



## Appendix H

### Coastal Zone Emergency Action Subplan



# Eurobodalla Open Coast Coastal Zone Emergency Action Subplan

Final

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## Acknowledgements

### **Acknowledgement of Traditional Owners**

Eurobodalla Shire Council recognises Aboriginal people as the original inhabitants and custodians of all land and water in the Eurobodalla and respects their enduring cultural and spiritual connection to it.

### **Acknowledgment of Financial Assistance**

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## Acronyms and Abbreviations

AHD	Australian Height Datum
Bureau	Bureau of Meteorology
CM Act	<i>NSW Coastal Management Act 2016</i>
CMP	Coastal Management Program
CZEAS	Coastal Zone Emergency Action Subplan
CZMP	Coastal Zone Management Plan
DPE	NSW Department of Planning and Environment
DPIE	Former NSW Department of Planning, Industry and Environment
EMPLAN	Emergency Management Plan
ESC	Eurobodalla Shire Council
km <sup>2</sup>	Square kilometres
LEOCON	Local Emergency Operations Controller
LEMC	Local Emergency Management Committee
LEMO	Local Emergency Management Officer
m <sup>2</sup>	Square metres
m <sup>3</sup>	Cubic metres
m/s	Metres per second
m <sup>3</sup> /s	Cubic metres per second
MSL	Mean Sea Level
NSW	New South Wales
NSW SES	NSW State Emergency Service
OEH	Former NSW Office of Environment and Heritage
REOCON	Regional Emergency Operations Controller
SEOCON	State Emergency Operations Controller
SEPP	State Environmental Planning Policy
SERM Act	<i>NSW State Emergency and Rescue Management Act 1989</i>
WRL	Water Research Laboratory

## Glossary\*

Annual Exceedance Probability (AEP)	The probability (expressed as a percentage) of an exceedance (e.g. large wave height or high water level) in a given year.
Asset	Something of value and may be environmental, economic, social, recreational or a piece of built infrastructure.
Australian Height Datum (AHD)	A common national surface level datum approximately corresponding to mean sea level.
Average recurrence interval (ARI)	The average time between which a threshold is reached or exceeded (e.g. large wave height or high water level) of a given value. Also known as Return Period.
Beach erosion	Landward movement of the shoreline and/or a reduction in beach volume, usually associated with storm events or a series of events, which occurs within the beach fluctuation zone. Beach erosion occurs due to one or more process drivers; wind, waves, tides, currents, ocean water level, and downslope movement of material due to gravity.
Catchment	The land area draining through the main stream, as well as tributary streams, to a particular site. It always relates to an area above a specific location.
Cliff instability	<p>Cliff instability refers to a variety of geotechnical processes on coastal cliffs and bluffs, including rock fall, slumps and landslides. It may be driven by coastal processes such as wave undercutting and overtopping, or by differential weathering of rock layers in cliffs and bluffs or by surface and groundwater flows. Instability may occur during or following a coastal storm event but may also occur at other times. There may be very little warning that a cliff instability incident is imminent. Signs of cliff instability include (DPIE, 2019):</p> <ul style="list-style-type: none"> <li>• Open cracks, or steps, along contours</li> <li>• Ground water seepage, or springs</li> <li>• Bulging in the lower part of the slope</li> <li>• Trees leaning down slope, or with exposed roots</li> <li>• Debris/fallen rocks at the foot of a cliff</li> <li>• Tilted power poles, or fences</li> <li>• Cracked or distorted structures.</li> </ul>
Climate change	A process that occurs naturally in response to long-term variables, but often used to describe a change of climate that is directly attributable to human activity that alters the global atmosphere, increasing change beyond natural variability and trends.
Coast	A strip of land of variable width that extends from the shoreline inland to the first significant landform that is not influenced by coastal processes (such as waves, tides and associated currents).

Coastal hazard	<p>Coastal hazards, as defined by the CM Act, include:</p> <ul style="list-style-type: none"> <li>• Beach erosion</li> <li>• Shoreline recession</li> <li>• Coastal lake or watercourse entrance instability</li> <li>• Coastal inundation</li> <li>• Coastal cliff or slope instability</li> <li>• Tidal inundation</li> <li>• Erosion and inundation of foreshores caused by tidal waters and the action of waves, including the interaction of those waters with catchment floodwaters.</li> </ul>
Coastal inundation	<p>Coastal inundation occurs when a combination of marine and atmospheric processes raises the water level at the coast above normal elevations, causing land that is usually 'dry' to become inundated by sea water. Alternatively, the elevated water level may result in wave run-up and overtopping of natural or built shoreline structures (e.g. dunes, seawalls).</p>
Coastal processes	<p>Coastal processes are the set of mechanisms that operate at the land-water interface. These processes incorporate sediment transport and are governed by factors such as tide, wave and wind energy.</p>
Coastal protection works	<p>In accordance with the CM Act and Resilience and Hazards SEPP:</p> <p><i>(a) beach nourishment activities or works, and</i></p> <p><i>(b) activities or works to reduce the impact of coastal hazards on land adjacent to tidal waters, including (but not limited to) seawalls, revetments and groynes.</i></p>
Coastal vulnerability area (CVA)	<p>Defined in the CM Act as land subject to the seven coastal hazards included in the CM Act.</p>
Coastal zone	<p>The coastal zone, as defined by the CM Act, means the area of land comprised of the following coastal management areas:</p> <p>(a) the coastal wetlands and littoral rainforests area,</p> <p>(b) the coastal vulnerability area,</p> <p>(c) the coastal environment area,</p> <p>(d) the coastal use area.</p>
Emergency coastal protection works	<p>In accordance with the Resilience and Hazards SEPP:</p> <p><i>Works comprising the placement of sand, or the placing of sandbags for a period of not more than 90 days, on a beach, or a sand dune adjacent to a beach, to mitigate the effects of coastal hazards on land.</i></p>
Estuary	<p>The CM Act defines an estuary as any part of a river, lake, lagoon, or coastal creek whose level is periodically or intermittently affected by coastal tides, up to the highest astronomical tide.</p>

Foreshore	The part of the shore, lying between the crest of the seaward berm (or upper limit of wave wash at high tide) and the ordinary low water mark, that is ordinarily traversed by the uprush and backrush of the waves as the tides rise and fall; or the beach face, the portion of the shore extending from the low water line up to the limit of wave uprush at high tide. The CM Act defines the foreshore as 'the area of land between highest astronomical tide and the lowest astronomical tide'.
Flood	A general and temporary condition of partial or complete inundation of normally dry land areas, including inundation as a result of sea/ocean storms and other coastal processes or catchment flows.
Geographical information system (GIS)	A system of software and procedures designed to support the management, manipulation, analysis and display of spatially referenced data.
High Tide	The maximum height reached by a rising tide. The high water is due to the periodic tidal forces and the effects of meteorological, hydrologic, and/or oceanographic conditions.
Highest astronomical tide (HAT)	<p>The highest level which can be predicted to occur under average meteorological conditions and any combination of astronomical conditions. In Australia HAT is calculated as the highest level from tide predictions over the tidal datum epoch (TDE), this is currently set to 1992 to 2011.</p> <p>The HAT and the Lowest Astronomical Tide (LAT) levels will not be reached every year. LAT and HAT are not the extreme water levels which can be reached, as storm surges may cause considerably higher and lower levels to occur.</p>
Mean Sea Level (MSL)	MSL is a measure of the average height of the sea or ocean's surface such as the halfway point between the mean high tide and the mean low tide. At present, mean sea level is approximately equivalent to 0 mAHD (reported as 0.03 mAHD in MHL, 2019).
Probability	A statistical measure of the expected frequency or occurrence of flooding.
Revetment or seawall	A type of coastal protection work which protects assets from coastal erosion by armouring the shore with erosion-resistant material. Large rocks/boulders, concrete or other hard materials are used, depending on the specific design requirements.
Risk	The chance of something happening that will have an impact on objectives, usually measured in terms of a combination of the consequences of an event and likelihood of occurrence.

Sea level rise	A rise in the level of the sea surface that has occurred or is projected to occur in the future, as measured from a point in time. The rise can be reported as a global mean or as measured at a specific point or estimated for a specific part of the sea or ocean.
Severe Weather Warning	<p>According to the NSW State Storm Plan (NSW SES, 2018a) the BoM specifies the following thresholds when issuing warnings of ‘severe’ storms:</p> <ul style="list-style-type: none"> <li>• Rainfall of sufficient intensity to cause flash flooding (generally 10% Annual Exceedance Probability or less)</li> <li>• Waves equal to or exceeding 5m height in the surf zone</li> <li>• Sea level higher than 50cm above the Highest Astronomical Tide (Abnormally High Tide and Storm Surge).</li> </ul> <p>According to the BoM website (BoM, 2022), Severe Weather Warnings are issued for:</p> <ul style="list-style-type: none"> <li>• <i>Sustained winds of gale force (63 km/h) or more</i></li> <li>• <i>Wind gusts of 90 km/h or more (100 km/h or more in Tasmania)</i></li> <li>• <i>Very heavy rain that may lead to flash flooding</i></li> <li>• <i>Abnormally high tides (or storm tides) expected to exceed highest astronomical tide</i></li> <li>• <i>Unusually large surf waves expected to cause dangerous conditions on the coast</i></li> <li>• <i>Widespread blizzards in Alpine areas.</i></li> </ul>
Shoreline	The intersection between the sea and the land. The line delineating the shoreline is often approximated as the Mean High Water Mark, however, the definition can vary depending on the application.
Storm bite (escarpment)	The landward limit of erosion in the dune system caused by storm waves. At the end of a storm the escarpment may be nearly vertical; as it dries out the sand slumps to a typical slope of one vertical to 1.5 horizontal.
Storm surge	The increase in coastal water level caused by the effects of storms. Storm surge consists of two components – the increase in water level caused by the reduction in barometric pressure and the increase in water level caused by the action of wind blowing over the sea surface (wind set-up).
Storm tide	An abnormally high water level that occurs when a storm surge combines with a high astronomical tide. The storm tide must be accurately predicted to determine the extent of coastal inundation.

Tidal inundation	The inundation of land by tidal action under average meteorological conditions and the incursion of sea water onto low lying land that is not normally inundated, during a high sea level event such as a king tide or due to longer-term sea level rise. For planning controls, it is defined as the land that is inundated up to the level of Highest Astronomical Tide (HAT).
Wave run-up	The vertical distance above mean water level reached by the uprush of water from waves across a beach or up a structure.
Wave set-up	The rise in the water level above the still water level when a wave reaches the coast. It can be especially important during storm events as it results in further increases in water level above the tide and surge levels.
Wind waves	Waves resulting from the action of the wind on the surface of the water.

\*Many of the glossary terms here are derived or adapted from the *Coastal Management Glossary* within the Coastal Management Manual (OEH, 2018).

## 1 Introduction

This Coastal Zone Emergency Action Subplan (CZEAS) forms a part of the Eurobodalla Open Coast Coastal Management Program (CMP) (Rhelm, 2022b). This CZEAS applies to the open coast locations at risk within the Eurobodalla Shire Local Government Area (LGA), as listed in **Section 3**.

### 1.1 Purpose

As specified in the *Coastal Management Act 2016* (the CM Act), a CZEAS is a plan that outlines the roles and responsibilities of all public authorities (including the local council) in response to coastal emergency events immediately preceding or during periods of beach erosion, coastal inundation or cliff instability, where the beach erosion, coastal inundation or cliff instability occurs through storm activity or an extreme or irregular event.

Eurobodalla Shire Council (Council) with the assistance of NSW Department of Planning and Environment (DPE) have prepared this CZEAS to detail arrangements for the four emergency phases (prevention, preparation, response and recovery) to manage coastal emergency events relating to beach erosion, cliff instability and coastal inundation. Those roles and responsibilities include the carrying out of coastal protection works and emergency coastal protection works for the protection of property and assets affected or likely to be affected by coastal emergency events.

This CZEAS has been prepared in accordance with the mandatory requirements for CZEAS specified in the CM Act and accompanying NSW Coastal Management Manual (OEH, 2018), specifically the *Guideline for preparing a coastal zone emergency action subplan* (DPIE, 2019), referred to herein as the Guideline.

In accordance with the Guideline (DPIE, 2019), the purpose of this CZEAS is to identify and facilitate the implementation of appropriate emergency response actions in order to:

- Protect human life and public safety
- Minimise damage to property and assets
- Minimise impacts on social environmental and economic values
- Not create additional hazards or risk.

### 1.2 Scope

The CM Act requires that a CZEAS be included in the CMP if Council's LGA contains land within the coastal vulnerability area (CVA) and beach erosion, coastal inundation or cliff instability is occurring on that land due to storm activity or an extreme or irregular event.

The extent of the CVA is shown in the *Eurobodalla LGA Open Coast CMP* (Rhelm, 2022b) and takes into account the full range of coastal hazards identified in the CM Act, as discussed in detail in the CMP.

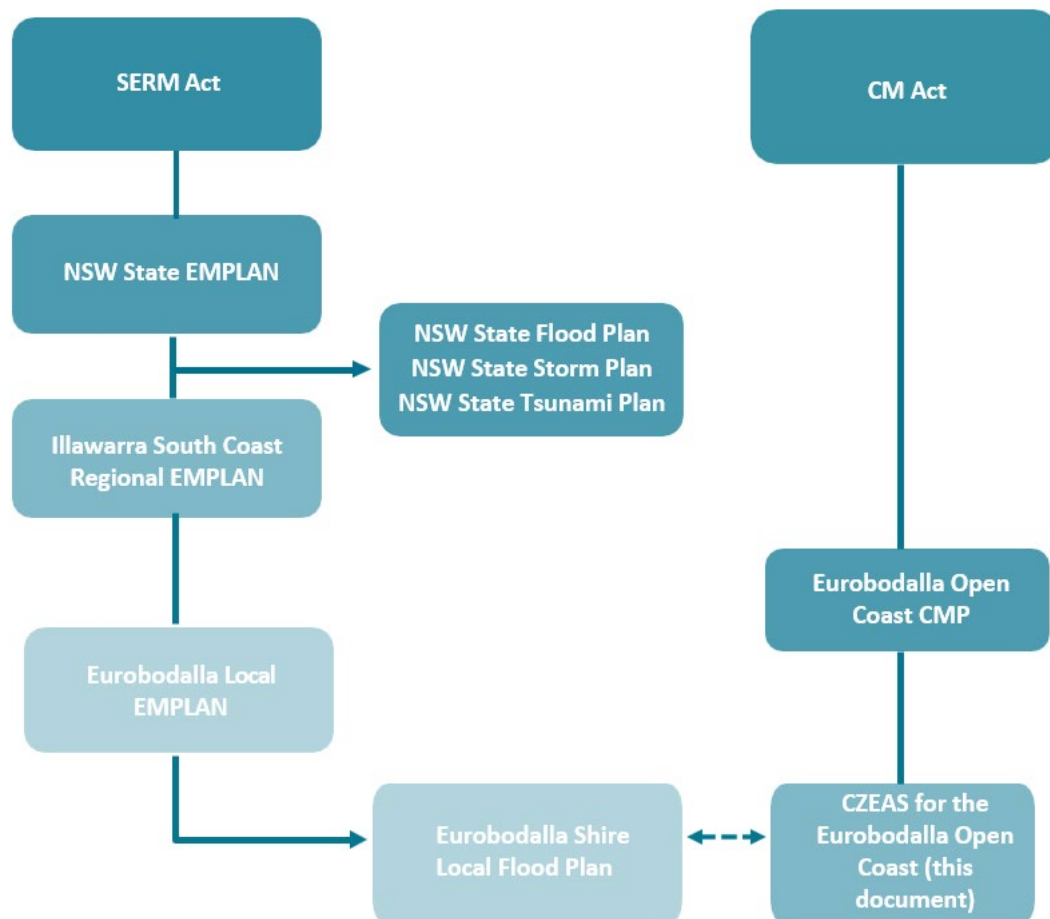
The Eurobodalla Shire open coast is subject to the coastal hazards of beach erosion, coastal inundation and cliff instability, as well as shoreline recession and tidal inundation, which have all been addressed in the CMP (Rhelm, 2022b). At the time of preparing this document, the CVA for the Eurobodalla Shire LGA was yet to go through the planning proposal process to be included in

the *State Environmental Planning Policy (Resilience and Hazards) 2021* (Resilience and Hazards SEPP). The planning proposal will be undertaken as an outcome of the CMP (Rhelm, 2022b).

Other coastal hazards identified in the CM Act (shoreline recession, coastal lake or watercourse entrance instability, tidal inundation and erosion and inundation of foreshores caused by tidal waters and the action of waves) are outside the scope of this CZEAS (DPIE, 2019).

The NSW State Emergency Service (NSW SES) is the designated combat agency for management of floods, tsunami and storms, including severe storms which cause coastal erosion. The NSW SES prepares the State Storm Plan, State Flood Plan and State Tsunami Plan, which are subplans to the NSW State Emergency Management Plan (EMPLAN). The Emergency Operations Controller has responsibility for operations where no specific combat agency is nominated (DPIE, 2019).

A CZEAS within a CMP must not include matters dealt with in any plan made under the *State Emergency and Rescue Management Act 1989* (SERM Act) (DPIE, 2019). This CZEAS is consistent with plans prepared under the SERM Act including the state, regional and local EMPLANs and subplans, as shown in **Figure 1-1**.



**Figure 1-1** Legislative framework for emergency management in NSW and its relationship with coastal management legislation (adapted from DPIE, 2019)



Coastal erosion caused by storm activity is within the scope of the NSW State Storm Plan (NSW SES, 2018a). Emergency management of all forms of coastal erosion that is within the scope of this plan.

Flooding is within the scope of the NSW State Flood Plan (NSW SES, 2021) and the Eurobodalla Shire Local Flood Plan (NSW SES, 2013), which defines flood as a relatively high-water level which overtops the natural or artificial banks in any part of a stream, river, estuary, lake, or dam, and/or local overland flooding associated with drainage before entering a watercourse, and/or coastal inundation resulting from super-elevated sea levels and/or waves (including tsunami) overtopping coastline defences.

### 1.3 Objectives

As required by the Guideline (DPIE, 2019) this CZEAS:

- Defines a coastal emergency and triggers for emergency response actions (**Section 2**)
- Identifies the locations that may be affected by beach erosion, coastal inundation or cliff instability that would constitute a coastal emergency (**Section 3**)
- Outlines the roles and responsibilities of all public authorities, including Council, and coordinates their response to emergencies immediately preceding or during periods of beach erosion, coastal inundation and cliff instability (**Section 4**)
- Outlines what actions are to be undertaken in the four phases of emergency management (**Section 5**)
- Identifies the locations and types of works that may be undertaken for the protection of property and assets (**Section 5**)
- Informs the public and potentially affected property owners about their responsibilities during a coastal emergency and what actions they are and are not permitted to undertake (**Section 7**).

The four phases of emergency management are shown in **Figure 1-2**.

