

Mitigating Natural Hazards *through*
Land Use Planning *and* Building Control

Coastal Hazards in Tasmania
Summary Report
Of
Coastal Hazards Technical Report

1 December 2016

Access to the Coastal Hazards Technical Report:

The Coastal Hazards Technical Report is available for download from the Department of Premier and Cabinet's Office of Security and Emergency Management website at:

http://www.dpac.tas.gov.au/divisions/osem/coastal_hazards_in_tasmania

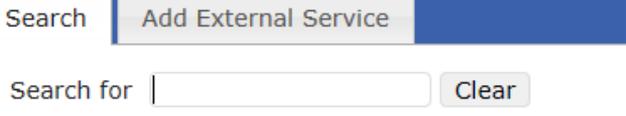
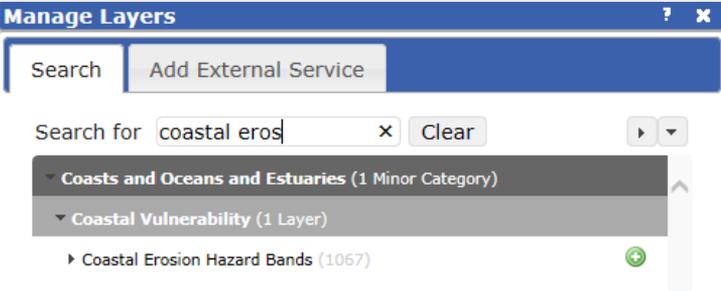
Access to the coastal inundation and erosion mapping

The Inundation and erosion maps are available through the LIST: www.thelist.tas.gov.au or through the following bookmark http://bit.do/coastal_tasmania

Coastal hazard layers:

- Coastal Erosion Hazard Bands 20161201
- Coastal Inundation Hazard Bands 20161201

Instructions to add the coastal hazard layers to LISTmap:

<p>Click on the LISTmap icon in the centre of the LIST home page www.thelist.tas.gov.au</p>	
<p>On the top RHS of the screen, click on 'Layers'</p>	
<p>Click on 'Add Layer'</p>	
<p>Search for the coastal hazard layers</p>	
<p>Add each layer to the map by clicking on the green button</p> 	
<p>Zoom into the area of interest</p>	

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1 Introduction

1.1 Background

In 2009, the Council of Australian Governments agreed to adopt a nationwide resilience-based approach to disaster management to mitigate the risks natural hazards present to the Australian community. As part of this approach, the Tasmanian Government established the *Mitigating Natural Hazards through Land Use Planning (MNHLUP)* project in 2011.

The *MNHLUP* project provides a comprehensive framework to mitigate the risks to Tasmanian communities from natural hazards – including landslip, riverine and estuary flooding, storm events, and coastal erosion and inundation – through land use planning and building controls.

The *MNHLUP* framework comprises:

- a set of principles that describe the role of the Tasmanian Government in managing natural hazards through land use planning and building controls;
- a guide that outlines the method used to mitigate the risks presented by natural hazards through land use planning and building controls;
- hazard mapping that provides an indication of the risks to Tasmanian communities from each of the abovementioned hazards; and
- reports for each of the hazards that describes the methodology for defining hazard bands and proposed planning and building controls for managing development within those hazard bands.

This report and the associated technical report are the final outputs of the coastal hazards component of *MNHLUP* framework.

1.2 Purpose

This *Coastal Hazards in Tasmania Summary Report* accompanies the *Coastal Hazards in Tasmania Technical Report (the Report)*. The purpose of these reports is to provide guidance to decision-makers on how to mitigate the impacts of the coastal hazards of erosion and inundation through the land use planning system and building controls.

Through *MNHLUP*, extensive mapping was undertaken, which provides an indication of Tasmania's vulnerability to the coastal erosion and inundation. From this mapping, four hazard bands were defined that establish the relative risk for those hazards. Finally, hazard matrices were developed to indicate the level of intervention (land use planning and building controls) appropriate to each hazard band.

This guidance is intended to reduce public risk from coastal hazards and secure a safe and sustainable working, living and recreational environment on Tasmania's coast.

1.3 Context

1.3.1 Land use planning controls

The Resource Management and Planning System (RMPS), which was established in 1993, guides land use planning in Tasmania. The promotion of sustainable development is one of the key objectives of RMPS, which are included as schedules in each of the three key pieces of legislation that comprise RMPS, being:

- *Land Use Planning and Approvals Act 1993 (LUPAA)*
- *State Policies and Projects Act 1993 (SPP Act)*
- *Tasmanian Planning Commission Act 1997*.

For the purposes of RMPS, 'sustainable' is defined as:

... *managing the use, development and protection of natural and physical resources in a way, or at a rate, which enables people and communities to provide for their social, economic and cultural wellbeing, and for their health and safety, while:*

- *sustaining the potential of natural and physical resources to meet the reasonable foreseeable needs of future generations;*
- *safeguarding the life-supporting capacity of air, water, soil and ecosystems; and*
- *avoiding, remedying or mitigating any adverse effects of activities on the environment.*

The Tasmanian Planning Scheme (TPS) has applied the planning outcomes of the Coastal Hazards Technical Report (2016) in the development of the coastal inundation and coastal erosion State Planning Provisions. The mapping for coastal inundation and coastal erosion will be applied through the Local Planning Schedules¹.

