

APPENDIX 2

Draft Coastal Emergency Management Plan

Wyong Shire Council

EXHIBITION DRAFT
Coastal Emergency Management Plan
Wyong Shire

June 2011

EXHIBITION DRAFT Coastal Emergency Management Plan

**Prepared by
Umwelt (Australia) Pty Limited
on behalf of
Wyong Shire Council**

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1.0 Coastal Emergencies

This draft Coastal Emergency Response Management Plan establishes protocols and processes for preparing for and responding to the impacts of natural disasters (events) that affect coastal assets (property and infrastructure, community safety and coastal amenity).

The draft Plan is required by Section 55C(1)(b) of the *Coastal Protection Act 1979* (as amended 2010). The structure and content of the draft Plan draws on and is consistent with guidance provided in the coastal reform documents development by the NSW government, including:

- Guidelines for Preparing Coastal Zone Management Plans (DECCW 2010).
- Coastal Zone Management Guide Note: Emergency Action Plans (Consultation draft, OEH 2011).
- Guide to the Statutory Requirements for Emergency Coastal Protection Works ((DECCW 2011).
- Code of Practice under the *Coastal Protection Act 1979* (DECCW 2011).

The draft plan also considers the requirements of:

- NSW Storm Sub-plan 2007;
- Emergency Management Australia (EMA) guideline 'Emergency Planning' (2004);
- the NSW DISPLAN (see **Section 1.1**); and
- existing emergency management plans and guidance (storm and flood management) for the Wyong Local Government Area (see **Section 1.1.2**).

The Wyong Shire Coastal Zone Management Plan (WSCZMP) (2011) discusses the social, economic and natural values of the Wyong coastline, and the short and longer term threats to those values. The WSCZMP addresses the full range of coastal process threats and associated risks to coastal values, for the immediate to 2100 timeframes, including:

- coastal erosion impacts on homes, community infrastructure, access, amenity and cultural and ecological values;
- inundation associated with major storms, including catchment flooding, elevated sea level and high waves;
- geotechnical hazards that affect homes, gardens, the safety and stability of public pathways, rock platforms and lookout points;

The WSCZMP presents strategies to minimise risk and support resilient coastal landscapes in the context of predicted significant climate change, i.e. they are coastal zone sustainability strategies. Many of the risks discussed in the WSCZMP are gradually accumulating risks. Some coastal hazards are, however, associated with specific high intensity events, principally major storms. When these events cause erosion or inundation that threatens property, safety or health, they are considered to be coastal emergencies.

Coastal emergencies occur during severe coastal storms and would occur if a tsunami hit the local coast. Severe erosion, leading to a coastal emergency may also occur with moderate seas and very high tides.

The scope of coastal process events for which emergency responses may be required includes:

- Wave cut into dunes, undermining and eroding fences, swimming pools, decks, and houses on private property; public steps, ramps, pathways and viewing platforms; surf club buildings and associated facilities; sea walls; roads; sewerage or other major community infrastructure; promenades and boardwalks. Wave cut (storm bite) may be followed by slumping and slope adjustment as the sand drains and dries. Figures 8.3 to 8.9 of the WSCZMP show the area considered to be subject to immediate coastal erosion hazard. A coastal emergency could occur in these areas at any time.
- Land slip and rock fall caused by saturated soils, high waves or following tree throw.
- Wind-blown sand being deposited across road ways, park land and residential or commercial development
- Wind damage such as tree fall and loss of roofing. Tree throw could also occur because of storm bite erosion.
- Inundation of low lying land by wave overtopping of dunes or set up of lake waters.
- Injury to residents or other people moving through the affected area.

All of these impacts can cause inconvenience, injury and upset to residents. However, for the purpose of specifying Council's involvement in coastal emergency response management, a **coastal emergency** is confined to:

- **Erosion caused by storm waves or very high oceanic water levels**, which impacts on private or public assets to the extent that:
 - Structures (residential buildings) on private property have collapsed or are in imminent danger of collapse onto the beach or the rock platform. In Wyong Shire, recent examples of storm bite impact on private property can be seen at North Entrance Beach. Storm waves have eroded private gardens, fences and garden structures, but no major structures (such as pools or houses) have been undermined so far.
 - Structures (such as surf clubs or promenade walls, steps, ramps or other access infrastructure) on Crown or community land have collapsed or are in imminent danger of collapse onto the beach or the rock platform.
 - Untreated sewage or other contaminants are discharging or are likely to discharge onto the beach because storm bite erosion has disrupted the reticulation system.
 - Residents are likely to be isolated from important community services. For instance, coastal residents are cut off from power or water supplies or elderly residents are or will be cut off from medical assistance.
- **Tsunami** as communicated by the Australian Government Tsunami Warning System. Tsunami are rare events, but the consequence of a major tsunami event in terms of risks to human lives, property and infrastructure is devastating.
- **Geotechnical events (land slip or rockfall)** which impact on private or public assets such that:
 - There are significant and immediate threats to public safety, such as if pathways, lookouts or stairs are in imminent danger of collapse
 - Residential property is damaged or is in imminent danger of being damaged in a way that makes it dangerous and uninhabitable

- Untreated sewage or other pollutants are discharging directly into the environment (e.g. from a broken reticulation system)
- **Inundation (dune overtopping)** associated with elevated water levels and high wave run-up during major storms, causing flooding of homes, businesses, recreational areas and infrastructure (such as roads and sewerage systems).
- **Inundation associated with flood tail water** in coastal lakes (ICOLLS), causing flooding of homes, businesses, shoreline recreation areas and along shore access, infrastructure. This hazard is addressed in Council's Flood Risk Management Plan.

All of the above will be exacerbated by sea level rise associated with medium to long term climate change. Events once considered rare will have a shorter recurrence interval (e.g. see Lord and Gibbs 2004, Church et al 2004, 2006).

Other immediate or emergency hazards may include:

- Aeolian sand movement due to high winds – burial of access ways, sand blasting of gardens and property
- Other major water quality issues, such as may occur if a vessel runs aground or major traffic incidents on roads and bridges along the coast. These issues are addressed in oil spill management plans, prepared separately by OEH and SES.

A coastal zone emergency response management plan must not include any matters dealt with in plans made under the *State Emergency and Rescue Management Act 1989*.

During major storms, strong winds may also blow over trees and/or damage property such as by lifting or damaging roofs and breaking windows. This type of damage is often identified as an emergency in the community, but is not considered in this specific Coastal Emergency Management Plan. Coastal emergencies are associated with processes that are limited to the coastal environment, not general storm damage that could include anywhere in the Shire. The broader interpretation of emergencies and emergency response is covered under the *State Emergency and Rescue Management Act 1989*.