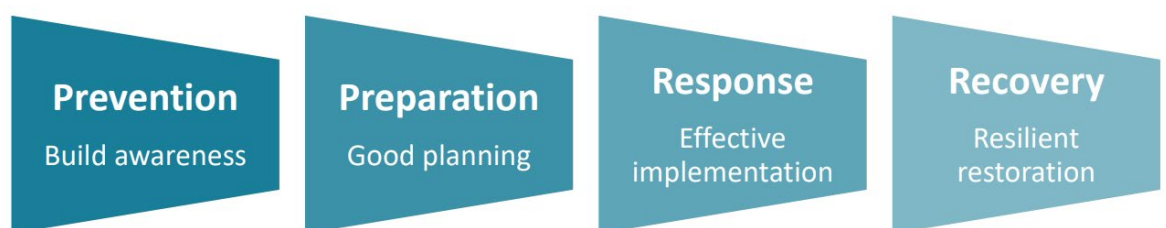


Figure 1-2 Emergency response in the coastal management context (from DPIE, 2019)

### 1.4 Consultation

Agencies other than Council involved in the implementation of this CZEAS, such as NSW DPE, NSW SES, and approval agencies were provided a copy of the draft CZEAS for review and comment. This CZEAS addresses feedback received.

## 2 Coastal Emergency Event Triggers

*This section defines a coastal emergency and triggers for emergency response actions.*

For the purposes of this CZEAS a coastal emergency event within the Eurobodalla Shire LGA is occurring when one or more of the below triggers occurs:

- When a public authority advises of a significant weather event that could impact any of the locations at risk identified in **Section 3i.e** the Bureau has issued a Severe Weather Warning (SWW) for potentially hazardous or dangerous weather that covers the Eurobodalla coastline (e.g. from Eden to Port Kembla).
- Storm bite is occurring or expected to occur at key locations at risk of beach erosion identified in **Section 3.1**, impacting or with potential to impact on public or private assets and/or affect safe access/egress
- Wave run-up is occurring or expected to occur at the key locations at risk of coastal inundation identified in **Section 3.2**, affecting/with potential to affect safe access/egress or impacting/with potential to impact on public or private assets
- Signs of cliff instability (refer below) are occurring or expected to occur at key locations at risk of cliff instability identified in **Section 3.3**.

In identifying triggers for erosion protection works (sand container placement and beach scraping), a balance needed to be found between predicted storm bite in large events, and avoiding the triggers being reached too often, resulting in “false alarms” and implementation of erosion protection works unnecessarily often.

All definitions relevant to the triggers are in the Glossary, however key definitions are repeated below for ease of reference:

- Severe Weather Warning: The BoM provides Severe Weather Warnings for potentially hazardous or dangerous weather, as follows (BoM, 2022):
  - Sustained winds of gale force (63 km/h) or more
  - Wind gusts of 90 km/h or more
  - Very heavy rain that may lead to flash flooding
  - Abnormally high tides (or storm tides) expected to exceed highest astronomical tide
  - Unusually large surf waves expected to cause dangerous conditions on the coast
- Storm bite: The landward limit of erosion in the dune system caused by storm waves. At the end of a storm the escarpment (storm bite) may be nearly vertical and as it dries out the sand slumps to a typical slope of one vertical to 1.5 horizontal
- Wave run-up: The vertical distance above mean water level reached by the uprush of water from waves across a beach or up a structure
- Cliff instability: Refers to a variety of geotechnical processes on coastal cliffs and bluffs, including rock fall, slumps and landslides. It may be driven by coastal processes such as wave undercutting and overtopping, or by differential weathering of rock layers in cliffs and bluffs or by surface and groundwater flows. Instability may occur during or following a coastal storm event but may also occur at other times. There may be very little warning that a cliff instability incident is imminent. Signs of cliff instability include (DPIE, 2019):
  - Open cracks, or steps, along contours

- Ground water seepage, or springs
- Bulging in the lower part of the slope
- Trees leaning down slope, or with exposed roots
- Debris/fallen rocks at the foot of a cliff
- Tilted power poles, or fences
- Cracked or distorted structures.

Once a coastal emergency event is triggered, Council will activate this CZEAS and follow the actions detailed in the Response Phase of the Emergency Response Action Plan (**Section 5**).

### 3 Locations at Risk

*This section identifies the locations that may be affected by beach erosion, coastal inundation or cliff instability that would constitute a coastal emergency event.*

This Plan only applies to the known locations affected by beach erosion, coastal inundation or cliff instability as noted in this section. As per 5.15 this also includes high potential Aboriginal cultural heritage sites. It is possible that beach erosion, coastal inundation or cliff instability will affect additional locations not currently assessed or known to be risk locations anywhere along the Eurobodalla open coast. In this event Council should assess these locations and revise this Plan to include new locations at risk, as the need arises.

#### 3.1 Beach Erosion

The *Eurobodalla Shire Coastal Hazards Scoping Study* (SMEC, 2010), *Eurobodalla Coastal Hazard Assessment* (WRL, 2017) as well as the revised deterministic beach erosion mapping undertaken for the CMP Stage 2 Vulnerability Assessments (Rhelm, 2022a) have informed the locations discussed below.

The CMP identifies 11 open coast locations within the Eurobodalla LGA at risk of beach erosion, which are listed in Table 3-1. Maps showing these locations are contained in the CMP Stage 2 Vulnerability Assessments (Rhelm, 2022a).

**Table 3-1 Locations at Risk of Beach Erosion**

Location	Description
<b>Maloneys Beach</b>	Erosion at current sea levels could significantly impact the beach and dunes and may impact the foundational stability of Northcove Road and associated culverts. Under future sea level rise, the erosion risk to Northcove Road is increased.
<b>Long Beach</b>	Erosion risk under existing and future conditions threatens beach amenity, public land, roadways (i.e. Bay Road), stormwater outlets, reticulation assets, private property and a car park at the eastern end of Long Beach and also stormwater outlets at the western end of Long Beach.
<b>Surfside</b>	Erosion risk at current sea levels is mostly limited to beach front and public land. However, existing risk to Wharf Road at the Surfside Creek outlet. Future (2100) erosion risk will exacerbate the risk to Wharf Road, threaten private properties and a number of stormwater outlets.  CMP includes an action to provide protection to Wharf Road. This CZEAS would be used as an interim measure to respond to erosion risk at this location until these works are complete.

Location	Description
<b>Wharf Road</b>	<p>There is erosion risk under existing and future conditions to private properties seaward of Wharf Road. It is noted that the CMP includes action to voluntarily acquire these properties and return to public ownership.</p> <p>There is erosion risk to Wharf Road and adjacent infrastructure (e.g. sewer and water infrastructure) under existing and future (2100) conditions. The CMP includes an action to provide protection to Wharf Road. This CZEAS would be used as an interim measure to respond to erosion risk at this location until these works are complete.</p> <p>There is erosion risk to informal beach accessways across the low frontal dune, a small area of vegetation and an existing low rock revetment fronting the bend in Wharf Road and the holiday park.</p>
<b>Caseys Beach</b>	<p>Not assessed in the CMP Stage 2 assessment, however, previous studies indicate a high erosion risk to foreshore assets (including roads) and potentially adjoining private properties.</p> <p>The CMP includes an action to upgrade the existing seawall at Caseys Beach. This would address the erosion and inundation risk to the roadway, assets and private properties. This CZEAS would be used as an interim measure to respond to erosion risk until these works are complete.</p>
<b>Sunshine Bay</b>	Existing erosion risk to beach amenity, dunes and the foreshore section of the public carpark. Future (2100) erosion risk extends to the entire public carpark and adjoining private property.
<b>Malua Bay</b>	<p>Existing erosion risk to beach, public recreational land, dune system Kuppa Avenue.</p> <p>Future (2100) erosion risk extends to Malua Bay Surf Lifesaving Club, carpark, public toilets, private properties at Kuppa Avenue, stormwater outlets and reticulation assets at northern end of beach.</p>
<b>Guerilla Bay (south)</b>	Existing erosion risk is limited to the beach and the coastal boundary of several private properties. Future erosion risk extends marginally further into private properties.
<b>Barlings Beach</b>	Existing erosion risk to the beach and dunes. Future erosion risk extends to Barlings Beach Holiday Park frontage.
<b>Tomakin Cove</b>	Existing erosion risk to the beach and dunes. Future erosion risk extends to private property along Sunpatch Parade and stormwater outlets.
<b>Broulee</b>	Existing erosion risk to the beach and dunes. Future erosion risk extends to roadway, reticulation assets and private properties at northern end of beach.
<b>Aboriginal Cultural Heritage Sites</b>	Existing and future (2100) erosion risk to known and high potential Aboriginal cultural sites along the Eurobodalla coastline. This includes risks to extensive coastal middens, burial sites and artefacts.

A former site-specific Emergency Action Sub-plan was prepared for the Wharf Road locality (Umwelt, 2016) as part of the former Wharf Road Coastal Zone Management Plan (ESC, 2017). This document replaces this former site-specific Emergency Action Sub-plan.

### 3.2 Coastal Inundation

The *Eurobodalla Shire Coastal Hazards Scoping Study* (SMEC, 2010), *Eurobodalla Coastal Hazard Assessment* (WRL, 2017) as well as the refined coastal inundation assessment undertaken for the CMP Stage 2 Vulnerability Assessments (Rhelm, 2022a) have informed the locations discussed below.

The CMP identifies 14 open coast locations within the Eurobodalla LGA at risk of coastal inundation, which are listed in **Table 3-2**, with the exception of Batemans Bay CBD. Maps showing these locations are contained in the CMP Stage 2 Vulnerability Assessments (Rhelm, 2022a).

**Table 3-2 Locations at Risk of Coastal Inundation**

Location	Description
<b>Durras Beach (south)</b>	Existing inundation risk to private properties and roads under existing conditions.
<b>Maloneys Beach</b>	Existing inundation risk to Northcove Road in 100 Year ARI existing event. Private property becomes at risk of inundation in a 20 Year ARI event in 2100.
<b>Long Beach</b>	Wave overtopping poses a threat to Bay Road under existing conditions and minor impacts to private properties in a 100 Year ARI storm event.  In 2100, a 20 Year ARI event inundation impacts several private properties and Bay Road.
<b>Surfside</b>	Future (2100) 1 Year ARI inundation risk threatens a small number of low lying properties and several roads.  Existing 20 Year ARI inundation threatens considerable number of private properties and roads within Surfside. This risk will increase under sea level rise, both in terms of the depth of inundation and the number of properties and roads impacted.
<b>Wharf Road</b>	Existing 20 Year ARI inundation threatens considerable number of private properties and Wharf Road. The depth of inundation rather than the extent will increase under sea level rise.
<b>Batemans Bay CBD</b>	Future (2100) 1 Year ARI inundation risk to Clyde Street and a section of North Street.  Existing 20 Year ARI inundation risk threatens portions of the CBD including properties and roads. Future (2100) inundation risk significantly increases in depth and extent, with a larger number of properties and roads impacted.
<b>Boat Harbour</b>	Inundation risk to properties, roads and assets is significant under existing 20 Year ARI storm conditions. This risk increases under sea level rise, with large areas impacted by inundation by a 1 Year ARI event by 2100.
<b>Corrigans Beach</b>	The dunes at Corrigans Beach are overtopped in a 20 Year ARI event under existing conditions impacting the caravan park, private and public land include roads and other assets.
<b>Caseys Beach</b>	Existing and Future (2100) 100 Year ARI inundation risk poses risk to private properties adjoining the lower reaches of Short Beach Creek, Sunshine Bay Public School and Pleasurelea Tourist Park.  Wave overtopping poses a risk to Beach Road.
<b>Malua Bay</b>	Future (2100) 100 Year ARI inundation risk to private properties.

Location	Description
<b>Guerilla Bay</b>	Minor inundation risk occurs along the creek due to coastal inundation in a 100 Year ARI event under existing and future sea level rise conditions.
<b>Barlings Beach</b>	Minor inundation risk occurs along the creek through the tourist park in a 20 Year ARI event under existing and future sea level rise conditions.
<b>Broulee</b>	Existing and future (2100) 100 Year ARI inundation risk (shallow) to a small number of properties on Candlagan Drive.

### 3.3 Cliff Instability

The CMP identifies three open coast locations within the Eurobodalla LGA at risk of cliff instability. Coastal cliff and slope instability information has been derived from the *Geotechnical Slope Instability Risk Assessment* undertaken for Batemans Bay (ACT Geotechnical Engineers Pty Ltd, 2012). These locations are:

- Long Beach – Headland at the eastern end of Long Beach
- Corrigans Beach – Headland at the southern end of Corrigans Beach
- Caseys Beach – Headland at the southern end of Caseys Beach.

Maps showing these locations, including key risk features of the headlands, are contained in **Appendix A**, adapted from ACT Geotechnical Engineers Pty Ltd (2012).

## 4 Roles and Responsibilities

*This section outlines the roles and responsibilities of all public authorities, including Council, and coordinates their response to coastal emergency events immediately preceding or during periods of beach erosion, coastal inundation and cliff instability.*

**Table 4-1** lists personnel and agencies with roles and responsibilities under this CZEAS, along with a description of their roles and responsibilities. The general responsibilities of emergency services organisations and support agencies are listed in the Local and State EMPLANS. Some specific responsibilities are expanded upon in **Table 4-1**.

**Table 4-1 Roles and responsibilities**

Agency	Responsibilities
<b>Eurobodalla Shire Council</b>	<ul style="list-style-type: none"> <li>• Prepare, maintain and update this CZEAS as necessary and provide the NSW SES with a copy</li> <li>• Implement the Prevention and Preparation Phase emergency actions prior to a coastal emergency event occurring (<b>Section 5</b>)</li> <li>• In the event of a coastal emergency at a location at risk, activate this CZEAS and implement the Response Phase emergency actions for the duration of the coastal emergency event (<b>Section 5</b>)</li> <li>• Implement the Recovery Phase emergency actions following a coastal emergency event (<b>Section 5</b>)</li> <li>• As identified in <b>Section 5</b>, implement (or authorise and coordinate) emergency coastal protection works, including construction of physical works where appropriate, to protect property and public assets from beach erosion, coastal inundation and cliff instability</li> <li>• Assist the NSW SES with reconnaissance of areas susceptible to coastal erosion and/or inundation</li> <li>• Liaise with the NSW SES Local Controller to provide advice regarding the need for response actions by the NSW SES such as evacuations</li> <li>• Assist, at their request, the Police, NSW SES, and Local Emergency Operations Controller (LEOCON) in dealing with a coastal emergency</li> <li>• Provide engineering resources required for response and recovery phases</li> <li>• Provide a range of support to the LEOCON</li> <li>• Provide back-up radio communications.</li> </ul>
<b>Local Emergency Operations Controller (LEOCON)</b>	<ul style="list-style-type: none"> <li>• Monitor coastal emergency event operations</li> <li>• Act as the combat/responsible agency in the event of coastal erosion that is not caused by storm activity by controlling and coordinating emergency management of the coastal emergency event</li> <li>• Act as the combat/responsible agency in the event of a landslip (Illawarra South Coast Regional Emergency Management Committee, 2019)</li> <li>• Coordinate support to the NSW SES Eurobodalla Shire Local Controller, if requested to do so.</li> </ul>



Agency	Responsibilities
<b>Eurobodalla Shire Council Local Emergency Management Officer (LEMO)</b>	<ul style="list-style-type: none"> <li>• Provide executive support to the Local Emergency Management Committee (LEMC) and LEOCON in accordance with the Eurobodalla Local EMPLAN (ESC, 2019).</li> </ul>
<b>Eurobodalla Shire Council Local Emergency Management Committee (LEMC)</b>	<ul style="list-style-type: none"> <li>• The LEMC is a Council advisory committee, including representatives from the below-listed agencies:</li> <li>• NSW Police</li> <li>• NSW SES</li> <li>• Kantungal</li> <li>• Aboriginal Affairs</li> <li>• NSW Health</li> </ul>
<b>NSW State Emergency Service (NSW SES) Eurobodalla Shire Unit Members</b>	<ul style="list-style-type: none"> <li>• Act as the combat/responsible agency for damage control and the coordination of community evacuation during the following coastal zone hazards as per the Eurobodalla Local EMPLAN (ESC, 2019): <ul style="list-style-type: none"> <li>• Flooding</li> <li>• Storms</li> <li>• Tsunamis</li> </ul> </li> <li>• Act as the combat/responsible agency in the event of coastal erosion that is caused by storm activity (emergency management of coastal erosion that is caused by storm activity is within the scope of the NSW State Storm Plan)</li> <li>• Carry out required response tasks. These may include: <ul style="list-style-type: none"> <li>• Assist in the collection of flood and coastal erosion/inundation information for the development of intelligence</li> <li>• Evacuation</li> <li>• Delivery of warnings</li> <li>• Assisting with road closures and traffic control operations</li> </ul> </li> <li>• The NSW SES is not responsible for planning or conduct of emergency beach protection works or other physical mitigation works (NSW SES, 2013) and as such is not authorised to undertake emergency coastal protection works.</li> </ul>
<b>NSW SES Eurobodalla Shire Local Controller</b>	<ul style="list-style-type: none"> <li>• Deal with floods as per the Eurobodalla Shire Local Flood Plan (NSW SES, 2013)</li> <li>• Identify and monitor people and/or communities at risk of flooding and coastal erosion</li> <li>• Provide an information service in relation to: <ul style="list-style-type: none"> <li>• Coastal erosion</li> <li>• Coastal inundation</li> <li>• Road conditions and closures (general information only)</li> <li>• Confirmation of evacuation warnings</li> </ul> </li> <li>• Direct the evacuation of people and/or communities</li> <li>• Ensure caravan parks are advised of flood/coastal inundation warnings</li> <li>• Coordinate the collection of flood and coastal erosion/inundation information for development of intelligence.</li> </ul>

Agency	Responsibilities
<b>The Ambulance Service of NSW</b>	<ul style="list-style-type: none"> <li>Assist with the evacuation of at-risk communities (in particular elderly and/or infirm people) (NSW SES, 2013).</li> </ul>
<b>NSW Police Force</b>	<ul style="list-style-type: none"> <li>Assist the NSW SES with delivery of evacuation warnings and the conduct of evacuations</li> <li>Conduct road and traffic control operations in conjunction with Council and/or Transport for NSW</li> <li>Coordinate the registration of evacuees</li> <li>Secure evacuated areas (NSW SES, 2013).</li> </ul>
<b>Fire and Rescue NSW</b>	<ul style="list-style-type: none"> <li>Assist the NSW SES with delivery of evacuation warnings and the conduct of evacuations</li> <li>Provide equipment for pumping flood water out of buildings and from low-lying areas</li> <li>Provide back-up radio communications</li> <li>Assist with clean-up operations, including the hosing of flood affected properties (NSW SES, 2013).</li> </ul>
<b>Australian Government Bureau of Meteorology (Bureau)</b>	<ul style="list-style-type: none"> <li>Issue public weather warning products before and during an event for the Eurobodalla Shire i.e. Severe Thunderstorm Warnings, Severe Weather Warnings, Tropical Cyclone Watches and Tropical Cyclone Warnings (NSW SES, 2018a) as well as Flood Watches and Flood Warnings (NSW SES, 2021).</li> </ul>
<b>Marine Rescue NSW (Batemans Bay, Tuross and Narooma)</b>	<ul style="list-style-type: none"> <li>Assist the NSW SES with delivery of evacuation warnings and the conduct of evacuations (NSW SES, 2013).</li> </ul>
<b>Surf Life Saving NSW</b>	<ul style="list-style-type: none"> <li>Assist the NSW SES with the warning and/or evacuation of at-risk communities and flood rescue operations (NSW SES, 2013).</li> </ul>
<b>Narooma Volunteer Rescue Association Rescue Squad</b>	<ul style="list-style-type: none"> <li>Assist the NSW SES Eurobodalla Shire Local Controller with flood operations with equipment, resources and appropriately trained members within their capabilities (NSW SES, 2013).</li> </ul>

## 5 Emergency Response Action Plans for Locations at Risk

*This section outlines what actions are to be undertaken in the four phases of emergency management at each of the locations at risk that this Plan applies to. It also identifies the locations and types of works that may be undertaken for the protection of property and assets.*

Council's ability to undertake the actions identified in this CZEAS will be dependent on the availability of resources during emergency events. Actions must not conflict with or impede NSW SES or NSW Department of Planning and Environment (DPE) actions. Emergency coastal protection works must not be undertaken during extreme weather unless safe to do so, as emergency actions must not put Council or other agency staff or volunteers at risk.