1.3.2 State Coastal Policy 1996

Coastal planning in Tasmania is guided by the *State Coastal Policy 1996* (SCP). The SCP is a statutory document that applies to the whole of Tasmania and includes all islands except for Macquarie Island, which is subject to a special management regime.

SCP is guided by three principles:

1. Natural and cultural values of the coast shall be protected.
2. The coast shall be used and developed in a sustainable manner.
3. Integrated management and protection of the coastal zone is a shared responsibility.

While the SCP addresses both management and statutory planning issues, it was developed before the implications of climate change and sea level rise were fully understood. This report is a result of a risk methodology to define the areas at significant risk from natural hazards (*Low, Medium and High* hazard bands). Where the outcomes of the report are inconsistent with the SCP, the SCP will prevail. The inconsistency relates to clause 1.4.2² of the SCP, which prohibits all development on actively mobile landforms unless it is for engineering and remediation works to protect land, property and human life. This is further discussed in Section 4.

1.3.3 Building controls

The National Construction Code (NCC) is a set of technical provisions for building and plumbing in Australia, produced and maintained by the Australian Building Codes Board (ABCB) on behalf of the Australian Government and each state and territory government.

NCC is given legal effect by legislation in each state and territory. In Tasmania, the relevant legislation is the *Building Act 2000*. The *Building Act 2000* and the *Building Regulations 2004* incorporate coastal inundation as part of the clauses concerning land subject to flooding. Under the regulations, the floor height of habitable rooms must be 300 mm above the designated flood level³.

¹ A local government has the discretion under the Local Provisions Schedules to seek amendment to the State mapping if the amendment meets the intent and standards of the state mapping, uses locally specific information or an improved modelling method and has been peer reviewed.

²SCP Clause 1.4.1: Areas subject to significant risk from natural coastal processes and hazards such as flooding, storms, erosion, landslip, littoral drift, dune mobility and sea-level rise will be identified and managed to minimise the need for engineering or remediation works to protect land, property and human life. SCP Clause 1.4.2: Development on actively mobile landforms such as frontal dunes will not be permitted except for works consistent with Outcome 1.4.1.

³ The designated flood level is the water level achieved by either 1% AEP Flood, or 600 mm above the Spring High Water Mark.

The current building controls provide limited guidance on future coastal hazards in the context of climate change and sea level rise. Consequently, the regulations are being reviewed to consider the outcomes of the Report.

1.3.4 *Mitigating Natural Hazards through Land Use Planning project*

The *MNHLUP* project was established to deliver a framework to mitigate the risks to Tasmanian communities from natural hazards through land use planning and building controls. The framework guides the mitigation of natural hazards and promotes the use of the hazard treatment approach.

The hazard treatment approach assesses the regulatory and public risk of coastal hazards, developed through a series of workshops with hazard experts, land use planners, building surveyors and industry stakeholders to:

- define the hazard;
- consider available evidence and identify options for mapping areas that may be exposed to hazards throughout the State;
- define the boundaries of 'hazard bands'; and
- develop planning, building, emergency management outcomes to apply within each hazard band.

Through *MNHLUP*, extensive mapping was undertaken to determine Tasmania's vulnerability to the abovementioned natural hazards. The project provides a framework to evaluate the threat posed by a natural hazard and to make judgements on the appropriate balance of controls. Hazard bands have been mapped according to exposure to the hazard. The composition of the land use planning and building controls in each hazard band defines the risk tolerance to the hazard and the responsible action to manage the hazard for human settlements. In defining this balance through the hazard treatment approach, Tasmania provides a clear statement of tolerance to risk in any given location.

2 Coastal hazards in Tasmania

The coast is a dynamic system, shaped by wave, wind and tidal movements. Coastal hazards occur as the result of the negative impacts of these natural processes. Influenced by weather patterns, seasonal variations and climate change, these processes can have a temporary or permanent influence on the coastline. When impacts such as erosion and inundation threaten to cause harm or damage to public and private assets, environmental and/or social values, the processes are described as hazards.

Without a localised technical investigation, the relationship between coastal erosion and coastal inundation is complex and difficult to assess. For this reason, this report deals with coastal erosion and coastal inundation separately.

1.4 *Erosion*

Coastal erosion is the removal of coastal land by water, wind and general weather conditions. There are three aspects of coastal erosion:

- **Hazardous erosion** of the coastline typically occurs on open, soft sandy coasts.
- **Coastal recession** is the long-term movement of land due to sea level rise and typically occurs on both soft sandy and tertiary sediment coasts.
- **Landslide** is the downslope movement of land; on the coast. landslide is typically caused by the removal of material at the foot of the landslide due to wave or storm activity⁴.

⁴ Landslide within the coastal zone is addressed as part of the *MNHLUP* landslide hazard planning report (DPAC 2013).

