Preparing a shoreline erosion management plan

Guideline for coastal development

The purpose of this guideline is to assist local governments in the preparation of a shoreline erosion management plan (SEMP) to proactively plan for erosion management in erosion prone areas.

1. Introduction

Key elements of a SEMP include obtaining a sound technical understanding of the physical coastal processes at the site, involving the community, and engaging the agencies responsible for development application decisions. This guideline does not provide definitive advice on the development of a SEMP. A flexible approach is required to suit local government circumstances. A SEMP is best undertaken via the steering committee to ensure stakeholder concerns and preferences are addressed and managed.

1.1 Context

Various beaches in Queensland are experiencing recurring or persistent shoreline erosion problems as a result of the dynamic nature of the coastal environment.

The coastal processes of sediment transport, land building and erosion—driven by an interaction of tidal currents, waves, river flows and vegetation—continuously shape and reshape our coastline.

Developed areas impacted by erosion require balanced management to protect infrastructure and preserve coastal values and amenity. However, it is important that natural coastal processes are maintained in the process of protecting development, and where practical development is located away from areas of active coastal processes. Maintaining natural coastal processes is the most cost-effective and least impacting action to protect beach environments.

Management of coastal areas that are vulnerable to erosion is complex due to varying land tenure, high recreational and ecological values, competing interests in the land, and coastal processes. Long-term planning for these areas must also consider the potential for coastal hazards, such as storm tide events and flooding, and the need for adaptation to climate change induced sea-level rise.

1.2 Purpose of a SEMP

A SEMP is a non-statutory planning document that sets out an agreed framework and management strategy to manage and respond to current erosion or potential future erosion problems.

A SEMP provides a framework for the sustainable use, development and management of land vulnerable to erosion because it considers the environmental, social and economic values of the land and the physical coastal processes acting on the foreshore. The SEMP also outlines the appropriate uses of erosion prone land, and long-term management goals as agreed upon by governments and the community.

The local authority may request that the SEMP be endorsed by the Department of Environment and Science to facilitate its application in the assessment of development applications lodged for land contained in the coastal zone.

The purpose of a SEMP is to:

1. enable local government to proactively plan for erosion management
2. investigate and address the underlying causes of shoreline erosion and likely future progression, at the local scale
3. determine cost-effective and sustainable erosion management strategies that maintain natural coastal processes and resources, and consider community needs in the short-term and long term.

1.3 The benefits of a SEMP

A SEMP may be beneficial when:

- natural coastal processes in an area pose a threat to existing development, such as roads and other community infrastructure or multiple private properties, along a coastal sector; or
- existing or proposed land uses are disrupting natural coastal processes, or are increasing the erosion risk by destroying native vegetation, removing sand or altering land levels, or changing currents and wave actions which transfer erosion to other areas; or
- natural coastal processes need to be allowed to proceed by managing an area as an erosion buffer zone or by maintaining areas free of permanent development.

Local governments are encouraged to develop long-term management strategies for these areas through a SEMP.

The preparation of a SEMP provides the following benefits to local governments and the community.

- Individual and ad-hoc property protection works can be expensive and time consuming as additional detailed information is often required to adequately assess the impacts of each proposal on coastal management.
- The preparation of a SEMP provides for a technically sound and integrated approach to shoreline management in a local government area, streamlining the assessment process and reducing the need for multiple, costly investigations and reports.
- By developing a SEMP in consultation with relevant government agencies and the community, local government can gain a clear understanding of the constraints and opportunities for shoreline management prior to embarking on development application processes. It can also be a useful tool in managing stakeholder expectations and educating the wider community about coastal processes and available erosion management options.

1.4 Land to which a SEMP can apply

The geographical scope of a SEMP may be confined to a specific coastal section or include all erosion prone areas within a local government area (as defined by the relevant erosion prone area plan) and land adjacent to the erosion prone area where future development is proposed in potential erosion prone areas. Erosion risk is not constrained by tenure and therefore a SEMP should apply to all types of public and private land tenure.

Consideration may also need to be given to the related management of coastal resources, such as coastal wetlands and dune systems, particularly those contiguous with, or linked to, the erosion prone area.

Although a SEMP provides a management strategy to deal with shoreline erosion in specific localities, the studies undertaken as part of a SEMP may involve an investigation of the sediment transport process occurring in the broader region.