Each table in the following sub-sections details the coastal emergency actions through the four phases of emergency response, which apply to the locations at risk along the Eurobodalla Shire open coast (**Section 3**). Any implementation options indicated in the sub-sections below with an Option ID are discussed in detail in the CMP (Rhelm, 2022b).

Actions in this CZEAS aim to reduce risk:

- In areas where Council has chosen not to implement other coastal protection works to reduce coastal hazard risks, which have been evaluated as tolerable or acceptable
- Where coastal hazard risks have not been reduced or eliminated because an agreed action in a CMP has not yet been implemented
- Where coastal hazard risks remain after other actions have been implemented (residual risk)
- When rare and large or unexpected events occur, outside the design criteria or capacity of agreed management actions in the CMP.

## 5.1 Durras Beach

Durras Beach is subject to coastal inundation.

**Table 5-1** lists the response action plan for Durras Beach.

**Table 5-1 Coastal Emergency Actions for Durras Beach**

Action	Responsibility
<b>Phase 1 – Prevention</b>	
Provide advice to the community, landholders and the NSW SES about the potential for a coastal emergency event and the types of responses that are permitted and not permitted.	Council
Assess threats to life and property arising from a coastal emergency through the CMP process. Make the public aware of the hazards and risks through publication of the Eurobodalla Open Coast CMP and this CZEAS, and education campaigns.	NSW SES and Council
Council to monitor beach/dune condition and weather events such as warnings issued by the Bureau (i.e. Severe Weather Warnings from Port Kembla to Eden).and/or advice provided by Agencies which may impact the area.	Council
<b>Phase 2 – Preparation</b>	
Identify the most appropriate emergency coastal protection works including access and location. For Durras Beach this is considered to be road closure, and evacuation of residents, as required.	Council
Develop an operations procedure to guide Council's response to coastal emergency events (including resourcing, internal training, testing and periodic review).	Council
Maintain up-to-date personal contact details for key Council staff involved in coordinating actions under this CZEAS and individuals Council may need advice from, such as DPE staff, or to integrate with personnel from other emergency sectors.	Council
<b>Phase 3 – Response</b>	
Implement the communication protocol in conjunction with the combat agency (NSW SES) to advise landholders, residents, public authorities and other organisations that a coastal emergency is likely or is occurring and that actions in this CZEAS are to be implemented.	Council and NSW SES
Alert residents if risk level is high and if any emergency management actions are being implemented.	NSW SES
Erect temporary signage of dangers or closure to the beach.	Council
Evacuate residents if necessary.	NSW SES
Increase surveillance of coastal hazards at this location.	Council
Close affected Council managed roads or liaise with road owners to enable closure.	Council
<b>Phase 4 – Recovery</b>	
Inspect the beach, public assets and properties after damaging storm events and carry out works to ensure the area is safe, including general clean up and clearing of any exposed debris, before taking down signage or reopening the area.	Council

Action	Responsibility
Erect permanent warning signs if necessary.	Council
Restore access to beaches and headlands.	Council
Maintain temporary safety fencing and associated warning signage, as necessary.	Council
Issue clean-up orders under the <i>Local Government Act 1993</i> .	Council
Assess the structural integrity of unprotected assets affected by or damaged during the coastal emergency event. Geotechnical, structural and/or coastal engineering investigations may be required to understand residual risk following a coastal emergency event.	Council
Liaise with property owners to ensure any private and/or public structures do not pose a risk to the public.	Council
Undertake works to re-establish or enhance the natural protective features of the coast, such as dune shaping and revegetation.	Council
Issue orders under the <i>Local Government Act 1993</i> and/or the <i>Environmental Planning and Assessment Act 1979</i> when properties are deemed structurally unsafe or pose a risk to the public.	Council
Critically review this CZEAS, communications protocol/plan and operational procedures to ensure they achieved their performance objectives. Amend if shortcomings or improvements are identified.	Council

## 5.2 Maloneys Beach

Maloney Beach is subject to beach erosion and coastal inundation.

The CMP recommends upgrading Northcove Road to reduce the impacts of coastal inundation and beach erosion at this location (Option CH1\_B). In total, 250m of retaining structure and wave return wall is recommended along the eastern section of Northcove Road and the western section of Maloneys Drive. The option also includes raising a 100-120m section Northcove Road.

**Table 5-2** lists the response action plan for Maloneys Beach, including fast-tracking of the abovementioned CMP option as a high priority recovery action, if necessary.

**Table 5-2 Coastal Emergency Actions for Maloneys Beach**

Action	Responsibility
<b>Phase 1 – Prevention</b>	
Provide advice to the community, landholders and the NSW SES about the potential for a coastal emergency event and the types of responses that are permitted and not permitted.	Council
Assess threats to life and property arising from a coastal emergency through the CMP process. Make the public aware of the hazards and risks through publication of the Eurobodalla Open Coast CMP and this CZEAS, and education campaigns.	NSW SES and Council
Council to monitor beach/dune condition and weather events such as warnings issued by the Bureau (i.e. Severe Weather Warnings from Port Kembla to Eden) and/or advice provided by Agencies which may impact the area.	Council
<b>Phase 2 – Preparation</b>	
Identify the most appropriate emergency coastal protection works including access and location. For Maloneys Beach this is considered to be toe protection using sand containers or sand nourishment via beach scraping if conditions/resources permit. Access is via Northcove Road.	Council
Prepare an environment impact assessment for emergency coastal protection works and gain necessary approvals from state agencies.	Council
Maintain a stockpile of sand containers for the purpose of erosion protection works. These will be stored at the nearest Council Depot.  Sand containers made of geotextile fabric or woven polypropylene fabric (not hessian) with maximum volume of 0.75m <sup>3</sup> should be used (DECCW, 2011). It is recommended that a container volume of not less than 0.3m <sup>3</sup> be used.  Sand can be imported to the site from a lawfully approved source. Imported sand should have a grain size (D50) of at least 0.2mm and no greater than 0.25mm.	
Maintain the ability to mobilise required plant and equipment at short notice.	Council
Develop an operations procedure to guide Council's response to coastal emergency events (including resourcing, internal training, testing and periodic review).	Council

Action	Responsibility
Maintain up-to-date personal contact details for key Council staff involved in coordinating actions under this CZEAS and individuals Council may need advice from, such as DPE staff, or to integrate with personnel from other emergency sectors.	Council
<b>Phase 3 – Response</b>	
Implement the communication protocol in conjunction with the combat agency (NSW SES) to advise landholders, residents, public authorities and other organisations that a coastal emergency is likely or is occurring and that actions in this CZEAS are to be implemented.	Council and NSW SES
Alert residents if risk level is high and if any emergency management actions are being implemented.	NSW SES
Erect temporary signage of dangers or closure to the beach.	Council
Evacuate residents if necessary.	NSW SES
Alert land managers about access requirements.	Council
Increase surveillance of coastal hazards at this location.	Council
Place appropriate equipment on stand-by.	Council
<p>Dune toe protection works may be undertaken prior to dangerous ocean conditions developing, if the following triggers are reached:</p> <ul style="list-style-type: none"> <li>• East Coast Low predicted and;</li> <li>• Erosion scarp is at trigger line (<b>Figure 5-2</b>), located approximately 10m from Northcove Drive.</li> </ul> <p>The protection structure will be temporary and constructed as a single stack of containers along the erosion scarp to a maximum height of 1.5m from the toe of the escarpment (DECCW, 2011), as shown in <b>Figure 5-1</b>. Approximately 25 containers are required for every 10m of structure length, with the total number required dependant on the length of shoreline requiring immediate protection and the number of containers that can be installed in the time available. Emergency protection would prioritise sections of the shoreline most exposed at the time and remain within the area specified on <b>Figure 5-2</b>.</p> <p>Beach scraping as a form of beach nourishment, could also be undertaken if time, resource and event magnitude permit. Determination of beach scraping location will involve consultation with relevant NSW government agencies as per the communication protocol.</p> <p>Beach scraping involves the relocation (by mechanical means) of sand from the intertidal zone to the upper beach or dune. The volumes practically able to be moved will not be generally sufficient to renourish the beach profile, however, can be used to enhance the remaining dune, provide buffer to the asset and accelerate the natural process of dune re-building.</p> <p>The ‘borrow’ area should be restricted to within the intertidal zone with no greater than 0.3m depth removed from the beach profile between elevations of -0.5mAHD and +1mAHD.</p>	Council

Action	Responsibility
<p>The 'placement' area should be placed at the base of the asset at a slope of approximately 1 in 7. Placement volumes are likely to be approximately 15-20m<sup>3</sup>/m width of beach. Ideally a small lip can be left to minimise sand blowing over the top of foreshore, and/or other considerations such as use of jute mesh and plantings on the landward margin of the nourishment if appropriate can increase stability.</p> <p>The sand scraping area is shown on <b>Figure 5-2</b>.</p> <p>Plant and equipment should access the area for the works via <b>Northcove Road</b>, avoiding disturbance to surrounding areas, in particular to any dune vegetation.</p>	
Close Northcove Road if affected by inundation (including wave overtopping) or instability due to beach erosion.	Council
<b>Phase 4 – Recovery</b>	
Inspect the beach, public assets and properties after damaging storm events and carry out works to ensure the area is safe, including general clean up and clearing of any exposed debris, before taking down signage or reopening the area.	Council
<p>Beach scraping may be undertaken if required Beach scraping may be undertaken if required to restore public beach access following storm erosion and to assist beach recovery. The location and scale of beach scraping activities will depend on the damage caused by the event and will need to be determined at the time of the event. Beach scraping involves the relocation (by mechanical means) of sand from the intertidal zone to the upper beach or dune. The volumes practically able to be moved will not be sufficient to renourish the beach profile following a large erosion event, however, can be used to enhance the remaining dune and accelerate the natural process of dune re-building.</p> <p>The 'borrow' area should be restricted to within the intertidal zone with no greater than 0.5m depth removed from the beach profile between elevations of -0.5mAHD and +1mAHD.</p> <p>The 'placement' area should be placed at the base of the erosion scarp at a slope of approximately 1 in 7. Placement volumes are likely to be approximately 10-15m<sup>3</sup>/m width of beach.</p>	Council
If beach erosion is within 6m of Northcove Road, recovery works should include the implementation of CMP Option CH1_B if funding is available.	Council
Erect permanent warning signs if necessary.	Council
Remove any sand containers within 90 days.	Council
Monitor the condition, performance and impact of any coastal protection works or emergency coastal protection works.	Council
Restore access to beaches and headlands.	Council
Maintain temporary safety fencing and associated warning signage, as necessary.	Council
Issue clean-up orders under the <i>Local Government Act 1993</i> .	Council
Assess the structural integrity of unprotected assets affected by or damaged during the coastal emergency event. Geotechnical, structural and/or coastal engineering investigations may be required to understand residual risk following a coastal emergency event.	Council



Action	Responsibility
Liaise with property owners to ensure any private and/or public structures do not pose a risk to the public.	Council
Undertake works to re-establish or enhance the natural protective features of the coast, such as dune shaping and revegetation.	Council
Issue orders under the <i>Local Government Act 1993</i> and/or the <i>Environmental Planning and Assessment Act 1979</i> when properties are deemed structurally unsafe or pose a risk to the public.	Council
Replenish any emergency materials and supplies for future emergency events.	Council
Critically review this CZEAS, communications protocol/plan and operational procedures to ensure they achieved their performance objectives. Amend if shortcomings or improvements are identified.	Council

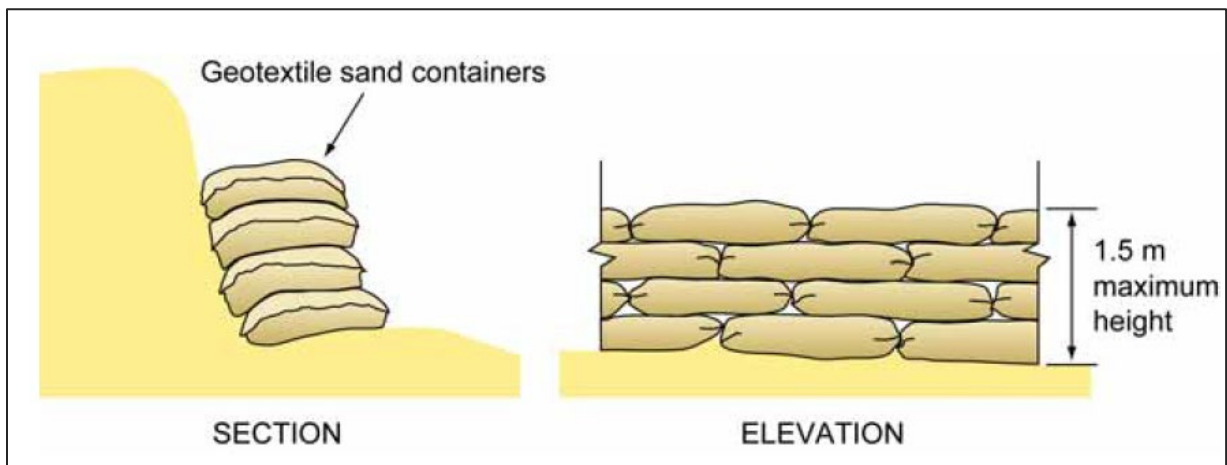


Figure 5-1 Concept Sand Container Placement Method (DECCW, 2011)



Figure 5-2 Maloneys Beach Erosion Protection Works

### 5.3 Long Beach

Long Beach has coastal risks associated with beach erosion, coastal inundation and cliff instability.

The CMP recommends the construction of a revetment wall at Long Beach, to protect Bay Road and the carpark from beach erosion (Option CH1\_D). These works are identified for immediate action (commencing with investigation and design, followed by construction). In the interim, the existing erosion risks remain. The action plan below considers this interim risk.

**Table 5-3** lists the response action plan for Long Beach.

**Table 5-3 Coastal Emergency Actions for Long Beach**

Action	Responsibility
<b>Phase 1 – Prevention</b>	
Provide advice to the community, landholders and the NSW SES about the potential for a coastal emergency event and the types of responses that are permitted and not permitted.	Council
Assess threats to life and property arising from a coastal emergency through the CMP process. Make the public aware of the hazards and risks through publication of the Eurobodalla Open Coast CMP and this CZEAS, and education campaigns.	NSW SES and Council
Council to monitor beach/dune condition and weather events such as warnings issued by the Bureau (i.e. Severe Weather Warnings from Port Kembla to Eden) and/or advice provided by Agencies which may impact the area.	Council
<b>Phase 2 – Preparation</b>	
Identify the most appropriate emergency coastal protection works including access and location. For Long Beach this is considered to be toe protection using sand containers or beach nourishment through sand scraping if conditions and resourcing permit. Access to undertake these works is via Bay Road, which has a number of low access points that can be utilised depending on conditions.	Council
Prepare an environment impact assessment for emergency coastal protection works and gain necessary approvals from state agencies.	Council
To prepare for cliff instability, maintain an adequate supply of fencing, hazard tape and hazard signage at the Council depot.	Council
Maintain a stockpile of sand containers for the purpose of erosion protection works. These will be stored at the nearest Council Depot. Sand containers made of geotextile fabric or woven polypropylene fabric (not hessian) with maximum volume of 0.75m <sup>3</sup> should be used (DECCW, 2011). It is recommended that a container volume of not less than 0.3m <sup>3</sup> be used. Sand can be imported to the site from a lawfully approved source. Imported sand should have a grain size (D50) of at least 0.2mm and no greater than 0.25mm.	Council
Maintain the ability to mobilise required plant and equipment at short notice.	Council
Develop an operations procedure to guide Council's response to coastal emergency events (including resourcing, internal training, testing and periodic review).	Council

Action	Responsibility
Maintain up-to-date personal contact details for key Council staff involved in coordinating actions under this CZEAS and individuals Council may need advice from, such as DPE staff, or to integrate with personnel from other emergency sectors.	Council
Private property owners at risk from coastal erosion can submit a Development Application to Council for the implementation of emergency coastal protection works on their land and ensuring Part 5 Section 27 is satisfied. The works on private property cannot be undertaken until the erosion scarp has reached the trigger line shown on <b>Figure 5-3</b> .	Private property owners
<b>Phase 3 – Response</b>	
Implement the communication protocol in conjunction with the combat agency (NSW SES) to advise landholders, residents, public authorities and other organisations that a coastal emergency is likely or is occurring and that actions in this CZEAS are to be implemented.	Council and NSW SES
Alert residents if risk level is high and if any emergency management actions are being implemented.	NSW SES
Erect temporary signage of dangers or closure to the beach.	Council
Evacuate residents if necessary.	NSW SES
Alert land managers about access requirements.	Council
Erect temporary signage of dangers or closure to the cliff area, etc and fencing to barricade access to the unstable cliff area (above and below area of instability).	Council
Increase surveillance of coastal hazards at this location.	Council
Place appropriate equipment on stand-by.	Council
<p>Dune toe protection works may be undertaken prior to dangerous ocean conditions developing, if the following triggers are reached:</p> <ul style="list-style-type: none"> <li>• East Coast Low predicted and;</li> <li>• Erosion scarp is at trigger line (<b>Figure 5-3</b>), located approximately 7m from Bay Road.</li> </ul> <p>Prior to the implementation of the formal coastal protection works as part of the CMP, a temporary protection structure will be constructed as a single stack of containers along the erosion scarp to a maximum height of 1.5m from the toe of the escarpment (DECCW, 2011), as shown in <b>Figure 5-3</b>. Approximately 25 containers are required for every 10m of structure length, with the total number required dependant on the length of shoreline requiring immediate protection and the number of containers that can be installed in the time available. Emergency protection would prioritise sections of the shoreline most exposed at the time and remain within the area specified on <b>Figure 5-3</b>.</p> <p>Plant and equipment should access the area to be sandbagged via Bay Road, avoiding disturbance to surrounding areas, in particular to any dune vegetation.</p> <p>Beach scraping as a form of beach nourishment, could also be undertaken if time, resource and event magnitude permit. Determination of beach scraping location will involve consultation with relevant NSW government agencies as per the communication protocol.</p>	Council