Other emergencies which occur in coastal landscapes include people being washed off rock platforms, and people drowning in the surf or estuaries (lakes or creeks). These are emergencies involving SES, ambulance and police and are not specifically the responsibility of Council. These medical emergencies are not considered further in the draft Coastal Emergency Response Management Plan.

Bushfire can also affect coastal landscapes, threatening homes and bushland down to Mean High Water level. Council and the Rural Fire Service address bushfire risks in specific strategic and operational plans and it is not considered further in this draft Coastal Emergency Response Management Plan.

1.1 Institutional, Statutory and Policy Context

1.1.1 NSW disaster management arrangements

The framework for disaster management in NSW is set out in the NSW State Disaster Plan (DISPLAN) (2005). Clauses 116 and 117 of the State DISPLAN identify the State Emergency Service as having overall control of operations in response to flood and storm. The NSW Storm Sub-plan (2007) provides further detail.

The specific responsibilities of NSW State Emergency Service are identified in the State DISPLAN as:

- Combat Agency for dealing with floods and to coordinate rescue, evacuation and welfare of affected communities. This includes tsunami (there is a separate NSW Tsunami Emergency Management Sub Plan).
- Designated Combat Agency for damage control for storms and to coordinate the evacuation and welfare of affected communities (protection of life and protection of readily moveable household goods and commercial stock and equipment). However, planning for and construction of physical mitigation works for coastal property is the responsibility of local councils.

There is a hierarchy of disaster management committees, from state level, through districts to local areas. The State DISPLAN also identifies Functional Areas, such as engineering services and environmental services, for which other State agencies have a coordinating role.

Engineering services includes structural assessments, demolition and shoring up of buildings, removal of debris, construction of levees to control flooding; maintenance and reestablishment of essential services (water, sewer and power). At the State level, NSW Department of Public Works, within the Department of Finance and Services has coordination responsibility for these services during emergency events.

In the State DISPLAN, environmental services include those listed below. OEH is the coordinating agency.

- Protect the environment during emergency response and recovery operations
- Coordinate scientific support for the on-scene controller during operations to combat the pollution of the sea or inland waters
- Provide advice to relevant agencies on environmentally sound and legal practices for disposal of wastes or contaminated materials
- Direct and coordinate the clean-up of hazardous materials once they have been rendered safe). Conduct post response operations investigations where incidents involve hazardous materials.

The NSW DISPLAN also provides the framework for emergency response operations. Procedures for alert, call out and stand down of emergency response staff are discussed, as are procedures for evacuation and recovery.

1.1.2 Roles and responsibilities

Table 1.1 identifies the main organisations having a role in the management of coastal emergencies along the Wyong coastline, and the relevant pieces of legislation and policy that they implement.

Wyong Shire Council has responsibility for planning and works to protect property from coastal erosion, but all other aspects of disaster management for floods and storms are coordinated by other organisations.

Table 1.1 - Institutions and statutory context

Organisation	Legislation and policy responsibilities
<p>State Emergency Services (SES) The Wyong LGA is within the Central Coast District for emergency planning. Wyong/Central Coast Local Emergency Management Committee</p>	<p>State Emergency and Rescue Management Act 1989. Combat agency and coordination roles as noted in Section 1.1.1. DISPLANS relate to a wide range of disasters/emergencies, often with separate detail in sub plans (e.g. for fire, tsunami).</p>
<p>Wyong Shire Council Tuggerah Lakes Estuary, Coastline and Floodplain Management Committee</p>	<p>Coastal Protection Act 1979 State Emergency and Rescue Management Act 1989 Local Government Act 1994 Environmental Planning and Assessment Act 1979 (LEP and local development assessment) Crown Lands Act 1989 Coastal lake entrance management plans Estuary Management Plan Coastal Zone Management Plan Flood Risk Management Plans Coastal Reserve (Foreshore) Plans of Management Responsible for coastal erosion mitigation works for protection of coastal property during storms.</p>
<p>Department of Planning and Infrastructure (DoPI)</p>	<p>NSW Coastal Policy 1997 SEPP 71, SEPP 14 Environmental Planning and Assessment Act 1979</p>
<p>Office of Environment and Heritage (OEH)</p>	<p>Coastal Protection Act 1979 and amendments 2010 (and associated policies, guidelines, codes of practice) Coastline Management Manual 1990 Protection of the Environment Operations Act National Parks and Wildlife Act 1974 Threatened Species Conservation Act 1995 Comprehensive Coastal Assessment. Responsible for coordination of environmental services during and after storms.</p>
<p>NSW Department of Public Works, within the Department of Finance and Services</p>	<p>Supervise engineering services, particularly in relation to shoring up or demolition of buildings affected by erosion (see State DISPLAN).</p>
<p>Land and Property Management Authority</p>	<p>When a landholder proposes to install emergency protection works on Crown land, the landowner must notify the public authority that owns or has care, control and management of the land. In many cases, the Land and Property Management Authority represents the Crown as the land owner and must be advised in writing about proposed works.</p>
<p>Commonwealth Bureau of Meteorology (BoM)</p>	<p>Identified as the key provider of weather advice, particularly in relation to extreme weather events.</p>
<p>Emergency Management Australia</p>	<p>Prepares guidelines for nationally consistent approaches to emergency planning and management. Provides funding through the Disaster Mitigation Program and Regional Flood</p>

Organisation	Legislation and policy responsibilities
	Mitigation Program to address priority risks. Funding can be used for disaster risk assessment, mitigation strategies and measures, resilient infrastructure and community awareness and warning systems.

The specific responsibilities of SES, WSC and BoM in relation to storm driven coastal erosion are discussed in Hanslow and Howard 2006 and also in OEH (2011, Consultation Draft). These pre-storm, during storm and post-storm responsibilities are summarised in **Table 1.2** (based on Appendix 1 of Hanslow and Howard 2006).

The role of BoM is to provide accurate and up to date forecasts and severe weather warnings to assist other organisations to plan, communicate and act effectively. The principle division of roles between the SES and WSC is in relation to protection of human life and property (SES) and emergency beach protection works (Council) during an emergency event. The SES has protection of human life as its first priority, followed by evacuation and/or rescue of animals, household and business possessions. It is not responsible for emergency beach protection works. Council is responsible for emergency beach protection works, in consultation with OEH and Land and Property Management Authority.