Coastal erosion has many causes including tides, currents, sediment budgets, storm intensity and frequency, wave energy, fetch, sea level rise, land erodability, and human intervention. In Tasmania, coastal erosion is impacted by the considerable variation in wave climates between the West, East, North and North-West Coasts. Rising sea levels can also trigger non-linear changes to the sediment budget of beaches, in excess of the loss of sand that naturally occurs on shores due to erosion.

1.5 Inundation

Coastal inundation is the natural process of flooding of land by the sea. For the purpose of this report, coastal inundation is classified as either temporary or permanent. Temporary inundation is flooding due to storm surge, extreme storm events, floods or tides. Permanent inundation is the permanent loss of land to the sea.

Climate change projections indicate that sea level rise (SLR) is likely to increase the frequency and severity of coastal inundation in Tasmania. To allow for SLR in planning decisions, the Tasmanian Government implemented statewide Sea Level Rise Planning Allowances (SLRPAs) in August 2012 to promote consistent decision-making concerning future land use and development, and reduce the level of uncertainty around the management of future SLR for coastal areas. The rationale for the 2012 SLRPAs⁵ is described in the *Derivation of the Tasmanian Sea Level Rise Planning Allowance – Technical paper*, released by the Department of Premier and Cabinet's Tasmanian Climate Change Office in August 2012.

In March 2016, the Tasmanian Government engaged the Commonwealth Scientific and Industrial research Organisation (CSIRO) to develop sea level rise planning allowances for Tasmania's coastal councils based on the International Panel on Climate Change (IPCC)'s Fifth Assessment Report (AR5). This has provided regional appropriate change to the SLRPAs from the previous level of 0.8 m by 2100 for all of Tasmania to between 0.92 m by 2100 in the North East of Tasmania to 0.82 m by 2100 in the central north coast⁶. These projections are based on the IPCC AR5's high emissions, 'business-as-usual' scenario, known as Representative Concentration Pathway 8.5, or RCP 8.5.

1.6 Tasmania's exposure to coastal hazards

The Tasmanian coast contributes to the State and regional economies through tourism and recreational activities, and provides for a range of commercial and industrial uses such as fishing and aquaculture, ports and shipping.

The indicative coastal hazard maps developed as part of the *MNHLUP* project provide an assessment of the houses and other infrastructure vulnerable to coastal erosion and inundation, both at present day and out to the year 2100, when climate change is projected to have significant impacts on coastal processes.

The **coastal erosion** mapping indicates that:

- In 2010, 734 houses were potentially vulnerable to storm bite (the area of land removed due to storm-based erosion), represented by the **High** hazard area.
- By 2050, an additional 1334 houses (2 068 houses in total) are projected to be vulnerable to coastal recession, represented by the **Medium** hazard area.
- By 2100, an additional 1 720 houses (3 788 in total) are projected to be vulnerable to coastal recession, represented by the **Low** hazard area.

⁵ The August 2012 SLRPA included:

- Tasmania's SLRPA for 2050 - 0.2 m SLR above the 2010 Mean High Tide (MHT) benchmark
- Tasmania's SLRPA for 2110 - 0.8 m SLR above the 2010 MHT benchmark

Statewide coastal hazard mapping incorporating the August 2012 SLRPAs was released by the Government in January 2014, and again in January 2016. Is it worthwhile mentioning who it was released to and why?

⁶ McInnes KI, Monselesan D, O'Grady JG, Church JA and Xhang, X, 2016: sea-Level Rise and Allowances for Tasmania based on the IPCC AR5, CSIRO Report 33pp.

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- A further 814 houses are within the investigation areas where there is insufficient information for a full classification.

The **coastal inundation** mapping indicates that inundation issues will worsen as this century progresses.

- In 2010, 85 houses were potentially vulnerable to sea level rise (SLR) to 2050 from the 2010 mean high tide (MHT) represented by the **High** hazard area.
- By 2050, an additional 1 288 houses (1 373 houses in total) are projected to be vulnerable to a 1% Annual Exceedance Probability (AEP) storm surge event⁷ or a 0.8 m SLR from the 2010 MHT, represented by the **Medium** hazard area.
- By 2100, an additional 1 779 houses (3 152 houses in total) are projected to be vulnerable to a 1% AEP storm surge event, represented by the **Low** hazard area.
- A further 357 houses are within the investigation areas where there is insufficient information for a full classification.

Based on the indicative mapping, the **High** hazard bands for inundation and erosion identify 779 houses as potentially vulnerable. Of those, 40 houses are identified as being in the **High** hazard bands for both erosion and inundation. Half of these houses are located in Ansons Bay (Break O'Day Council), with the remainder spread throughout the South⁸.

3 Understanding the evidence

3.1 Coastal erosion evidence

The MNHLUP project's indicative coastal erosion hazard maps depict the way Tasmania's coastline can reasonably be expected to erode over the next 100 years due to natural processes such as wave action, climate change and projected sea level rise.

