maps identified which cultural assets were a risk by when, this information was then provided back to Councils and First Nations Groups. No further action has been taken re mitigation measures.
- Regarding quality control:
 - The Expert Panel was established, which is a group of experts in all relevant areas of coastal hazard adaptation planning who undertake reviews and provide technical advice/guidance where required.
 - There are six members on the Panel with a mix of both academic (universities) and consulting backgrounds. An allocation of funds was established prior and agreements set up with the six members regarding cost

structures. I.e. Costs were established per task type (technical review, meeting attendance etc.).

- The review process is considered the mechanism which has driven consistency across the state. I.e. Consistent personal (with appropriate technical capabilities) undertaking the reviews.
- The time that it takes for reviews to be complete has been as one of the biggest challenges of the program, drawing out the process can cause agitation with Councils who are keen to maintain momentum and moving into the implementation phase. However, now councils have moved into an implementation phase, rigorous reviews of reports are no longer required as often as projects are more on-ground action.

3.3 CHRMAP Guidelines (WA)

- CHRMAP delivery sits within DPLH, DoT provide technical support (in-house coastal engineers). DPLH administer the grant funds and the CHRMAPs are owned and undertaken by local councils. The CHRMAP has to be adopted by Council.
- The CAP Grants program is currently under-funded (\$450,000 in current round of grants) and over-prescribed.
- DPLH and DoT are about to undertake a review of SPP2.6 Policy. To support the review and update process a data gathering exercise has been undertaken by seeking feedback from a range of stakeholders including consultants, local government, state government agencies.
- The CHRMAP Guidelines have been in place for over 10 years, most Councils have completed a CHRMAP, currently less than 10% of Councils haven't started.
- The set up of a dedicated coastal officer within WALGA, is considered to be a great success in provided a connection/conduit between State and Local Government and supporting buy in to adaptation planning across the state. WALGA run engagement sessions every 2 months, whereby Councils are asked to speak to their experience, guest speakers invited along. This has created a strong coastal network.
- The CHRMAP Guidelines are generally accepted and viewed as quite prescriptive in terms of method and process, DPLH and DoT believe this has supported consistency in plans across the state.
- DoT and DPLH acknowledge the increased importance of the cost benefit analysis (CBA) and Benefit Distribution Analysis (BDA) to support CHRMAPs. The quality of these have improved over time however stronger guidance is likely to be provided as part of a review of SPP2.6.. This is likely to be captured in the CHRMAP Guidelines.
- Other areas likely to receive focus in the review of SPP2.6:
 - Best practice approach to hazard assessment of riverine and estuarine environments
 - Greater support in terms of user guides and templates for Councils

- Assessment and consideration for nature based solutions
- Other areas which are likely to receive more focus for the CoastWA program:
 - Increase in data collection (to be owned and managed by the Western Australian Government) to support Councils and the technical quality of the CHRMAPs
 - Investigations into raw materials (sustainable material options, suppliers and unit costs)
- Regarding quality control:
 - if grant funding to Council is provided by DoT and DPLH, the Council is required to set up a Steering Committee with representation both DoT and DPLH
 - Whilst not a formalised process, reviews are undertaken by relevant personnel with DoT and DPLH. Considered a good working relationships between DoT ad DPLH, DPLH run majority of the co-ordination and overarching reviews and lean on DoT for technical input (coastal engineers).
 - The review process is considered the mechanism which has driven consistency across the state. I.e. Consistent personal (with appropriate technical capabilities) undertaking the reviews.
 - Given the review process is quite time consuming this can be a source of frustration for Council, a full CHRMAP process can take years (2-3 years) for all stages.

3.4 Coastal Management Manual (NSW)

- The NSW Reconstruction Authority (RA) has launched NSW first State Disaster Mitigation Plan (SDMP) for 2024 – 2026 to work towards reducing the risk of natural hazards. This Plan identifies NSW's risk of a range of natural hazards, such as bush fires and floods, and how this will change in the future. The SDMP will be supported by localised Disaster Adaptation Plans (DAPs) to support our communities. DAPs will be developed by the RA, councils, Aboriginal landowners and other organisations. The DAPs will draw as appropriate from the risk reduction toolkit outlined in the SDMP and identify a suite of prioritised options that work to reduce risk at a local or regional level in partnership with the community.
- Coastal Management Programs (CMPs) have a coastal focus and set a long-term strategy for the coordinated management of the coast, with a focus on achieving the objectives of the NSW Coastal Management Act 2016; However, it is likely CMP will provide critical information to inform the development of DAPs given the severity of the likely impacts due to SLR and the compounding risks and impacts between natural hazards.
- More specifically to the development of coastal management program, governance and roles and responsibilities:
 - CMPs are undertaken by local governments, however it is a partnership approach with the State Government, hereby the State provides funding (2:1), technical guidance, relevant statewide science and support.

- There are four state government coastal regional offices (2 additional inland regional offices), with approximately 4 dedicated staff per regional office. The regional staff provide on ground support to LGAs with the development of CMPs, coastal management advice and support more broadly. This is also supported by a Coastal and Estuary Programs Branch which oversees the broader delivery of the NSW Coastal Management Framework, the CM Act and Manual.
- The framework and development of CMPs is largely considered a partnership process, it is broadly accepted that local government are best placed to facilitate the CMPs to understand and respond to their communities needs whilst the state can provide guidance and support via funding and technical support.
- CMPs are considered to be rolling programs which requires ongoing support from state government. CMPs have a lifespan of 10 years, after which its expected they should be revisited.
- Regarding quality control:
 - Technical advice and support is provided by state government staff within the regional offices, along with assistance of the Programs Branch where required.
 - CMPs are required to certified by the Minister of the Environment, the CMPs must meet the mandatory requirements as set out in the Manual. To support the certification, technical reviews and advice regarding the certification of CMPs is provided by the Programs Branch.
 - Only certified CMPs are eligible to receive funding for implementation actions under the Coast and Estuary Grants Program. A competitive implantation grant round is run annual with applications assessed by and independent State Assessment Panel.
 - The CMP development process can take time and has drawn out the adaptation planning process, the time taken to develop CMPs may be a source of frustration for local councils.
 - Certification is not provided by the coastal NSW Coastal Council, the NSW Coastal Council was set up to provided independent advice to the Minister on an as need basis. This is not specific to the CMPs, however advice relevant to a component of a CMP may be sought from the NSW Coastal Council.
- First Nations engagement:
 - Considerable improvements have been made in inclusion, consideration and engagement with First Nations communities. This has been driven by the introduction of the Coastal Management Act 2016 (The former act being the Coastal Protection Act 1979). Acknowledgement of Aboriginal peoples' spiritual, social, customary and economic use of the coastal zone is a key objective of the CM Act and the need for engagement with stakeholder including First Nations is a key component in CMP development.
 - It is however acknowledged this this can be challenging and ongoing learning and improving is important, subsequently the NSW government are currently working on

developing cultural safe engagement guidelines, this has been a co-design process with First Nations representation. These guidelines are intended to support engagement with First Nation communities broader than just CMPs.

- Implementation:
 - More recent revisions of the Manual has focused on provided stronger guidance on implementation, more specifically change management. A requirement within the implementation phase is to identify the funding action to ensure the adaptation actions recommended can in fact be implemented.

4. Benchmark summary snapshot

4.1 Framework and governance

The lines of inquiry relevant to adaptation planning framework and governance were as follows:

- **Policy placement:**
 - How are the adaptation guidelines linked to broader Policy frameworks?
 - Are they mandatory or legislated?
- **Governance, roles and responsibilities:**
 - Who owns an adaptation plan, how are roles and responsibilities defined (levels of government, private land owners, community)?
 - Is support or guidance provided on setting up governance arrangements and levels of responsibility?
- **How each stage or phases of the adaptation planning process are defined:**
 - How is the adaptation planning process broken down?
 - What are the defined stages or phases?
 - How is each stage documented and/or closed?
- **Mandatory steps or minimum requirements within each stage or phase:**
 - Are there minimum standards set out which are compulsory or is it left to the reader?
- **Quality control process:**
 - Is there a mandatory or formalised process for the adaptation plans to be reviewed and endorsed?
 - Is review and endorsement from a technical perspective and/or from a governance perspective?
- **Form and function:**
 - How usable are the adaptation planning guidelines and what factors influence their usability?
 - How well is adaptation planning terminology and definitions outlined?
 - What supporting references and examples are provided, how accessible is this information?

Table 2 below provides a summary of each framework reviewed against the above lines of enquiry. Further learnings and considerations in regarding to adaptation planning governance are presented in Section 5.1.

Table 2: Framework and governance snapshot

Line of enquiry	SA	VIC	QLD	WA	NSW
<p>Policy placement</p> <p>(i.e. how are the adaptation guidelines linked to broader Policy frameworks? Are they mandatory or legislated?)</p>	<p>Adaptation plans are not legislated or mandatory.</p> <p>Policy context is provided, referencing the overarching State legislation for coastal management is the Coast Protection Act 1972. For councils this presents obligations that are in addition to meeting the requirements of the Local Government Act SA 1999 and the Harbors and Navigation Act 1993.</p> <p>Liability considerations for Councils is discussed if they fail to fulfil their function or responsibilities described in the Local Government Act 1999.</p>	<p>Adaptation plans are not legislated or mandatory however the Adapting for 2100+ guidelines build on the directions of the Marine and Coastal Act 2018 and Marine and Coastal Policy 2020.</p> <p>That is, the Adapting for 2100+ guidelines must be followed when planning for, assessing, or managing coastal hazard risk under the Marine and Coastal Policy 2020, which is a statutory tool under the Act.</p> <p>Notwithstanding this, one of the key components of the scoping and preparation stage is to define the governance model. The project partners may opt to develop a Regional and Strategic Partnership (RaSP) which is a Statutory strategic planning process under the Marine and Coastal Act 2018. An example of a RaSP is the Cape to Cape Resilience Project.</p>	<p>A Coastal Hazard Adaptation Strategy (CHAS) is not a mandatory requirement. However it is considered best practice for coastal Councils to address requirements of the State Planning Policy 2016. A CHAS specifically addresses the coastal hazards component of the State policy for natural hazards, risk and resilience, which states: 'The risks associated with natural hazards are avoided or mitigated to protect people and property and enhance the community's resilience to natural hazards'.</p> <p>The CHAS outcomes must also align with and inform council disaster risk reduction, mitigation and resilience plans in line with the Disaster Management Act 2003.</p>	<p>A Coastal Hazard Risk Management Adaptation Plan (CHRMAP) is not a mandatory requirement in isolation.</p> <p>Section 77 of the Planning and Development Act 2005 requires local governments, when preparing or amending a local planning scheme, to have due regard to the State Coastal Planning Policy (SPP 2.6).</p> <p>SPP2.6 provides the framework for undertaking risk management planning for risks arising from coastal hazards, as provided in the CHRMAP guidelines.</p>	<p>The framework for managing the NSW coast includes:</p> <ul style="list-style-type: none"> • Coastal Management Act 2016 (CM Act) • State Environmental Planning Policy (Coastal Management) 2018 (CM SEPP) • Coastal management programs (CMPs) prepared in accordance with the NSW coastal management manual. <p>The manual imposes mandatory requirements and provides guidance regarding the preparation, adoption, implementation, amendment, review and the contents of a coastal management program (CMP).</p>

Line of enquiry	SA	VIC	QLD	WA	NSW
<p>Roles and responsibilities (i.e. who owns an adaptation plan and how are roles and responsibilities defined?)</p>	<p>Whilst guidelines are intended for coastal Councils it is acknowledged that effective coastal adaptation plans and implementation cannot be achieved by council in isolation, noting there is a need to share responsibilities and resources across all levels of government and different sectors within the State.</p> <p>Definition of roles and responsibilities beyond this are not explicit.</p>	<p>2100+ guidelines outline the responsibility of a range of land and asset owners/managers across public and private land.</p> <p>The Victorian Marine and Coastal Strategy 2022 provides an overview of all parties with a role in caring for the marine and coastal environment.</p> <p>Emphasis is given to establishing the governance model in the scoping and preparation phase. This includes mapping out project partners, defining clear roles and responsibilities, identifying gaps, and establishing a collaborative process.</p>	<p>QCoast2100 is governed by a Board comprising members from the Local Government Association of Queensland (LGAQ), the Department of Environment and Science (DES) and the Department of Local Government, Racing and Multicultural Affairs (DLGRMA) providing oversight and the decision-making authority for all matters related to the Program.</p> <p>The CHAS is owned and undertaken by the coastal Council.</p> <p>A minimum requirement of Phase 1 of the CHAS (is to map out internal and external stakeholders and agree on council's roles and responsibilities in communicating and engaging with stakeholders.</p>	<p>CHRMAPs are owned and undertaken by the coastal Councils.</p> <p>The CHRMAP guidelines note that governments at all levels and private parties (individuals, businesses and the community) each have important, complementary and differentiated roles in managing risk arising from coastal hazards (as outlined in the WA Coastal Zone Strategy (2017)).</p> <p>CHRMAP guidelines recommend establish a Steering Committee to provide guidance and oversight on, and make decisions in relation to, all aspects of the CHRMAP process</p>	<p>It is a statutory provision that the preparation of CMPs is prepared by local council in accordance with the CMM.</p> <p>The CM Act establishes specific roles and responsibilities for relevant Ministers, the NSW Coastal Council, public authorities and local councils which is clearly defined in Table A1 of the CMM Part A.</p> <p>State government provide technical advice, support and guidance and funding (2:1).</p>
<p>How are private assets and landowners considered?</p>	<p>Guiding principle to avoid public resources and investment to protect private assets.</p>	<p>Victoria's policy setting does not require land managers to manage Crown land in a manner that protects private property from natural coastal processes</p>	<p>Listed as leading practice to include the consideration of private infrastructure.</p> <p>Noting private landowners may need to be project partners for the CHAS.</p>	<p>Private parties are responsible for managing risks to their assets, roles and responsibilities of private parties are set out in WA Coastal Zone Strategy (2017).</p>	<p>Private landowners must protect or undertake coastal management for private assets.</p>