OEH and DoPI share responsibility for policy and technical advice in relation to managing the impact of coastal processes. OEH (regional operations office and coastal unit) has specific on ground roles during emergency events. These responsibilities are also discussed in **Table 1.2**.

Council, OEH and SES share important information needs. Communication between these organisations is critical during an emergency response exercise, to ensure that consistent messages are provided to the community, and that evacuation and protection responses are effectively coordinated.

The Land and Property Management Authority is also a significant land manager along the Wyong coastline and is responsible for the beds of estuaries and the ocean floor within the NSW State limits.

Council and Central Coast Water Corporation manage sewage and effluent reticulation and discharge in the Wyong local government area, including extensive reticulation systems, pumping stations and discharge points that lie within coastal hazard zones or may be affected by severe storm events. For this reason, Central Coast Water Corporation is also included in **Table 1.2**.

Local community organisations, such as Surf Clubs, Precinct Committees, Landcare, etc. will have a strong interest in proposals for emergency response management, in terms of human safety, protection of assets, protection of ecological diversity (and robustness of their rehabilitation and stabilisation efforts on dunes) and rapid restoration of suitable access to beaches and dunes. These groups will require details about emergency response procedures before, during and after any emergency event.

The community of interest includes anyone who lives along or uses the Wyong coastline for recreation, conservation or business.

Table 1.2 - Roles and responsibilities of key organisations in coastal emergency response

In this table actions are shown as follows: **planning responsibilities**, **consultation**, **communication and awareness actions**, **on ground works** and review processes

Organisation	Pre storm responsibilities	During the storm	Post storm
State Emergency Service	<p>Prepare and maintain the Local Flood Plan, including arrangements for the management of coastal erosion during storms.</p> <p>Consult with Council, OEH and coastal zone committee re management of coastal erosion in various Plans.</p> <p>Prepare and deliver community awareness material (with WSC) to ensure people living in high hazard areas are aware of the erosion threat and the measures that will be implemented during major storms.</p>	<p>Activate the Local Flood Plan.</p> <p>Ensure BoM storm warnings are passed on the WSC and other organisations.</p> <p>Monitor at risk locations during the storm</p> <p>Coordinate advice to the community during the storm – re evacuation and what should be removed from properties.</p> <p>Provide a phone in service for requests for assistance or advice.</p> <p>Coordinate evacuation of people.</p> <p>Coordinate evacuation of livestock and portable assets.</p>	<p>Take feedback on the implementation process during the storm; update records on areas susceptible to inundation or erosion.</p> <p>Review/update plans as necessary.</p> <p>Liaise with Council, OEH about feedback and about new information on future risk to coastal properties.</p>
Wyong Shire Council	<p>Prepare Coastline Management Study and Coastal Zone Management Plan. The Plan must address emergency actions for coastal erosion.</p> <p>Consult with affected communities re the CZMP and also about proposed emergency management measures for coastal erosion.</p> <p>Coordinate community and agency liaison on the implementation of the CZMP</p> <p>Collaborate with SES on community awareness and education programs</p> <p>Ensure approvals are in place (e.g. for dredging of The Entrance or sand extraction from other sources) if emergency sand supplies are likely to be required as part of the emergency response.</p>	<p>Monitor at risk locations during the storm.</p> <p>Liaise with SES about support for potential evacuations.</p> <p>Liaise with 'Engineering Services Functional Area Coordinator' (ESFAC) (OEH) before any physical erosion mitigation works (to provide temporary protection for property or other assets) commence.</p> <p>Monitor and install hazard barriers at compromised locations.</p>	<p>Remove all temporary erosion mitigation structures and rehabilitate/restore access.</p> <p>Liaise with OEH re changes to risk assessments.</p> <p>Update CZMP as necessary, in consultation with community and agency stakeholders.</p> <p>Survey and photo monitoring of affected sites.</p>

Organisation	Pre storm responsibilities	During the storm	Post storm
OEH	<p>Provide technical and policy advice on coastal issues to Council</p> <p>Review coastal hazard assessments and provide advice to Council to ensure that risks are adequately recognised.</p> <p>Review draft CZMP and Emergency Response proposals</p>	<p>ESFAC provides advice to council about activation of emergency erosion mitigation measures – which temporary measures are warranted.</p>	<p>Liaise with and support Council in removal of temporary structures and rehabilitation of beaches</p> <p>Provide advice on any post storm re-evaluation of coastal hazards and risks.</p> <p>Contribute to discussion of updates of the CZMP as necessary to accommodate new risk information.</p>
Bureau of Meteorology	<p>Contribute to community awareness material about coastal storms and emergency response</p> <p>Monitor evolving storm conditions. Prepare Severe Weather Warnings for high waves (dangerous surf) or storm surge.</p> <p>Provide warning information to SES, radio stations, council during the lead up to and during storm events likely to cause erosion.</p>	<p>Maintain monitoring of storm conditions and keep SES and Council updated as the storm progresses</p>	
DoPI	<p>Incorporate hazards associated with major storms in local and regional land use planning requirements</p>		
Land and Property Management Authority	<p>Contribute to preparation of the CZMP. Assess hazards and risks affecting structures such as breakwalls and jetties and implement plans to enhance resilience of structures.</p> <p>Approvals for emergency sand extraction from estuary mouths</p>	<p>Monitor assets at risk during storm events, in communication with other responsible organisations.</p>	<p>Restore and remediate structures that are damaged by storm erosion or inundation.</p> <p>Contribute to review of the Emergency Response Management Plan.</p>
Central Coast Water Corporation (as responsibility is transferred from WSC)	<p>Contribute to risk assessments for coastal hazards, in relation to water and sewerage infrastructure.</p> <p>Conduct in-house risk assessments.</p> <p>Prepare risk management plans to address issues associated with major storms.</p>	<p>Monitor infrastructure in at-risk sites.</p> <p>During a storm, implement emergency protection or other measures in consultation with Council and OEH, as necessary</p>	<p>Clean up/remediate any impacts of emergency discharges from the sewerage system.</p> <p>Restore and remediate any damage to infrastructure caused by storm waves or inundation.</p> <p>Review risk management plan as necessary.</p>

2.0 Scope of the Coastal Emergency Management Plan

Council has a DISPLAN and has prepared risk assessments for various natural hazards that affect the people and assets of the Shire.