The coastal geomorphology data was spatially represented in maps that classify the Tasmanian coastline into four coastal erosion hazard bands according to their susceptibility. The susceptibility is for coastal erosion and shoreline recession, in consideration of present conditions and under projected future conditions, including those defined by the Tasmanian SLRPA.

The four coastal erosion hazard bands are:

- **Acceptable** : the area is unaffected by coastal recession until after 2100, and not subject to controls
- **Low**: the area vulnerable to coastal recession by 2100 or is protected by coastal defences
- **Medium**: the area vulnerable to coastal recession to 2050
- **High**: the area vulnerable to hazardous erosion now, and typically found on sand dunes; for the purpose of SCP, this is considered the area that is a potentially actively mobile landform.
- **Coastal Erosion Investigation area**: an area adjacent to the coastline for which there is insufficient information to classify it into Acceptable, Low, Medium, or High hazard bands. The width of the area is the cumulative width of the Low, Medium, and High hazard bands. In this area a site specific investigation is required to classify the land into one of the hazard bands.

⁷ A storm surge is "the temporary piling-up of water at the coast due to onshore wind and/or low barometric pressure. A storm surge combined with high tide can be particularly dangerous, and even more so in the presence of wind-generated waves. Negative surges (lowered water levels) are also possible. There is a close association between tides and storm surges – the impact of a surge often depends on the state of the tide, and the surge and tide waves may interact over the shelf or as they move up an estuary" (National Tide Centre, 2010). A 1% AEP storm surge event has a one per cent chance of occurring in a year, or once in every 100 years.

⁸ Clarence Council (2), Circular Head (1), Glenmorgan Spring Bay (1) Hobart Council (1), Huon Valley (10), Sorell Council (2), Tasman Council (1).

Coastal landform behaviour, including storm erosion and longer-term shoreline recession, is driven by a complex range of processes and factors that may vary considerably from one coastal location to another. This means it is not possible to predict the behaviour of some areas of the coast with high accuracy, and any coastal hazard zoning at a statewide level must be of an indicative or generalised nature only.

Despite the inherent uncertainties, it is possible to identify a number of first-order characteristics of the coastline that predispose parts to being more or less susceptible to erosion than other parts. The approach taken to develop the coastal erosion mapping was to identify and use a small number of the most fundamental determinants of potential shoreline erodibility in order to rank shorelines into very broadly defined categories of greater or lesser potential susceptibility to erosion. These provided a first-order delineation of coastal hazard for three coastal types: soft sediment, soft rock and hard rock.

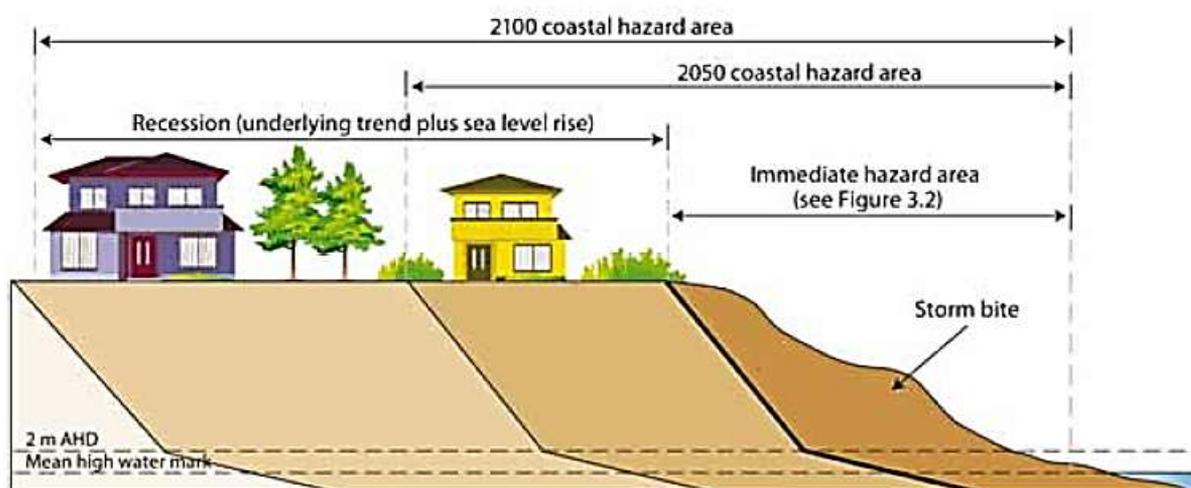


Figure 1 Idealised schematic of a dune profile depicting the high hazard area, 2050 coastal hazard area and 2100 coastal hazard area (after Nielson et al (1992) and used by Mariani et al (2012) and Sharples et al (2013))

To develop an integrated coastal erosion susceptibility map, the coastal types were merged into a single hazard susceptibility scheme that incorporated an assessment of the relative hazard zones within each substrate type. This was achieved using the *Pairwise Assessment Method*⁹. More detail on the development of the indicative erosion hazard mapping and bands can be found in the *Coastal Hazards Technical Report*.