Action	Responsibility
<p>Beach scraping involves the relocation (by mechanical means) of sand from the intertidal zone to the upper beach or dune. The volumes practically able to be moved will not be generally sufficient to renourish the beach profile, however, can be used to enhance the remaining dune, provide buffer to the asset and accelerate the natural process of dune re-building.</p> <p>The 'borrow' area should be restricted to within the intertidal zone with no greater than 0.3m depth removed from the beach profile between elevations of - 0.5mAHD and +1mAHD.</p> <p>The 'placement' area should be placed at the base of the asset at a slope of approximately 1 in 7. Placement volumes are likely to be approximately 15-20m<sup>3</sup>/m width of beach. Ideally a small lip can be left to minimise sand blowing over the top of foreshore, and/or other considerations such as use of jute mesh and plantings on the landward margin of the nourishment if appropriate can increase stability.</p> <p>The sand scraping area is shown on <b>Figure 5-3</b>.</p>	
<p>Where an approved Development Application exists, dune toe protection works on private property may be undertaken to protect private property prior to dangerous ocean conditions developing, if the following triggers are reached:</p> <ul style="list-style-type: none"> <li>• East Coast Low predicted and;</li> <li>• Erosion scarp is at trigger line (<b>Figure 5-3</b>), located approximately 7m from Bay Road.</li> </ul>	Private property owners
Close Bay Road if affected by inundation (including wave overtopping) or instability due to beach erosion.	Council
<b>Phase 4 – Recovery</b>	
Inspect the beach, public assets and properties after damaging storm events and carry out works to ensure the area is safe, including general clean up and clearing of any exposed debris, before taking down signage or reopening the area.	Council
<p>Beach scraping may be undertaken if required to restore public beach access following storm erosion and to assist beach recovery. The location and scale of beach scraping activities will depend on the damage caused by the event and will need to be determined at the time of the event. Beach scraping involves the relocation (by mechanical means) of sand from the intertidal zone to the upper beach or dune. The volumes practically able to be moved will not be sufficient to renourish the beach profile following a large erosion event, however, can be used to enhance the remaining dune and accelerate the natural process of dune re-building.</p> <p>The 'borrow' area should be restricted to within the intertidal zone with no greater than 0.5m depth removed from the beach profile between elevations of - 0.5mAHD and +1mAHD.</p> <p>The 'placement' area should be placed at the base of the erosion scarp at a slope of approximately 1 in 7. Placement volumes are likely to be approximately 15-20m<sup>3</sup>/m width of beach.</p>	Council



Action	Responsibility
Undertake cliff stabilisation works, if necessary. This may be done by anchoring (the use of terracing, planting, wiring or concrete supports to hold cliffs in place), smoothing the slope, or dewatering (drainage of excess rainwater to reduce waterlogging).	Council
If the Long Beach revetment construction works (Option CH1_D) are yet to be commenced, fast track these works as a high priority recovery action.	Council
Erect permanent warning signs if necessary.	Council
Remove any sand containers within 90 days.	Council Private property owners
Monitor the condition, performance and impact of any coastal protection works or emergency coastal protection works.	Council
Restore access to beaches and headlands.	Council
Maintain temporary safety fencing and associated warning signage, as necessary.	Council
Issue clean-up orders under the <i>Local Government Act 1993</i> .	Council
Assess the structural integrity of unprotected assets affected by or damaged during the coastal emergency event. Geotechnical, structural and/or coastal engineering investigations may be required to understand residual risk following a coastal emergency event.	Council
Liaise with property owners to ensure any private and/or public structures do not pose a risk to the public.	Council
Undertake works to re-establish or enhance the natural protective features of the coast, such as dune shaping and revegetation.	Council
Issue orders under the <i>Local Government Act 1993</i> and/or the <i>Environmental Planning and Assessment Act 1979</i> when properties are deemed structurally unsafe or pose a risk to the public.	Council
Replenish any emergency materials and supplies for future emergency events.	Council
Critically review this CZEAS, communications protocol/plan and operational procedures to ensure they achieved their performance objectives. Amend if shortcomings or improvements are identified.	Council

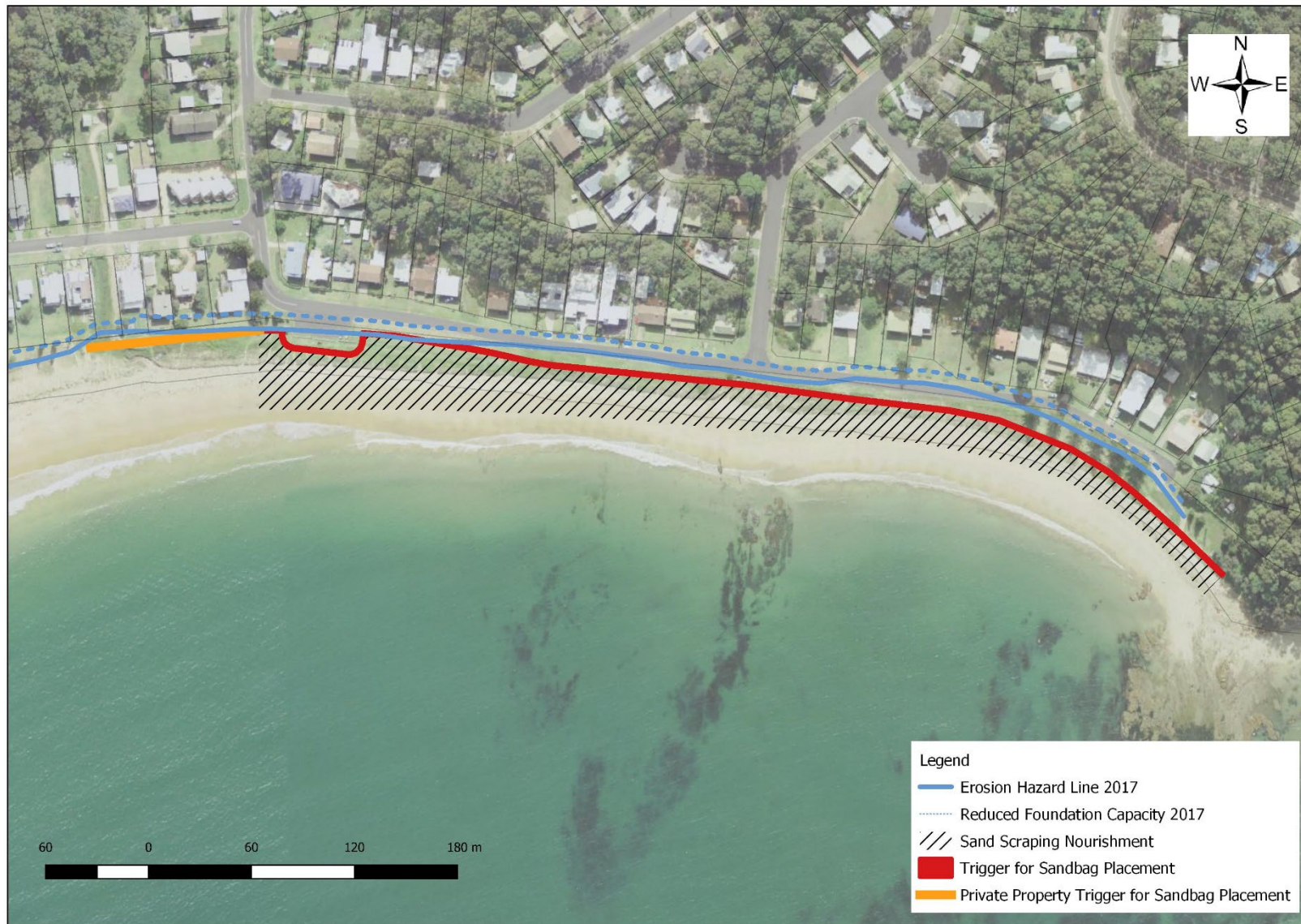


Figure 5-3 Long Beach Erosion Protection Works

## 5.4 Surfside

Surfside is subject to beach erosion and coastal inundation.

The CMP recommends a number of permanent options to address these coastal hazards, including:

- Construction of a culvert extension that would also act as a groyne at Surfside West (Macleods) in order to stabilise the beach compartment and address beach erosion and shoreline recession at this location (Option CH1\_ZA)
- A periodic sand nourishment program at Surfside Beach for the sub-aerial beach to maintain the beach width and afford a buffer against beach erosion (Option CH1\_L).
- Construction of a flood berm at Surfside to protect low lying urban areas from coastal inundation during storm events at this location (Option CH4\_D). The option would see the staged construction of a flood berm to protect the low-lying residential precinct adjacent to the bay. This would reduce the impact of coastal inundation to properties, assets and roads.

**Table 5-4** lists the response actions specific to Surfside, including fast-tracking of the abovementioned CMP options as high priority recovery actions, if necessary.

**Table 5-4 Coastal Emergency Actions for Surfside**

Action	Responsibility
<b>Phase 1 – Prevention</b>	
Provide advice to the community, landholders and the NSW SES about the potential for a coastal emergency event and the types of responses that are permitted and not permitted.	Council
Assess threats to life and property arising from a coastal emergency through the CMP process. Make the public aware of the hazards and risks through publication of the Eurobodalla Open Coast CMP and this CZEAS, and education campaigns.	NSW SES and Council
Council to monitor beach/dune condition and weather events such as warnings issued by the Bureau (i.e. Severe Weather Warnings from Port Kembla to Eden) and/or advice provided by Agencies which may impact the area.	Council
<b>Phase 2 – Preparation</b>	
Identify the most appropriate emergency coastal protection works including access and location. For Surfside this is considered to be toe protection using sand containers or sand nourishment via beach scraping if conditions/resources permit. Access is via Wharf Road (Macleods) or Myamba Parade (Surfside Beach).	Council
Prepare an environment impact assessment for emergency coastal protection works and gain necessary approvals from state agencies.	Council
Maintain a stockpile of sand containers for the purpose of erosion protection works. These will be stored at the nearest Council Depot.  Sand containers made of geotextile fabric or woven polypropylene fabric (not hessian) with maximum volume of 0.75m <sup>3</sup> should be used (DECCW, 2011). It is recommended that a container volume of not less than 0.3m <sup>3</sup> be used.	Council



Action	Responsibility
Sand can be imported to the site from a lawfully approved source. Imported sand should have a grain size (D50) of at least 0.2mm and no greater than 0.25mm.	
Maintain the ability to mobilise required plant and equipment at short notice.	Council
Develop an operations procedure to guide Council's response to coastal emergency events (including resourcing, internal training, testing and periodic review).	Council
Maintain up-to-date personal contact details for key Council staff involved in coordinating actions under this CZEAS and individuals Council may need advice from, such as DPE staff, or to integrate with personnel from other emergency sectors.	Council
<b>Phase 3 – Response</b>	
Implement the communication protocol in conjunction with the combat agency (NSW SES) to advise landholders, residents, public authorities and other organisations that a coastal emergency is likely or is occurring and that actions in this CZEAS are to be implemented.	Council and NSW SES
Alert residents if risk level is high and if any emergency management actions are being implemented.	NSW SES
Erect temporary signage of dangers or closure to the beach.	Council
Evacuate residents if necessary.	NSW SES
Alert land managers about access requirements.	Council
Increase surveillance of coastal hazards at this location.	Council
Place appropriate equipment on stand-by.	Council
<p>Dune toe protection works may be undertaken prior to dangerous ocean conditions developing, if the following triggers are reached:</p> <ul style="list-style-type: none"> <li>• East Coast Low predicted and;</li> <li>• Erosion scarp is at trigger line (<b>Figure 5-4</b>), located approximately 8m from Wharf Road.</li> </ul> <p>The protection structure will be temporary and constructed as a single stack of containers along the erosion scarp to a maximum height of 1.5m from the toe of the escarpment (DECCW, 2011). Approximately 25 containers are required for every 10m of structure length, with the total number required dependant on the length of shoreline requiring immediate protection and the number of containers that can be installed in the time available. Emergency protection would prioritise sections of the shoreline most exposed at the time and remain within the area specified on <b>Figure 5-4</b>.</p> <p>Beach scraping as a form of beach nourishment, could also be undertaken if time, resource and event magnitude permit. Determination of beach scraping location will involve consultation with relevant NSW government agencies as per the communication protocol.</p> <p>Beach scraping involves the relocation (by mechanical means) of sand from the intertidal zone to the upper beach or dune. The volumes practically able to be</p>	Council

Action	Responsibility
<p>moved will not be generally sufficient to renourish the beach profile, however, can be used to enhance the remaining dune, provide buffer to the asset and accelerate the natural process of dune re-building.</p> <p>The 'borrow' area should be restricted to within the intertidal zone with no greater than 0.3m depth removed from the beach profile between elevations of - 0.5mAHD and +1mAHD.</p> <p>The 'placement' area should be placed at the base of the asset at a slope of approximately 1 in 7. Placement volumes are likely to be approximately 15-20m<sup>3</sup>/m width of beach. Ideally a small lip can be left to minimise sand blowing over the top of foreshore, and/or other considerations such as use of jute mesh and plantings on the landward margin of the nourishment if appropriate can increase stability.</p> <p>The sand scraping area is shown on <b>Figure 5-4</b>.</p> <p>Plant and equipment should access the area for the works via Wharf Road, avoiding disturbance to surrounding areas, in particular to any dune vegetation.</p>	
Close affected Council managed roads or liaise with road owners to enable closure.	Council
<b>Phase 4 – Recovery</b>	
Inspect the beach, public assets and properties after damaging storm events and carry out works to ensure the area is safe, including general clean up and clearing of any exposed debris, before taking down signage or reopening the area.	Council
<p>Beach scraping may be undertaken if required to restore public beach access following significant storm erosion and to assist beach recovery. The location and scale of beach scraping activities will depend on the damage caused by the event and will need to be determined at the time of the event. Beach scraping involves the relocation (by mechanical means) of sand from the intertidal zone to the upper beach or dune. The volumes practically able to be moved will not be sufficient to renourish the beach profile following a large erosion event, however, can be used to enhance the remaining dune and accelerate the natural process of dune re-building.</p> <p>The 'borrow' area should be restricted to within the intertidal zone with no greater than 0.5m depth removed from the beach profile between elevations of - 0.5mAHD and +1mAHD.</p> <p>The 'placement' area should be placed at the base of the erosion scarp at a slope of approximately 1 in 2. Placement volumes are likely to be approximately 10-15m<sup>3</sup>/m width of beach.</p>	Council
If the groyne construction works (Option CH1_ZA) at Surfside West (Macleods Beach) are yet to be commenced, implement these works as a high priority recovery action.	Council
If the flood berm construction works at Surfside to protect low lying urban areas from coastal inundation (Option CH4_D) are yet to be commenced, implement these works as a high priority recovery action.	Council
Erect permanent warning signs if necessary.	Council

Action	Responsibility
Remove any sand containers within 90 days.	Council
Monitor the condition, performance and impact of any coastal protection works or emergency coastal protection works.	Council
Restore access to beaches and headlands.	Council
Maintain temporary safety fencing and associated warning signage, as necessary.	Council
Issue clean-up orders under the <i>Local Government Act 1993</i> .	Council
Assess the structural integrity of unprotected assets affected by or damaged during the coastal emergency event. Geotechnical, structural and/or coastal engineering investigations may be required to understand residual risk following a coastal emergency event.	Council
Liaise with property owners to ensure any private and/or public structures do not pose a risk to the public.	Council
Undertake works to re-establish or enhance the natural protective features of the coast, such as dune shaping and revegetation.	Council
Issue orders under the <i>Local Government Act 1993</i> and/or the <i>Environmental Planning and Assessment Act 1979</i> when properties are deemed structurally unsafe or pose a risk to the public.	Council
Replenish any emergency materials and supplies for future emergency events.	Council
Critically review this CZEAS, communications protocol/plan and operational procedures to ensure they achieved their performance objectives. Amend if shortcomings or improvements are identified.	Council

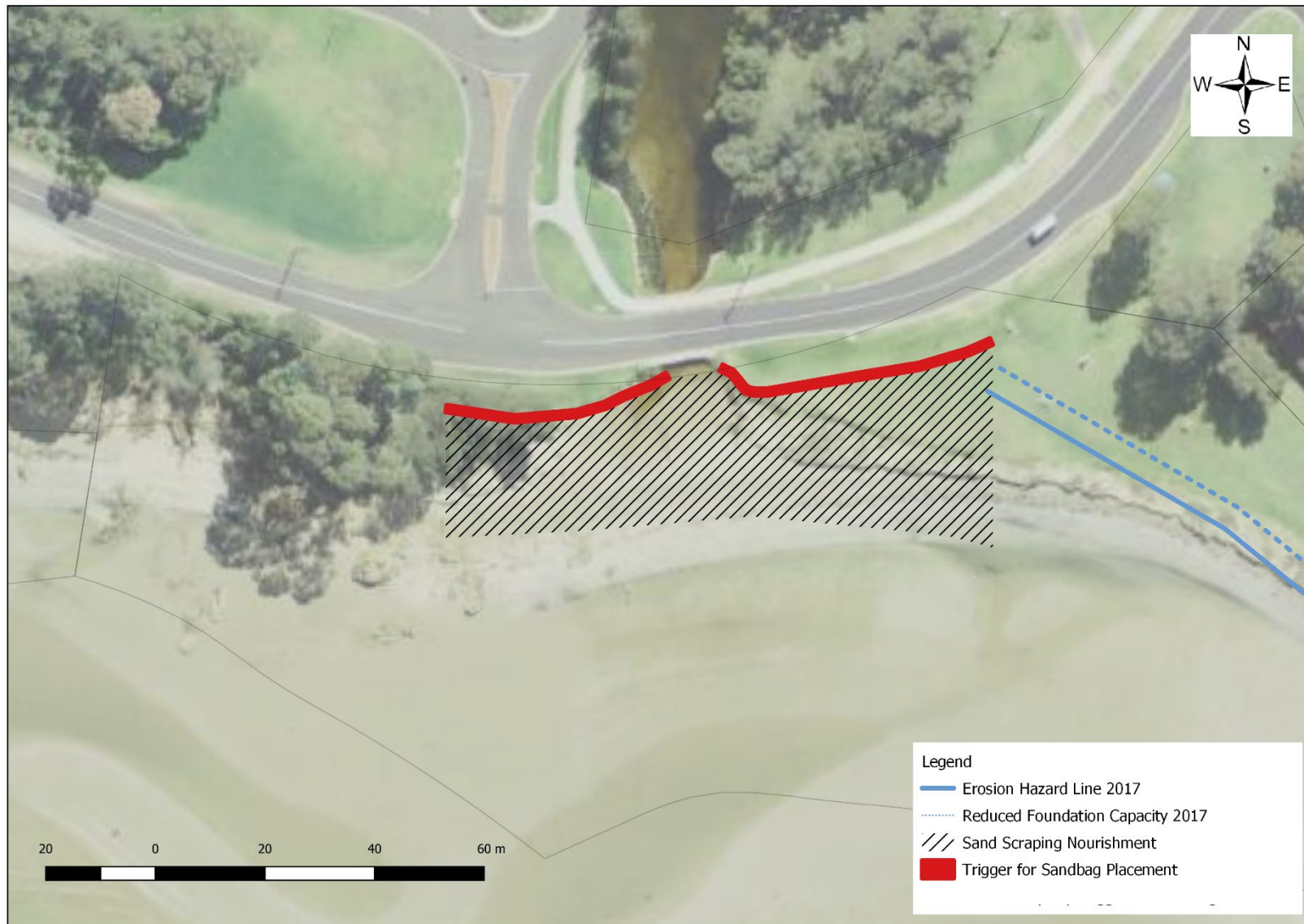


Figure 5-4 Surfside Beach Erosion Protection Works

## 5.5 Wharf Road

Wharf Road is subject to beach erosion and coastal inundation.