Council has not previously prepared a detailed emergency management plan for coastal emergencies, developed in cooperation with OEH and SES, but dealing specifically with Council's responsibilities. This draft Emergency Management Plan has the following scope:

- Planning to minimise exposure to coastal emergencies.
- Planning for efficient, effective and timely responses during coastal emergencies. This includes planning for emergency beach nourishment, such as identification of sand sources, obtaining approvals, preparing stockpiles of suitable material.
- Clear lines of communication between response organisations and between relevant sections of Council during coastal emergencies.
- Clear communication and warning systems for residents.
- Clear advice to land owners about the types of emergency action that they may take to protect their property in the event of coastal storm bite and the types of approval process that apply to different types of action, different locations (on Crown land or on private property) and different expected permanence (e.g. sand dumping, simple sand bag structures, large geotextile walls). The advice in the draft Plan is in accordance with current amendments to the Coastal Protection Act (currently before NSW Parliament, as at October 2010) and related protocols, guidelines and legislation. The draft Plan includes sub plans for two Authorised Locations on the Wyong Coastline – North Entrance Beach and Hargraves Beach. The draft Plan also extends the capacity to lawfully place emergency coastal protection works at other locations along the Wyong coastline where private residences are currently located within the immediate coastal erosion hazard zone.
- Clear guidance for land owners about Council's regulatory powers if land owners take action that is outside the regulatory framework (for instance if land owners place unapproved rock or rubble on a beach during a coastal emergency). These regulatory powers and the relevant training of Council Authorised Officers are still evolving with amendments to the Coastal Protection Act and related policies and guidelines.
- Internal protocols and processes for regulation and enforcement of the planning framework for emergency structures or other emergency actions to protect private property.
- Clean up and review protocols, including future arrangements to address climate change impacts.

2.1 Purpose of this Plan

The purpose of this Plan is to clearly define the actions and effective working relationships that are essential to minimise the emergency risks associated with coastal hazards and to provide a rapid and effective response in the event of coastal hazards that threaten life, property or community amenity along the Wyong coastline.

The Emergency Response Management Plan sets out the responsibilities of key players and how they will communicate and collaborate in planning and implementing coordinated responses to emergencies associated with coastal hazards.

OEH (Hanslow and Howard) 2006 suggest that planning and implementing responses to coastal emergencies should address three priorities:

- Protection of the life and safety of people and animals.
- Minimising damage to property (structures and contents).
- Protection or timely restoration of beach amenity.

Planning and response in emergencies for each of these three priorities must also recognise the natural resource and cultural heritage values of the coastal landscape. This includes Endangered Ecological Communities, habitat for threatened species, habitats and landscapes protected under the EPBC Act and culturally significant landscapes.

2.1.1 Objectives: What WSC wants to achieve and what it wants to avoid

In relation to coastal processes emergency management, WSC wants to achieve the following:

- local communities that are aware of the nature and extent of coastal hazards that could occur in an emergency context;
- local communities that are aware of and capable of implementing the principal steps required in the event of a coastal emergency;
- coordinated and effective responses to minimise immediate harm. Clear definition of responsibilities, collaborative relationships and communication protocols;
- emergency actions are not hindered by unfulfilled requirements for planning or other approvals;
- investment in preventative measures that is balanced against risk;
- responses to immediate and short term threats which are consistent with the long term natural resource and amenity objectives for the coastline;
- well trained council personnel for response to coastal emergencies; and
- gradual reduction of risk associate with coastal emergencies as planning, training and community preparedness improve over time.

WSC wants to avoid the following:

- loss of life, and unnecessary loss of public or private assets;
- haphazard and uncoordinated responses to coastal emergencies;
- conflicts between Council and SES officers during on ground operations;
- dumping of rubble or other unsuitable materials on beaches in the mistaken belief it will slow down or prevent erosion or inundation;

- poorly designed coastal protection structures – not suitable for the magnitude of erosion or high water level events;
- duplication of investment or significant gaps in investment in preparedness and response capacity for coastal emergencies;
- extended periods where coastline access and amenity are compromised; and
- increasing risks associated with coastal emergencies.

3.0 Council's Priorities

Wyong Shire Council has adopted a hierarchy of responses in relation to potential coastal emergencies.

Level 1: Plan to reduce risk

- Minimise the likelihood that a coastal emergency event will occur. Clearly Council has no influence over the magnitude or frequency of coastal storms. However, Council can influence exposure to coastal hazards. Council will work with residents to minimise the exposure of coastal assets to hazardous coastal process events. Council's exposure reduction activities will take into account the effects of sea level rise and climate change in terms of the changing spatial impact of coastal storms over time.

Level 2: Prepare for unavoidable emergency events

- Prepare coastal emergency response plans and implement preparation actions, such as approved sand supplies, beach access points and other measures to facilitate smooth implementation during actual emergencies
- Train Council officers in all relevant aspects of emergency management. Because of the shared responsibilities for emergency response between Council, DECCW and SES, training of Council officers will be conducted in close consultation with the other key agencies.
- Prepare residents and communities for coastal emergencies. This includes awareness of residents about appropriate emergency protection works, safe emergency egress and how to stay in contact with up to date information during coastal emergencies.

Level 3: Effective implementation of emergency response procedures during coastal storm events

- Clear communication and coordination between key response organisations.
- Clear communication with affected residents and communities.
- Clear differentiation of roles, so there is no conflict or overlap between WSC actions and those of SES implementing the *State Emergency and Rescue Management Act*.
- A focus on the safety of all personnel working in adverse weather conditions.

Level 4: Effective record keeping, monitoring and review of responses to coastal emergency events (post storm actions)

- Photographic records of all areas and infrastructure impacted by the coastal emergency.
- Continue temporary safety measures (such as track closures and fencing) until safe access can be restored.
- Restore services and public access and remove any storm related debris in a timely manner.
- Assess the structural integrity of assets that have been exposed to storm impacts, as necessary.
- Ensure that emergency materials and supplies are replenished.

- Feedback from Authorised Officers.
- Feedback from community.
- Critical review of procedures and outcomes – what should be changed or updated for greater effectiveness?

3.1 Immediate Actions

Council proposes that the following actions will take effect as soon as possible:

- Achieve certification of the coastal emergency subplans for Hargraves Beach, North Entrance Beach and Cabbage Tree Harbour (see **Section 4.0**).
- Council has decided to decline the option to authorise an appropriate Council officer under the *Coastal Protection Act 1979* to certify and regulate emergency protection works at certain locations and beaches. However, Council officers will be properly trained in relation to other emergency response measures in the Emergency Management Plans/Subplans.
- Ensuring residents and landowners in authorised locations are aware of the erosion hazards affecting their properties and of the options available to them for emergency protection.
- Propose that any landowner within the immediate coastal hazard zone may carry out emergency protection works, within prescribed conditions. For instance, several properties at Blue Bay are currently mapped as within the immediate coastal hazard zone.