Line of enquiry	SA	VIC	QLD	WA	NSW
Phases or stages defined	<p>Six stages:</p> <ul style="list-style-type: none"> 1 - Stocktake 2 - Engagement 3 - Identifying coastal hazards 4 - Assessing risks 5 - Identifying and assessing options 6 - Plan development and implementation 	<p>Seven stages with three embedded stages:</p> <ul style="list-style-type: none"> 1 - Scoping and preparation 2 - Values, vision and objectives 3 - Coastal hazard exposure 4 - Vulnerability and risk 5 - Adaptation actions and pathways 6 - Plan and implement 7 - Ongoing monitoring and review <p>Embedded stages (i.e. required throughout each stage listed above):</p> <ul style="list-style-type: none"> - Traditional Owner knowledge, rights and assertions - Partnerships and a collaborative process - Engagement and communication 	<p>Eight phases:</p> <ul style="list-style-type: none"> 1 - Plan for life-of-project stakeholder communication and engagement 2 - Scope coastal hazard issues for the area of interest 3 - Identify areas exposed to current and future coastal hazards 4 - Identify key assets potentially impacted 5 - Risk assessment of key assets in coastal hazard areas 6 - Identify potential adaptation options 7 - Socio-economic appraisal of adaptation options Phase 8 - Strategy development, implementation, and review 	<p>Seven stages:</p> <ul style="list-style-type: none"> Stage 1 – Establish the context Stage 2 – Risk identification Stage 3 – Vulnerability analysis Stage 4 – Risk evaluation Stage 5 – Risk treatment Stage 6 – Implementation Stage 7 – Monitor and review 	<p>NSW Coastal Management Manual has two parts:</p> <p>Part A: Introduction and mandatory requirements for a coastal management program</p> <p>Part B: Guidance for preparing and implementing a coastal management program. Part B has 5 stages:</p> <ul style="list-style-type: none"> Stage 1 – Identify the scope of a coastal management program Stage 2 – Determine risks, vulnerabilities and opportunities Stage 3 – Identify and evaluate options Stage 4 – Prepare, exhibit, finalise, certify and adopt a coastal management program Stage 5 – Implement, monitor, evaluate and report

Line of enquiry	SA	VIC	QLD	WA	NSW
Are mandatory steps or minimum requirements set out within each stage or phase?	Minimum requirements are recommended for each of the six stages.	No, however recommendations for minimum standards are made in a number of areas (e.g. planning time horizons, likelihood events etc). For a RaSP, all 7 stages are required.	Yes, minimum standards are set out per phase and must be undertaken. Additional leading practices are provided per stage. A council may choose to employ these depending on the scale of the CHAS being undertaken and the individual needs of the council.	The 7 defined stages are set as the minimum requirement. Strong suggestions provided within each stage regarding what should be undertaken, however these are not set out as minimum standards.	Mandatory requirements are outcome driven. The process to achieve these outcomes is not prescriptive. The guidelines place emphasis on Stage 1. Users are prompted to consider if Stage 2 and 3 are actually needed or whether the process can be fast tracked to Stage 4 (prompting questions are provided to help answer this).
Quality control process. Is there a mandatory or formalised process for the adaptation plans to be reviewed and/or endorsed? (From a technical perspective and from a governance perspective)	A formal process does not exist. Informally, Council (or consultants) send DRAFT adaptation plans to DEW Coastal Protection Branch staff for consideration and comment.	There is not currently a formalised independent review process. From a governance perspective, the output for each of the framework stages includes a summary report. The summary reports represent key 'hold points'. The project partners need to endorse each stage. Further to this, the end of Stage 1 check list includes the question: <i>Has DECCA provided in principle support for the Project Plan (recommended output of Stage 1).</i>	The output for each of the framework phases includes a summary report which is to be reviewed by the QCoast2100 Panel. Discussions with QCoast2100 program personnel indicated that reviews are usually undertaken of 2-3 phases at a time. QCoast2100 Guidelines outline that the CHAS should be approached as a cyclic process, whereby each phase is interconnected and can be revisited and refined where necessary.	Not a formalised process however if the CHRMAP is WA Government (DoT or DPLH) grant funded, each stage needs to be reviewed and endorsed by the DoT and DPLH personnel. DoT personnel noted that if the level of technical detail does not meet the scale of the required assessment, Councils are instructed to revise before future stages can progress. The established steering committee are recommended to review and sign off on the project stage prior to subsequent stages being initiated.	State government provide technical support and advice throughout the development of the CMP. CMPs must be certified by the Minister of the Environment. State government staff provided technical support and provide recommendation for refusal or certification to the Minister.

Line of enquiry	SA	VIC	QLD	WA	NSW
<p>Form and function, i.e. how usable are the adaptation planning guidelines and what factors influence their usability?</p> <p>terminology and definitions, supporting references and examples.</p>	<ul style="list-style-type: none"> Consistent headings provided for each stage: <ul style="list-style-type: none"> - Purpose - Process - Minimum requirements - Further reading A number of call out boxes to address likely FAQs with supporting links for greater information are provided throughout the document. List of a acronyms and glossary of adaption terms provided at the back of the guideline document. Limited figures and flowcharts provided, guidelines largely set out as explanatory text. 	<ul style="list-style-type: none"> Clear definitions and explanation of terminology provided in relevant sections. Guidance provided on how to use the guidelines. Each stage is supported with a purpose statement, summary of steps and closing checklist (example provided in Figure 5). A number of resources and explanation of the purposes of the resource throughout (e.g. links to data sources to use, relevant policy context, case studies, monitoring programs). Example provided in Figure 5. Extended guidelines, and technical compendiums provide greater detail outside of the guidelines (specific to adaptation actions and economical analysis of adaptation). 	<ul style="list-style-type: none"> Acronyms and key terminology presented in one page fronting the guidelines document and throughout guidelines where relevant. CHAS case studies provided with links to relevant documents on the QCoast 2100 landing page. A useful information landing page provides links to CoastAdapt, technical compendiums, discussion papers and relevant guidelines. Clear purpose statement set out at the start of each phase within the guideline document. References and further reading material provided for each phase within the guideline document. Separating out minimum requirements and leading practice allows for a scalable framework. 	<ul style="list-style-type: none"> Clear definitions and explanation of terminology provided in the CHRMAP guideline overview. Worked examples provided throughout each stage of the CHRMAP guidelines including examples of hazard maps, risk tables, pathway maps and implementation plans. The CHRMAP guidelines are prescriptive in terms of method and process, however the worked examples throughout allow this to be easily followed and understood. An example CHRMAP scope of work to engage a consultant is provided along with a generic coastal hazard assessment scope. Appendices to the guidelines provide further technical support and toolboxes specific to engagement, non market evaluation of community values, and planning instruments to support managed retreat. 	<ul style="list-style-type: none"> A standalone framework document provides an overview of how the CMP and CMM need to developed. Supporting coastal management toolkit landing page provides extensive access to resources and Stand alone glossary document provides definitions of terms that are in common use when describing coastal processes and coastal management. It is not a comprehensive dictionary of coastal terminology. Content of the CMM Part A (mandatory requirements) is succinct and provides a clear outline of what outcomes are required, list of documents and outputs and where responsibility lies. Separate manual provided per stage of CMM Part B (guidance documents).



Figure 1: Victoria's Resilient Coast - Adapting for 2100+ framework stages



Figure 2: QCost2100 CHAS project phases

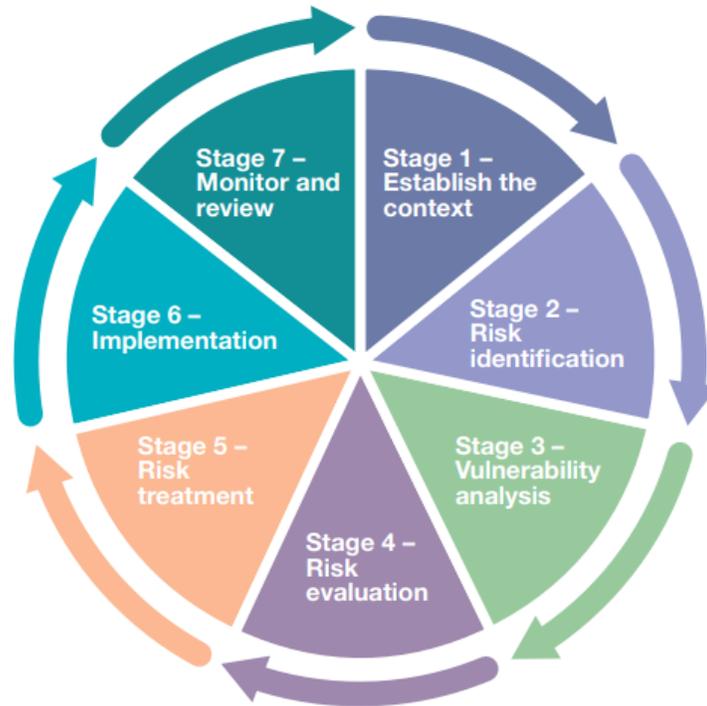


Figure 3: WA Government CHRMAP Guidelines staging flowchart

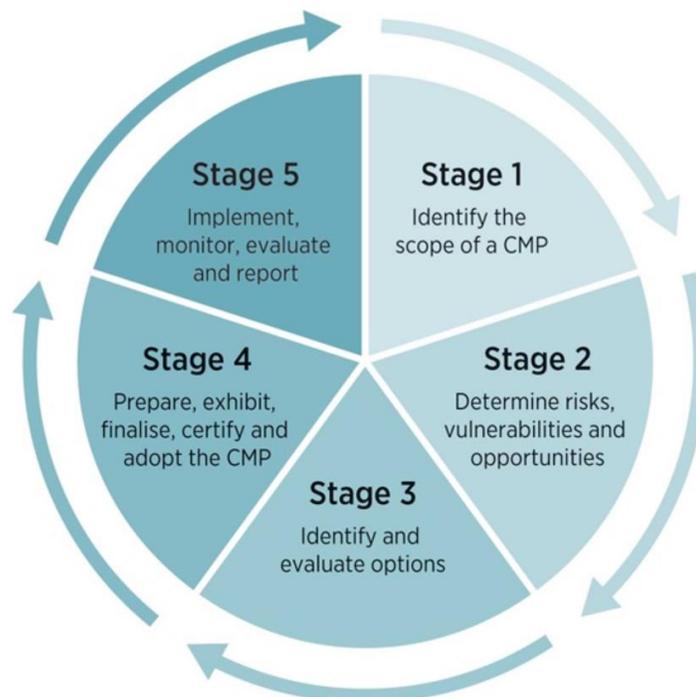


Figure 4: Stages for preparing and implementing a CMP (NSW Government)

This section outlines the Stage 1 steps including to:

- define the need for action
- refine the study area
- select a governance model
- establish a collaborative process
- scope the work required
- complete a Project Plan
- complete a Stage 1 checklist

Stage purpose

The purpose of **Stage 1** is to provide a foundation for commencing or progressing coastal hazard risk management and adaptation planning, aligned to best practice guidance, in each place-based context.

