

4 EMERGENCY RESPONSE PLANNING

4.1 Intent of Emergency Response Plan

As outlined in Section 2, there are a number of areas where during severe storms it is possible that erosion and oceanic inundation may place public and private property, facilities and potentially life at various levels of risk. The Coastline Management Plan will put in place strategies for dealing with this threat. Until such strategies are implemented, the need for emergency action may arise during a major storm event.

Recent storm events in other areas have highlighted the potential need for emergency works and difficulties which can arise without a clear understanding of the processes, responsibilities and consequences of certain actions. It is therefore imperative to have appropriate procedures, strategies and actions in place to deal with such situations. This will be in the form of a Coastal Erosion and Inundation Emergency Action Plan (CEIEAP).

The intent of the CEIEAP is to have in place appropriate actions, measures and responses for dealing with emergency issues associated with the impacts prior to, during and following a coastal storm. It is to support those faced with dealing with emergencies. In particular, it is to make provision for actions carried out under the Stage Emergency and Rescue Management Act, 1989 including consideration of:

- public education;
- storm warning; and
- evacuation;

as well as works deemed necessary for the protection of property and infrastructure affected by the storm.

The CEIEAP is also intended to:

- clearly identify responsibilities, and
- ensure needed resources are identified and available.

Furthermore, it is to ensure that emergency actions are:

- compatible with the coastal environment as per the objectives of the NSW Coastal Policy and the Coastal Protection Regulation 2004;
- in accordance with all requisite approvals; and
- consistent with and not prejudicial to potential provisions of the future Coastline Management Plan.

It is recommended that the Coastal Erosion and Inundation Emergency Action Plan (CEIEAP) be included as a local sub-plan in the overall Ballina Shire Local Disaster Plan (DISPLAN). It should also be noted that the object of the Coastal Protection Regulation 2004 is to minimise any adverse environmental consequences resulting from the impact of coastal processes on and from works or

development proposed for the offshore marine waters of the state. The Regulation (under provisions of the Coastal Protection Act 1979) requires the concurrence of the Minister (for Natural Resources) prior to undertaking any works or development seaward of the open coast mean high water mark.

4.2 Key Stakeholders

The key stakeholders responsible for preparation and implementation of the Plan include:

- State Emergency Service (SES);
- NSW Police;
- Ballina Shire Council (BSC); and
- Department of Infrastructure, Planning and Natural Resources (DIPNR), with co-ordination being under the auspices of the Ballina Shire Coastline Management Committee.

As well as local residents, other organisations likely to be involved with various activities include:

- Bureau of Meteorology (BOM);
- Disaster Welfare Service (DWS);
- Department of Community Services (DOCS);
- Department of Lands;
- Rural Fire Service;
- Country Energy; and
- Telstra/Optus.

4.3 Key Issues

The key emergency response issues are discussed in Section 2 and summarised in Table 4.1.

Table 4-1 Summary of Short Term Threats

Hazard	Threat	Probability	Consequences
Lennox Head Southern Section (Existing Beach Management Works)			
Failure of existing seawalls	Erosion threat to property behind (approx. 15 properties)	Very Low	High (threat to close buildings)
Wave runup/overtopping of wall	Limited overwash and inundation of low floors (approx. 15 properties)	Very Low	Low (inundation of low floors)
Erosion/overtopping of constructed dune	Inundation of swale behind and adjacent low floors (approx. 14 properties)	Low	Low (inundation of low floors)
Lennox Head Central Section			
Erosion and failure of old seawall	Erosion threat to Pacific Parade (approx. 4km at southern end)	Low	High (loss of beach front access)
Erosion and failure of old seawall	Erosion threat to properties between Foster & Byron Sts (approx. 12 properties)	Very Low	High (threat to building)
Wave runup/overtopping of dune/wall	Limited overwash and inundation of low floors (approx. 12 properties)	Low	Low (inundation of low floors)
Lennox Head Northern Section			
Erosion and failure of old seawall	Erosion threat to Surf Club Building and Car Park	Very Low	High (loss of building)
Boulder Beach/Skennars Head			
Wave runup/overtopping of beach ridge	Limited overwash and inundation threat to one property	Low	Low (inundation of low floors)

While certain erosion and inundation threats exist, the risks and probability of occurrence are generally low to very low. However, should the threat of erosion eventuate, the consequences are generally high in relation to the potential loss or damage to structures or facilities.