3.2 Ten Year Strategy

Multiple private and public assets along the Wyong coastline are currently exposed to immediate coastal hazard impacts and therefore potentially affected by coastal emergencies.

Over the next ten years, Council will focus on:

- Implementing land use planning strategies to reduce the likelihood that coastal assets will be exposed to immediate coastal erosion hazards. Section 9 of PART B of the WSCZMP sets out planning controls to restrict new development in immediate coastal erosion hazard zones and to work with property owners whose houses are already in the immediate coastal erosion hazard zone to protect and/or relocate assets. An overview of planning actions is in **Section 5.0**.
- Improving its own knowledge of how different types of emergency event will affect the coastline and how risks will change over time. This includes climate change and tsunami planning (see **Section 6.3**).
- Enhancing community understanding of coastal emergencies, particularly in the context of climate change (see **Section 6.5**)
- Providing up to date advice to landowners about statutory requirements and the consequences of illegal protection works (see **Section 4.0** and **Section 6.2**)
- Refining planning and communication about coastal emergencies (**Section 8.0**)

- Improving its cooperative relationship with OEH, and SES in relation to coastal emergencies including developing effective and innovative communication systems for coastal emergencies in Wyong Shire (**Sections 6.4, 7.0 and 8.0**)

4.0 Emergency Management Subplans

This section presents the emergency subplans for Authorised Locations on the Wyong Coastline.

Authorised Locations are beach and dune systems where at least five residences are located within the immediate coastal erosion hazard zone. Authorised locations are listed in Schedule 1 of the draft Code of Practice.

Hargraves Beach, North Entrance Beach and Cabbage Tree Harbour are identified as Authorised Locations for emergency coastal protection works. **Box 4.1** explains the process for undertaking emergency coastal erosion protection works at these beaches.

Note that currently:

- Hargraves Beach has a well developed incipient foredune, but residences are located on a low foredune. The 1974 erosion scarp removed the incipient foredune and cut into the foredune.
- There is no incipient foredune buffer in front of houses on Curtis Parade or the southern end of Hutton Road. Houses at Curtis Parade are seaward of the alignment of the incipient foredune immediately to the south.
- Council is constructing a permanent protection structure at Cabbage Tree Harbour. This structure will protect the toe of the unstable slope from wave impact and will assist drainage.

BOX 4.1: Emergency Management at Authorised Locations

One off emergency protection works may be approved at certain locations at Hargraves Beach, North Entrance Beach and Cabbage Tree Harbour.

These emergency works are consistent with the coastal protection strategies proposed in the WSCZMP.

Requirements for these one off works are set out below.

What emergency protection works are permitted?

Sand nourishment, large geotextile bags, filled with sand. Council will not support the placement of emergency protection works which use small 'sandbag' type bags to protect private property on open ocean beaches. Rock and rubble materials are not permitted.

Approvals required

Landholders who wish to undertake one off emergency protection works must apply to OEH for a certificate permitting the works to take place. OEH may place conditions on the certificate. Landholders must notify OEH and council before approved works commence. Where works are on public land, the owner or manager of the land must be notified.

Applications for a certificate must include information about the materials to be used, concept designs for placement and where the works will be placed. If stockpiling of materials is necessary, the application must state where materials will be stockpiled.

Locations

Only those properties where the coastal erosion escarpment is within 20 metres of the maximum seaward extent of residential buildings (not including decks, fences, pergolas). In specific circumstances, a land owner may place emergency protection works in front of an immediately adjoining property, with the consent of the land owner.

When

Emergency protection works may only commence when the wave erosion escarpment is no more than 20 metres from the most seaward wall of the residential building.

Placement of sand or sand filled geotextile bags is not to occur during major storm events, unless specifically approved by a senior police officer (as defined in the State Emergency and Rescue Management Act 1989) or a professional engineer certifies that the eroded escarpment has a low likelihood of failure (note these conditions are subject to change).

Emergency protection measures must only be placed on the beach and/or dune when it is safe for machinery to be on the beach. In general, this implies at low tide and outside peak beach usage periods.

Where can materials be obtained?

Only clean sand in the grain size range 0.15 to 0.5 millimetre may be used for beach nourishment or to fill geotextile bags. Council expects that any sand which is used for filling geotextile bags will eventually become part of the beach or dune sand.

Sand for emergency protection works must not be extracted or removed from local coastal dunes, except if it is obtained from an existing, licensed or approved sand quarry. No such quarries exist in Wyong Shire. Quarries which may be able to provide suitable sand are located in the Stockton Coastal Barrier, north of Newcastle.

Sand for emergency protection works may be obtained from the material that Council dredges from shoals in the entrance of Tuggerah Lake. Such sand must be placed in accordance with the Entrance Management Strategy and Dredging Management Plan for the entrance channel.

Rock, gravel, soil or other extractive materials must not be used for beach nourishment or to fill geotextile bags which will be placed on the beach. Use of rubble or other unspecified waste or fill is prohibited.

Where can materials be stockpiled?

Council prefers that stockpiles of sand or geotextile bags are stored on private property. The nature of existing development at Hutton Road and Curtis Parade North Entrance is such that stockpiling of materials on private land may not be feasible. Where there is vacant private land, other landholders may come to an agreement with the owner of the vacant private land to stockpile sand materials, subject to relevant legal advice.

Landholders may stockpile sand for emergency protection works on public land only when no private land options are available. The intention to stockpile sand on public land must be notified in the application for a certificate. Details of where the sand will be placed, measures to prevent wind blowing sand off the stockpiles, and the period of stockpiling must be stated.

Figures 4.1, 4.2 and 4.3 show public land at Hargraves Beach, North Entrance Beach and Cabbage Tree Harbour where stockpiling will be considered.

Which beach access ways may be used to move materials into place?

Figures 4.1, 4.2 and 4.3 show the beach access ways which OEH may approve for use to move emergency protection works onto the beach. Landholders applying to OEH for a certificate must nominate which beach access ways will be used.

What equipment may be used?

Sand and sand filled geotextile bags must be placed using suitable machinery which can operate on soft sand. Machinery must be operated by qualified operators with current, relevant safety training. Care must be taken to prevent geotextile bags being pierced or ripped during placement.

Acceptable designs

DECCW 2011a (Code of Practice under the *Coastal Protection Act 1979*) and 2011b (Guide to Statutory Requirements for Emergency Coastal Protection Works) provide guidance on suitable designs and materials for emergency protection works on open beaches.