3.2 Coastal inundation evidence

The MNHLUP project's indicative coastal inundation hazard maps depict the way sea level rise and major storm events are projected to affect Tasmania's coastline has been limited to the 2100 coastal process including that SLR is expected to continue beyond that time. Information used to assess coastal inundation as part of the map development includes Tasmania's SLRPA, storm tide event information along with the MHT line, the 10 m contour line and the LiDAR-based¹⁰ DEM (digital elevation model) for coastal communities.

⁹ A Pairwise Assessment supports decision-making by assisting non-technical experts to understand the relative susceptibility of each coastal erosion hazard component. The Pairwise Assessment delivers two outcomes: it translates expert knowledge on coastal hazards for policy-makers (expert knowledge includes an understanding of components that make up coastal erosion on the Tasmanian coastline, confidence in spatial and attribute accuracy, and expert opinion on the 'likelihood' that erosion may occur in an area, as well as its scale/magnitude); and it provides an order of importance for merging the components into a single planning layer, ensuring a less important component does not overwrite a more important feature.

¹⁰ Light Detection and Ranging (LiDAR) is a remote sensing method that uses light in the form of a pulsed laser to measure variable distances from a plane to the Earth. These light pulses generate information about the shape of the Earth and its surface characteristics.

As with the coastal erosion process, the indicative inundation maps and underlying data were used to classify all parts of the Tasmanian coastline into four coastal inundation hazard bands, which consider present conditions and projected future conditions.

To develop the coastal inundation hazard bands, a number of policy options were presented in the workshops, during which their respective strengths and weaknesses were analysed. Further details about policy options and the analysis of strengths and weaknesses are provided in the *Coastal Hazards Technical Report*.

The coastal inundation hazard bands are defined as follows:

- **Low:** areas vulnerable to a 1% AEP storm event in 2100; these areas have a medium-term flooding issue
- **Medium:** areas vulnerable to a 1% AEP storm event in 2050; the medium band also contains all of the land that will be impacted by a 0.8 m SLR by 2100
- **High:** areas that will be within a 0.2 m SLR from the mean high tide line by 2050; these areas are currently impacted by the Highest Astronomical Tide
- **Coastal Investigation:** areas that are not covered by LiDAR and are below the 10 m contour and within the coastal zone.

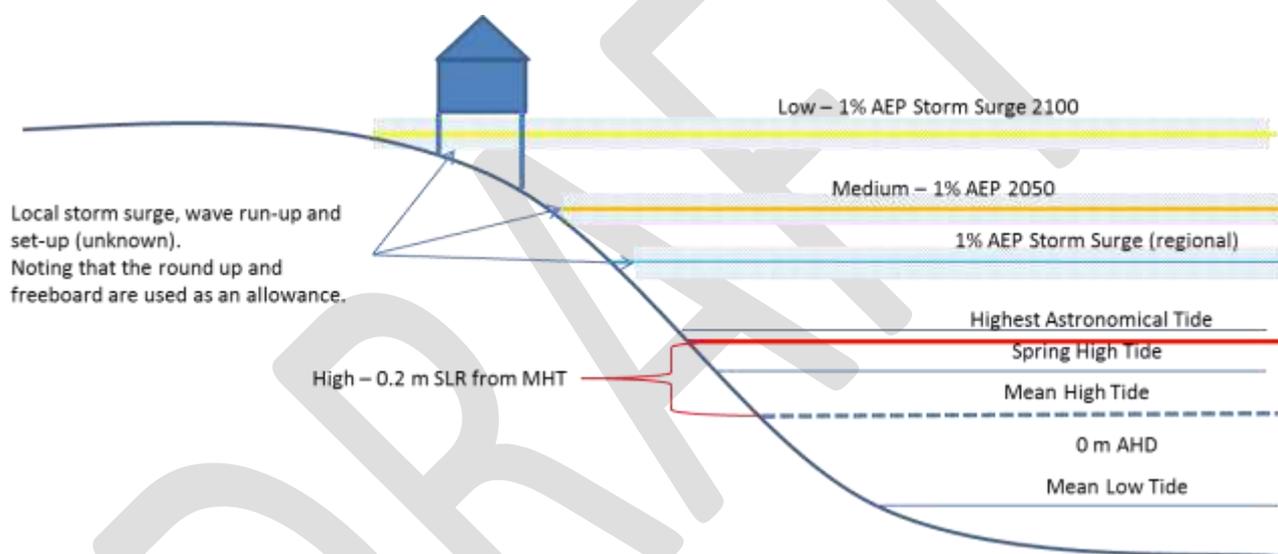


Figure 2 Coastal inundation hazard bands [adapted from Planning for Sea Level Rise (Melbourne Water, June 2012)]

4 Treating the hazard

Based on the evidence and analysis of Tasmania's coastal erosion and inundation hazard risk and the outcomes of extensive stakeholder consultation, recommended land use planning and building responses for each of the hazard bands were developed. These are outlined in *Tables 1 to 4* of this Report.

Table 5 outlines the requirements for coastal defences and vulnerable, hazardous or critical uses, when permitted or discretionary, in both erosion and inundation responses.