2. Methodology

A SEMP may include:

1. Assessment, identification and review of factors comprising risk, physical coastal processes, implementation strategies and responses including:

- an assessment, analysis and documentation of the severity of shoreline erosion and the subsequent risks posed for the community and development in the area
- a description of the local and regional coastal processes impacting the area (specifically sediment transport processes, hydrodynamic regimes and the role of plants in erosion control and land building)
- identification of the cause of shoreline erosion, the geomorphic system responses and likely future trends, in a manner that can be understood by all stakeholders
- a review of the effectiveness and suitability of existing erosion responses and strategies being implemented (including an analysis of the structural integrity and effectiveness of any existing protection works) to determine if these are consistent with government policy
- identification of any knowledge gaps that may limit management of shoreline erosion.

2. Management options and strategies:

- the provision of technical descriptions of shoreline erosion or buffer zone management options
- a ranking of management options with regard to environmental, social and economic cost benefits, sequentially prioritising options having regard to:
- minimising adverse impacts on coastal processes and biodiversity
    - preserving areas of high conservation or ecological values with specific reference to areas of state

significance (natural resources), coastal wetlands, biodiversity, environmental values and water quality objectives[1], and any relevant marine park zoning plan[2] or declared Fish Habitat Area[3].

- Other international, national, state and regional designations may also be relevant and should be identified and considered
    - maintaining or enhancing buffer zones (dunal, mangrove or riparian)
    - maintaining foreshore access and recreational amenity of the site
    - minimising the threat to permanent development
    - minimising risk within storm tide coastal hazard areas
    - a recommendation of the preferred management strategy based on the ranking.

3. Budgetary information, including:

- an outline of the estimated costs associated with the preferred management strategy and possible funding sources
- a summary of potential sources and costs of materials should a preferred management strategy require the use of sand for nourishment or rock for seawalls.

4. Implementation strategies, including:

- a program or strategy to implement preferred erosion and buffer zone management works
- details of all federal, state and local government development approvals and requirements that may be required to undertake works associated with the recommended management strategies
- a summary of how the preferred management strategy complies with all relevant legislation particularly the *Coastal Protection and Management Act 1995* and relevant policies of the Coastal Management Plan.

3. Stakeholder roles

3.1 Local government

Generally, council will lead and administer a SEMP project and be responsible for implementing erosion mitigation measures. Council's role in developing a SEMP may include[4] (but not limited to):

- establishing a community participation program
- preparing a terms of reference and expressions of interest for interested consultants
- selecting an appropriate consultant and administer the contract of engagement
- collating preliminary information for the consultant
- conducting a community consultation and participation program
- updating the steering committee
- making final decisions regarding the implementation of management options outlined in the SEMP, based on advice and comments from the steering committee and the community
- implementing the preferred management strategy, including obtaining the relevant statutory approvals, overseeing programs of works, and regularly monitoring and reviewing the effectiveness of the preferred management strategy[5].
- selecting, forming and administering a project steering committee

3.2 The Department of Environment and Science

The Department of Environment and Science (DES) is available to provide technical direction and expert coastal advice and ensure the objectives of the *Coastal Protection and Management Act 1995* are met. The key roles of DES may include:

- assisting council set the terms of reference for any investigation
- providing access to coastal data held by DES
- providing technical guidance and expert knowledge on coastal processes, coastal resources and their values (including biodiversity and habitat values) and techniques to manage coastal areas
- addressing any matters affecting DES's estate (such as national parks) or State marine parks

[1] See Environmental Protection (Water) Policy 2009 and the Deriving local water quality guidelines (https://www.ehp.qld.gov.au/water/pdf/deriving-local-water-quality-guidelines.pdf).
[2] Prepared under the *Marine Parks Act 2004*.
[3] Declared under the *Fisheries Act 1994*.
[4] The availability of resources may require local government to restrict their role and the outputs of the SEMP or undertake the SEMP in sequential stages.
[5] The monitor/review/update cycle should be based on a timescale of approximately five years.

- ensuring the erosion mitigation options and the final management strategy are consistent with the Coastal Management Plan policies and other relevant policies and guidelines for coastal development
- considering the SEMP as a pre-design agreement between the relevant agencies as a means of facilitating or simplifying future development approvals for proposed works[6].

3.3 Consulting

The local community should be consulted on the draft SEMP and asked to provide feedback on the management options provided. The steering committee may establish a reference group of interested community members to carry out this role. It may also be beneficial for a reference group to provide scope for the project by contributing to the development of the terms of reference. This will ensure community expectations are met by the consultant when preparing the SEMP. All landholders in areas with a defined problem would be encouraged to participate or express their views.