When must emergency protection works be removed?

The *Coastal Protection Act 1979* as amended in 2010 allows one off emergency protection works at Authorised Locations for a maximum of twelve months. Short extensions are possible if a land holder has an application with Council or the Coastal Panel for permanent protection works. Permanent works must be in accordance with a certified Coastal Zone Management Plan.

OEH will have officers authorised to enforce the requirements of the *Coastal Protection Act 1979*. If in

the opinion of an authorised officer, emergency coastal protection works are causing erosion elsewhere on the beach or are impeding safe public access to the beach, the authorised officer may issue a notice requiring that the works are removed after less than twelve months.

What permanent protection works may be permitted?

Permanent coastal protection works are not part of the short term emergency management subplan. Permissible permanent protection works are part of a Level 1 response for coastal emergencies and are considered in **Section 5.0** of the overarching Coastal Emergency Management Plan and in Section 9.0 of the WSCZMP.



Source: SMEC (2010)
Note: Contour Interval 0.5m

0 25 50 100m
1:2 500

Legend

- Immediate Limit of Zone of Wave Impact and Slope Adjustment
- Immediate Limit of Zone of Reduced Foundation Capacity

FIGURE 4.1a

**Emergency Protection Works
at North Entrance
(Private Property)**



Source: SMEC (2010)
Note: Contour Interval 0.5m

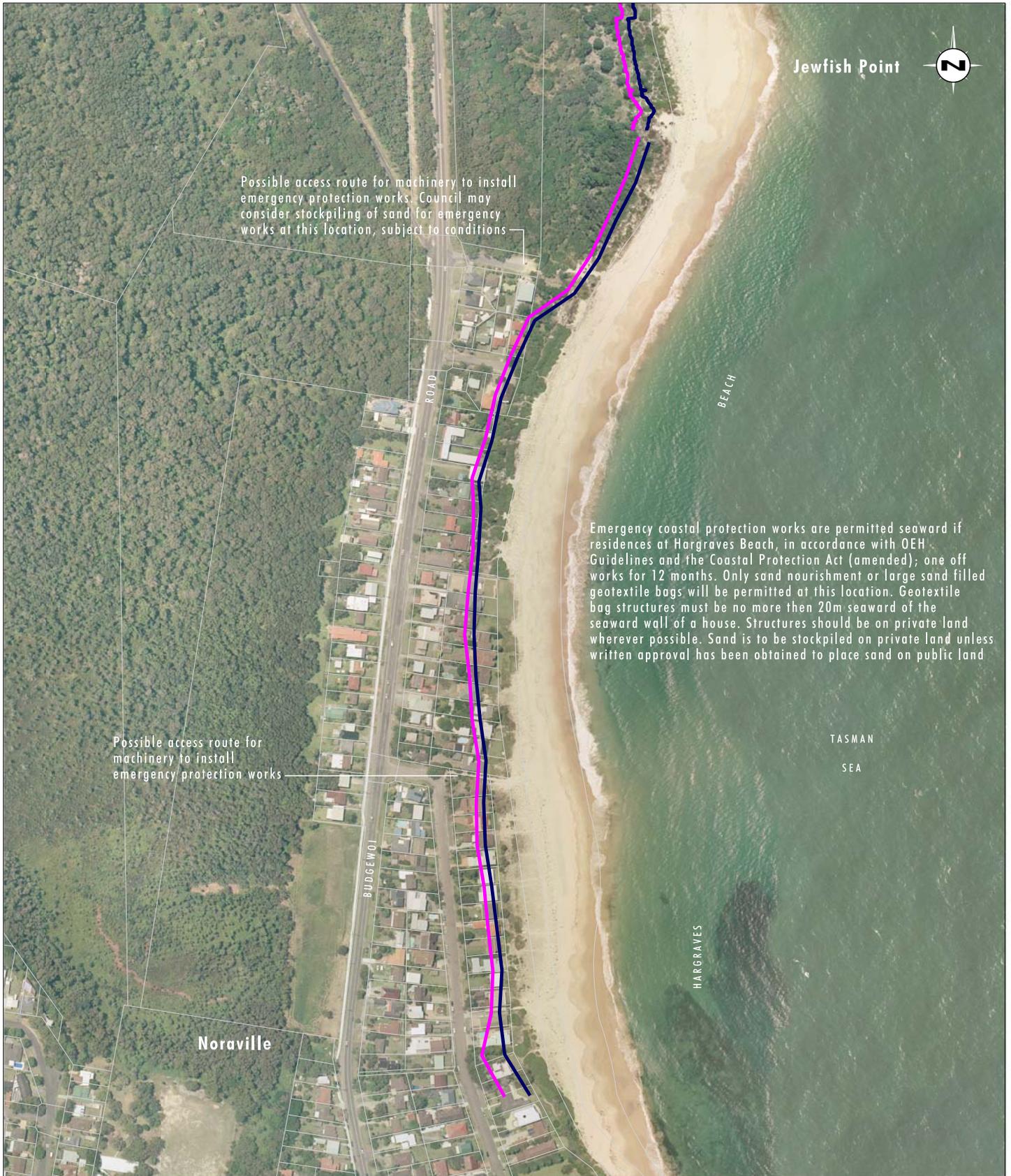
0 25 50 100m
1:2000

Legend

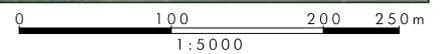
- Immediate Limit of Zone of Wave Impact and Slope Adjustment
- Immediate Limit of Zone of Reduced Foundation Capacity

FIGURE 4.1b

**Emergency Protection Works
at North Entrance
(Private Property)**



Source: SMEC (2010)



Legend

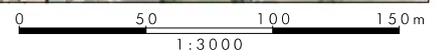
- Immediate Limit of Zone of Wave Impact and Slope Adjustment
- Immediate Limit of Zone of Reduced Foundation Capacity

FIGURE 4.2

**Emergency Protection Works
for Private Property at Hargraves Beach**



Source: Shirley Consulting Engineers Pty Ltd



Legend

- Immediate Low Hazard Line
- Immediate High Hazard Line

FIGURE 4.3

**Emergency Protection Works
at Cabbage Tree Harbour**

5.0 Planning to Reduce the Likelihood of Coastal Emergencies Occurring on the Wyong Coastline

This section outlines the steps Council proposes to reduce exposure of assets to coastal processes. An important aim of coastal land use planning is to prevent coastal emergencies, i.e. emergencies associated with coastal process (waves, currents and elevated sea levels) by locating assets outside immediate coastal risk areas wherever possible.