4.1 Coastal erosion responses

Based on the evidence and analysis of Tasmania's coastal erosion hazard risk, the recommended responses to each coastal erosion hazard band are outlined in the following matrices:

- *Table 1: Coastal Erosion Hazard Planning Matrix* sets out the hazard exposure, control intent and strategic planning measures relevant to each coastal erosion hazard band.
- *Table 2: Coastal Erosion Hazard Band – Use and Development Guide* provides statutory guidance to assist with the development of planning and building controls.

4.2 Coastal inundation responses

Based on the evidence and analysis of Tasmania's coastal inundation hazard risk, the recommended responses to each coastal inundation hazard band are outlined in the following matrices:

- *Table 3: Coastal Inundation Hazard Planning Matrix* sets out the hazard exposure, control intent and strategic planning measures relevant to each coastal erosion hazard band.
- *Table 4: Coastal Inundation Hazard Band – Use and Development Guide* provides statutory guidance to assist with the development of planning and building controls.

Table 1 Coastal erosion hazard planning matrix

Coastal Erosion Hazard Planning Matrix				
	Coastal erosion hazard band			
Hazard exposure	Acceptable Based on current understanding of the hazard, coastal erosion is a rare event in this area but it may occur in some exceptional circumstances.	Low This area has been identified as vulnerable to a coastal recession by 2100 based on the elevation, soil, or rock type of the area and current sea level rise models. Or This area is protected by coastal defences for erosion.	Medium This area is vulnerable to coastal recession to 2050 based on the elevation, soil, or rock type of the area and current sea level rise models.	High (alternate) This area is vulnerable to storm-based erosion from two back to back one percent AEP storm events, this area is potentially an active mobile landform.
Control intent	Development and use is not subject to coastal hazard controls.	While non-construction requirements are unnecessary for most use and development, the capacity for the use and development to adapt should be encouraged. Controls may be necessary to reduce the risks associated with vulnerable, hazardous or critical uses to ensure that residual tolerable risk is achieved. Building controls apply for all buildings and associated works requiring a building permit. The site should be considered problem site for coastal erosion. Works must not increase the erosion risk for neighbouring properties.	Planning and building controls are necessary for all use and development to ensure that risks are managed. Vulnerable, hazardous, or critical uses may be allowed if associated with a coastally dependent use. Building controls apply for all buildings and associated works requiring building permit. The site should be considered problem site for coastal erosion. Works must not increase the erosion risk for neighbouring properties.	Planning and building controls are necessary for all use and development to ensure that risks are managed. If the area is an actively mobile landform then development is not permitted except for engineering or remediation works to protect land, property and human life. If the area is not an actively mobile landform then: <ul style="list-style-type: none"> • New use or development is not permitted unless it is coastally dependent or a development to an existing building; • Building controls apply for work to new and existing buildings and associated works requiring a building permit. The site should be considered problem site for coastal erosion. • Work must not increase the erosion or inundation risk to neighbouring properties.

Strategic planning	No impacts on land use strategies or change to zoning required.	When broader planning considerations support the development of the area, the low and medium hazard band classification should not challenge the existing zoning. However, if an area is to be rezoned to a more intensive use consideration of the hazard is required so that future development minimises the impact of the hazard.	This area should be zoned for non-residential or industrial use, and ensure new use or development on actively mobile landforms is not permitted with exception of works that minimise the areas need for engineering or remediation works to protect land property, and human life. Coastal defences, critical, hazardous, or vulnerable use and development are not permitted on actively mobile landforms unless they are part of works that minimise the area need for engineering or remediation works to protect land property, and human life.
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Table 2 Coastal erosion hazard planning band – use and development guide

Coastal Erosion Hazard Band – Use and Development Guide					
		Acceptable	Low	Medium	High
Planning and development controls	Rezoning	Exempt from planning	If the proposed use of the land is a rezoning away from an agricultural, coastal-dependent industry, open space, recreation, or environmental zone purpose, then a coastal assessment is required to demonstrate how a tolerable risk can be achieved and maintained.		
	Outside the urban growth boundary		<p>New use or development not requiring a building permit is allowed subject to demonstrating a tolerable risk to coastal erosion can be achieved while minimising the increase in risk to public asset or reliance on defensive structures.</p> <p>Vulnerable, hazardous, critical uses or coastal defences associated with a coastally-dependent use are allowed subject to demonstrating that they achieve the relevant objectives in <i>Table 5</i>.</p>	<p>If the area is an actively mobile landform then development is not permitted except for engineering or remediation works to protect land, property and human life.</p> <p>If the area is not a actively mobile landform then:</p> <ul style="list-style-type: none"> • Strategies should not permit zonings that allow new development. The exception being for utilities that cannot be reasonably located elsewhere or coastal-dependent uses that meet the objectives in Table 1 I and minimise the need for engineering or remediation works. • Coastally-dependent or temporary use and development are allowed subject to demonstrating that they will meet the objectives in Table 1 I and minimise the need for engineering or remediation works. • Other use or development, including and vulnerable, hazardous, critical uses or coastal defences not associated with an existing dwelling or a coastally-dependent use or development is not permitted. 	
	Inside urban growth boundary	<p>Infill use or development</p> <p>Infill use or development will be managed through building control measures.</p>	<p>Infill use or development</p> <p>If the area is an actively mobile landform then development is not permitted except for engineering or remediation works to protect land,</p>		