The CMP recommends the acquisition of the private properties seaward of Wharf Road and conversion of this area to a public reserve, to restore the area for safe public use (Option CH1\_M).

Natural coastal processes will be allowed to occur, including beach erosion and shoreline recession, until they begin to threaten the existing sewer main through the area. Council will then construct a revetment wall aligned with the sewer to provide protection to the sewer and the road behind it (Option C1\_Kd). The CMP includes the Wharf Road Protection Stage 1 as priority works at the exposed corner of Wharf Road (Option C1\_Ka).

**Table 5-5** lists the response actions specific to Wharf Road, including fast-tracking of the abovementioned CMP options as high priority recovery actions, if necessary.

**Table 5-5 Coastal Emergency Actions for Wharf Road**

Action	Responsibility
<b>Phase 1 – Prevention</b>	
Provide advice to the community, landholders and the NSW SES about the potential for a coastal emergency event and the types of responses that are permitted and not permitted.	Council
Assess threats to life and property arising from a coastal emergency through the CMP process. Make the public aware of the hazards and risks through publication of the Eurobodalla Open Coast CMP and this CZEAS, and education campaigns.	NSW SES and Council
Council to monitor beach/dune condition and weather events such as warnings issued by the Bureau (i.e. Severe Weather Warnings from Port Kembla to Eden) and/or advice provided by Agencies which may impact the area.	Council
<b>Phase 2 – Preparation</b>	
Identify the most appropriate emergency coastal protection works including access and location. For Wharf Road this is considered to be toe protection using sand containers or sand nourishment via beach scraping if conditions/resources permit. Access is via <b>Wharf Road</b> .	Council
Prepare an environment impact assessment for emergency coastal protection works and gain necessary approvals from state agencies.	Council
Maintain a stockpile of sand containers for the purpose of erosion protection works. These will be stored at the nearest Council Depot.  Sand containers made of geotextile fabric or woven polypropylene fabric (not hessian) with maximum volume of 0.75m <sup>3</sup> should be used (DECCW, 2011). It is recommended that a container volume of not less than 0.3m <sup>3</sup> be used.  Sand can be imported to the site from a lawfully approved source. Imported sand should have a grain size (D50) of at least 0.2mm and no greater than 0.25mm.	Council

Action	Responsibility
Maintain the ability to mobilise required plant and equipment at short notice.	Council
Develop an operations procedure to guide Council's response to coastal emergency events (including resourcing, internal training, testing and periodic review).	Council
Maintain up-to-date personal contact details for key Council staff involved in coordinating actions under this CZEAS and individuals Council may need advice from, such as DPE staff, or to integrate with personnel from other emergency sectors.	Council
<b>Phase 3 – Response</b>	
Implement the communication protocol in conjunction with the combat agency (NSW SES) to advise landholders, residents, public authorities and other organisations that a coastal emergency is likely or is occurring and that actions in this CZEAS are to be implemented.	Council and NSW SES
Alert residents if risk level is high and if any emergency management actions are being implemented.	NSW SES
Erect temporary signage of dangers or closure to the beach.	Council
Evacuate residents if necessary.	NSW SES
Alert land managers about access requirements.	Council
Increase surveillance of coastal hazards at this location.	Council
Place appropriate equipment on stand-by.	Council
<p>Dune toe protection works should be undertaken prior to dangerous ocean conditions developing, if the following triggers are reached:</p> <ul style="list-style-type: none"> <li>• East Coast Low predicted</li> <li>• Erosion scarp is at trigger line (<b>Figure 5-5</b>), located approximately 6m from Wharf Road,</li> </ul> <p>The protection structure will be temporary and constructed as a single stack of containers along the erosion scarp to a maximum height of 1.5m from the toe of the escarpment (DECCW, 2011). Approximately 25 containers are required for every 10m of structure length, with the total number required dependant on the length of shoreline requiring immediate protection and the number of containers that can be installed in the time available. Emergency protection would prioritise sections of the shoreline most exposed at the time and remain within the area specified on <b>Figure 5-5</b>.</p> <p>Beach scraping as a form of beach nourishment, could also be undertaken if time, resource and event magnitude permit. Determination of beach scraping location will involve consultation with relevant NSW government agencies as per the communication protocol.</p> <p>Beach scraping involves the relocation (by mechanical means) of sand from the intertidal zone to the upper beach or dune. The volumes practically able to be moved will not be generally sufficient to renourish the beach profile, however, can be used to enhance the remaining dune, provide buffer to the asset and accelerate the natural process of dune re-building.</p>	Council



Action	Responsibility
<p>The 'borrow' area should be restricted to within the intertidal zone with no greater than 0.3m depth removed from the beach profile between elevations of -0.5mAHD and +1mAHD.</p> <p>The 'placement' area should be placed at the base of the asset at a slope of approximately 1 in 7. Placement volumes are likely to be approximately 15-20m<sup>3</sup>/m width of beach. Ideally a small lip can be left to minimise sand blowing over the top of foreshore, and/or other considerations such as use of jute mesh and plantings on the landward margin of the nourishment if appropriate can increase stability.</p> <p>The sand scraping area is shown on <b>Figure 5-5</b>.</p> <p>Plant and equipment should access the area works area via <b>Myamba Parade</b>, avoiding disturbance to surrounding areas, in particular to any dune vegetation.</p>	
Close affected Council managed roads, such as Wharf Road, or liaise with road owners to enable closure. Liaise with other agencies, including Transport for NSW, Crown Land and National Parks and Wildlife Service if debris from coastal hazards creates a safety hazard in adjoining areas.	Council
<b>Phase 4 – Recovery</b>	
If the coastal emergency event threatens to cause damage or has caused damage to the sewer infrastructure in this area (150mm pipe shown on <b>Figure 5-6</b> ), the sewer line should be relocated to align with Wharf Road.	Council
If the coastal emergency event threatens to or has caused damage to Wharf Road, then the Wharf Road Protection Stage 1 priority works (Option C1_Ka) should be implemented as a high priority recovery action, if the protection works are yet to be commenced.	Council
Inspect the beach, public assets and properties after damaging storm events and carry out works to ensure the area is safe, including general clean up and clearing of any exposed debris, before taking down signage or reopening the area.	Council
The location east of the rock revetment (where the unauthorised rock structure is located) has a lot of debris on the foreshore (tyres, car bodies), that may be moved or exposed following a storm event. If this is the case, erect signage warning of the hazard, or if the public safety risks are considered to be extreme, temporarily close access to this beach area, until said risks are mitigated.	Council
Repair Wharf Road if necessary.	Council
Repair the seawall if necessary.	Council
Beach scraping may be undertaken if required to restore public beach access following significant storm erosion and to assist beach recovery. The location and scale of beach scraping activities will depend on the damage caused by the event and will need to be determined at the time of the event. Beach scraping involves the relocation (by mechanical means) of sand from the intertidal zone to the upper beach or dune. The volumes practically able to be moved will not be sufficient to renourish the beach profile following a large	Council

Action	Responsibility
<p>erosion event, however, can be used to enhance the remaining dune and accelerate the natural process of dune re-building.</p> <p>The 'borrow' area should be restricted to within the intertidal zone with no greater than 0.5m depth removed from the beach profile between elevations of -0.5mAHD and +1mAHD.</p> <p>The 'placement' area should be placed at the base of the erosion scarp at a slope of approximately 1 in 2. Placement volumes are likely to be approximately 10-15m<sup>3</sup>/m width of beach.</p>	
Erect permanent warning signs if necessary.	Council
Remove any sand containers within 90 days.	Council
Monitor the condition, performance and impact of any coastal protection works or emergency coastal protection works.	Council
Restore access to beaches and headlands.	Council
Maintain temporary safety fencing and associated warning signage, as necessary.	Council
Issue clean-up orders under the <i>Local Government Act 1993</i> .	Council
Assess the structural integrity of unprotected assets affected by or damaged during the coastal emergency event. Geotechnical, structural and/or coastal engineering investigations may be required to understand residual risk following a coastal emergency event.	Council
Liaise with property owners to ensure any private and/or public structures do not pose a risk to the public.	Council
Undertake works to re-establish or enhance the natural protective features of the coast, such as dune shaping and revegetation.	Council
Issue orders under the <i>Local Government Act 1993</i> and/or the <i>Environmental Planning and Assessment Act 1979</i> when properties are deemed structurally unsafe or pose a risk to the public.	Council
Replenish any emergency materials and supplies for future emergency events.	Council
Critically review this CZEAS, communications protocol/plan and operational procedures to ensure they achieved their performance objectives. Amend if shortcomings or improvements are identified.	Council





Figure 5-5 Wharf Road Erosion Protection Works



Figure 5-6 Sewer Infrastructure at Wharf Road

## 5.6 Batemans Bay CBD and Boat Harbour

Batemans Bay CBD and Boat Harbour are subject to coastal inundation.

**Table 5-6** lists the response action plan for Batemans Bay CBD and Boat Harbour.

**Table 5-6 Coastal Emergency Actions for Batemans Bay CBD and Boat Harbour**

Action	Responsibility
<b>Phase 1 – Prevention</b>	
Provide advice to the community, landholders and the NSW SES about the potential for a coastal emergency event and the types of responses that are permitted and not permitted.	Council
Assess threats to life and property arising from a coastal emergency through the CMP process. Make the public aware of the hazards and risks through publication of the Eurobodalla Open Coast CMP and this CZEAS, and education campaigns.	NSW SES and Council
Council to monitor beach/dune condition and weather events such as warnings issued by the Bureau (i.e. Severe Weather Warnings from Port Kembla to Eden) and/or advice provided by Agencies which may impact the area.	Council
<b>Phase 2 – Preparation</b>	
Identify the most appropriate emergency coastal protection works including access and location. For Boat Harbour this is considered to be road closures and evacuation warnings.	Council
Develop an operations procedure to guide Council's response to coastal emergency events (including resourcing, internal training, testing and periodic review).	Council
Maintain up-to-date personal contact details for key Council staff involved in coordinating actions under this CZEAS and individuals Council may need advice from, such as DPE staff, or to integrate with personnel from other emergency sectors.	Council
<b>Phase 3 – Response</b>	
Implement the communication protocol in conjunction with the combat agency (NSW SES) to advise landholders, residents, public authorities and other organisations that a coastal emergency is likely or is occurring and that actions in this CZEAS are to be implemented.	Council and NSW SES
Alert residents if risk level is high and if any emergency management actions are being implemented.	NSW SES and Council
Issue evacuation warnings, if necessary.	NSW SES
Increase surveillance of coastal hazards at this location.	Council
Close affected Council managed roads or liaise with road owners to enable closure.	Council
<b>Phase 4 – Recovery</b>	
Inspect the beach, public assets and properties after damaging storm events and carry out works to ensure the area is safe, including general clean up and clearing of any exposed debris, before taking down signage or reopening the area.	Council
Erect permanent warning signs if necessary.	Council

Action	Responsibility
Monitor the condition, performance and impact of any coastal protection works, following a structural inspection and assessment by a qualified engineer.	Council
Maintain temporary safety fencing and associated warning signage, as necessary.	Council
Issue clean-up orders under the <i>Local Government Act 1993</i> .	Council
Assess the structural integrity of unprotected assets affected by or damaged during the coastal emergency event. Geotechnical, structural and/or coastal engineering investigations may be required to understand residual risk following a coastal emergency event.	Council
Liaise with property owners to ensure any private and/or public structures do not pose a risk to the public.	Council
Issue orders under the <i>Local Government Act 1993</i> and/or the <i>Environmental Planning and Assessment Act 1979</i> when properties are deemed structurally unsafe or pose a risk to the public.	Council
Critically review this CZEAS, communications protocol/plan and operational procedures to ensure they achieved their performance objectives. Amend if shortcomings or improvements are identified.	Council

## 5.7 Corrigans Beach

Corrigans Beach is subject to coastal inundation and cliff instability.

**Table 5-7** lists the response action plan for Corrigans Beach.

**Table 5-7 Coastal Emergency Actions for Corrigans Beach**

Action	Responsibility
<b>Phase 1 – Prevention</b>	
Provide advice to the community, landholders and the NSW SES about the potential for a coastal emergency event and the types of responses that are permitted and not permitted.	Council
Assess threats to life and property arising from a coastal emergency through the CMP process. Make the public aware of the hazards and risks through publication of the Eurobodalla Open Coast CMP and this CZEAS, and education campaigns.	NSW SES and Council
Council to monitor beach/dune condition and weather events such as warnings issued by the Bureau (i.e. Severe Weather Warnings from Port Kembla to Eden) and/or advice provided by Agencies which may impact the area.	Council
<b>Phase 2 – Preparation</b>	
Identify the most appropriate emergency coastal protection works including access and location. For Corrigans Beach this is considered to be road closures and evacuation warnings.	Council
To prepare for cliff instability, maintain an adequate supply of fencing, hazard tape and hazard signage at the Council depot.	Council
Develop an operations procedure to guide Council's response to coastal emergency events (including resourcing, internal training, testing and periodic review).	Council
Maintain up-to-date personal contact details for key Council staff involved in coordinating actions under this CZEAS and individuals Council may need advice from, such as DPE staff, or to integrate with personnel from other emergency sectors.	Council
<b>Phase 3 – Response</b>	
Implement the communication protocol in conjunction with the combat agency (NSW SES) to advise landholders, residents, public authorities and other organisations that a coastal emergency is likely or is occurring and that actions in this CZEAS are to be implemented.	Council and NSW SES
Alert residents if risk level is high and if any emergency management actions are being implemented.	NSW SES
Erect temporary signage of dangers or closure to the beach.	Council
Issue evacuation warnings, if necessary.	NSW SES
Alert land managers about access requirements.	Council
Erect temporary signage of dangers or closure to the cliff area, etc and fencing to barricade access to the unstable cliff area (above and below area of instability).	Council
Increase surveillance of coastal hazards at this location.	Council

Action	Responsibility
Close affected Council managed roads or liaise with road owners to enable closure.	Council
<b>Phase 4 – Recovery</b>	
Inspect the beach, public assets and properties after damaging storm events and carry out works to ensure the area is safe, including general clean up and clearing of any exposed debris, before taking down signage or reopening the area.	Council
Undertake cliff stabilisation works, if necessary. This may be done by anchoring (the use of terracing, planting, wiring or concrete supports to hold cliffs in place), smoothing the slope, or dewatering (drainage of excess rainwater to reduce waterlogging).	Council
Erect permanent warning signs if necessary.	Council
Restore access to beaches and headlands.	Council
Maintain temporary safety fencing and associated warning signage, as necessary.	Council
Issue clean-up orders under the <i>Local Government Act 1993</i> .	Council
Assess the structural integrity of unprotected assets affected by or damaged during the coastal emergency event. Geotechnical, structural and/or coastal engineering investigations may be required to understand residual risk following a coastal emergency event.	Council
Liaise with property owners to ensure any private and/or public structures do not pose a risk to the public.	Council
Undertake works to re-establish or enhance the natural protective features of the coast, such as dune shaping and revegetation.	Council
Issue orders under the <i>Local Government Act 1993</i> and/or the <i>Environmental Planning and Assessment Act 1979</i> when properties are deemed structurally unsafe or pose a risk to the public.	Council
Critically review this CZEAS, communications protocol/plan and operational procedures to ensure they achieved their performance objectives. Amend if shortcomings or improvements are identified.	Council



## 5.8 Caseys Beach

Caseys Beach is subject to beach erosion, coastal inundation and cliff instability.

The CMP recommends the immediate replacement of the existing coastal protection works at Caseys Beach with a seawall to protect Beach Road and reduce the likelihood of damage from wave overtopping during storm events (Option CH1\_P).

**Table 5-3** lists the response action plan for Caseys Beach, including fast-tracking of the abovementioned CMP option as a high priority recovery action, if necessary.