Readiness to progress checklist

Have you reviewed Stages 2-7 of these guidelines to inform the scope of the work required?	✓
Have you received direction from Traditional Owner groups?	✓
Have you completed a Project Plan that includes a summary of the required Stage 1 scoping elements (1.1. to 1.5)?	✓
Does the Project Plan have in principle support from all project partners?	✓
Has the Department provided in principle support for the Project Plan?	✓
Are all necessary agreements and resources in place for the scope of the work?	✓

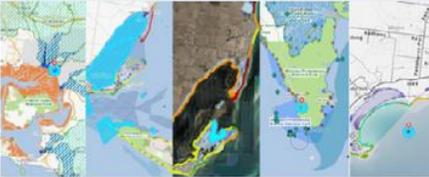
Figure 5: Adapting for 2100+ guidelines (Vic) Example of stage summary steps, purpose statement and checklist

Resources: CoastKit

The CoastKit portal provides a range of up to date information on marine and coastal scientific data, images and resources including:

- existing coastal hazard information
- physical conditions/data for the coast
- jurisdictional and administrative areas
- statewide/first pass studies
- easy to navigate mapping products (aerial imagery, location details).

This resource supports refinement of study areas, and all **Stages 1 – 7** of *Victoria's Resilient Coast – Adapting for 2100+* framework.



marineandcoasts.vic.gov.au/coastal-programs/coastkit

Resource: Engagement and communication reference pack – example activities

A Communications and Engagement Reference Pack was developed as a resource to support and empower the Port Phillip Bay Coastal Hazard Assessment (PPBCHA) project delivery partners.

The Reference Pack included a series of factsheets about the following nine engagement and communication activities/tools:

- wave tanks
- coastal timelines
- community pop-ups
- community workshops
- interviews
- communications toolkit
- internal/intra-agency engagement
- stakeholder briefings
- interagency engagement.

Contact the Department for further information.

Figure 6: Adapting for 2100+ guidelines (Vic) example of links to relevant resources

4.2 Engagement

The following lines of enquiry were considered during the review of each framework's recommended engagement approach.

- Is an engagement plan required? Are required elements clearly identified?
- When (at what stages and how often) should engagement be undertaken?
- How do the outcomes of engagement influence the options assessment?
- Does the recommended engagement approach (i.e. depth and breadth) change relative to the level of coastal hazards and risk identified?
- Is there a minimum expectation of stakeholder type to be engaged?
- How is First Nations engagement captured?
- How is engagement and communications guidance included (i.e. embedded in the framework or a separate document)?

Table 3 provides a summary of the content of each framework and guideline in relation to each of the lines of enquiry. Further learning and considerations in regarding to adaptation planning engagement is discussed further in Section 5.

Table 3: Guideline engagement snapshot

Line of inquiry	SA	VIC	QLD	WA	NSW	NZ
Engagement guidance embedded or separate	Embedded	Embedded, with attachment	Separate guidelines	Embedded	Separate guidelines	Embedded
Engagement plan required?	Yes. Identified as a minimum requirement to capture the approach in an engagement strategy or plan and review regularly throughout the project.	Yes. Developing an Engagement and Communication Plan is a core task in Stage 1 – Scoping and preparation. Clear direction provided on how this should be developed with each stage for the entire project.	Yes. Phase 1 of the CHAS is to ‘Plan for life-of-project stakeholder communication and engagement’ (Figure 2). As part of this phase, councils are to prepare a stakeholder engagement plan that documents the approach to consultation for all future CHAS phases. Minimum standards are outlined for the stakeholder engagement plan.	Yes. The guideline notes that a community and stakeholder engagement strategy should be developed as part of the first stage of establishing the context. This strategy should: <ul style="list-style-type: none"> - determine what type of participation is appropriate - select appropriate engagement mechanisms 	Yes. As part of Stage 1, the manual recommends that councils develop a community and stakeholder engagement strategy. Detail is provided on what the plan should include and what should be considered for preparing the engagement strategy.	Yes. The guide identifies that an engagement strategy should be prepared.
Timing	Planning engagement activities and mapping stakeholders is defined at Stage 2. However the scheduling of engagement activities is inferred to be throughout the adaptation process.	Engagement and communication are embedded in all seven of the framework stages through the entire project as shown in Figure 1.	The guideline suggests that engagement ‘should’ occur in most phases of the project, and that it ‘may’ occur in other phases of the project, as shown in Figure 7.	Recommended in each stage, throughout the entire CHRMAP process as presented in Figure 8.	Mandatory engagement requirement is to exhibit the draft CMP for public inspection. Outside of this, recommends councils engage from the outset and during each stage of the process.	The guide notes that engagement should be sought in six out of ten stages.

Line of inquiry	SA	VIC	QLD	WA	NSW	NZ
<p>Engagement level of influence</p> <p>i.e Level of influence on the options assessment and other aspects of the project</p>	<p>IT is a minimum requirement of the option assessment to ensure that the approach allows consideration of social consequences, however detail beyond this is not explicit.</p>	<p>Community and stakeholder input should inform the multi-criteria analysis and underpin the selection of adaptation pathways. Adaptation pathways selected should be underpinned by a robust engagement process with all project partners and the community.</p> <p>The Framework recommends that activities in every stage should include participatory approaches to enable a two-way flow of information – i.e. above a ‘consult’ or ‘involve’ level of engagement (IAP2 spectrum).</p> <p>The framework also recommends that the Engagement and Communications Plan should describe what people can and cannot influence to set clear expectations.</p>	<p>Stakeholders must be involved in the selection of criteria, weighting of criteria and scoring of adaptation options through a multi-criteria analysis.</p> <p>Community acceptability is one of the seven suggested criteria for the MCA.</p> <p>In the early stages, up to the risk assessments and the exploration of adaptation options, the aim of communication tends to be on informing (IAP2 spectrum).</p> <p>Once the risks are analysed, implications (trade-offs, costs and benefits) understood and possible ways to adapt have been identified, there is an opportunity to consult, get involved and collaborate with the community.</p> <p>Later in the project, communication is mostly aimed at informing the community and other stakeholders about the outcomes of this process.</p>	<p>Multi-criteria analysis of options including criteria and scoring should be done in collaboration with the community and stakeholders.</p>	<p>Community and stakeholders are not involved in the risk assessment but must be involved in identifying and evaluating management actions.</p>	<p>The guide emphasises that inclusion of the community in the identification of options and pathways is essential, particularly for existing settlements or suburbs that are currently, or soon to be, exposed to coastal climate change effects.</p>

Line of inquiry	SA	VIC	QLD	WA	NSW	NZ
Stakeholder types identified	<p>Internal stakeholders identified as elected members and council staff how have a role in supporting Council's responsibilities to manage costal hazards.</p> <p>External stakeholders recognised as key groups including state agencies, interest groups, asset and land owners, utility providers, the community and Traditional Owners.</p>	<p>While the framework does not specify particular stakeholders to be engaged, it recommends brainstorming the key organisations, partners, advocacy groups and community members who should take part.</p> <p>It also recommends including a wide range of voices, those who are likely to be most affected by the project, those who might find it harder to take part in the engagement, and those who have taken part in past engagement.</p>	<p>Internal stakeholder mapping provided for both sole Council and joint council projects.</p> <p>Example external stakeholder mapping provided across levels of government, authorities bodies, private sector, community groups, residents and potential groups of interest (banks, insurers).</p> <p>Identifies that in many coastal adaptation projects, the directly affected community is a very important target group.</p>	<p>The guideline notes that community and stakeholder groups might include:</p> <ul style="list-style-type: none"> - local communities and community groups - land management agencies/councils - emergency management agencies and emergency service organisations - essential services - Local, State and Commonwealth government agencies and entities - industry/business 	<p>Part A of the manual outlines statutory provisions for consultation. This include consultation on the draft program (prior to adopting a coastal management program) with:</p> <ul style="list-style-type: none"> - the community - other councils and stakeholders that may be impacted, affected <p>The manual does not provide any other guidance for the type of stakeholders to be engaged besides the Aboriginal community as detailed in the following section.</p>	<p>The guide notes that the engagement should include iwi/hapū, the community, and stakeholders at the national, regional or local level.</p> <p>It is recommended that participation should be more rather than less inclusive, because including a wide set of values from the beginning will help generate community, iwi/hapū and stakeholder support for the development and implementation of a plan.</p>
First Nations engagement	<p>First Nations identified as an external stakeholder to consider in the engagement mapping and should be engaged with early particularly in area of high cultural significance</p>	<p>The framework notes that Traditional Owners should provide direction and input to every stage of the project.</p> <p>Registered Aboriginal Parties must be engaged, using a self-determination model..</p>	<p>The guidelines do not mention engagement with Traditional Owners or other First Nations peoples. The QCoast2100 2.0 program includes available funding and support for First Nations Coastal Hazard Studies.</p>	<p>The guideline does not make any mention of Traditional Owners or other First Nations people.</p>	<p>The community and stakeholder guidelines associated with the manual identify that culturally appropriate engagement with traditional Aboriginal owners and the Local Aboriginal Land Council is an important part of the preparation of a CMP.</p>	<p>The guide identifies that iwi, hapū and whānau have partnership status through the Treaty of Waitangi. Engagement with iwi/hapū is essential in any phase where engagement is undertaken with any other stakeholders</p>

CHAS Phase	Description	Consultation type and possible techniques
1. Plan for life-of-project stakeholder communication and engagement	Identify relevant internal and external stakeholders	Brainstorming/discussion with internal stakeholders, review of previous studies
2. Scope coastal hazard issues for the area of interest	Key stakeholders should be consulted to assist in the identification of coastal hazards and their potential impacts	Review of previous studies, direct engagement with key stakeholders, project reference group, on-line survey/tool, social media campaign
3. Identify areas exposed to current and future coastal hazards	Stakeholders and technical experts may be consulted for the validation of identified hazard areas	Direct engagement with key stakeholders and technical experts, workshop, project reference group
4. Identify key assets potentially impacted	Internal and external stakeholders should be consulted or actively engaged to assist in this phase	Direct engagement with asset owners, project reference group, community consultation (website, online surveys/tools, mail outs)
5. Undertake a risk assessment of key assets in coastal hazard areas	Internal and external stakeholders may be consulted for the identification and validation of vulnerabilities, consequences, losses and risks	Internal questions/discussion, workshop with key stakeholders, project reference group
6. Identify potential adaptation options	Internal and external stakeholders should be involved in the identification of options. The broader community should be informed and engaged in the consideration of options	Stakeholder workshop, community consultation (project reference group), website, online surveys/tools, information sheets, mail outs to those directly impacted
7. Undertake a socio-economic appraisal of adaptation options	Internal stakeholders must be involved in the selection and scoring of values for a multi-criteria assessment	Internal workshop involving key stakeholders and technical experts, online survey/tool, project reference group
8. Strategy development, implementation and review	Internal and key stakeholders should be informed and asked for feedback	Direct engagement with key stakeholders, online access to draft strategy for a minimum period of 28 days, targeted consultation with potentially affected communities (e.g. information sessions, newsletters, fact sheets)

Figure 7: QCoast2100 – Suggested level of engagement in each phase of the CHAS

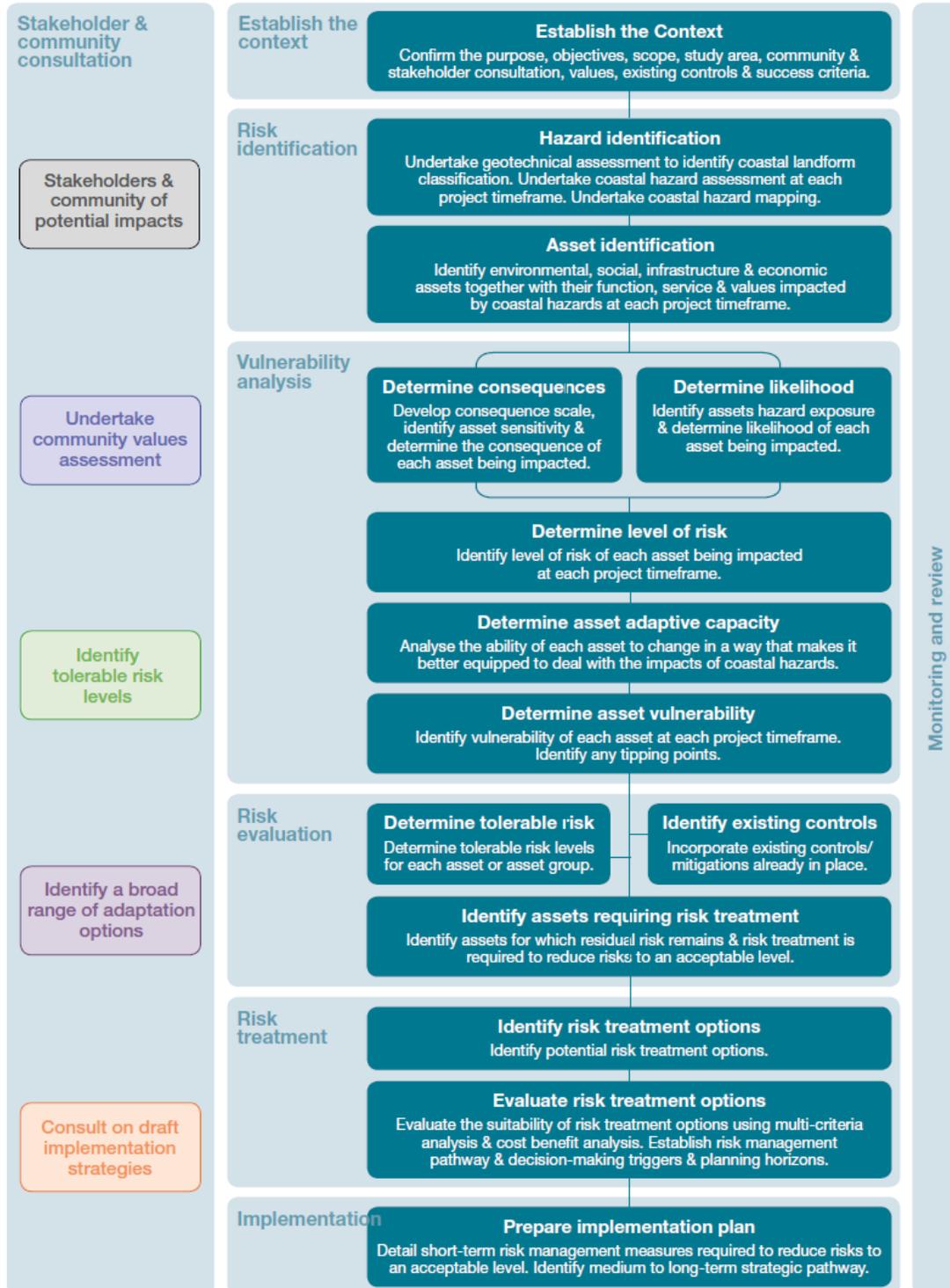


Figure 8: CHMAP Guidelines (WA) – engagement steps per risk management process

4.3 Scoping and establishing coastal context

The lines of inquiry relevant to scoping and establishing the coastal context in the adaptation planning process were as follows:

- **Extent of scoping**, is there anything prescriptive relevant to scoping?
- **How is the coastal system defined?**
 - Consideration of coastal compartments
 - Consideration of geomorphic setting
- **What is the extent of historical investigation**, how prescriptive is this?

Table 4 below provides a summary of each states framework and guidelines reviewed against the above lines of enquiry. Further learning and considerations in regarding to scoping adaptation planning is discussed further in Section 5.

Table 4: Guideline scoping and establishing coastal context snapshot

Line of inquiry	SA	VIC	QLD	WA	NSW
<p>Extent of scoping, is there anything prescriptive in this phase</p>	<p>Stage 1 (Stocktake) outlines the following minimum requirements:</p> <ol style="list-style-type: none"> 1. Seek agreement and approval from decision makers within council to develop and implement coastal adaptation plans. 2. Prepare a scoping report that identifies the extent and scale, current conditions and information gap analysis, and schedule of activities for approval by decision makers. 3. Conduct a self-diagnosis before your organisation commences further adaptation work to determine what level of adaptation is required next and whether there are any specific barriers that should be addressed first. <p>Data requirements for coastal hazard risk modelling is noted as a likely barrier.</p>	<p>Clear steps as follows:</p> <ol style="list-style-type: none"> 1. Lead/partner organisations should first define the need for action across an area of interest. (i.e. defining the problem). The need is often best framed as the positive outcomes expected from acting. 2. Define area: Refine the study area. The study area will vary based on each place-based context. Example questions in Figure 9. 3. Define the governance model this include mapping roles, skills, capacity and capability mapping. 4. Establishing a collaborative process via an Engagement and Communication Plan. 5. Scoping the work, via a scoping study. Supporting prompt questions provided. 6. Summary Project Plan. Minimum requirement of scoping. 	<p>Scoping is a defined stage with objectives and minimum standards.</p> <p>Minimum standards outlined as:</p> <ol style="list-style-type: none"> 1. Identify existing information 2. Analyse and determine if further investigations are required 3. Identify the timescale and planning horizons 4. Estimate the internal and external resource requirements. e.g. hours, timing, costs, resources and responsibilities to support each phase of the project 5. Prepare a scoping study report <p>Emphasis placed on ‘fit for purpose’ and ‘value for money’ approach should be taken and information needs prioritised accordingly.</p>	<p>Stage 1 (Establishing the context) provided guidance and worked examples on:</p> <ol style="list-style-type: none"> 1. Defining the purpose 2. Defining objectives 3. Defining the scope the 4. Defining the study area 5. Designing a community and stakeholder engagement strategy. <p>Acknowledging the importance of internal engagement and values mapping</p> <ol style="list-style-type: none"> 6. Review of exiting controls 7. Developing success criteria 	<p>Mandatory requirements of preparing a CMP</p> <p>During preparation of a CMP, a council is to identify the scope of the CMP.</p> <p>The scope of a CMP may be specific to local circumstances, the community and coastal environment and may depend on a range of factors. Provision and strong guidance provided subject to the category of coastal management area (e.g. wetland, coastal vulnerable area).</p> <p>A CMP must provide a description of how the objects of the CM Act have been considered and promoted in preparing the CMP.</p>

Line of inquiry	SA	VIC	QLD	WA	NSW
How is the coastal system (study area) defined?	Advice is provided to outline the geographic extent and scale of the project, including the nature of the assets (built and/or natural, public and/or private) and services to be assessed. The extent could range from the coastline for an entire region through to specific settlements in regional areas or local assets like ports or boat ramps.	<p>Framed that hazards are broader than the coast, climate change is a pressure broader than the coast and how these other climate pressures may influence coastal processes and hazards.</p> <p>Guidance questions provided to define study area presented in Figure 9, noting the study area is likely to cross jurisdiction boundaries,</p> <p>Noting adaptation planning is best framed across study areas at a regional scale e.g., whole or multiple LGAs, whole/multiple secondary sediment compartments.</p>	No emphasis on this. It is assumed that this is because the local government jurisdiction boundaries ultimately dictate the area of interest.	<p>The total study area is to be identified ensuring it encompasses all the relevant coastal processes operating in the identified area.</p> <p>The study area should include the entire sediment cell, which are the natural management units with a physical basis, identifying sections of the coast within which sediment transport processes are strongly related.</p>	<p>The area covered by a CMP may include all or any part of the coastal zone within the council area, but may also extend outside the council boundaries, and be prepared in cooperation with adjoining councils.</p> <p>The CMP may also cover areas outside the mapped coastal zone, where the management of the external area has a significant impact on issues within the coastal zone, for instance, wider estuarine catchments.</p>
Extent of historical investigation	Minimum requirement of Stage 3 (identifying coastal hazards) is to establish a baseline condition based on historical coastal hazards data through desktop research and stakeholder engagement.	<p>Recommended but not prescribed or explicit.</p> <p>Consideration for previous studies or works set the context for scoping and what stage are needed/not needed. i.e. has all the existing information been reviewed? how does work completed to date align with the seven-stage framework?</p>	Captured in Stage 1. Minimum standard is to collate and review all relevant historical information and identify gaps in light of the minimum standard requirements of future stages of the CHAS.	No reference to historical investigation.	<p>CMM acknowledges the importance of historical record, maps and photos to ascertain longer term context.</p> <p>Emphasis on the importance of understanding historical context of cultural assets.</p>

Category	Example questions	Considerations
Traditional Owner rights and assertions for Country	What are Traditional Owner rights and assertions for Country, including existing Country Plans?	Aligning study area to Traditional Owner rights and assertions, and to support Traditional Owner-led adaptation.
	What are Traditional Owner preferences for the study area?	
Landscape setting	What are the primary, secondary and tertiary coastal compartments in this region? (refer to Stage 3 for further detail)	Aligning study area to landscape processes and existing / proposed hazard assessment extents.
	Where do we already have detailed coastal hazard information?	The cost/logistics of acquiring new coastal hazard information.
Jurisdictional areas	What jurisdictional areas should the study include?	Aligning study area to be: <ul style="list-style-type: none"> • inclusive of key partner areas including Local Government Areas (LGAs), Registered Aboriginal Parties, Catchment Management Authorities, National Park areas, other. • the best use of resources.
Existing knowledge, plans and strategies	Where are the known risks and vulnerabilities from coastal hazards currently, or projected to be?	Aligning study area with the greatest need for action.
	Where are there known management gaps?	
	What current plans and strategies exist (including CMMPs)?	Aligning study area to best incorporate and build on from (and not duplicate) existing work.
Public and private land	What extent of public and private land is likely to be within the 2100 hazard prone area?	Ensuring study area is inclusive of all relevant areas for long-term planning (2100+).

Figure 9: Guiding questions for defining a study area, Adapting for 2100+ guidelines (Vic)

4.4 Hazard assessment and mapping

The lines of inquiry relevant to hazard assessment and mapping were as follows:

- **How is the technical guidance provided?** (e.g. embedded within guidelines, stand alone compendium)
- **Establishing the coastal site setting** (i.e. recommended process for understanding the coastal processes at play). E.g.:
 - Consideration of coastal compartments (coastal compartments are defined areas of the coast based on sediment flows and landforms)
 - Consideration of geomorphic setting
- **What planning horizons and subsequent SLR scenarios are recommended?**
- **How is erosion quantified and what is deemed a minimum assessment approach?** More specifically, how are the following considered/quantified:
 - Storm bight for a sandy shoreline
 - Underlying erosion/accretion
 - Setback due to sea level rise (SLR)
 - Are factors of safety included or recommended?
- **How is coastal inundation quantified and what is deemed a minimum assessment approach?**
- **How are other hazards considered and assessed?** (e.g., stormwater, groundwater, catchment generated flooding, sand drift, CASS)
- **How is the presentation of coastal hazard risks graphically (hazard mapping) recommended?**

Table 5 provides a summary of each state’s framework and guidelines reviewed against the above lines of enquiry. Further learning and considerations in regarding to scoping adaptation planning is discussed further in Section 5.

Table 5: Guideline coastal hazard assessment and mapping snap shot

Lines of inquiry	SA	VIC	QLD	WA	NSW
Technical guidance documentation	No guidance given on process to quantify coastal hazards.	Description of hazards sits within the guidelines, however quantification sits in supporting document.	Guideline provide brief description of hazards, however guidance on quantification sits in supporting document.	Technical standards sit in planning policy with guidance document providing descriptions of hazards.	Overarching legislation mandates the consideration of various hazards, guidance document provide descriptions of hazards.
Establishing the coastal site setting Consideration of coastal compartments Consideration of geomorphic setting	Listed as a minimum requirement to understand regional and local geomorphology and topography and its response to coastal hazards.	Use nationally delineated primary, secondary and tertiary compartments. A first step to understanding coastal hazard exposure involves summarising/assessing the geomorphic setting including landscape geology and shoreline class. Significant guidance is given on the geomorphic setting and coastal delineation in the extended (separate, standalone) guideline. Key step in establishing the hazard is acknowledgement of other physical hazards that could impact the coastal system (example provided in Figure 10). In line with Marine and Coastal Policy 2020, coastal processes need to be considered in the context of their coastal compartment. Delineated primary, secondary and tertiary compartments is provided.	No guidance provided on establishing the coastal site setting. Technical guide for assessing coastal hazard provides guidance on the assessment of a sandy shorelines verses presences of outcropping bedrock.	Require consideration of coastal compartments however not predefined. Significant guidance provided in coastal classification within the Policy document rather than the Guidelines.	Nationally delineated primary, secondary and tertiary compartments are required to be considered. Guidance in relation to the determining the geomorphic settings is less prescribed, however there is strong wording around site specific hazard consideration.