The most severe problems of coastal erosion and inundation occur as a result of oceanic storm conditions associated with the passage of cyclones and temperate-zone low-pressure systems. These storms may cause temporary sea level rises with large associated waves. The worst erosion is likely when severe weather conditions occur in conjunction with onshore winds and high spring tides. This was the case in June/July 1967 and February 1974 when coastal storms occurred in conjunction with very high spring tides.

The water level is often a critical factor affecting the extent of erosion and inundation by governing the level at which waves attack the dunes. Severe wave attack in conjunction with moderate or low tide levels may not result in significant erosion. Conversely, smaller storm waves occurring at the time of high spring tides may result in substantial erosion. The worst erosion is likely when large waves coincide with high spring tide levels.

Storm activity which causes coastal erosion and inundation is often accompanied by heavy regional rainfall and local flooding. As such, emergency resources and access may be restricted.

The area at greatest risk is Pacific Parade immediately north of Lennox Village (i.e. north of Bryon Street). The buried seawall is likely to be exposed first. Depending on the severity of the storm and the status of the wall, it may be sufficient to prevent further recession. However, failure of the wall would first threaten Pacific Parade. Only in extreme conditions is it likely that erosion would then reach private property behind. In such conditions, it may not be feasible to either identify that the wall is likely to fail or take any ameliorative action.

In extreme conditions, erosion may also threaten the Surf Club building at Lake Ainsworth and the car park to the south if the buried seawall fails. It is understood that the Beach Management Works at the southern end of Lennox Head have been designed to withstand severe storm conditions and, on this basis, there would be only a very low risk of failure with subsequent threat to property behind.

Oceanic inundation in the above areas is most likely to be in the form of low overland flow from episodic and infrequent wave overtopping which may occur for a few hours around high tide. Inundation to a substantial depth is only likely to occur in the swale behind the constructed dune at the southern end of the beach should this be breached.

4.4 Emergency Response Plan Components

The primary Coastal Erosion and Inundation Emergency Action Plan components have been prepared in the form of a summary table which is attached as Appendix A. The actions have been divided into periods relating to the storm activity as follows:

- 1 Before the Storm
- 2 During the Storm – Low Alert
- 3 During the Storm – High Alert
- 4 Recovery after the Storm

Prime responsibilities and other responsibilities are also noted with a generic contact list as outlined in Appendix A. This list will need to be completed and reviewed on a regular (at least annual) basis. Details of the actions and responsibilities are discussed below. It should be recognised that some of the actions identified may not eventuate and are dependent on the outcomes of other investigations, Council's position on implementing emergency protection works, or how events occur during the storm. As such, the plan may need to incorporate additional details as noted.

4.5 Public Awareness

Public awareness of the risks and likely actions in the event of threats being realised is a key consideration.

The SES/Council should conduct educational activities to ensure that people in locations potentially threatened by coastal erosion and/or oceanic inundation are aware of the threat and management actions. This should include (as necessary):

- public seminars involving residents and community groups;
- publicity in local newspapers and over local radio stations; and
- provision of printed material to residents.

4.6 Response Preparedness (Before The Storm)

In order to prepare for and/or reduce the threats associated with coastal storms, a number of actions should be undertaken before any storm as outlined below.

4.6.1 Implement and Monitor Interim Measures

Any measures identified as being necessary to reduce the threat or consequences of erosion or inundation should be implemented as soon as possible. These are discussed further in Section 6. The majority of the areas under immediate threat from erosion have a seawall of some form seaward of them. The Lennox Head Beach Management Works include substantial seawalls while the area north of Byron Street has a buried seawall believed to be of a lower standard.

Interim protection works are generally designed to a lower standard (e.g. 1 in 5 year to 1 in 10 year ARI) given the limited timeframe for exposure until final strategies are decided and implemented. The existing seawalls are understood to provide such a level of protection while recognising that there is a risk of a severe storm occurring and the limited design walls failing.

Therefore it is considered that no further interim protection seawalls are necessary at this stage. However, the structural integrity of all seawalls should be monitored and maintenance carried out as necessary, particularly following any exposure to storm conditions during the interim period.