**Table 5-8 Coastal Emergency Actions for Caseys Beach**

Action	Responsibility
<b>Phase 1 – Prevention</b>	
Provide advice to the community, landholders and the NSW SES about the potential for a coastal emergency event and the types of responses that are permitted and not permitted.	Council
Assess threats to life and property arising from a coastal emergency through the CMP process. Make the public aware of the hazards and risks through publication of the Eurobodalla Open Coast CMP and this CZEAS, and education campaigns.	NSW SES and Council
Council to monitor beach/dune condition and weather events such as warnings issued by the Bureau (i.e. Severe Weather Warnings from Port Kembla to Eden) and/or advice provided by Agencies which may impact the area.	Council
<b>Phase 2 – Preparation</b>	
Identify the most appropriate emergency coastal protection works including access and location. For Caseys Beach this is considered to be road closure. Once the proposed seawall upgrade (Option CH1_P) is complete wave overtopping should no longer occur and road closures will not likely be required.	Council
To prepare for cliff instability, maintain an adequate supply of fencing, hazard tape and hazard signage at the Council depot.	Council
Maintain the ability to mobilise required plant and equipment at short notice. This includes a bobcat in the event large rocks and debris need to be moved following a landslip.	Council
Develop an operations procedure to guide Council's response to coastal emergency events (including resourcing, internal training, testing and periodic review).	Council
Maintain up-to-date personal contact details for key Council staff involved in coordinating actions under this CZEAS and individuals Council may need advice from, such as DPE staff, or to integrate with personnel from other emergency sectors.	Council
<b>Phase 3 – Response</b>	
Implement the communication protocol in conjunction with the combat agency (NSW SES) to advise landholders, residents, public authorities and other organisations that a coastal emergency is likely or is occurring and that actions in this CZEAS are to be implemented.	Council and NSW SES

Action	Responsibility
Alert residents if risk level is high and if any emergency management actions are being implemented.	NSW SES
Erect temporary signage of dangers or closure to the beach.	Council
Evacuate residents if necessary.	NSW SES
Alert land managers about access requirements.	Council
Erect temporary signage of dangers or closure to the cliff area, etc and fencing to barricade access to the unstable cliff area (above and below area of instability).	Council
Increase surveillance of coastal hazards at this location.	Council
Place appropriate equipment on stand-by.	Council
Close affected Council managed roads, such as Beach Road, or liaise with road owners to enable closure.	Council
<b>Phase 4 – Recovery</b>	
Inspect the beach, public assets and properties after damaging storm events and carry out works to ensure the area is safe, including general clean up and clearing of any exposed debris, before taking down signage or reopening the area.	Council
Undertake cliff stabilisation works, if necessary. This may be done by anchoring (the use of terracing, planting, wiring or concrete supports to hold cliffs in place), smoothing the slope, or dewatering (drainage of excess rainwater to reduce waterlogging).	Council
If the Beach Road seawall construction works (Option CH1_P) are yet to be commenced, implement these works as a high priority recovery action.	Council
Erect permanent warning signs if necessary.	Council
Monitor the condition, performance and impact of any coastal protection works or emergency coastal protection works, following a structural inspection by a qualified engineer.	Council
Restore access to beaches and headlands.	Council
Maintain temporary safety fencing and associated warning signage, as necessary.	Council
Issue clean-up orders under the <i>Local Government Act 1993</i> .	Council
Assess the structural integrity of unprotected assets affected by or damaged during the coastal emergency event. Geotechnical, structural and/or coastal engineering investigations may be required to understand residual risk following a coastal emergency event.	Council
Liaise with property owners to ensure any private and/or public structures do not pose a risk to the public.	Council
Undertake works to re-establish or enhance the natural protective features of the coast, such as dune shaping and revegetation.	Council
Issue orders under the <i>Local Government Act 1993</i> and/or the <i>Environmental Planning and Assessment Act 1979</i> when properties are deemed structurally unsafe or pose a risk to the public.	Council
Replenish any emergency materials and supplies for future emergency events.	Council

Action	Responsibility
Critically review this CZEAS, communications protocol/plan and operational procedures to ensure they achieved their performance objectives. Amend if shortcomings or improvements are identified.	Council



## 5.9 Sunshine Bay

Sunshine Bay is subject to beach erosion.

**Table 5-9** lists the response action plan for Sunshine Bay.

**Table 5-9 Coastal Emergency Actions for Sunshine Bay**

Action	Responsibility
<b>Phase 1 – Prevention</b>	
Provide advice to the community, landholders and the NSW SES about the potential for a coastal emergency event and the types of responses that are permitted and not permitted.	Council
Assess threats to life and property arising from a coastal emergency through the CMP process. Make the public aware of the hazards and risks through publication of the Eurobodalla Open Coast CMP and this CZEAS, and education campaigns.	NSW SES and Council
Council to monitor beach/dune condition and weather events such as warnings issued by the Bureau (i.e. Severe Weather Warnings from Port Kembla to Eden) and/or advice provided by Agencies which may impact the area.	Council
<b>Phase 2 – Preparation</b>	
Identify the most appropriate emergency coastal protection works including access and location. For Sunshine Bay this is considered to be toe protection using sand containers.	Council
Prepare an environment impact assessment for emergency coastal protection works and gain necessary approvals from state agencies.	Council
Maintain a stockpile of sand containers for the purpose of erosion protection works. These will be stored at the nearest Council Depot.  Sand containers made of geotextile fabric or woven polypropylene fabric (not hessian) with maximum volume of 0.75m <sup>3</sup> should be used (DECCW, 2011). It is recommended that a container volume of not less than 0.3m <sup>3</sup> be used.  Sand can be imported to the site from a lawfully approved source. Imported sand should have a grain size (D50) of at least 0.2mm and no greater than 0.25mm.	Council
Maintain the ability to mobilise required plant and equipment at short notice.	Council
Develop an operations procedure to guide Council's response to coastal emergency events (including resourcing, internal training, testing and periodic review).	Council
Maintain up-to-date personal contact details for key Council staff involved in coordinating actions under this CZEAS and individuals Council may need advice from, such as DPE staff, or to integrate with personnel from other emergency sectors.	Council
Private property owners at risk from coastal erosion can submit a Development Application to Council for the implementation of emergency coastal protection works on their land and ensuring Part 5 Section 27 is satisfied. The works on private property cannot be undertaken until the erosion scarp has reached the trigger line shown on <b>Figure 5-7</b> (approximately 8m from property boundaries).	Private property owners
<b>Phase 3 – Response</b>	

Action	Responsibility
Implement the communication protocol in conjunction with the combat agency (NSW SES) to advise landholders, residents, public authorities and other organisations that a coastal emergency is likely or is occurring and that actions in this CZEAS are to be implemented.	Council and NSW SES
Alert residents if risk level is high and if any emergency management actions are being implemented.	NSW SES
Evacuate residents if necessary.	NSW SES
Alert land managers about access requirements.	Council
Erect temporary signage of dangers or closure to the beach.	Council
Increase surveillance of coastal hazards at this location.	Council
Place appropriate equipment on stand-by.	Council
<p>Dune toe protection works should be undertaken prior to dangerous ocean conditions developing, if the following triggers are reached:</p> <ul style="list-style-type: none"> <li>• East Coast Low predicted</li> <li>• Erosion scarp is at trigger line (<b>Figure 5-7</b>)</li> </ul> <p>The protection structure will be temporary and constructed as a single stack of containers along the erosion scarp to a maximum height of 1.5m from the toe of the escarpment (DECCW, 2011). Approximately 25 containers are required for every 10m of structure length, with the total number required dependant on the length of shoreline requiring immediate protection and the number of containers that can be installed in the time available. Emergency protection would prioritise sections of the shoreline most exposed at the time and remain within the area specified on <b>Figure 5-7</b>.</p> <p>Plant and equipment should access the works area via <b>Beach Road</b> avoiding disturbance to surrounding areas, in particular to any dune vegetation.</p>	Council
<p>Where an approved Development Application exists, dune toe protection works on private property may be undertaken to protect private property prior to dangerous ocean conditions developing, if the following triggers are reached:</p> <ul style="list-style-type: none"> <li>• East Coast Low predicted and;</li> </ul> <p>Erosion scarp is at trigger line (<b>Figure 5-7</b>), located approximately 8m from property boundaries.</p>	Private property owners
<b>Phase 4 – Recovery</b>	
Inspect the beach, public assets and properties after damaging storm events and carry out works to ensure the area is safe, including general clean up and clearing of any exposed debris, before taking down signage or reopening the area.	Council
Beach scraping may be undertaken to restore public beach access following storm erosion and to assist beach recovery. The location and scale of beach scraping activities will depend on the damage caused by the event and will need to be determined at the time of the event. Beach scraping involves the relocation (by mechanical means) of sand from the intertidal zone to the upper beach or dune. The volumes practically able to be moved will not be sufficient to renourish the beach profile following a large erosion event, however, can be used to	Council

Action	Responsibility
<p>enhance the remaining dune and accelerate the natural process of dune re-building.</p> <p>The 'borrow' area should be restricted to within the intertidal zone with no greater than 0.5m depth removed from the beach profile between elevations of - 0.5mAHD and +1mAHD.</p> <p>The 'placement' area should be placed at the base of the erosion scarp at a slope of approximately 1 in 2. Placement volumes are likely to be approximately 10-15m<sup>3</sup>/m width of beach.</p>	
Erect permanent warning signs if necessary.	Council
Remove any sand containers within 90 days.	Council Private property owners
Monitor the condition, performance and impact of any coastal protection works or emergency coastal protection works.	Council
Restore access to beaches and headlands.	Council
Maintain temporary safety fencing and associated warning signage, as necessary.	Council
Issue clean-up orders under the <i>Local Government Act 1993</i> .	Council
Assess the structural integrity of unprotected assets affected by or damaged during the coastal emergency event. Geotechnical, structural and/or coastal engineering investigations may be required to understand residual risk following a coastal emergency event.	Council
Liaise with property owners to ensure any private and/or public structures do not pose a risk to the public.	Council
Undertake works to re-establish or enhance the natural protective features of the coast, such as dune shaping and revegetation.	Council
Issue orders under the <i>Local Government Act 1993</i> and/or the <i>Environmental Planning and Assessment Act 1979</i> when properties are deemed structurally unsafe or pose a risk to the public.	Council
Replenish any emergency materials and supplies for future emergency events.	Council
Critically review this CZEAS, communications protocol/plan and operational procedures to ensure they achieved their performance objectives. Amend if shortcomings or improvements are identified.	Council



Figure 5-7 Sunshine Bay Erosion Protection Works

## 5.10 Malua Bay

Malua Bay is subject to beach erosion and coastal inundation.

**Table 5-10** lists the response action plan for Malua Bay.

**Table 5-10 Coastal Emergency Actions for Malua Bay**

Action	Responsibility
<b>Phase 1 – Prevention</b>	
Provide advice to the community, landholders and the NSW SES about the potential for a coastal emergency event and the types of responses that are permitted and not permitted.	Council
Assess threats to life and property arising from a coastal emergency through the CMP process. Make the public aware of the hazards and risks through publication of the Eurobodalla Open Coast CMP and this CZEAS, and education campaigns.	NSW SES and Council
Council to monitor beach/dune condition and weather events such as warnings issued by the Bureau (i.e. Severe Weather Warnings from Port Kembla to Eden) and/or advice provided by Agencies which may impact the area.	Council
<b>Phase 2 – Preparation</b>	
Identify the most appropriate emergency coastal protection works including access and location. For Malua Bay this is considered to be toe protection using sand containers or sand nourishment via beach scraping if conditions/resources permit.	Council
Prepare an environment impact assessment for emergency coastal protection works and gain necessary approvals from state agencies.	Council
Maintain a stockpile of sand containers for the purpose of erosion protection works. These will be stored at the nearest Council Depot.  Sand containers made of geotextile fabric or woven polypropylene fabric (not hessian) with maximum volume of 0.75m <sup>3</sup> should be used (DECCW, 2011). It is recommended that a container volume of not less than 0.3m <sup>3</sup> be used.  Sand can be imported to the site from a lawfully approved source. Imported sand should have a grain size (D50) of at least 0.2mm and no greater than 0.25mm.	Council
Maintain the ability to mobilise required plant and equipment at short notice.	Council
Maintain the ability to mobilise required plant and equipment at short notice. This includes a bobcat, filling frame and sewing machine.	Council
Develop an operations procedure to guide Council's response to coastal emergency events (including resourcing, internal training, testing and periodic review).	Council

Action	Responsibility
Maintain up-to-date personal contact details for key Council staff involved in coordinating actions under this CZEAS and individuals Council may need advice from, such as DPE staff, or to integrate with personnel from other emergency sectors.	Council
<b>Phase 3 – Response</b>	
Implement the communication protocol in conjunction with the combat agency (NSW SES) to advise landholders, residents, public authorities and other organisations that a coastal emergency is likely or is occurring and that actions in this CZEAS are to be implemented.	Council and NSW SES
Alert residents if risk level is high and if any emergency management actions are being implemented.	NSW SES
Erect temporary signage of dangers or closure to the beach.	Council
Evacuate residents if necessary.	NSW SES
Alert land managers about access requirements.	Council
Increase surveillance of coastal hazards at this location.	Council
Place appropriate equipment on stand-by.	Council
<p>Dune toe protection works should be undertaken prior to dangerous ocean conditions developing, if the following triggers are reached:</p> <ul style="list-style-type: none"> <li>• East Coast Low predicted</li> <li>• Erosion scarp is at trigger line (<b>Figure 5-8</b>)</li> </ul> <p>The protection structure will be temporary and constructed as a single stack of containers along the erosion scarp to a maximum height of 1.5m from the toe of the escarpment (DECCW, 2011). Approximately 25 containers are required for every 10m of structure length, with the total number required dependant on the length of shoreline requiring immediate protection and the number of containers that can be installed in the time available. Emergency protection would prioritise sections of the shoreline most exposed at the time and remain within the area specified on <b>Figure 5-8</b>.</p> <p>Beach scraping as a form of beach nourishment, could also be undertaken if time, resource and event magnitude permit. Determination of beach scraping location will involve consultation with relevant NSW government agencies as per the communication protocol.</p> <p>Beach scraping involves the relocation (by mechanical means) of sand from the intertidal zone to the upper beach or dune. The volumes practically able to be moved will not be generally sufficient to renourish the beach profile, however, can be used to enhance the remaining dune, provide buffer to the asset and accelerate the natural process of dune re-building.</p> <p>The ‘borrow’ area should be restricted to within the intertidal zone with no greater than 0.3m depth removed from the beach profile between elevations of -0.5mAHD and +1mAHD.</p>	Council



Action	Responsibility
<p>The 'placement' area should be placed at the base of the asset at a slope of approximately 1 in 7. Placement volumes are likely to be approximately 15-20m<sup>3</sup>/m width of beach. Ideally a small lip can be left to minimise sand blowing over the top of foreshore, and/or other considerations such as use of jute mesh and plantings on the landward margin of the nourishment if appropriate can increase stability.</p> <p>The sand scraping area is shown on <b>Figure 5-8</b>.</p> <p>Plant and equipment should access the area to be sandbagged via <b>George Bass Drive or Kuppa Avenue</b>, avoiding disturbance to surrounding areas, in particular to any dune vegetation.</p>	
Close affected Council managed roads, such as Kuppa Avenue, or liaise with road owners to enable closure.	Council
<b>Phase 4 – Recovery</b>	
Inspect the beach, public assets and properties after damaging storm events and carry out works to ensure the area is safe, including general clean up and clearing of any exposed debris, before taking down signage or reopening the area.	Council
<p>Beach scraping may be undertaken if required to restore public beach access following storm erosion and to assist beach recovery. The location and scale of beach scraping activities will depend on the damage caused by the event and will need to be determined at the time of the event. Beach scraping involves the relocation (by mechanical means) of sand from the intertidal zone to the upper beach or dune. The volumes practically able to be moved will not be sufficient to renourish the beach profile following a large erosion event, however, can be used to enhance the remaining dune and accelerate the natural process of dune re-building.</p> <p>The 'borrow' area should be restricted to within the intertidal zone with no greater than 0.5m depth removed from the beach profile between elevations of -0.5mAHD and +1mAHD.</p> <p>The 'placement' area should be placed at the base of the erosion scarp at a slope of approximately 1 in 7. Placement volumes are likely to be approximately 10-15m<sup>3</sup>/m width of beach.</p>	Council
Erect permanent warning signs if necessary.	Council
Remove any sand containers within 90 days.	Council
Monitor the condition, performance and impact of any coastal protection works or emergency coastal protection works.	Council
Restore access to beaches and headlands.	Council
Maintain temporary safety fencing and associated warning signage, as necessary.	Council
Issue clean-up orders under the <i>Local Government Act 1993</i> .	Council
Assess the structural integrity of unprotected assets affected by or damaged during the coastal emergency event. Geotechnical, structural and/or coastal engineering investigations may be required to understand residual risk following a coastal emergency event.	Council

Action	Responsibility
Liaise with property owners to ensure any private and/or public structures do not pose a risk to the public.	Council
Undertake works to re-establish or enhance the natural protective features of the coast, such as dune shaping and revegetation.	Council
Issue orders under the <i>Local Government Act 1993</i> and/or the <i>Environmental Planning and Assessment Act 1979</i> when properties are deemed structurally unsafe or pose a risk to the public.	Council
Replenish any emergency materials and supplies for future emergency events.	Council
Critically review this CZEAS, communications protocol/plan and operational procedures to ensure they achieved their performance objectives. Amend if shortcomings or improvements are identified.	Council





Figure 5-8 Malua Bay Erosion Protection Works

### 5.11 Guerilla Bay

Guerilla Bay is subject to beach erosion and coastal inundation.

**Table 5-11** lists the response action plan for Guerilla Bay.

**Table 5-11 Coastal Emergency Actions for Guerilla Bay**

Action	Responsibility
<b>Phase 1 – Prevention</b>	
Provide advice to the community, landholders and the NSW SES about the potential for a coastal emergency event and the types of responses that are permitted and not permitted.	Council
Assess threats to life and property arising from a coastal emergency through the CMP process. Make the public aware of the hazards and risks through publication of the Eurobodalla Open Coast CMP and this CZEAS, and education campaigns.	NSW SES and Council
Council to monitor beach/dune condition and weather events such as warnings issued by the Bureau (i.e. Severe Weather Warnings from Port Kembla to Eden) and/or advice provided by Agencies which may impact the area.	Council
<b>Phase 2 – Preparation</b>	
Identify the most appropriate emergency coastal protection works including access and location. For Guerilla Bay this is considered to be severe storm warnings.	Council
Maintain up-to-date personal contact details for key Council staff involved in coordinating actions under this CZEAS and individuals Council may need advice from, such as DPE staff, or to integrate with personnel from other emergency sectors.	Council
<b>Phase 3 – Response</b>	
Implement the communication protocol in conjunction with the combat agency (NSW SES) to advise landholders, residents, public authorities and other organisations that a coastal emergency is likely or is occurring and that actions in this CZEAS are to be implemented.	Council and NSW SES
Alert residents if risk level is high and if any emergency management actions are being implemented.	NSW SES
Erect temporary signage of dangers or closure to the beach.	Council
Increase surveillance of coastal hazards at this location.	Council
<b>Phase 4 – Recovery</b>	
Inspect the beach, public assets and properties after damaging storm events and carry out works to ensure the area is safe, including general clean up and clearing of any exposed debris, before taking down signage or reopening the area.	Council
Beach scraping may be undertaken to restore public beach access following storm erosion and to assist beach recovery. The location and scale of beach scraping activities will depend on the damage caused by the event and will need to be determined at the time of the event. Beach scraping involves the relocation (by mechanical means) of sand from the intertidal zone to the upper beach or dune. The volumes practically able to be moved will not be sufficient to	Council

Action	Responsibility
<p>renourish the beach profile following a large erosion event, however, can be used to enhance the remaining dune and accelerate the natural process of dune re-building.</p> <p>The 'borrow' area should be restricted to within the intertidal zone with no greater than 0.5m depth removed from the beach profile between elevations of -0.5mAHD and +1mAHD.</p> <p>The 'placement' area should be placed at the base of the erosion scarp at a slope of approximately 1 in 2. Placement volumes are likely to be approximately 10-15m<sup>3</sup>/m width of beach.</p>	
Erect permanent warning signs if necessary.	Council
Restore access to beaches and headlands.	Council
Maintain temporary safety fencing and associated warning signage, as necessary.	Council
Issue clean-up orders under the <i>Local Government Act 1993</i> .	Council
Assess the structural integrity of unprotected assets affected by or damaged during the coastal emergency event. Geotechnical, structural and/or coastal engineering investigations may be required to understand residual risk following a coastal emergency event.	Council
Liaise with property owners to ensure any private and/or public structures do not pose a risk to the public.	Council
Undertake works to re-establish or enhance the natural protective features of the coast, such as dune shaping and revegetation.	Council
Issue orders under the <i>Local Government Act 1993</i> and/or the <i>Environmental Planning and Assessment Act 1979</i> when properties are deemed structurally unsafe or pose a risk to the public.	Council
Critically review this CZEAS, communications protocol/plan and operational procedures to ensure they achieved their performance objectives. Amend if shortcomings or improvements are identified.	Council

## 5.12 Barlings Beach

Barlings Beach is subject to beach erosion and coastal inundation.