In consultation with the steering committee, the project manager is to prepare terms of reference, which outline the desired outcomes of the SEMP and the respective requirements of any consultant engaged to prepare the SEMP[7]. The development of a SEMP should be generally based on the following methodology:

- If the SEMP is to address more than one erosion prone area, divide the coastal section into logical units or localities for individual investigation. This could be based on physical boundaries, such as headlands or river entrances or administrative boundaries.
- Identify coastal resources, including wildlife and vegetation communities (such as shoreline vegetation, migratory shorebirds, nesting turtles, and intertidal communities), environmental values and water quality objectives of waters in each locality and their relative importance with regards to biodiversity conservation, water quality protection and maintenance of coastal processes.
- Identify and describe the physical coastal processes at work in each locality.
- Determine the threats within each coastal locality and describe present and emerging risks to people, property and the environment from shoreline erosion. In addition, the benefits of the coastal areas to the community should be outlined.
- This information is then used to outline the processes required to retain coastal resources and maintain or return a stable coastline. This should be based on a planning period of up to 20 years and would comprise:
- mapping the erosion prone areas showing the various land uses with particular emphasis on property, infrastructure (including roads and access points), existing coastal protection works and areas of high ecological significance
- identifying or mapping existing coastal resources (such as wetlands, inshore and wildlife habitats).

4. Procedures for developing a SEMP

Stakeholder roles

- Detailing a description of the environmental, economic and social values of the developed and undeveloped areas.
- Identifying zones of present and emerging threats to existing and planned development within the erosion prone areas. This would include coastal areas subject to active shoreline recession and areas that are apparently stable that may be affected by potential short-term storm erosion. The assessment should take into account potential impacts of coastal hazards (coastal erosion and storm-tide inundation, or permanent inundation due to sea-level rise and effects of cyclones).
- Identifying present and emerging pressures for preserving and enhancing public access to foreshore areas and providing additional recreation infrastructure, such as walking tracks, viewing platforms and shelters.
- Identifying a priority listing for rehabilitating areas to create coastal buffer zones.
- Assessing erosion risks for various localities and determine an approximate ranking of importance[8].

1. For each coastal locality, determine options for risk treatment, including a discussion of:

- descriptions and conceptual designs of the options available to limit erosion threats to development and coastal values, including the ‘do nothing’ case
- a ‘triple-bottom line’ benefit–cost analysis of the options.

[6] The completion of an SEMP is not a pre-requisite for assessment of a coastal development proposal by DES; however, the SEMP process could be used to identify all works requiring approval and one integrated development application could then be prepared for all works required to implement the management strategy.
[7] If a local government chooses to not engage a consultant to undertake the SEMP, the terms of reference may not be required or would be a simplified document such as a project plan.
[8] If a local government is undertaking the SEMP process as a staged approach, this ranking is used to identify which stages are to be completed first.

2. Seek stakeholder input on proposed options.

The objectives are to:

- gather information and improve estimates of the economic and social values of various coastal localities
- obtain feedback from stakeholders on the various options and associated costs, benefits and impacts and incorporate this knowledge into refinements of possible options
- seek advice from the relevant state agencies[9] regarding compliance with relevant legislation and policies and approval requirements for any works required to implement the various options identified.

3. Develop a recommended management strategy.

This would comprise:

- an assessment of each risk management option taking into account all environmental, economic and social factors
- relevant stakeholder input, determining a priority list of recommended actions including timings and estimated costs
- relevant stakeholder input, determining the recommended review process for the SEMP, including performance criteria, monitoring programs, timings and reporting responsibilities
- the development of a SEMP is likely to require specialist technical and planning advice. The terms of reference for a SEMP should be carefully tailored to suit the coastal section and might not include the complete methodology outlined above. DES can assist in the formulation of a SEMP. Email coastal.support@des.qld.gov.au to obtain further information.

[9] In addition to the state agencies who may be represented on the steering committee, the following may need to be consulted: DES regarding acid sulphate soils, the Department of State Development, Manufacturing, Infrastructure and Planning regarding development approvals, the Department of Transport and Main Roads (Maritime Safety Queensland) regarding potential impacts of protection works on navigational safety, and the Department of Queensland Fire and Emergency Services regarding disaster mitigation.