Lines of inquiry	SA	VIC	QLD	WA	NSW
What planning horizon and SLR scenario's are recommended	<p>Coast Protection Board's recommendation of 0.3 m sea level rise by 2050 and 1 m by 2100 is referenced.</p> <p>Climate risk assessment timeframes should as a starting point consider 2050 and 2100. Or alternatively align with align to the timeframes of common data sources for sea level rise projections in Australia, which typically refer to 2030, 2050, 2070 and 2090.</p>	<p>Planning horizons recommended as a minimum:</p> <ul style="list-style-type: none"> - Baseline (Present day) - Short term, 10-25 yrs (2040) - Medium term, 25 – 50 yrs (2070) - Long term 50 – 100 yrs (2100) <p>Alignment of sea level rise increments to time horizons should be based on the Marine and Coastal Policy 2020 and future updates to sea level rise benchmarks.</p> <p>Recommended sensitivity testing for the upper-end projections under high-emissions scenarios are recommended.</p>	<p>Not explicit in guidelines however recommends multiple likelihood scenarios over a variety of planning horizon (e.g. 2030, 2050, 2070, 2100).</p>	<p>Short, medium and long-term planning horizons recommended however not specifically prescribed.</p> <p>SLR values are in accordance with those contained in the Sea Level Change In Western Australia Application To Coastal Planning (2010) document.</p>	<p>Mandatory requirement for CMPs to consider a range of timeframes and planning horizons including immediate, 20 years, 50 years, 100 years.</p>
Approach to storm bight assessment	<p>Method not prescribed and assessment not captured as a minimum requirement.</p>	<p>Methodology not prescribed but recommend using probabilistic methods where calibration data is available, alternatively use design storms. Minimum hazard AEP event likelihoods recommended as:</p> <ul style="list-style-type: none"> - MHWS or HAT (Almost certain) - 10% Likely - 1% (Possible) - 0.2% (Rare) 	<p>Methodology not prescribed but 'leading practice' suggest process based numerical models or parametric equilibrium shoreline evolution models.</p>	<p>Specifies a cross-shore sediment transport model should be run for 3 consecutive storm events. In the absence of a model, a minimum of 40m should be applied.</p>	<p>To be considered, however methodology not prescribed.</p>

Lines of inquiry	SA	VIC	QLD	WA	NSW
Quantification of underlying erosion/accretion approach	Method not prescribed and assessment not captured as a minimum requirement.	Recommendation to assess measured shoreline positions (e.g. from aerials) and also consider sediment budget.	Recommendation to assess measured shoreline positions (e.g. from aerials) but also consider sediment budget.	Specifies 5-yearly aerial imagery from ~1950s to be used to determine an annual rate of change.	Determine the net long-term shoreline recession/accretion trend, and its variability, due to deficits and/or gains in the onshore, offshore and longshore sediment budget under current conditions.
Setback due to SLR	Guidance provided on using the Bruun Rule, listed as a minimum requirement for assessment coastal hazards.	Recommends Bruun rule (with note that it may not be suitable in some cases).	Bruun Rule recommended, some guidance is presented as to where this is not appropriate.	Set at 90m (SLR of 0.9m over 100yr time frame).	Recommends consideration however does not specify method.
Safety factor inclusion	Not specified.	Consideration of safety factor based on the adequacy of available data and knowledge of coastal processes.	Safety factor of 40% applied to define erosion prone area.	0.2 m/yr allowance for uncertainty.	Not specified.
Inundation assessment requirements	Minimum requirement to develop projections of coastal flooding under current and future conditions aligning with the Coast Protection Board's recommendation of 0.3 m sea level rise by 2050 and 1 m by 2100, considering mean high water spring tide and 1-in-100 (ARI) storm surge scenarios.	Separates inundation into permanent inundation from the regular tidal cycle and storm tide inundation from temporary events. Various recommendations given for these hazards.	Prescribed approach of 1.5m above HAT in south-east Queensland and 2m above HAT in the rest of Queensland is at very low risk to storm tide inundation over the next 100 years. Detailed studies need to be performed to stray from this default hazard extent.	Storm surge inundation should be based on the 0.2% AEP event (1 in 500 year) plus the predicted extent of sea level rise over the planning time frame.	In depth supporting material on inundation, however methodologies not enforced.

Lines of inquiry	SA	VIC	QLD	WA	NSW
How are other hazards considered?	<p>Stormwater and catchment generated flooding: outlined as factors to consider when assessing coastal flooding</p> <p>Groundwater: consideration for connection with coastal waters, impacts of rising sea levels to groundwater system via review of available drill hole information.</p>	<p>Stormwater: Consider coastal stormwater outfalls in inundation assessment and ensure that where catchment flows are thought to have significant influence, localised flow gauging should be considered in advance of coastal hazards.</p> <p>Groundwater: Saline intrusion into groundwater considered as a coastal hazard.</p> <p>Additional natural hazards may be relevant in some areas and should be included if/as required to address place-based adaptation needs. Off-shore sediment dynamics and estuary dynamics listed as hazards for consideration.</p>	<p>Stormwater: Local stormwater flows are listed as a factor that should be taken into account when performing numerical modelling of coastal water levels.</p> <p>Groundwater: Not considered.</p> <p>Other considerations: Flood velocities and consideration for cyclones</p>	<p>Stormwater: Back up of stormwater from rainfall unable to drain due to high sea level is listed as an inundation pathway for consideration.</p> <p>Groundwater: Not considered.</p> <p>Other considerations: Dune scarp considered in erosion set-back zones; and dune protection considered in inundation assessment.</p>	<p>Stormwater: Supporting document which specifically details interaction between stormwater and coastal inundation.</p> <p>Groundwater: Impacts to groundwater listed as a potential study performed in conjunction with an inundation study.</p> <p>Other considerations: Coastal lake or watercourse entrance stability and special consideration for erosion or inundation of estuaries.</p>
Presentation of coastal hazard risks graphically (hazard mapping)	<p>Erosion mapping not explicit. Suggests creating flood maps however not prescriptive beyond this. Minimum requirement to discuss the implications of releasing or not releasing hazard data, and the most effective methods for releasing the data.</p>	<p>This is not prescriptive however extended guidelines provide guidance on what should be included in coastal hazard graphical maps via GIS spatial layers, e.g.:</p> <ul style="list-style-type: none"> - depth of inundation - erosion hazard lines - extent of groundwater intrusion - impacts of future climate change, based on the planning horizon 	<p>Reference to external guidance on mapping complicated inundation modelling. Limited reference, or guidance on mapping erosion hazard risks.</p>	<p>An important output of Stage 2 (Risk identification) is the formulation of coastal hazard risk maps. Listed as highly desirable for hazard maps to apply titling, terminology, a legend, colour coding and disclaimers. Example given as shown in Figure 11.</p>	<p>Recommended however not prescribed. Recommended that accompanying text describes the information and models that have been used to undertake the hazard mapping and the level of confidence in the hazard mapping</p>

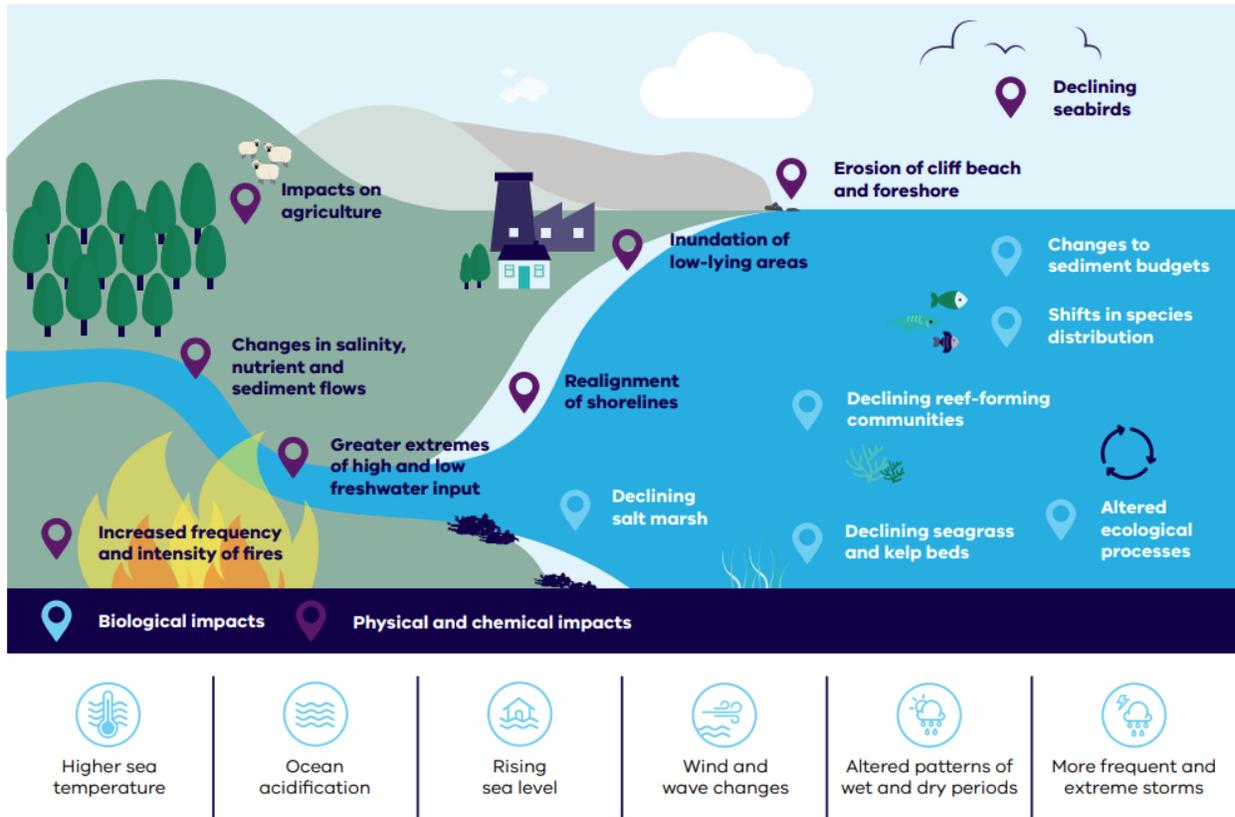


Figure 10: Likely changes to the coast caused by climate change (Adapting for 2100+ guidelines (Victorian Government))

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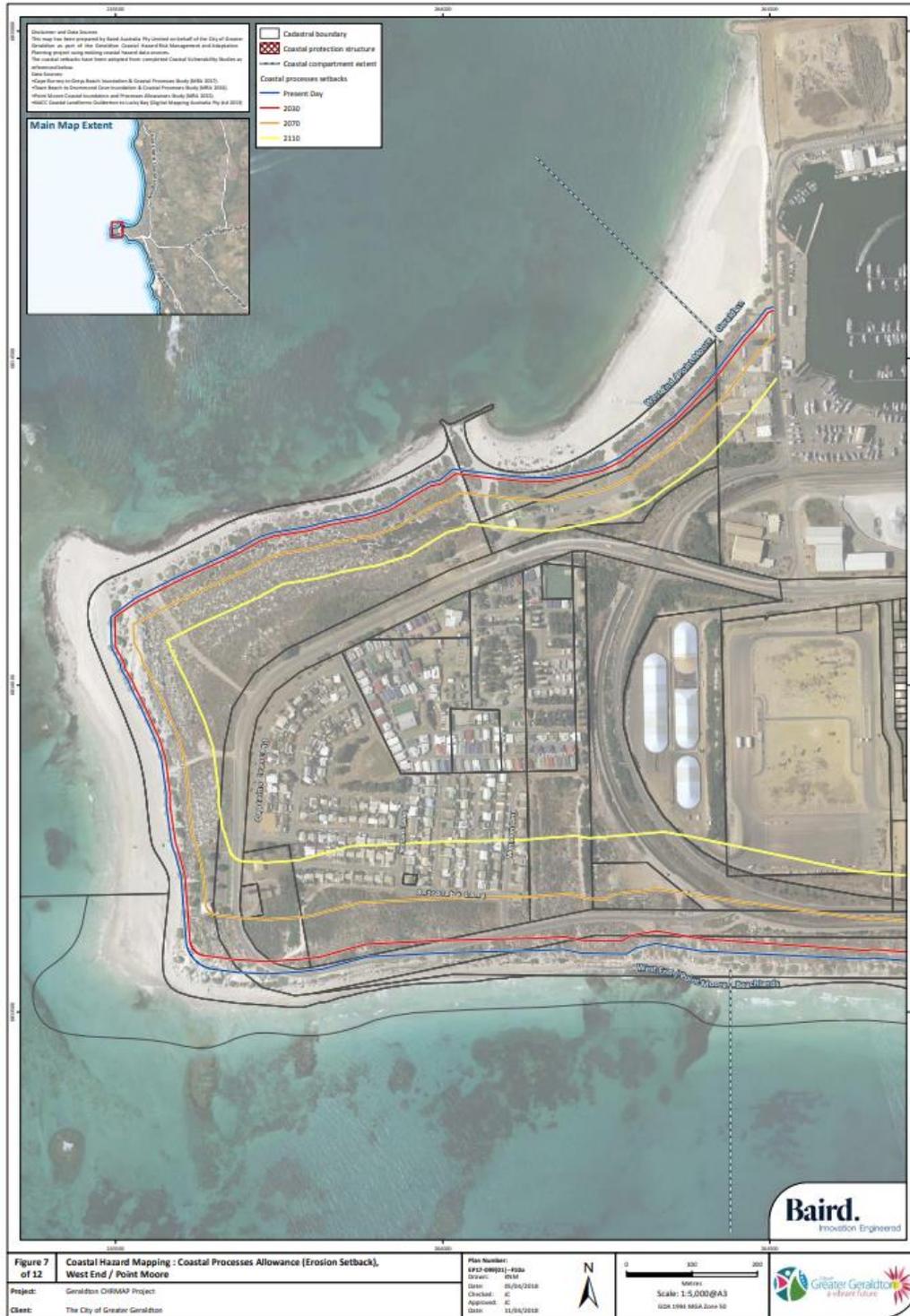


Figure 11: Example of coastal erosion hazard map (WA CHRMAP Guidelines)

4.5 Risk assessment

The lines of inquiry relevant to the risk assessment process in adaptation planning were as follows:

- How is an asset defined?
- How are assets captured (e.g. documented/reported)?
- Are cultural assets specifically identified?
- What risk framework is recommended (or prescribed) to be applied? And does the risk framework require the consideration for adaptive capacity of the asset?
- How does the suggested risk framework tie to Council's risk frameworks?
- What risk rating for an asset would require consideration for risk treatment (e.g. High or above)?