			<p>Vulnerable, hazardous, critical uses or coastal defences are discretionary, subject to demonstrating that they achieve the relevant objectives in <i>Table 5</i>.</p>	<p>property and human life.</p> <p>If the area is not a actively mobile landform then:</p> <ul style="list-style-type: none"> • New use or development, including and vulnerable, hazardous, critical uses not associated with a coastally-dependent use or development is prohibited. • Utilities that cannot be reasonably located elsewhere meet the objectives in <i>Table 5</i> and minimise the need for engineering or remediation works. • Coastally-dependent (including coastal defences) or temporary use and development are allowed subject to demonstrating that they meet the objectives in <i>Table 5</i> and minimise the need for engineering or remediation works.
			<p>Existing use or development</p> <p>Work to existing buildings will be managed through building control measures.</p> <p>The substantial intensification of vulnerable, hazardous, critical uses or coastal defences are discretionary, subject to demonstrating that they achieve the relevant objectives in <i>Table 5</i>.</p>	<p>Existing use or development</p> <p>If the area is an actively mobile landform then development is not permitted except for engineering or remediation works to protect land, property and human life.</p> <p>If the area is not a actively mobile landform then:</p> <ul style="list-style-type: none"> • Work to existing buildings will be managed through building control measures. • The substantial intensification of vulnerable, hazardous, critical uses or coastal defences are discretionary, subject to demonstrating that they achieve the relevant objectives in <i>Table 5</i>.
Building controls	Building and associated works	Exempt from building.	<p>Building design and associated works should consider the land as part of a coastal erosion area. In this area:</p> <ul style="list-style-type: none"> • The design of the Building and Associated works should consider potential erosion through either hardening of the structures or by simplifying the relocation of the building to unaffected areas as the risk from erosion is realised. • A 'P' classification under AS2870 residential footing and foundations for erosion should be considered for the site classification. <p>Building and associated works must not increase the erosion or inundation risk to neighbouring properties and minimise the need for engineering or remediation works.</p>	

Table 3 Coastal inundation hazard planning matrix

Coastal Inundation Hazard Planning Matrix				
	Coastal inundation hazard band			
Hazard exposure	Acceptable Coastal inundation may occur in this area in some exceptional circumstances.	Low This area is vulnerable to a 1% AEP storm tide event in 2100. <i>Or</i> This area is protected by coastal defences for inundation.	Medium This area is vulnerable to a 1% AEP storm tide event in 2050. Note: this area is also vulnerable to a 0.8m sea level rise by 2100.	High This area is vulnerable to a sea level rise of 0.2m AHD by 2050. Note it is also within the Highest Astronomical Tide now.
Control intent	Use and development are not subject to coastal hazard controls.	Non-construction requirements are not necessary for most uses. Controls may be necessary to reduce risks associated with vulnerable, hazardous or critical uses to ensure the residual risk is tolerable. Building controls should consider this area as part of the coastal inundation area and not increase the flooding risk to neighbouring properties. Also, consider changes to natural drainage paths, wastewater or stormwater on and from the site as part of the building and associated works.	Planning controls are necessary for all use and development to ensure that risks are managed. Any vulnerable or hazardous use will only be allowed in exceptional circumstances. Building controls should consider this area as part of the coastal inundation area and not increase the flooding risk to neighbouring properties. Also consider changes to natural drainage paths, wastewater or stormwater on and from the site as part of the building and associated works.	New use or development is discouraged as it would require significant mitigation measures to achieve, and maintain a tolerable level of risk. Mitigation measures may never achieve adequate levels of security and safety.
Strategic planning	No impacts on land use strategies or change to zoning required.	When broader planning considerations support the development of the area, the low band should not change existing zoning. However, if an area is outside the urban growth boundary and is to be rezoned to a more intensive use, or is within a urban growth boundary undergo substantial infill development through intensification or redevelopment, consideration of the hazard is required so that future development minimises the impact of the hazard. Critical, hazardous, vulnerable or defensive works are allowed (ie. permitted or discretionary)	Strategies should indicate appropriate zoning outside the urban growth boundary includes open space, rural, agricultural or environmental purposes. The exception is for vital community infrastructure that cannot be reasonably located elsewhere or coastal-dependent developments. Existing use and development may be retained, maintained or redeveloped, but the opportunity to intensify development for infill develop these areas must be minimised so as not to increase public risk. Critical, hazardous, vulnerable or defensive works not associated with a coastal dependent use are prohibited.	