To reduce the threat of inundation (and erosion) it is important to maintain the crest elevation and volume of sand within the dune system. It is noted that the design level of the constructed dune in the Lennox Head Beach Management works was RL 5.5m AHD (as indicated on Plan CP20 attached to DCP 3). Photogrammetric survey profiles analysed as part of the Coastline Hazard Definition Study indicate that the crest level is as low as RL 4.8m AHD in places. Design levels and existing levels

should be confirmed and any necessary works carried out to reinstate the design crest level and thereby reduce the threat of inundation.

Similarly, available survey information along Pacific Parade indicates that the crest elevation of the dune at the southern end is less than RL 6.0m AHD. Again, it is recommended that existing levels be confirmed and works carried out as necessary to maintain a dune crest elevation of at least RL 6.0m AHD in this area to minimise the risk of overtopping.

Maintenance of frontal dunes through the protection of vegetation and prevention of wind erosion is a key coastal management action that should be included in ongoing works programmes. Appropriate dune management is important to retain the volume of sand available to accommodate storm erosion and maintain crest elevations to reduce the risk of overtopping.

4.6.2 Identify Potential Emergency Protection Works

The status of the buried seawall north of Byron Street is unclear at present. It has been identified that this wall will be exposed during storm events and there is a risk that it may fail leading to the threat of erosion to Pacific Parade and in extreme conditions, private property landward of the road. Depending on the nature of the storm, the progression of the erosion and the performance of the wall, there may be an opportunity for and benefit in carrying out emergency works to strengthen the wall if failure becomes imminent. This would most effectively be achieved by placing additional rock.

If such works were able to be successfully implemented, they would:

- provide protection to the road and private property landward;
- maintain access to the properties and foreshore; and
- prevent the need to reinstate the roadway.

However, there are risks that such works:

- may not be consistent with future coastal management options;
- may not be successful in preventing erosion; and
- may be difficult to implement in an emergency storm situation.

If such works are not implemented:

- there will be a risk of erosion damage to the roadway and possibly private land behind;
- future coastline management options will not be compromised; and
- personnel will not be put at risk implementing the works during the emergency.

Should loss of the roadway eventuate:

- beach front access would be lost although alternative rear access is available to the properties behind and to the north; and
- the roadway and access may be reinstated after the event subject to planning controls and consideration of future coastline management options.

The actual cost to carry out the emergency protection works is likely to be substantially less than the damage and reinstatement costs. However, disaster relief funding may also be available.

Council needs to consider the various advantages, disadvantages, risks and consequences of such works as outlined above in deciding whether to implement such emergency works.

On balance, it is recommended that such works not be carried out given:

- the limited risk to private property;
- alternative access is available;
- difficulties and potential risks to the workers themselves associated with sourcing material and implementing works in an emergency situation;
- the potential for the works to not be successful;
- future coastline management options will not be compromised;
- reinstatement and/or other protection works may be implemented following the storm subject to planning and approval considerations; and
- disaster relief funding may be available.

However, should Council decide to pursue such emergency protection works, there will be a need for prior actions including:

- establishment of design considerations and implementation triggers;
- obtaining approvals for the works as outlined in Section 4.1; and
- identifying and planning availability of materials, equipment and personnel to implement the works during the storm.

The sources of materials (if any) to be used in an emergency situation should be clearly identified and the location of same articulated in the plan. It is imperative that pre-determined stockpiles or source sites of all necessary materials are clearly identified in the plan along with the protocol for accessing necessary plant and labour. Council will therefore need to consider and decide if specific emergency works are likely to be implemented and incorporate the above actions into the plan as necessary.

4.6.3 Monitoring Coastal Storms

Early warning of potential emergency situations is an important factor. Therefore potential coastal storms and cyclones should be monitored in terms of pressure systems, wave heights and direction, tide levels, wind speed and direction and rainfall.

As discussed in Section 4.3, critical conditions are likely to be associated with low pressure systems (or cyclones), strong onshore winds/waves and high spring tides.

4.7 Storm Warning and Monitoring (During Storm – Low Alert)

4.7.1 Issue Initial Warnings

When the Bureau of Meteorology issues a warning of large waves or storm surge conditions for the NSW north coast, and when in the judgement of the SES Local Controller, severe storm activity occurs off the coast (e.g. in the form of a large and intense low pressure system), the SES will seek technical advice from DIPNR (with the assistance of Ballina Shire Council) concerning the state of the beach, dune erosion and adequacy of existing protection.