Table 6 provides a summary of each states framework and guidelines reviewed against the above lines of enquiry. Further learning and considerations in regarding to adaptation planning risk assessments is presented in Section 5.5.

Table 6: Guideline risk assessment snapshot

Line of inquiry	SA	VIC	QLD	WA	NSW
How is an asset defined?	Includes built assets, regional coastal towns and settlements, services, culturally sensitive areas and natural assets such as beaches, dunes, estuaries and coastal wetlands.	Something that has values or uses across public and private land. Consideration of tangible, indirect tangible and intangible impacts.	Physical, natural, economic, social and cultural assets inclusive of both tangible and intangible assets.	Deemed necessary to consider 'all assets (social, economic, environmental)'.	Legislative requirement to assess risks to environmental, social and economic values.
How are assets captured?	Set up in spreadsheets, enabling the tabulation of risk scores.	Specifies a database for asset capture based on coastal values and uses which are defined by the project partners.	Minimum requirement is to map assets exposed to coastal hazards, identify asset owners, engage with stakeholders to identify assets, estimate asset value and agree on priority assets.	Methodology not specified.	NSW does not specify an asset capture methodology, although it is recommended that asset identification is performed during the community engagement phase.
Are cultural assets specifically identified?	Culturally sensitive areas listed as a type of asset.	Yes, cultural assets are considered throughout evaluation process.	Consideration of the cultural importance of key assets is a minimum requirement.	Policy document objective to consider cultural significance, however the guidance document does not explicitly outline how cultural values should be captured.	The CMM does not specify how cultural assets should be identified, however it is listed as a consideration.

Line of inquiry	SA	VIC	QLD	WA	NSW
What risk framework is applied?	<p>The risk management framework used for the project should align with national and international standards for risk management, specifically:</p> <ul style="list-style-type: none"> • ISO 31000:2018, Risk management – Guidelines; • AS 5334-2013 Climate change adaptation for settlements and infrastructure - A risk-based approach. 	<p>Should follow ISO 31000:2018, and align with the Victorian Government Risk Management Framework and DELWP Risk Management Guidelines.</p>	<p>Based on: AS/NZS ISO 31000:2009</p> <p>Councils may make use of internal risk assessment processes provided they are consistent with the risk management framework in the Australian Standard.</p>	<p>The process outlined in in the guidelines is adapted from the risk management and vulnerability assessment processes identified in Australian standards.</p> <p>Policy requires inclusion of vulnerability assessment and risk identification. The guideline provides examples of each aspect of these steps, however there is allowance and promotion for integration into decision maker's framework.</p>	<p>Based on: AS/NZS ISO 31000:2009</p> <p>Councils are required follow the staged approach set out by the guideline.</p>
Does the risk framework require the consideration for adaptative capacity of the asset?	<p>Councils asked to consider if a climate risk assessment or vulnerability assessment is required, vulnerability assessment explained however not guidance given on approach.</p>	<p>Yes, included in vulnerability assessment.</p>	<p>Yes, included in vulnerability assessment.</p>	<p>Yes, included in vulnerability assessment.</p>	<p>Yes, included in vulnerability assessment.</p>
What risk rating for an asset would require consideration for risk treatment (e.g. High or above)?	<p>Minimum requirement to identify priority risks that require new treatments or actions to reduce or eliminate risks. Where high or very high risk identified, recommends inclusion in Councils corporate risk register.</p>	<p>Risk classifications of significant and high requires action.</p>	<p>Risk classifications of high and extreme require immediate action.</p>	<p>Risk classifications of high and extreme require immediate action.</p>	<p>If high risks are identified in stage 2, councils must perform a stage 3 scope and options assessment. If only low risk issues are identified, councils may move straight to a future stage of a CMP.</p>

4.6 Adaptation options assessment

The lines of inquiry relevant to the adaptation option assessment process were as follows:

- Is there a hierarchy when considering options?
- Is there a defined process for the options assessment, and what is it?
- Is a Multi Criteria Assessment (MCA) recommended and the subsequent process?
 - How are the criteria established?
 - Are the criteria weighted?
- Approach to economics i.e. is a Benefit Distribution Analysis (BDA) or Cost Benefit Analysis (CBA) recommended?
- Approach to triggers, how are they defined, consideration to planning triggers.

Table 7 provides a summary of each states framework and guidelines reviewed against the above lines of enquiry. Further learning and considerations in regarding to adaptation planning risk assessments is presented in Section 5.

Table 7: Guideline adaptation options assessment snapshot

Line of inquiry	SA	VIC	QLD	WA	NSW
Is there a hierarchy when considering options	Not explicit, however references guideline principles in line with: <ol style="list-style-type: none">AvoidAccommodateDefend	Yes, in line with the Marine and Coastal Policy 2020 <ol style="list-style-type: none">Non-interventionAvoidNature-basedAccommodateRetreatProtect	Yes, framed as an order of preference. <ol style="list-style-type: none">AvoidPlanned RetreatAccommodateDefend	Yes and greater emphasis on flexibility of options. <ol style="list-style-type: none">AvoidPlanned RetreatAccommodateProtect	Not explicitly however states: “will focus first on enhancing natural defences such as sand dunes, vegetation and wetlands, and/or avoiding future risk by encouraging land uses that reduce exposure to coastal hazards”
Is there a defined process for the options assessment?	Not a prescribed process however describes the need to develop a long list of viable options, undertaken an initial screening then undertake a more detailed prioritisation (examples of MCA and CBA) given.	Yes. Recommends setting up pathways template first followed by assessing and selection of actions. <ol style="list-style-type: none">Compile a shortlist of relevant adaptation actionsMCAEconomic analysisEstablish the sequence and timing	Yes. <ol style="list-style-type: none">Compile list of optionsHold a workshop with key stakeholders to assist in informing the option identification process and set assessment criteriaScreening methodologyPrepare adaptation options document	Having identified the risk treatment options available, it is necessary to assess them (and their function, services and values) in a more detailed analysis using a range of social, environmental and economic criteria. Fatal flaws analysis of all options isn’t explicit. Suggests MCA followed by CBA.	Yes. Prescribed 4 step process: <ol style="list-style-type: none">Confirm the strategic direction of each section of coast (risks and opportunities)Identify potential optionsEvaluate potential actions (Feasibility, Viability and Acceptability)
Is an MCA recommended	Not explicitly however outlines MCAs have emerged as a preferred technique.	Yes	Yes. A defined stage. Minimum standard that MCA should be applied to all viable adaptation options identified.	Yes. Undertaking a MCA should be done in collaboration with the community and stakeholders. Example MCA process steps shown in Table 8.	MCA process suggested, not explicit.

Line of inquiry	SA	VIC	QLD	WA	NSW
What criteria is applied to the options assessment (MCA if applied) and is the criteria weighted	Guidance on criteria or weighting not provided.	Guidance given on what criteria could be. Recommends criteria and weighing is determined collaboratively with partners.	Not defined however recommends establishment of criteria and weighting should be workshop driven.	Example criteria provided however suggested this is developed with the community and stakeholders. The weight to each criterion should be in line with values and success criteria of the broader adaptation plan or strategy.	Criteria is defined as follows: <ul style="list-style-type: none"> • Feasibility (effective, ecological, sustainable, legal). • Viability (affordable, distribution of costs and benefits) • Community and stakeholder acceptability (fair and equitable)
Approach to economics	CBA listed as an approach to consider. Minimum requirement is to agree to how public funding will be allocated to protection of private assets or assets that deliver mostly private benefits.	Five step process outlined with further guidance provided in a stand-alone compendium . In summary: Step 1 – Scope the work. Step 2 – Value the base case Step 3 –Scope adaptation actions and quantify costs and benefits of adaptation Step 4 – Compare Step 5 - Communicate and Decide.	CBA set as a minimum standard for options progressed and identified as a priority of the MCA.	CBA approach is outlined (7 step process) Further guidance provided in stand alone document on non market valuation of community values affected by coastal hazards .	the distribution of costs and benefits of all proposed coastal management actions is to be captured in a business plan. Guidance is given on selecting the appropriate level of economic assessment, based on a matrix of risk and complexity
Approach to establishing triggers	Incorporates the concept of triggers and thresholds into the sequencing of options (the pathway approach), identified as a common process.	Trigger for change of adaptation pathway captured in the pathway plan. Also requires mapping triggers for review of the adaptation plan itself. Suggestions of triggers provided.	Establishing triggers listed as leading practice rather than minimum standard in implementation phase.	Defined step to establish triggers, once the options for implementation have been identified, pathway(s) and associated triggers need to be established. Example triggers shown in Table 19.	Statutory provisions to identify how and when those actions are to be implemented, and by who

Table 8: Example MCA process steps (CHRMAP Guidelines, WA Government)

Process Description	Process Description
1. Decision Criteria	Develop a set of criteria (technical social, environmental and financial) to appraise/score potential risk treatment options
2. Scoping	Assess the expected performance of each risk treatment option against the criteria.
3. Weighting	Assign weights for each of the criterion to reflect their relative importance to the decision
4. Weighted Scoring	Combine the weights and scores for each risk treatment option to derive an overall score. Scores are used to rank competing risk treatment options.
5. Sensitivity analysis	Conduct a sensitivity analysis to explore whether uncertainty in scoring or weights materially affect the results/overall ranking of the risk treatment options
6. Recommendations	Document the findings and results of the analysis and recommendations for input into CBA

Figure 12: Example trigger, decision-making and measures (CHRMAP Guidelines, WA Government)

Trigger name	Trigger	Decision	Measures
T1	The HSD is within the S1 distance of an asset's most seaward extent	Ongoing shoreline monitoring (survey profiles) to determine present location of HSD S1 defined by modelling, with data collected during shoreline and storm monitoring used to validate/refine the S1 value	Remove major infrastructure (roads, carparks), residential and commercial buildings, transfer land to public realm Provide interim protection for major infrastructure (roads, carparks), residential and commercial buildings Prepare response plans for minor infrastructure that could be impacted
T2	A public road is no longer available or able to provide legal access to a property	Liaison with/notification by relevant level of government	Remove residential and commercial buildings, and transfer land to public realm
T3	Water, sewer or electricity to a lot is no longer available as they have been removed/decommissioned by the relevant authority due to coastal hazards	Liaison with/notification by utility providers	Remove residential and commercial buildings, and transfer land to public realm
T4	Residential or commercial property lies seaward of the most up to date 100-year coastal erosion hazard line	Definition of hazard extent through CHRMAP CHRMAP and hazard extent updates due to availability of more relevant/recent information (such as updated SLR predictions) and changes in environmental conditions (such as changes to MSL)	Include all affected land in a SCA and ensure the hazard information is incorporated in structure planning Provide notification of potential hazards on certificates of title where reasonably practicable and by direct contact with affected landholders
T5	An asset is damaged, destroyed or becomes unsafe due to coastal erosion	Inspection of coastal assets following storm events or during times of increased longshore erosion Remote coastal monitoring cameras Notification by the public	Remove assets and relocate to less hazardous area if possible/appropriate
T6	Assets are predicted to become highly or very highly vulnerable within the next planning timeframe or within 15-20 years	Definition of hazard extents through CHRMAP CHRMAP and hazard extent updates due to availability of more relevant/recent information (such as updated SLR predictions) and changes in environmental conditions (such as changes to MSL)	Undertake details cost-benefit analysis and assessment of community acceptance of interim protection vs. managed retreat of the affected asset; Identify sources and begin to allocate funding for risk management measures
T7	The overall community and stakeholders are no longer supportive of a specific risk management technique or approach	Ongoing community engagement; Cost-benefit analysis	Investigate, identify and implement a change in the risk management pathway, if appropriate
T8	A specific risk management technique is forecast to no longer be economically or physically feasible within 10 years	Ongoing shoreline and coastal asset monitoring Budget expenditure and forecasts Cost-benefit analysis	Investigate, identify and implement a change in the risk management pathway, if appropriate
T9	The beach and coastal foreshore reserve is significantly diminished with respect to its original state and function	Long-term coastal monitoring program Assessment of aerial imagery Feedback through ongoing community consultation	Investigate, identify and implement a change in the risk management pathway, if appropriate
T10	Undeveloped land is identified as lying within the hazard extents	Definition of hazard extents through CHRMAP CHRMAP and hazard extent updates due to availability of more relevant/recent information (such as updated SLR predictions) and changes in environmental conditions (such as changes to MSL)	Implement planning controls to avoid inappropriate development of the land

4.7 Implementation

The lines of inquiry relevant to the implementation of adaptation plans were as follows:

- How operational is this stage? I.e. once options are determined how is the implementation mapped out (e.g. responsibility, timing)
 - What workable actions are recommended to build into Councils operations
- Approach to funding. E.g. How is 'who pays' resolved or what guidance is given?
- Approach to monitoring. I.e.:
 - Ongoing physical monitoring of coastal hazard
 - The performance of the adaptation plan itself
- What is the recommended frequency or trigger for review of the adaptation plans?