**Table 5-12** lists the response action plan for Barlings Beach.

**Table 5-12 Coastal Emergency Actions for Barlings Beach**

Action	Responsibility
<b>Phase 1 – Prevention</b>	
Provide advice to the community, landholders and the NSW SES about the potential for a coastal emergency event and the types of responses that are permitted and not permitted.	Council
Assess threats to life and property arising from a coastal emergency through the CMP process. Make the public aware of the hazards and risks through publication of the Eurobodalla Open Coast CMP and this CZEAS, and education campaigns.	NSW SES and Council
Council to monitor beach/dune condition and weather events such as warnings issued by the Bureau (i.e. Severe Weather Warnings from Port Kembla to Eden) and/or advice provided by Agencies which may impact the area.	Council
<b>Phase 2 – Preparation</b>	
Identify the most appropriate emergency coastal protection works including access and location. For Barlings Beach this is considered to be severe storm warnings.	Council
Maintain up-to-date personal contact details for key Council staff involved in coordinating actions under this CZEAS and individuals Council may need advice from, such as DPE staff, or to integrate with personnel from other emergency sectors.	Council
<b>Phase 3 – Response</b>	
Implement the communication protocol in conjunction with the combat agency (NSW SES) to advise landholders, residents, public authorities and other organisations that a coastal emergency is likely or is occurring and that actions in this CZEAS are to be implemented.	Council and NSW SES
Alert residents if risk level is high and if any emergency management actions are being implemented.	NSW SES
Erect temporary signage of dangers or closure to the beach.	Council
Increase surveillance of coastal hazards at this location.	Council
<b>Phase 4 – Recovery</b>	
Inspect the beach, public assets and properties after damaging storm events and carry out works to ensure the area is safe, including general clean up and clearing of any exposed debris, before taking down signage or reopening the area.	Council
Erect permanent warning signs if necessary.	Council
Beach scraping may be undertaken to restore public beach access following storm erosion and to assist beach recovery. The location and scale of beach scraping activities will depend on the damage caused by the event and will need to be determined at the time of the event. Beach scraping involves the relocation (by mechanical means) of sand from the intertidal zone to the upper	Council



Action	Responsibility
<p>beach or dune. The volumes practically able to be moved will not be sufficient to renourish the beach profile following a large erosion event, however, can be used to enhance the remaining dune and accelerate the natural process of dune re-building.</p> <p>The 'borrow' area should be restricted to within the intertidal zone with no greater than 0.5m depth removed from the beach profile between elevations of -0.5mAHD and +1mAHD.</p> <p>The 'placement' area should be placed at the base of the erosion scarp at a slope of approximately 1 in 2. Placement volumes are likely to be approximately 10-15m<sup>3</sup>/m width of beach.</p>	
Restore access to beaches and headlands.	Council
Maintain temporary safety fencing and associated warning signage, as necessary.	Council
Issue clean-up orders under the <i>Local Government Act 1993</i> .	Council
Liaise with property owners to ensure any private and/or public structures do not pose a risk to the public.	Council
Undertake works to re-establish or enhance the natural protective features of the coast, such as dune shaping and revegetation.	Council
Issue orders under the <i>Local Government Act 1993</i> and/or the <i>Environmental Planning and Assessment Act 1979</i> when properties are deemed structurally unsafe or pose a risk to the public.	Council
Critically review this CZEAS, communications protocol/plan and operational procedures to ensure they achieved their performance objectives. Amend if shortcomings or improvements are identified.	Council

### 5.13 Tomakin Cove

Tomakin Cove is subject to beach erosion.

**Table 5-13** lists the response actions specific to Tomakin Cove, including the abovementioned CMP option, if triggered by the event.

**Table 5-13 Coastal Emergency Actions for Tomakin Cove**

Action	Responsibility
<b>Phase 1 – Prevention</b>	
Provide advice to the community, landholders and the NSW SES about the potential for a coastal emergency event and the types of responses that are permitted and not permitted.	Council
Assess threats to life and property arising from a coastal emergency through the CMP process. Make the public aware of the hazards and risks through publication of the Eurobodalla Open Coast CMP and this CZEAS, and education campaigns.	NSW SES and Council
Council to monitor beach/dune condition and weather events such as warnings issued by the Bureau (i.e. Severe Weather Warnings from Port Kembla to Eden) and/or advice provided by Agencies which may impact the area.	Council
<b>Phase 2 – Preparation</b>	
Identify the most appropriate emergency coastal protection works including access and location. For Tomakin Cove this is considered to be severe storm warnings.	Council
Maintain up-to-date personal contact details for key Council staff involved in coordinating actions under this CZEAS and individuals Council may need advice from, such as DPE staff, or to integrate with personnel from other emergency sectors.	Council
<b>Phase 3 – Response</b>	
Implement the communication protocol in conjunction with the combat agency (NSW SES) to advise landholders, residents, public authorities and other organisations that a coastal emergency is likely or is occurring and that actions in this CZEAS are to be implemented.	Council and NSW SES
Alert residents if risk level is high and if any emergency management actions are being implemented.	NSW SES
Erect temporary signage of dangers or closure to the beach.	Council
Evacuate residents if necessary.	NSW SES
Alert land managers about access requirements.	Council
Increase surveillance of coastal hazards at this location.	Council
<b>Phase 4 – Recovery</b>	
Inspect the beach, public assets and properties after damaging storm events and carry out works to ensure the area is safe, including general clean up and clearing of any exposed debris, before taking down signage or reopening the area.	Council
Beach scraping may be undertaken if required to restore public beach access following storm erosion and to assist beach recovery. The location and scale of beach scraping activities will depend on the damage caused by the event and will	Council

Action	Responsibility
<p>need to be determined at the time of the event. Beach scraping involves the relocation (by mechanical means) of sand from the intertidal zone to the upper beach or dune. The volumes practically able to be moved will not be sufficient to renourish the beach profile following a large erosion event, however, can be used to enhance the remaining dune and accelerate the natural process of dune re-building.</p> <p>The 'borrow' area should be restricted to within the intertidal zone with no greater than 0.5m depth removed from the beach profile between elevations of - 0.5mAHD and +1mAHD.</p> <p>The 'placement' area should be placed at the base of the erosion scarp at a slope of approximately 1 in 5. Placement volumes are likely to be approximately 10-15m<sup>3</sup>/m width of beach.</p>	
Restore access to beaches and headlands.	Council
Maintain temporary safety fencing and associated warning signage, as necessary.	Council
Issue clean-up orders under the <i>Local Government Act 1993</i> .	Council
Assess the structural integrity of unprotected assets affected by or damaged during the coastal emergency event. Geotechnical, structural and/or coastal engineering investigations may be required to understand residual risk following a coastal emergency event.	Council
Liaise with property owners to ensure any private and/or public structures do not pose a risk to the public.	Council
Undertake works to re-establish or enhance the natural protective features of the coast, such as dune shaping and revegetation.	Council
Issue orders under the <i>Local Government Act 1993</i> and/or the <i>Environmental Planning and Assessment Act 1979</i> when properties are deemed structurally unsafe or pose a risk to the public.	Council
Replenish any emergency materials and supplies for future emergency events.	Council
Critically review this CZEAS, communications protocol/plan and operational procedures to ensure they achieved their performance objectives. Amend if shortcomings or improvements are identified.	Council



## 5.14 Broulee

Broulee is subject to beach erosion and coastal inundation.

**Table 5-14** lists the response action plan for Broulee.

**Table 5-14 Coastal Emergency Actions for Broulee**

Action	Responsibility
<b>Phase 1 – Prevention</b>	
Provide advice to the community, landholders and the NSW SES about the potential for a coastal emergency event and the types of responses that are permitted and not permitted.	Council
Assess threats to life and property arising from a coastal emergency through the CMP process. Make the public aware of the hazards and risks through publication of the Eurobodalla Open Coast CMP and this CZEAS, and education campaigns.	NSW SES and Council
Council to monitor beach/dune condition and weather events such as warnings issued by the Bureau (i.e. Severe Weather Warnings from Port Kembla to Eden) and/or advice provided by Agencies which may impact the area.	Council
<b>Phase 2 – Preparation</b>	
Identify the most appropriate emergency coastal protection works including access and location. For Broulee this is considered to be road closure, and evacuation of residents, as required.	Council
Maintain up-to-date personal contact details for key Council staff involved in coordinating actions under this CZEAS and individuals Council may need advice from, such as DPE staff, or to integrate with personnel from other emergency sectors.	Council
Private property owners at risk from coastal erosion can submit a Development Application to Council for the implementation of emergency coastal protection works on their land and ensuring Part 5 Section 27 is satisfied. The works on private property cannot be undertaken until the erosion scarp has reached the trigger line shown on <b>Figure 5-9</b> (approximately 12m from property boundaries).	Private property owners
<b>Phase 3 – Response</b>	
Implement the communication protocol in conjunction with the combat agency (NSW SES) to advise landholders, residents, public authorities and other organisations that a coastal emergency is likely or is occurring and that actions in this CZEAS are to be implemented.	Council and NSW SES
Alert residents if risk level is high and if any emergency management actions are being implemented.	NSW SES
Erect temporary signage of dangers or closure to the beach.	Council
Evacuate residents if necessary.	NSW SES
Increase surveillance of coastal hazards at this location.	Council
Close affected Council managed roads, such as Candlagan Drive, or liaise with road owners to enable closure.	Council

Action	Responsibility
Where an approved Development Application exists, dune toe protection works on private property may be undertaken to protect private property prior to dangerous ocean conditions developing, if the following triggers are reached: <ul style="list-style-type: none"> <li>East Coast Low predicted and;</li> </ul> Erosion scarp is at trigger line ( <b>Figure 5-9</b> ), located approximately 12m from property boundaries.	Private property owners
<b>Phase 4 – Recovery</b>	
Inspect the beach, public assets and properties after damaging storm events and carry out works to ensure the area is safe, including general clean up and clearing of any exposed debris, before taking down signage or reopening the area.	Council
Erect permanent warning signs if necessary.	Council
Remove any sand containers within 90 days.	Private property owners
Monitor the condition, performance and impact of any coastal protection works or emergency coastal protection works.	Council
Restore access to beaches and headlands.	Council
Maintain temporary safety fencing and associated warning signage, as necessary.	Council
Issue clean-up orders under the <i>Local Government Act 1993</i> .	Council
Assess the structural integrity of unprotected assets affected by or damaged during the coastal emergency event. Geotechnical, structural and/or coastal engineering investigations may be required to understand residual risk following a coastal emergency event.	Council
Liaise with property owners to ensure any private and/or public structures do not pose a risk to the public.	Council
Undertake works to re-establish or enhance the natural protective features of the coast, such as dune shaping and revegetation.	Council
Issue orders under the <i>Local Government Act 1993</i> and/or the <i>Environmental Planning and Assessment Act 1979</i> when properties are deemed structurally unsafe or pose a risk to the public.	Council
Replenish any emergency materials and supplies for future emergency events.	Council
Critically review this CZEAS, communications protocol/plan and operational procedures to ensure they achieved their performance objectives. Amend if shortcomings or improvements are identified.	Council



Figure 5-9 Broulee Erosion Protection Works

### 5.15 Aboriginal Cultural Sites

The Eurobodalla Coastline has significant Aboriginal cultural heritage sites. This includes extensive coastal middens, burial sites and artefacts and other cultural aspects and values that are of importance to the First Nations community. The coastal risks associated with beach erosion and cliff instability can impact these sites.

**Table 5-15** lists the response action plan for these locations.

**Table 5-15 Coastal Emergency Actions for Aboriginal Cultural Heritage Sites**

Action	Responsibility
<b>Phase 1 – Prevention</b>	
Work in partnership with the Aboriginal community, LALCS, DPE, NPWS and Heritage NSW to understand and provide advice to the community, landholders and the NSW SES about the potential for a coastal emergency event and the types of responses that are permitted and not permitted.	Council
Assess threats to cultural assets arising from a coastal emergency through the CMP process for both known and high potential locations.	Council
Council to monitor beach/dune condition and weather events such as warnings issued by the Bureau (i.e. Severe Weather Warnings from Port Kembla to Eden) and/or advice provided by Agencies which may impact the area.	Council
<b>Phase 2 – Preparation</b>	
Identify the most appropriate emergency coastal protection works including access and location. For known locations this is documented in the 'EASP Aboriginal Cultural Heritage Sites Confidential Report'. This report documents the location, appropriate emergency coastal works and trigger that has been developed in consultation with the Aboriginal community, LALCS, DPE, NPWS and Heritage NSW. For all high potential locations contained in <b>Figure 5-10</b> , the appropriate emergency coastal protection work is considered to be site protection using sand containers or beach nourishment.	Council
Prepare an environment impact assessment for emergency coastal protection works and gain necessary approvals from state agencies.	Council
Maintain a stockpile of sand containers for the purpose of erosion protection works. These will be stored at the nearest Council Depot.  Sand containers made of geotextile fabric or woven polypropylene fabric (not hessian) with maximum volume of 0.75m <sup>3</sup> should be used (DECCW, 2011). It is recommended that a container volume of not less than 0.3m <sup>3</sup> be used.  Sand can be imported to the site from a lawfully approved source. Imported sand should have a grain size (D50) of at least 0.2mm and no greater than 0.25mm. This applies for both sand containers and beach nourishment.  For beach scraping as a form of beach nourishment, the location and scale of beach scraping activities will depend on the determined buffer required in anticipation of the event and asset at risk. This will involve the Aboriginal community and relevant NSW government agencies as per the communication protocol.	Council
Maintain the ability to mobilise required plant and equipment at short notice.	Council

Action	Responsibility
Develop an operations procedure to guide Council's response to coastal emergency events (including resourcing, internal training, testing and periodic review).	Council
Maintain up-to-date personal contact details for key Council staff involved in coordinating actions under this CZEAS and individuals Council may need advice from, such as LALCs, Heritage NSW, DPE, NPWS staff, or to integrate with personnel from other emergency sectors.	Council
<b>Phase 3 – Response</b>	
Implement the communication protocol in conjunction with the combat agency (NSW SES) to discuss actions with the Aboriginal Community, LALCs, Heritage NSW, DPE, NPWS, landholders, residents, public authorities and other organisations that a coastal emergency is likely or is occurring and that actions in this CZEAS are to be implemented.	Council and NSW SES
If any emergency management actions are being implemented, alert Aboriginal community, LALCs, Heritage NSW, DPE, NPWS, landholders, residents, public authorities	Council
Erect temporary signage of dangers or closure to the beach.	Council
Alert land managers about access requirements.	Council
Increase surveillance of coastal hazards at this location.	Council
Place appropriate equipment on stand-by.	Council
<p>Protection works should be undertaken prior to dangerous ocean conditions developing, if the following triggers are reached:</p> <ul style="list-style-type: none"> <li>• East Coast Low predicted and</li> <li>• Existing erosion scarp within nominated distance identified 'EASP Aboriginal Cultural Heritage Sites Confidential Report'</li> <li>• Or for high potential locations, exposure of Aboriginal cultural site occurs and Aboriginal community and/or NSW Government Agencies have discussed, and emergency protection works are required.</li> </ul> <p>The emergency protection structure will be temporary and constructed as a stack of containers to a maximum height of 1.5m from the toe of the escarpment (DECCW, 2011). Approximately 25 containers are required for every 10m of structure length, with the total number required dependant on the length of shoreline requiring immediate protection and the number of containers that can be installed in the time available. Emergency protection would prioritise sections of the shoreline and assets most exposed at the time.</p> <p>For beach scraping as a form of beach nourishment, the location and scale of beach scraping activities will depend on the determined buffer required in anticipation of the event and asset at risk. This will involve the Aboriginal community and relevant NSW government agencies as per the communication protocol.</p> <p>Beach scraping involves the relocation (by mechanical means) of sand from the intertidal zone to the upper beach or dune. The volumes practically able to be</p>	Council

Action	Responsibility
<p>moved will not be generally sufficient to renourish the beach profile, however, can be used to enhance the remaining dune, provide buffer to the asset and accelerate the natural process of dune re-building.</p> <p>The 'borrow' area should be restricted to within the intertidal zone with no greater than 0.5m depth removed from the beach profile between elevations of - 0.5mAHD and +1mAHD.</p> <p>The 'placement' area should be placed at the base of the asset at a slope of approximately 1 in 7. Placement volumes are likely to be approximately 10-20m<sup>3</sup>/m width of beach. Ideally a small lip can be left to minimise sand blowing over the top of foreshore, and/or other considerations such as use of jute mesh and plantings on the landward margin of the nourishment if appropriate can increase stability.</p> <p>Plant and equipment for undertaking the works should avoid disturbance to surrounding areas, in particular damage to aboriginal cultural assets and existing dune and cliff vegetation.</p>	
<b>Phase 4 – Recovery</b>	
Inspect the beach and cultural sites after damaging storm events and carry out works to ensure the area is safe, including general clean up and clearing of any exposed debris, before taking down signage or reopening the area.	Council
Beach scraping may be undertaken if required to restore public beach access following storm erosion and to assist beach recovery.	Council
Erect permanent warning signs if necessary.	Council
Remove any sand containers within 90 days.	Council
Monitor the condition, performance and impact of any coastal protection works or emergency coastal protection works.	Council
Restore access to beaches and headlands.	Council
Maintain temporary safety fencing and associated warning signage, as necessary.	Council
Replenish any emergency materials and supplies for future emergency events.	Council
Critically review this CZEAS, communications protocol/plan and operational procedures to ensure they achieved their performance objectives. Amend if shortcomings or improvements are identified.	Council