The SES will then co-ordinate the provision of warnings, information and advice to occupiers of properties at threat as necessary.

4.7.2 Continue Monitoring

Monitoring is to continue of the prevailing conditions and beach state including beach/dune erosion, wave runup, tides and ocean levels and adequacy of existing protection. In particular, potential areas of threat at Lennox Head should be monitored, namely:

- Pacific Parade between Byron Street and Foster Street;
- the Surf Club at Lake Ainsworth;
- the constructed dune/levee at the southern end of the beach; and
- the seawalls at Lennox Village and the southern end of the beach.

4.7.3 Initiate Approved Protection Works

Should Council have decided to pursue emergency protection works along the Pacific Parade, these should be initiated if the road is under imminent threat from continued erosion and failure of the existing wall. These works are contingent on:

- legislation approval being in place;
- no danger to people undertaking the works (OH&S considerations); and
- no obstruction to any other emergency operations.

4.8 Emergency Operations (During Storm – High Alert)

4.8.1 Initiate Emergency Operations

In the event of:

- continued or strengthening storm activity;
- severe erosion of dunes;
- wave overtopping and anticipated oceanic inundation; and/or
- collapse of existing protection works;

the SES Controller may decide to:

- block threatened roads;
- evacuate threatened properties;
- halt further protection works where there is a danger or obstruction to evacuation operations; and/or
- place sand bags to prevent inundation of low floors.

Pacific Parade, between Byron and Foster Streets, is likely to be the focus of threats initially and there may be a need to block this section of road. Adjoining properties have alternative rear access. Oceanic inundation (if at all) is likely to be mainly in the form of overland flow at low depths from wave overtopping. Sand bagging may help prevent inundation of low floors in such instances. Lifting household contents and commercial stock in-situ is another alternative. Such activities may be necessary at the southern end of Pacific Parade and in the Lennox Village area.

Should the constructed dune/levee at the southern end of the beach be breached, inundation of the swale behind may occur. Any dwellings with low floors adjoining this swale (seaward of Allens Parade) may be potentially inundated.

4.8.2 Evacuation Considerations

Evacuation is to be carried out where there is an imminent threat of building collapse or deep over-floor inundation although either occurrence is unlikely. There should be sufficient warning of potential building collapse due to gradual erosion processes. While seawall failure may occur rapidly, most structures are still set back from the seawalls. The closest structures are those at the very southern end of the beach where wave heights are likely to be the lowest.

The only area of potential deep over-floor inundation is the area adjoining the swale seaward of Allens Parade (approx. 14 properties). As discussed above, inundation of this area may occur if the dune/levee in front is breached. This process would be rapid but the depth of inundation not excessive.

In the unlikely event of the need to evacuate, landward routes from threatened properties are available to the nearest accessible evacuation centre. Co-ordination of belongings, management of domestic pets/companion animals and welfare support are to be provided as well as management of traffic and provision of security.

4.9 Recovery (After Storm)

4.9.1 Assess Damage

Immediately following the storm, the damage to properties, roads, coastal protection works, services, beach accesses and dune systems is to be assessed. The threat of collapse of any houses in close proximity to the dune escarpment is also to be assessed. Any necessary recovery committees are to be established and the return of evacuated people co-ordinated when conditions are safe.

4.9.2 Repair Damage and Clean-up

Roads and services are to be repaired and reconnected as necessary and support given to residents who have suffered damage to their houses. Any hazardous material exposed on the beach should be removed.

High and steep dune escarpments may exist following the storm presenting a public safety hazard. Barriers and relevant safety warning signs are to be erected as necessary. In high use areas, the erosion escarpment may be artificially collapsed by machinery to a more stable slope and damaged beach accesses reinstated.

Interim protection measures are to be repaired and re-established as necessary giving consideration to the timeframe remaining to likely implementation of the final Coastline Management Plan and the necessary approvals for such works.

4.9.3 Review Plan and Works

If emergency protection works were implemented during the storm, a review should be carried out concerning their:

- adequacy in terms of providing protection;
- impact on beach amenity and access; and
- compliance with interim measures objectives.

The performance of the Coastal Erosion and Inundation Emergency Action Plan during the storm should be reviewed and amended as necessary. The Ballina Shire Coastline Management Committee should also endeavour to review the CEIEAP annually, throughout the interim period, to ensure its relevance and that contact details are adequately updated.