Table 9 provides a summary of each states framework and guidelines reviewed against the above lines of enquiry. Further learning and considerations in regarding to adaptation planning governance is presented in Section 5.

Table 9: Guideline implementation snapshot

Line of inquiry	SA	VIC	QLD	WA	NSW
<p>How operational is this stage? What actions are proposed to implement options</p>	<p>To ensure that the plan is used to drive on-ground action, either immediate or in the future, key outcomes should be embedded in council corporate governance documents.</p> <p>More specifically:</p> <ul style="list-style-type: none"> • Council risk register • Asset management plan • Long-term financial management plan <p>Plan should include at a minimum: necessary approvals, implementation timeframes, resourcing requirements and responsibilities, monitoring and evaluation.</p>	<p>In this final stage, an adaptation plan (CHARP or similar) is developed that includes refinement of adaptation pathways and triggers for change, and implementation details.</p> <p>This includes:</p> <ul style="list-style-type: none"> • Prioritising actions • Clarifying funding actions • Clarifying roles and responsibilities <ul style="list-style-type: none"> • Identifying triggers for review • change management (i.e. mapping out methods to change internal and external processes) <ul style="list-style-type: none"> • Developing a Monitoring, Evaluation, Reporting, and Improvement Plan 	<p>A minimum requirement is the development of an Implementation Strategy (internal document), this is an operational document providing clarity on actions, timing, ownership, costs, how each action will be funded and monitoring.</p> <p>A minimum requirement is also to undertake an internal organisational change management plan, to provide a structured and systematic way to guide the integration of CHAS implementation.</p> <p>QCoast are currently preparing further guidance material to support implementation.</p>	<p>Development of an implementation plan is suggested with a focus on risk management in the short-term (25 years), however also suggests to include measures and future decision points for the medium and long-term risk management pathways.</p>	<p>Business Plan is required which outlines:</p> <ul style="list-style-type: none"> • Clear expectations on actions • Responsibilities • Timings • Costs <p>Business Plan is imbedded within the CMP.</p>
<p>Approach to funding</p>	<p>Sources of funding opportunities outlines.</p> <p>Outlines the requirement to identify what funding is actually required.</p> <p>Prompting question in developing the Plan is to consider what is the funding ratio between local-state-federal government for agreed upon adaptation measures.</p>	<p>Framed as funding actions (within the implementation plan):</p> <ul style="list-style-type: none"> • The initial and ongoing cost of the adaptation action • Costs of offsetting impacts • Short, medium and long-term sources of funding • Cost-sharing arrangements • Cost triggers for changing approach 	<p>Requirement of the implementation plan is to capture the financial plan. I.e. how actions will be funded including the identification of new or increased revenue sources during the life of the plan.</p> <p>A supporting compendium provides further guidance on revenue raising mechanisms available to councils.</p>	<p>Funding options need to be identified and the governance framework that will support how revenue will be raised.</p> <p>The decision-maker should consider equity in terms of who benefits, who is disadvantaged, who should pay and the subsequent allocation of public resources.</p>	<p>Mandatory requirement of a Business Plan within the CMP:</p> <ul style="list-style-type: none"> • Costs • Timing • Proposed cost-sharing arrangements • Distribution of costs and benefits of all proposed actions.

Line of inquiry	SA	VIC	QLD	WA	NSW
Approach to monitoring	<p>Guidance provided for consideration of monitoring however not prescriptive.</p> <p>Monitoring discussed as often challenging to successfully implement given resources required to execute well.</p>	<p>Monitoring approach proposed to be captured in the recommended Monitoring, Evaluation, Reporting and Improvement plan (MERI).</p> <p>Monitoring a defined stage, however plans and approaches not prescribed. Tailored monitoring plan suggested with guiding principles.</p> <p>State guidelines for monitoring sandy coastlines are available to coastal managers.</p>	<p>Minimum standard to capture operational performance of the plan in the internal change management plan.</p> <p>Minimum standard to capture arrangements for monitoring, reporting and reviewing including indicators used to monitor key areas and assets for impacts of coastal hazard risks.</p>	<p>Monitoring is a defined stage however this is not prescriptive. Outlines the importance of monitoring rather than what and how to execute.</p>	<p>Mandatory requirement to identify a proposed monitoring, evaluation and reporting program in relation to the CMP.</p> <p>Councils must report on the implementation of a CMP on an annual, four yearly and ten-yearly basis.</p>
What is the recommended frequency or trigger for review of the adaptation plans	<p>Triggers for review of the plan may include changes in:</p> <ul style="list-style-type: none"> • Change in community attitudes • Change in coastal hazard risk or accept to scientific data <p>Explicit timeframe for review of a plan not provided beyond this.</p>	<p>Triggers for review of the plan may include changes in:</p> <ul style="list-style-type: none"> • Sea level rise benchmarks • Scientific advances • Policy contexts • Project partners • Other strategic plans • Hazard risk updates or changes in vulnerability profiles 	<p>Recommended for review every 5 - 10 years. Trigger for review may include:</p> <ul style="list-style-type: none"> • If a trigger is reached • Changing risk profile • In conjunction with the future review of planning schemes • Change in SLR projections • Emerging best practice or other adaptation learnings • Changes to community attitudes and risk tolerance • Changes to legislation. <p>Figure 12 outlines the CHAS adaptive management framework for continuous improvement.</p>	<p>Future revision and updates of the CHRMAP could be coordinated to coincide with: the review of strategic plans, local planning strategies and schemes; the release of IPCC assessment reports; legislation, policy and policy guideline change.</p> <p>Partial review and amendments may be applicable, based on matters such as annual monitoring and ongoing suitability of implementation of risk management measures and triggers.</p>	<p>Reviewed at least once every 10 years.</p> <p>The review is to be undertaken in accordance with the CMM.</p>

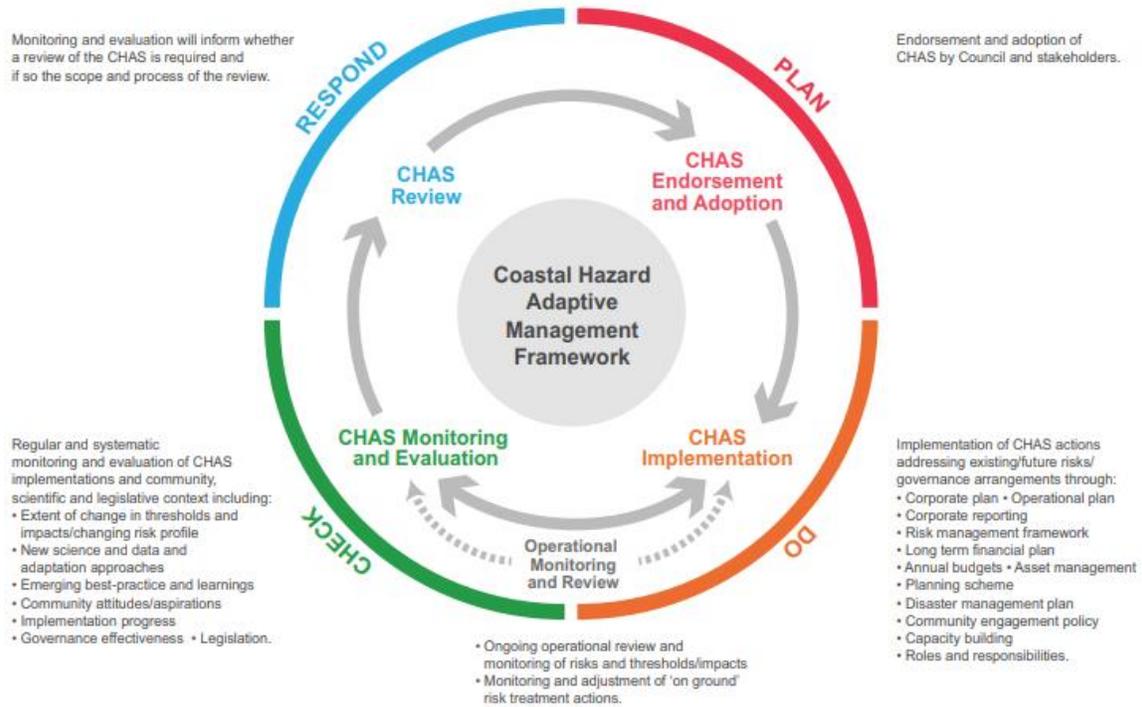


Figure 13: CHAS adaptive management framework for continuous improvement (Minimum Standards and Guideline for Queensland Local Governments)

5. Learnings for SA standards development

Following the review of other state frameworks, and considering the broader objectives of the SA CRC program, key learnings and recommendations are summarised below.

5.1 Framework and governance

- It is typical for adaptation plans and guidelines to not be mandatory, however they typically build on the directions of the broader coastal planning policy and Acts which are statutory tools.
 - Notwithstanding this, CMPs within NSW are a statutory requirement; and
 - Within Victoria, project partners may opt to develop a Regional and Strategic Partnership (RaSP) which is a statutory strategic planning process under the Marine and Coastal Act 2018. An example of a RaSP is the Cape to Cape Resilience Project. A key driver for opting for a RaSP may be the level of coastal hazard risk (e.g. imminent high risk) and the need to implement and embed long term mitigation measure(s).
- Typically, the adaptation plan itself is 'owned' and the process is undertaken by local government. However, it is acknowledged that the adaptation planning process is the responsibility of a diverse group of land and asset owners and managers across public and private land.
 - The success of this is largely driven by strong, respectful working relationships across local and state government where there is a genuine consensus that coastal management and adaptation planning is a shared problem.
 - Greater emphasis has been placed on establishing the governance model as a key first step in the scoping and preparation phase. This includes mapping out project partners, defining clear roles and responsibilities, identifying gaps, and establishing a collaborative process from the outset.
 - It is typical for state government to lead and drive the broader program and provide funding and technical support for local government throughout the develop of adaptation plans. This ongoing support has promoted a strong partnership approach to adaptation planning across local and state government.
 - It is common practice to establish a steering committee to provide guidance and oversight on, and make decisions in relation to, all aspects of the adaptation process. This establishes a collaborative process between project partners from the outset.

- Typical stages (or phases) of adaptation planning include:
 - Scoping and preparation
 - Establish governance model
 - Define values, objectives and success criteria
 - Risk identification
 - Coastal hazard exposure
 - Risk and vulnerability analysis
 - Adaptation actions and pathways
 - Implementation
 - Ongoing monitoring and review

Engagement and communication and a collaborative process with partners is typically embedded throughout the process.

The adaptation planning approach is typically considered to be a cyclical/iterative process, whereby each phase or stage is interconnected and can be revisited and refined as necessary. This has been challenging to implement in practice, given funding and resource constraints, competing priorities and procurement cycles.

- Establishing minimum standards per phase or stage presents both improvement opportunities and constraints. While this promotes greater consistency across the state, it can also lead to unnecessary effort and expenditure on adaptation activities and actions that aren't necessary (e.g. over investment in technical assessment or engagement). Providing additional leading practices (rather than minimum standards), per stage can promote a more scalable approach to adaptation planning.

- A supporting framework for quality control has resulted in greater consistency and confidence across adaptation plans and the adaptation planning process as a whole. The supporting framework for quality control usually involves a consistent approach to the review of adaptation reporting outputs, and consistent personnel (with the necessary strategic or technical skills) providing advice on scoping and reviews.

Typically, adaptation reporting outputs are reviewed for each stage or phase of the adaptation plans by either technical staff (planners and engineers) within state government or by an independent body (board or committee).

A common challenge to embedding a consistent and rigorous quality control process is that it can slow down the adaptation planning process considerably, extending the development of plans up to 3 – 5 years.

- The form and function of adaptation planning frameworks and guidelines is considered a strong influencing factor to success and uptake. Areas of consideration include:
 - Clear definitions and explanation of adaptation planning terminology.
 - Guidance provided on how to use the guidelines and who it is relevant to.
 - Purpose statements per stage or phase, summary steps and closing checklist (see example provided in Figure 5).
 - Extended guidelines, and technical compendiums providing greater detail outside of the guidelines.
 - Hyperlinks to supporting reference documents, relevant policy documents or coastal data sites.