Section 9.0 of the WSCZMP discusses proposed risk reduction actions for Soldiers Beach, Lakes Beach, Shelly Beach, Hargraves Beach, North Entrance Beach, Blue Bay and Toowoan Bay. In terms of planning to reduce the likelihood of coastal emergencies, the following actions are relevant:

- Council does not propose to approve new development in the immediate coastal erosion hazard zone. Exceptions may apply to coastal protection structures for certain locations.
- Council will relocate the six surf clubs and related infrastructure along its coastline, to outside the immediate coastal erosion hazard zone. In particular, Council proposes to relocate surf club buildings, other than relocatable modular structures, to landward of the 2050 coastal erosion hazard line.
- Council will work with L&PMA and coastal holiday park operators to relocate and/or redesign accommodation units over time, so that they are outside immediate coastal erosion hazard zones and can be quickly relocated if necessary.
- In general, only relocatable, modular designs will be approved for new residences or other domestic structures that are partly or wholly within the 2050 coastal erosion hazard zone.
- Council proposes to allow 'temporary' structures such as sea walls constructed from large geotextile bags, to be installed and remain in place at Curtis Parade, North Entrance, for up to ten years, with conditions.
- Council is considering not allowing rock wall structures to protect residential development in immediate hazard zones, but which is also seaward of the alignment of the frontal dune system along the coastal embayment. This could apply to property on the seaward side of Curtis Parade. With current sea level rise expectations, this would mean that some existing coastal residences would need to be removed within the next 10 to 20 years.
- Council is considering allowing residents at other locations to construct 'permanent' rock wall protection (i.e. with a design life of more than 50 years) at high risk locations. This would include North Entrance Beach, Blue Bay. In the medium to long term, structural protection is also being considered for the Central Coast Highway at Lakes Beach. The alignment of these structures is discussed in Section 9 of the WSCZMP and is subject to further discussion and review.
- Council will continue to nourish parts of North Entrance Beach with sand that has been dredged from The Entrance. It should be noted that this process does not increase the total volume of sand in the sediment compartment. It is not a long term solution for protecting North Entrance Beach in coastal emergencies.
- Council will work with the NSW government to identify and make available long term sand supplies for beach and dune nourishment, as part of a long term asset protection

strategy. In particular, Council will work with the NSW government to evaluate the feasibility of sourcing off shore sand to enhance beach and dune sand volume and protect coastal assets.

- Council is preparing a schedule of maintenance and relocation for community infrastructure in immediate, 2050 and 2100 coastal erosion hazard zones. Over time, Council will invest in upgrading the sea wall at The Entrance (southern shore) and relocating sewer lines, water supply, power lines and roads to reduce exposure to coastal erosion hazards and so that critical services can be maintained during future coastal storms and erosion events.
- Council is considering a shire wide coastal erosion hazard management charge. If introduced, this charge would apply to all ratepayers in the shire. Proceeds would be invested in a special Trust. The purpose of the Trust would be to help Council meet the costs of protecting and/or relocating key community (public) assets in coastal hazard zones, over time. Some of the Trust fund could also be used for coastal land acquisition, in conjunction with State and Commonwealth government investment.

6.0 Preparing for unavoidable coastal emergencies

As discussed in **Section 5.0**, Council's strategy is to firstly reduce the exposure of assets to the effects of coastal storms. However, as there are currently many assets located in the immediate hazard zone, and there will be a significant lag time in relocating assets Council must also prepare for the ongoing management of coastal emergencies.

This section first describes the main drivers of coastal emergencies. These drivers determine when and how often the conditions associated with coastal emergencies are likely to occur.

Over time, sea level rise will add to the oceanic water elevation that is associated with wave overtopping and severe coastal erosion events.

The remainder of **Section 6.0** discusses how Council will prepare itself and its coastal communities to respond safely and effectively during unavoidable coastal emergencies.

6.1 Principal Drivers of Coastal Emergency Events

The most important underlying process causing coastal emergency events on the NSW central coast is the 'east coast low'. **Section 6.1.1** provides general background on these storms and why they are a threat to coastal assets. Two other natural hazards may also drive severe coastal erosion; these are the southern tail of a tropical cyclone and tsunami. These less common process drivers are discussed in **Section 6.1.2**.

6.1.1 East coast lows

The Bureau of Meteorology (BoM) defines an East Coast Low as an intense low pressure system. The BoM discussion of the genesis of East Coast Lows provides a succinct explanation of the challenge that these systems present to weather forecasters and to emergency response planning. Key points are noted below:

- East Coast Lows occur on average several times each year off the southern Queensland, NSW and eastern Victorian coast.
- They are more common in autumn and winter.
- They may develop out of tropical cyclones, but more often (certainly for the south coast) develop rapidly offshore from a pre-existing low pressure trough, or in the wake of a cold front moving from Victoria into the Tasman Sea. Warm sea surface temperatures can contribute to their development.
- They can intensify rapidly overnight and their movement can be difficult to predict.
- East Coast lows typically generate gale or storm force winds, heavy widespread rainfall (leading to flash flooding or major river flooding), very rough seas and prolonged heavy swells. Wave heights are usually in the range 5 metres to 10 metres. During the two most documented storms, the 1974 'Sygna' storm and the 2007 Pasha Bulka storm, maximum wind gusts of 165 kilometres per hour and 124 kilometres per hour were recorded. In other major east coast low storms, very heavy short term rainfall has been recorded. For instance, the February 1955 storm resulted in the Maitland/Hunter floods in which 15,000 people needed to be evacuated, the August 1998 East Coast Low produced 401 millimetres of rain in Kangaroo Valley over three days; an August 1996

storm produced 386 millimetres of rain over two days in the Illawarra. Similar extreme rainfall events have been recorded right along the east coast.