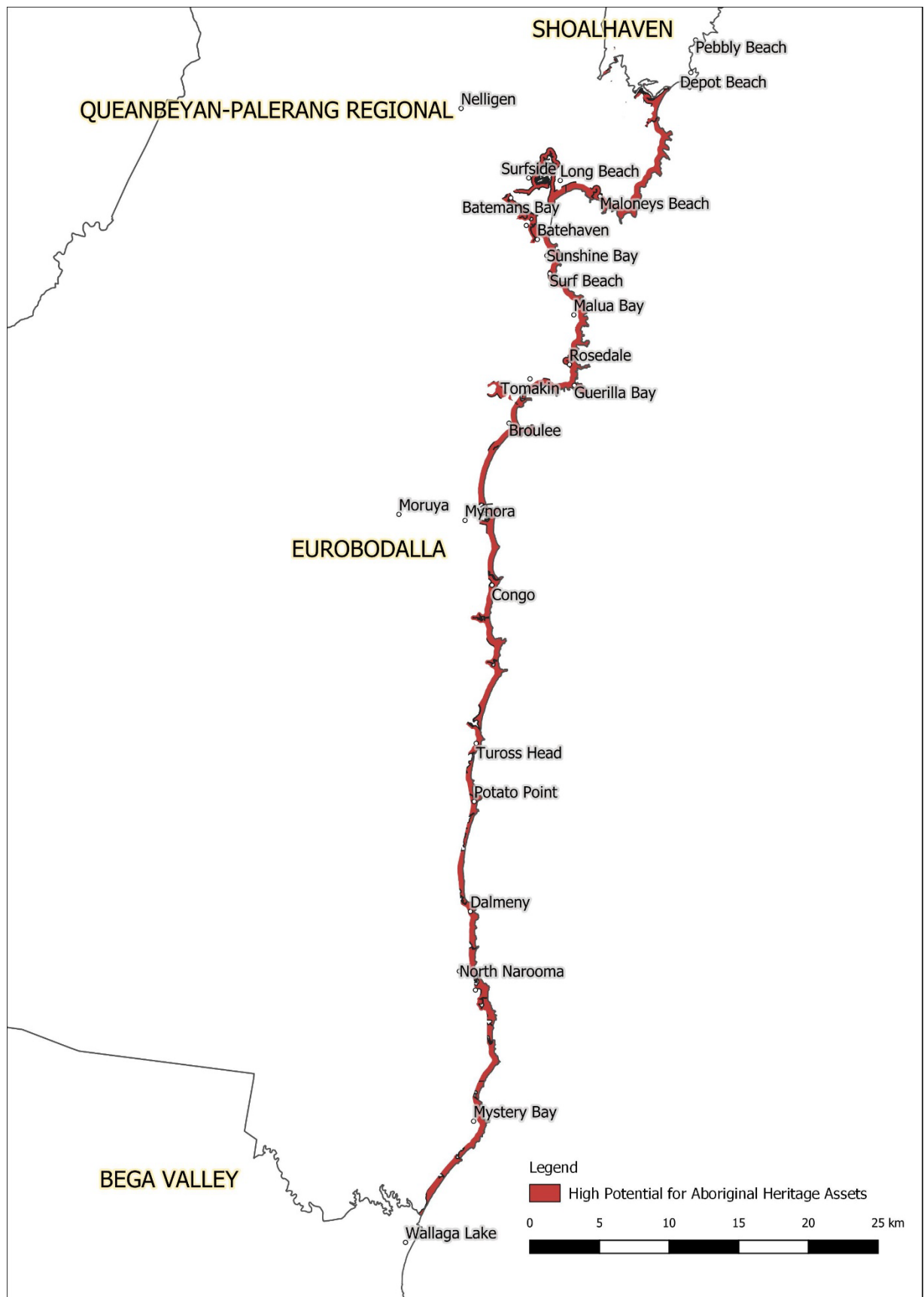


Figure 5-10 High Potential Locations for Aboriginal Heritage Assets



## 6 Other Emergency Response Details

### 6.1 Emergency Coordination Centres

The key coordination centre will be the Eurobodalla Shire Council Administration Centre. Alternative centres may include the central hubs for emergency response services, such as NSW SES or RFS hubs in Moruya.

### 6.2 Approval Pathways

Information on approval pathways for coastal protection works and emergency coastal protection works are set out in the Coastal protection works fact sheet (DPE, 2018).

A public authority, such as Council, can carry out coastal protection works without development consent if the works are (DPE, 2018):

- Identified in the relevant certified CMP
- Beach nourishment
- Placing sandbags for not more than 90 days
- Routine maintenance works or repairs to existing coastal protection works.

A public authority, such as Council, can conduct emergency coastal protection works, as exempt development, where these works are in accordance with a CZEAS (this document) prepared by Council and included in the relevant certified CMP (DPE, 2018).

The fact sheet (DPE, 2018) notes that other approvals may still be required under different legislation.

### 6.3 Recording Coastal Emergency Impacts and Emergency Response Actions

After a coastal emergency event, Council will record the following details in a database in order to maintain effective emergency actions and understand any changes in coastal conditions over time:

- Details of any beach erosion, coastal inundation, landslips or cliff instability and the weather conditions under which they were caused, including photographs, locations of assets and infrastructure that were damaged by the storm and details of the extent of damage
- Details of any emergency coastal protection works undertaken, including the cost and the installation date
- Details of any survey of the beach levels and other features that may be considered required to provide a greater understanding of the hazard or the event
- Review and update (if required) this CZEAS, in particular the Emergency Action Plan, in consultation with the NSW SES and any other relevant agencies.

The records of storm events, extent of damage and coastal protection works will assist Council to understand how climate change and/or extreme events are affecting its coastline and to better plan for retreat of some assets over time, to adapt to the effects of sea level rise and other factors such as increasing storm frequency and intensity.

## 7 Communication Protocol for Coastal Emergency Events

*This section outlines the communications required before, during and after a coastal emergency event to inform the public and potentially affected property owners about their responsibilities during a coastal emergency and what actions they are and are not permitted to undertake.*

Eurobodalla Shire Council will provide information about anticipated coastal emergency events to residents near the hazard zones and community representatives from the Surf Life Saving Clubs, holiday park and nearby businesses through the following mechanisms:

- Provide routine emergency management briefings to Council staff to communicate the strategy outlined in this CZEAS, including coastal emergency event triggers, locations at risk, roles and responsibilities and the emergency response actions, including ensuring they have the capacity to respond
- Provide emergency management briefings to the public as needed, in particular affected landholders, to communicate the strategy outlined in this CZEAS, including coastal emergency event triggers, locations at risk, roles and responsibilities and the emergency response actions, including what actions a landholder may need to take and any assistance that may be available to them
- Provide emergency management information (in the form of signage and brochures) at local community centres and at Council offices
- Coordinate with the NSW SES to issue safety advice to landowners and the community of the likelihood of an impending emergency that would initiate actions under this CZEAS and ensure residents are aware of urgent hazards during emergency events, and provide assistance with door-to-door communication as necessary
- Communicate with relevant NSW State Government agencies if sand nourishment is being pursued.
- For Aboriginal cultural sites identified in 5.15 above, consult with the Aboriginal community, LALCS, DPE, NPWS and Heritage NSW prior to any works being undertaken.
- Place barriers and signage at beach accessways and roads that are closed due to coastal erosion and/or coastal inundation impacts
- Provide up to date information on Council's website regarding beach accessway/area closures and road closures and re-openings.

## 8 References

- ACT Geotechnical Engineers Pty Ltd (2012). *Geotechnical Slope Instability Risk Assessment*. Prepared on behalf of Umwelt Australia Pty Ltd as an input to the Coastal Zone Management Plan.
- BoM (2022) Severe Weather Warning Services. Australian Government Bureau of Meteorology. Available online: [http://www.bom.gov.au/weather-services/severe-weather-knowledge-centre/WarningsInformation\\_SW\\_SWW.shtml](http://www.bom.gov.au/weather-services/severe-weather-knowledge-centre/WarningsInformation_SW_SWW.shtml).
- DECCW (2011) *Guide to the Statutory Requirements for Emergency Coastal Protection Works*. March 2011. Repealed.
- DPE (2018) *Coastal Management State Environmental Planning Policy – Fact Sheet 3: Coastal Protection Works*. April 2018.
- DPIE (2019). *Guideline for preparing a coastal zone emergency action subplan*.
- ESC (2017). *Coastal Zone Management Plan Wharf Road North Batemans Bay*.
- ESC (2019). *Eurobodalla Local Emergency Management Plan 2019*.
- Australian Geomechanics Society (2007). *Australian GeoGuide LR2 (Landslides)*. Australian Geomechanics, Vol 42 No 1 Page 162.
- Illawarra South Coast Regional Emergency Management Committee (2019). *Illawarra South Coast Regional Emergency Management Plan*. February 2019.
- NSW SES (2013) *Eurobodalla Shire Local Flood Plan*. A Sub-Plan of the Eurobodalla Shire Local Emergency Management Plan.
- NSW SES (2018a). *New South Wales State Storm Plan*. A Sub Plan of the State Emergency Management Plan. Endorsed by the State Emergency Management Committee, 7 June 2018.
- NSW SES (2018b). *New South Wales State Tsunami Plan*. A Sub Plan of the State Emergency Management Plan. Endorsed by the State Emergency Management Committee, 13 September 2018.
- NSW SES (2021). *New South Wales State Flood Plan*. A Sub Plan of the State Emergency Management Plan. Endorsed by the State Emergency Management Committee, 2 December 2021.
- OEH (2018). *Coastal Management Manual*.
- Rhelm (2021). *Eurobodalla Open Coast Coastal Management Program Stage 1 – Scoping Study*. Prepared for Eurobodalla Shire Council. Final report, 27 July 2021.
- Rhelm (2022a). *Eurobodalla Open Coast Coastal Management Program Stage 2 – Vulnerability Assessments*. Prepared for Eurobodalla Shire Council. Final report, 21 January 2022.
- Rhelm (2022b). *Eurobodalla Open Coast Coastal Management Program*. Prepared for Eurobodalla Shire Council. Draft report for Public Exhibition, May 2022.
- SMEC (2010). *Eurobodalla Shire Coastal Hazards Scoping Study*. Report prepared for Eurobodalla Shire Council.

Umwelt (2016) *Emergency Action Subplan for the Wharf Road Coastal Erosion 'Hot Spot' Batemans Bay, NSW*. Prepared for Eurobodalla Shire Council. Amended November 2016.

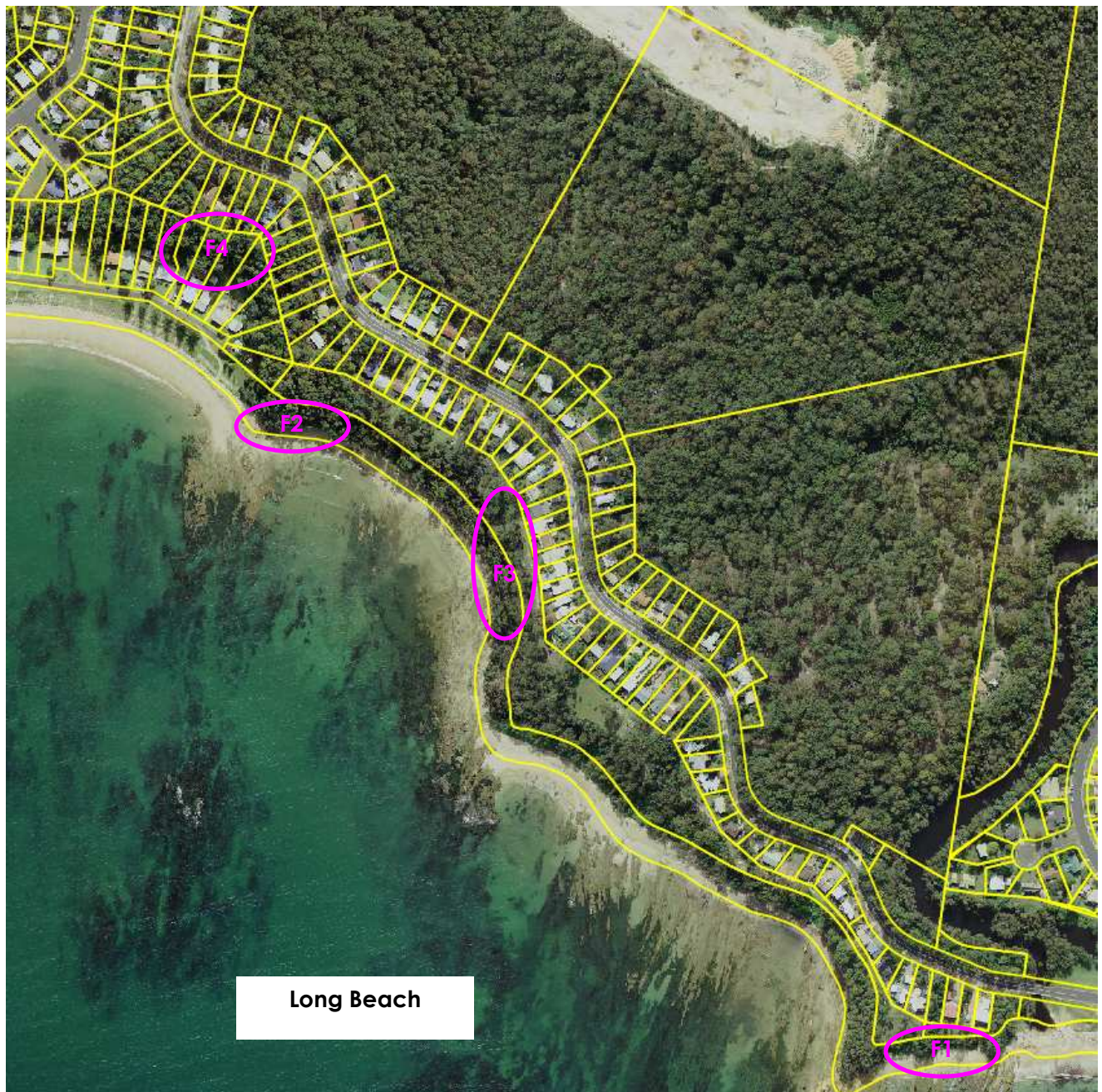
WRL (2017). *Eurobodalla Coastal Hazard Assessment*. WRL Technical Report 2017/09. Report prepared for Eurobodalla Shire Council. October.



## Appendix A

### Cliff Instability Maps



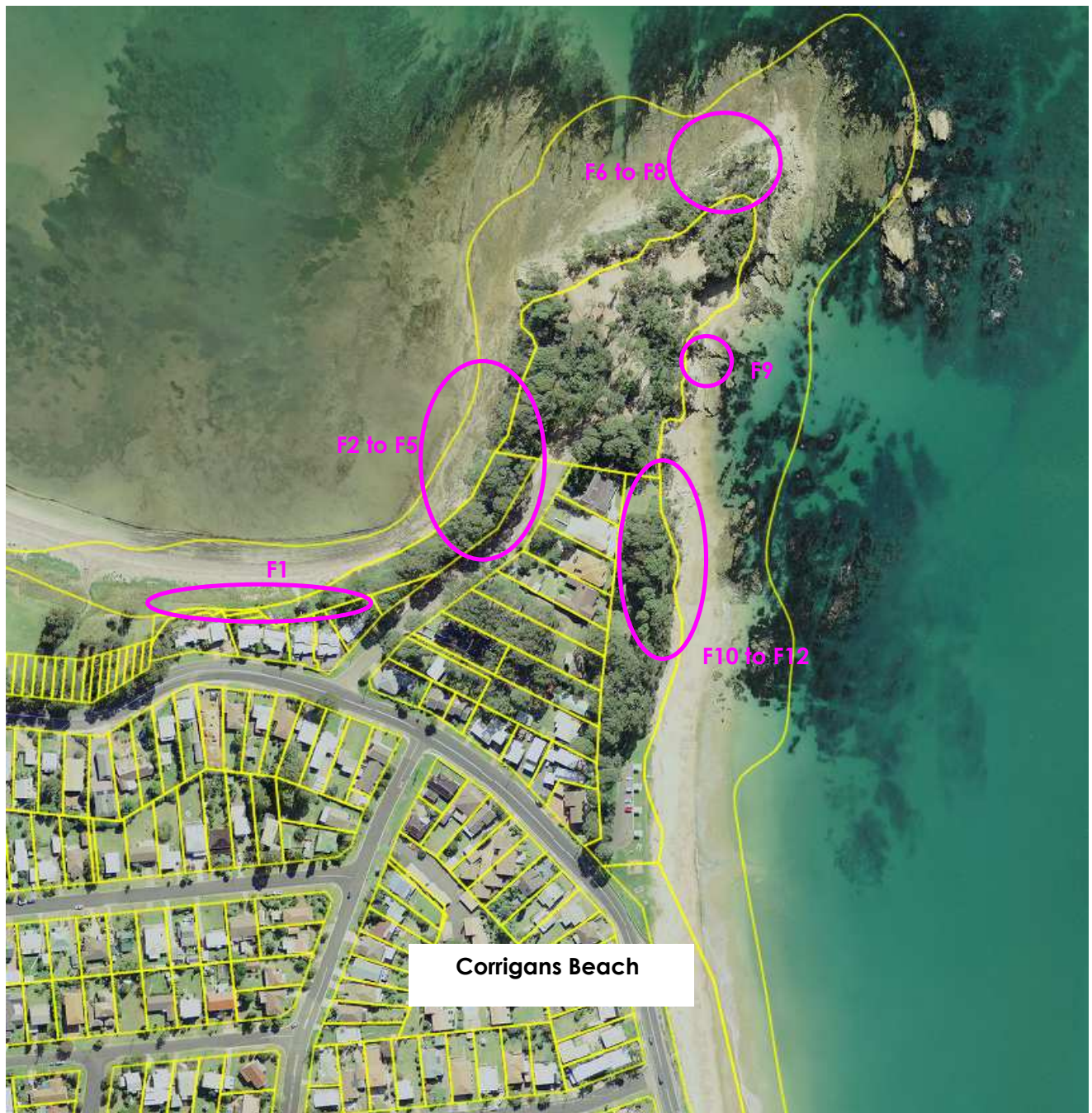


#### **LEGEND**

- F1: Feature 1 - Differential Erosion of Phyllite Beds
- F2: Feature 2 - Undercut Slope Top
- F3: Feature 3 - Dwellings near Slope Top
- F4: Feature 4 - Slope at Rear of Dwellings in Bay Road

### **AERIAL PHOTOGRAPH & LOCATION OF CLIFF INSTABILITY FEATURES - LONG BEACH**





#### **LEGEND**

- F1: Feature 1 - Dwellings facing Beach Road at SW Headland End
- F2: Feature 2 - Soil Erosion near Slope Base
- F3: Feature 3 - Soil & Weathered Rock Erosion of Steep Slope
- F4: Feature 4 - Erosion of Slope with Vertical Base
- F5: Feature 5 - Erosion of Headland Slope
- F6: Feature 6 - Cave at Cliff Base
- F7: Feature 7 - Fretting Boulders from Cliff Face
- F8: Feature 8 - Erosion of Headland Below Proposed Viewing Platform
- F9: Feature 9 - Cave at Cliff Base of Headland Slope
- F10: Feature 10 - Boulders at Cliff Base
- F11: Feature 11 - Failure on Clay Infilled Joint
- F12: Feature 12 - Rock Falls from Cliff Face

### **AERIAL PHOTOGRAPH & LOCATION OF CLIFF INSTABILITY FEATURES – CORRIGANS BEACH**





#### **LEGEND**

- F1: Feature 1 - Cave at Cliff Base
- F2: Feature 2 - Erosion of Headland Slope
- F3: Feature 3 - Erosion near Slope Top
- F4: Feature 4 - Eroded & Undercut Area Mid Slope
- F5: Feature 5 - Dislodged Boulders
- F6: Feature 6 - Rockfall
- F7: Feature 7 - Undercut Upper Cliff

### **AERIAL PHOTOGRAPH & LOCATION OF CLIFF INSTABILITY FEATURES – CASEYS BEACH**



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