5.2 Engagement

- Across all states, it is common practice to prepare an engagement plan. This is a critical early step of any coastal adaptation planning. Engagement plans typically capture:
 - Purpose of the engagement across the whole project as well as for particular phases of work.
 - Key messages for the overall project as well as anything unique to particular phases of engagement.
 - Project stakeholders (including community) and their likely interest and level of influence on project outcomes.
 - Engagement approach, including objectives, relevant stakeholders, timing, methods/tasks, resources, responsibilities, reporting and sharing engagement findings (closing the loop) for each phase.
 - Engagement-related risks and proposed mitigation strategies.
- A key consideration for assessing adaptation options is how community and stakeholder sentiments and values will be captured and how they will influence the options assessment.

Typically, social considerations such as community and stakeholder values are defined criteria within the options assessment (e.g. within multi-criteria analysis).

Further to this, the weighting of criteria and scores for adaptation options is often workshopped with representatives from the community and key stakeholders (e.g. reference group).

The community and stakeholder input needs to be from participants who are representative of the entire community, not dominated by the values of particular individuals or groups.

- Encouraging a more inclusive participation process to include a wide set of values helps to generate community and stakeholder support for the development and implementation of a plan. Stakeholder mapping typically includes the consideration of the following:
 - Local communities (especially directly affected residents, ratepayers and businesses)
 - Community groups and not for profit and non-government organisations
 - State government agencies
 - Other authoritative bodies (emergency response, natural resource management)
 - Political representatives (elected members, relevant ministers)

- Neighbouring councils
 - Essential services
 - Industry/business or industry/business associations.
 - Potential groups of concern: banks (regarding mortgages in affected areas), insurers, etc.
- The maturity in First Nations engagement within adaptation planning varies from state to state. Victoria and New Zealand provide examples of successful partnership approach with Traditional Owners, with an emphasis on early and ongoing engagement with Traditional Owners and a greater focus on cultural values and adaptation needs.
Engagement with First Nations communities should not be limited to consideration of cultural heritage and sites, and should cover the project as a whole and how they would like to be involved in adaptation planning and implementation.
 - It has been common practice across other states to establish a coordinated network for the coastal community (i.e. decision makers, policy officers, interested parties) for the purpose of building capacity within all stakeholders. These networks provide an opportunity to share and build knowledge through ongoing forums and workshops, where adaptation experiences are shared, and guest speakers are invited to speak. A key indicator of success is the improved understanding of coastal adaptation terms and definitions, i.e. stakeholders speaking the same language.
The co-ordination of the network is most often undertaken by a dedicated resource (i.e. a role within a relevant state government body) which provides a conduit between LGAs across the state and state government agencies.

5.3 Scoping and establishing coastal context

- Greater emphasis on scoping provides the opportunity to build a solid foundation for future stages, gain buy in from project partners including internal senior officers, executives and key decision makers.

The scoping stage also provides the opportunity to consider if all stages of the adaptation process are required. This is particularly important where funding is constrained. In establishing Victorias guidelines, DECCA incorporated the following prompting questions into the scoping phase of the guidelines to emphasise a ‘fit for purpose’ and ‘value for money’ approach:

- has all the existing information been reviewed?
 - how does work completed to date align with the seven-stage framework?
 - are some stages fully complete?
 - which stages have not yet commenced?
 - are some stages partially complete – and what gaps need to be filled?
 - does existing work from some stages need updating?
 - what are the tailored needs of the project partners?
 - what is needed to ensure a collaborative approach is continued/improved for future work?
- A project plan is a typical deliverable for the scoping phase of adaptation. The project plan can provide clarity on:
 - the need for action – refined through the collaborative work of the scoping stage
 - the study area
 - the governance model (example guidance presented in Figure 9)
 - the proposed collaborative process for the project, detailed in a Communication and Engagement Plan
 - the scope the work required for each Stage

Leading practice is to have all project partners or members of the steering committee endorse the project plan.

- The assessment study area has traditionally been defined by jurisdictional boundaries (LGA boundary extents). However, leading practice requires the consideration of the coastal (and catchment) system more broadly. For example, defining the study area may consider the landscape setting, sediment compartments and Traditional Owner rights and assertions for Country. Defining the study area beyond jurisdictional boundaries promotes a collaborative and partnership approach with neighbouring Councils, agencies and landowners. This approach requires establishing a clear governance model where project partners, roles and responsibilities within the partners, vision and objectives are agreed upon.

- Historical investigations provide good context and foundations for understanding the coastal setting, and can also provide a great engagement tool (e.g. historical photos of hazard impacts). Historical investigations such as archive searches can be labour intensive (time and budget consuming). Within the scoping phase it is important to consider the place-based risk (level of intolerable risk) against the level of effort required for the historical review.

5.4 Hazard assessment and mapping

- To promote consistency across adaptation plans, it is common for planning horizons to be recommended within guidelines. Typically the following planning horizons are recommended:
 - Baseline (Present day)
 - Short term, 10-25 yrs
 - Medium term, 25 – 50 yrs
 - Long term 50 – 100 yrs

Alignment of sea level rise increments to time horizons are typically prescribed within state policy documents.

- Supporting technical compendiums (to supplement the primary guideline document) outline the detail of the how coastal hazard should be assessed (analysis and mapping). These provide useful guidance to a technical audience and promote consistency. This allows for the introduction and discussion of coastal hazards within the primary document to be aimed at decision makers.
- For the quantification of coastal hazards, the following minimum requirements are recommended:
 - Consideration of geomorphic setting and coastal compartments to define which hazards need to be assessed.
 - Where coastal erosion is identified as a hazard for a sandy shoreline, the assessment requires the consideration of:
 - short term erosion (S1)
 - long term shoreline change (S2) and
 - erosion due to SLR (S3)

Relevant combinations of these factors should be considered for other coastline types.

- Typically, S1, S2 and S3 are calculated using simplistic and conservative approaches in areas where detailed analysis is not viable (e.g. funding constraints). For example:
 - S1: 40m landward of HAT
 - S2: Analysis of aerial imagery to determine annual shoreline change rate (m/year) multiplied by the number of years in the planning horizon and qualitative assessment of sediment transport to confirm ongoing trend.
 - S3: 'Bruun rule' methodology
- Where detailed analysis is undertaken, typically the following methodologies are applied:
 - S1: Cross shore numerical modelling or probabilistic approaches
 - S2: Quantitative sediment budget analysis or sediment transport modelling
 - S3: Shoreline translation modelling e.g. 'ShoreTrans'
- Where erosion hazard mapping has been prescribed in guidelines, the accepted method for presenting the erosion hazards (i.e. erosion hazard maps) is via erosion hazard lines (example provided in Figure 11).
- The assessment approach for coastal inundation varies across states however this typically requires the consideration of inundation from both the regular tidal cycle, and storm tide inundation from temporary events (e.g. 1% AEP).
- Undertaking assessment of a number of likelihood events (e.g. HAT, 10% AEP, 1% AEP and 0.2% AEP) provides insight on 'nuisance' flooding events (more frequent, less impact) and the 'severe' events (less frequent, greater impact).
- 'Bathtub' mapping approach is considered an acceptable minimum approach to provide a first pass of coastal inundation risks. Bathtub mapping provides a low cost simplistic means to identify coastal inundation risks. The limitations of the assessment approach (and subsequent maps) need to be made clear to decision makers, and the cost benefit of this approach compared to more detailed modelling considered.
- Ground truthing of hazard mapping (i.e. surveying after hazard events) provides greater confidence in the hazard maps and provides an important engagement tool when explaining the hazard maps to the community and key stakeholders.
- Regarding the consideration of other hazards:
 - Coastal stormwater outfalls need to be considered in the inundation assessment.
 - Where catchment flows have significant influence, localised flow gauging should be considered and the joint probability/impact of catchment generated and ocean induced flooding occurring needs to be analysed.
 - Saline intrusion into groundwater may be considered as a coastal hazard.
 - Additional natural hazards may be relevant in some areas and should be included if/as required to address place-based adaptation needs. They may include off-shore sediment dynamics, estuary dynamics, sand drift and coastal acid sulphate soils.

5.5 Risk assessment

- Identification of assets subject to coastal hazard typically consider:
 - Direct tangible impacts (e.g. damage to houses, roads etc.)
 - Intangible impacts (e.g. environmental values, cultural values etc.)

Consideration should be given to indirect tangible impacts (e.g. displaced tourism, emergency costs, business service disruption etc.), and whether these warrant capture in the assessment.

For the process of identifying assets, it is best practice to consult with relevant stakeholders and seek approval by all project partners (or steering committee).

- The selection of risk assessment framework is typically based on Australian Standards (currently AS ISO 31000:2018) and local Councils' own risk frameworks. Councils' own risk assessment frameworks typically align with relevant Australian Standards.
- In conjunction with the risk assessment process, the adaptive capacity of an asset is typically considered. This reflects the asset's ability to respond to hazards, providing a fuller insight into the asset's vulnerability.
- Assets identified at a risk classification of High or above typically require mitigation action(s).
- The economic value of assets (or an economic base case) is often used to provide an understanding of current and emerging economic implications from coastal hazards. Developing an understanding of the economic value of assets:
 - Provides further insight on economic risk and the need to manage coastal hazard risk.
 - Contributes to the evaluation of adaptation options.

5.6 Adaptation options assessment

- It is typical for adaptation options to be considered and assessed against an adaptation hierarchy, typically:
 1. Avoid or non-intervention
 2. Retreat
 3. Accommodate
 4. Protect or defend

Recent guidelines have seen the inclusion of nature based measures and solutions within the hierarchy. These options are typically assessed prior to retreat, accommodate or protect pathways.

It is common for the hierarchy to align with state planning policy guiding principles.

- Supporting stand-alone references and compendiums are commonly provided, outlining exhaustive lists of adaptation actions within each adaptation pathway, descriptions, place-based appropriateness, considerations and guidance for implementation, e.g.:
 - Preparation design period
 - Effectiveness period (e.g. short, medium or long term option)
 - Co-benefits
 - Approvals and requirements
 - Design considerations, constructability and materials
 - Cost considerations
 - Project examples
 - Policy setting

Example adaptation action compendium provided [here](#).

- As nature-based methods become more mainstream it will be important to articulate nature-based methods that can be undertaken through restoring the habitat alone ('soft' approach), or in combination with hard structures that support habitat establishment ('hybrid' approaches). Further guidance and support is provided in The National Centre for Coasts and Climate's Australian Guide to Nature-based Methods for Reducing Risk From Coastal Hazards 2021.
- It is common practice for a clear method and steps for the options assessment process to be provided within guidelines, to support greater consistency in adaptation planning across the state. It is common practice for the following steps to be included as a minimum:
 - Compiling an exhaustive list of viable adaptation actions within each adaptation pathway.
 - Screening methodology:
 - Typically an MCA, development of criteria and weighting of criteria to be a collaborative process with internal and external stakeholders.
 - Priority options assessed further via economic assessment tools (e.g. BDA, CBA).
 - Preparation of pathways plan outlining recommended adaptation actions, timing, and triggers for change.

- Economic analysis of preferred adaptation actions can provide greater confidence in the selected action, and can inform the sequencing and timing of actions. Economic analysis also provides greater confidence in value for investment, highlighting the economic benefits of adaptation and proactive planning. Economic assessment can be quite challenging to capture the tangible and intangible benefits and constraints. A clear process and a standalone supporting reference document or compendium has been identified by other states as particularly important to support consistency and confidence in this process.
- Providing examples for triggers (as shown in Figure 12) can provide a starting position for decision makers to consider, where triggers for changing from one pathway to another will become important to identify.

5.7 Implementation

- An implementation plan or strategy (which may be an internal document) provides the opportunity to provide clarity on actions, timing, ownership, costs, and how each action will be funded.
- Change management should be considered within the implementation plan or strategy. Change management refers to the methods taken to prepare and support organisations to alter their internal and external processes. A successful change management plan should provide clarity on:
 - The rationale for change
 - The internal procedures, processes and systems across the organisation that need to be amended
 - Proposed communication with and involvement of relevant staff across the organisation to achieve the change
 - The corporate documents, plans and strategies to be amended or updated to integrate and align with the adaptation plan
 - The prioritisation of organisational change management actions, proposed timing, roles and responsibilities
- Providing clear steps and methods for implementation and or change management plans supports consistency in adaptation planning across the state.
- A key requirement of an implementation plan is to capture the funding actions. Funding actions typically consider:
 - The initial and ongoing cost of the adaptation action
 - Short, medium and long-term sources of funding
 - Cost triggers for changing approach
 - If applicable, cost-sharing arrangements

Other states have provided a standalone compendium or reference document with further guidance and worked examples of revenue raising mechanisms for decision makers to consider.

- It is common practice for adaptation plans to be reviewed every 5 - 10 years. Typical triggers for review may include a change in:
 - Sea level rise benchmarks
 - Scientific advances
 - Policy contexts
 - Project partners
 - Other strategic plans
 - Hazard risk updates or changes in vulnerability profiles

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