Table 4 Coastal inundation hazard planning band – use and development guide

		Coastal Inundation Hazard Band – Use and Development Guide			
		Acceptable	Low	Medium	High
Planning and development controls	Rezoning	Exempt from planning	A coastal assessment is required to demonstrate how a tolerable risk can be achieved and maintained, if the proposed use of the land is a rezoning away from an agricultural, open space, recreation or environmental zone purpose.		
	Outside the urban growth boundary		<p>New use or development not requiring a building permit is allowed subject to demonstrating a tolerable risk to coastal inundation can be achieved while minimising the increase in risk to public asset or reliance on defensive structures.</p> <p>Vulnerable, hazardous, critical uses or coastal defences not associated with a coastally-dependent use or development are prohibited.</p> <p>Vulnerable, hazardous, critical uses or coastal defences associated with a coastally-dependent use are allowed subject to demonstrating that they achieve the relevant objectives in <i>Table 5</i>.</p>	<p>Coastally-dependent or temporary use and development are allowed. They must demonstrate a tolerable risk to coastal inundation is achievable for the duration of the proposed use and development.</p> <p>Other use or development, including and vulnerable, hazardous, critical uses or coastal defences not associated with an existing dwelling or coastally-dependent use or development are prohibited.</p> <p>The uses associated with coastal- dependent uses must demonstrate that they achieve the relevant objectives in <i>Table 5</i>.</p>	
	Inside urban growth boundary	<p>Infill use or development</p> <p>Infill use or development requiring a building permit will be managed through building control measures.</p> <p>Coastally-dependent or temporary use and development, including associated coastal defences are allowed. They must demonstrate a tolerable risk to coastal inundation is achievable for the duration of the proposed use and development.</p> <p>Vulnerable, hazardous, critical uses or coastal defences are discretionary subject to demonstrating that they achieve the relevant objectives in <i>Table 5</i>.</p>	<p>Infill use or development</p> <p>Coastally-dependent (including associated defensive works) or temporary use and development are allowed, subject to demonstrating that they achieve the relevant objectives in <i>Table 5</i>.</p> <p>Infill use or development is prohibited.</p> <p>Coastal defences are discretionary, subject to demonstrating that they achieve the relevant objectives in <i>Table 5</i>.</p>		
			<p>Existing use or development</p> <p>Changes to existing use and development are allowed and will be managed through building control measures.</p> <p>Vulnerable, hazardous or critical use, including coastal defences, are discretionary subject to demonstrating that they achieve the relevant objectives in <i>Table 5</i>.</p>		
Building controls	Building and associated works	Building controls do not apply	<p>Building and associated works should consider this area as part of the coastal inundation area. In this area:</p> <ul style="list-style-type: none"> • Designs should consider how buildings may be relocated as inundation becomes a regular occurrence towards 2100. • Floor heights for habitable rooms should be 300 mm above the 1% AEP in 2100 (Coastal Hazards Technical Report). • Building and associated works must not increase flood or erosion risk to neighbouring properties or public infrastructure. • Minor extensions or internal modifications are not subject to control. 		

Table 5 Coastal defences and vulnerable, hazardous or critical uses

Coastal Inundation – notes for vulnerable, hazardous or critical uses, including coastal defences	
1.	When allowed (ie permitted or discretionary), use or development should demonstrate that they can meet the following objectives: <ol style="list-style-type: none"> a) the use or development is consistent with the State Coastal Policy 1996, and a strategic plan for the community or a council policy relating to coastal defenses, or b) there is an insufficient increase in the level of risk to warrant any specific hazard reduction or protection measures, or c) a tolerable level of risk can be achieved and maintained for the type, form and duration of the use, and d) the appropriate clause(s) below:
2. Critical use	A critical use must demonstrate that a coastal inundation event of 1% AEP in 2100 or coastal erosion to 2100 will not: <ol style="list-style-type: none"> a) impact on the ability of the use to function and maintain service during the event and recovery period b) interrupt business continuity in locations external to the immediate impact of the inundation event, and c) create a risk to the health or safety of a community from damage or disruption to a water supply or for the drainage and treatment of waste water.
3. Hazardous use	A hazardous use must demonstrate that the release of a dangerous substances as a consequence of coastal inundation event of 1% AEP in 2100 or coastal erosion to 2100 will not impact on the health and safety of people, property or the environment.
4. Vulnerable use	A vulnerable use must demonstrate that a coastal inundation event of 1% AEP in 2100 or coastal erosion to 2100 that: <ol style="list-style-type: none"> a) the people who may live, work, or visit on the site have the capability to: <ol style="list-style-type: none"> i. protect themselves ii. evacuate in an emergency, and iii. understand and respond to instruction in the event of an emergency, and b) the level of risk to emergency personnel involved in evacuation and rescue is reasonable.
5. Coastal defences	When coastal defences are allowed, or part of a coastally-dependent industry, a report that considers the following must be ratified by the planning authority. The works: <ol style="list-style-type: none"> c) will not increase the risk of flooding or erosion to neighbouring properties d) will be paid for by the proponent and ongoing maintenance arrangements e) have the agreement of landowners f) mitigate the impacts of the hazard to 2100 (low hazard band), with the hazard band classification being changed from high or medium to low g) are able to be improved upon, and a) are designed by a suitably qualified person.