- The major severe weather impacts occur to the south of the centre of the low pressure system. BoM notes that even for severe storms, there can be clear skies to the north, so the change in conditions can be rapid and dramatic as the storm centre moves north.
- East Coast Lows usually last only a few days.
- Whilst there are about ten significant marine storms each year, the most dangerous storms occur on average only once a year.
- East Coast Lows have varying intensities, and the recurrence interval of the most severe storms, such as the May 1974 storm has been calculated as at least 100 years.
- Significant beach erosion events along the Central Coast occurred in 1974, 1978, 1986, 1998, and 2007 associated with major East Coast Low storms.
- Coastal inundation associated with East Coast Low storms can occur because of major catchment flooding, flash flooding or because elevated sea level and high waves overtop low coastal dune systems. Elevated sea level associated with low pressure systems and strong offshore forcing winds is known as 'storm surge'. The highest and most dangerous sea level occurs when a storm surge and high waves are superimposed on a high astronomical tide.
- Tuggerah Lake is an intermittently open and closed coastal lake (an ICOLL). The lake entrance closes naturally by the deposition of an accreting coastal berm. Council dredging in The Entrance since 1990 has maintained small tidal flows in and out of the lake. Lake water levels may still set up above mean sea level because of the height of the berm and the constrictions in the entrance channel. After very heavy rainfall associated with an East Coast Low, shoals in The Entrance scour and the lake entrance opens to the sea. High velocity flows driven by differential lake and ocean water levels result in entrance scouring which delivers sand to the nearshore zone along the beach and contributes to rapid recovery of sand volume on the beach after the storm has passed. High lake levels can also lead to early artificial opening to protect low lying property from flooding.

6.1.2 Other Severe Natural Hazards Affecting the Wyong Coastline

6.1.2.1 Tsunami

Geoscience Australia report that there is geological evidence that suggest that large tsunami may have reached the Australian coast over a time scale measured in thousands of years. Observations of perched boulders on cliffs in the Shoalhaven have been interpreted by some geologists as evidence of a very large tsunami in geological time. No similar features have been reported from the Central Coast.

The historical evidence of tsunami events is less on the east coast than the north-west coast. Gissing, Webb and Hanslow 2007 (drawing on Dominey-Howes 2007) report that the NSW coast has experienced 40 tsunami since European settlement, but most of them were very small. Geoscience Australia describes a tsunami that reached Sydney and the south coast in 1960, following a major earthquake off Chile. The tsunami waves were recorded at approximately one metre. Although this was sufficient to cause minor damage to boats in harbours along the NSW coast, it was a very small event compared with those experienced on the Western Australian coast and north into Indonesia.

Gissing, Webb and Hanslow (2007) also note the speculation that the 'Black Sunday' event at Bondi Beach in 1938 could have been due to the influence of a tsunami on wave size. At this stage, the event, in which five people died in very large waves, has not been directly linked to an earthquake and associated tsunami, but it is possible that an earthquake around the Pacific Rim could have caused the waves.

6.1.2.2 Tropical cyclones

Tropical cyclones do not normally have a direct impact on the NSW Central Coast, but as noted above some East Coast Lows develop out of the remains tropical cyclone low pressure systems. Indirect effects of tropical cyclones can include extended rain periods leading to flooding in major river systems and prolonged periods of high ocean swell. A possible consequence of predicted climate change is that tropical cyclones could track further south. If this occurs, the intensity of rainfall events and high ocean swells could increase.

6.1.2.3 Floods and electrical storms

The coastline and coastal catchments are affected by seasonal electrical storms and by occasional flash flooding or major flood events. WSC has prepared a Flood Policy and a Floodplain Risk Management Studies and Plans for various subcatchments and the Tuggerah Lakes.

WSC's web site also provides community information on what to do before, during and after floods and major electrical storms, including how and when to contact the State Emergency Service and other relevant service providers (see also contact details at the front of this document).

These storm and flood risk management issues are not addressed further in this Coastal Emergency Response Management Plan.

6.2 Plans and Approvals for Emergency Actions

6.2.1 Pre-emergency installation of temporary coastal protection works

The NSW Government has developed a Code of Practice and a Guide to the Statutory Requirements for Emergency Protection Works, which provide 'how to' detail about permissible temporary coastal protection works for private landholders. Currently, only landholders whose property is situated at an Authorised Location are permitted to install temporary erosion protection works, in accordance with methods prescribed in the Code and Guide. Residents considering installation of temporary emergency protection works should carefully consider the information in the OEH code and guides.

Council recognises that there are several other locations along the Wyong coastline where residential development and community assets are located within immediate coastal erosion hazard zones. Council also recognises that there may be unavoidable constraints to the installation of permanent coastal protection works, so that they are not in place before property is threatened by storm bite. Council proposes that temporary coastal protection works will be permitted at other locations in Wyong Shire as part of this Emergency Management Plan, subject to approval by the NSW Government.

At this stage, Council proposes that the following will be considered to be temporary coastal protection works:

- Beach nourishment, using sand of appropriate grain size and colour.

- Construction of temporary sea walls, using large geotextile bags, filled with sand of an appropriate grain size and colour. The design and location of these works will be in accordance with the Ministerial Guideline.

Council proposes that temporary emergency protection works could be placed seaward of any residential property in the immediate coastal erosion hazard zone, when the storm bite escarpment is less than 20 metres from the most seaward wall of existing residential development (houses and major domestic infrastructure, not minor decks and gazebos).

Approvals for these temporary emergency protection works will have the same requirements that are currently proposed for Authorised Locations (subject to any future variations in these requirements).

6.2.2 Approvals for sand supplies

Currently, there are few suitable sources of sand within Wyong Shire that can be used for beach nourishment or for filling large geotextile bags. In general, the sand needs to be of marine origin. Some wind-blown sand will also be appropriate.

Council will not approve sourcing sand from other parts of the frontal dune system of beaches in Wyong Shire. For instance, sand from the frontal dune at the northern end of Tuggerah Beach may not be used for beach nourishment at North Entrance of Hargraves Beach, or any other location in the immediate erosion hazard zone.

Council will not approve dredging sand from the relict tidal delta at Budgewoi Lake for use in beach nourishment or for filling large geotextile bags.

Council currently dredges up to 80,000 cubic metres of sand annually from the outer part of the entrance channel of Tuggerah Lake. This sand is placed directly onto North Entrance Beach and is therefore a short term beach nourishment program. Some of this sand is redistributed northward along Tuggerah Beach by longshore wave processes, some accretes into the local dune system and some returns to the tidal delta. Studies are currently underway to better quantify the sediment budget for this dredging process.

As noted in **Figures 4.1** and **4.2**, there is potential to stockpile some of this sand on unvegetated sections of the frontal dune or behind the frontal dune system at North Entrance. However, this is only relevant to nourishment and geotextile bag structures for North Entrance.

Other existing sources of sand for beach nourishment include sand quarries in coastal dunes elsewhere in the region. This sand would need to be transported to potential nourishment areas and stockpiled. Council will work with OEH and landholders to resolve appropriate stockpiling locations for affected beaches.

The WSCZMP discusses the potential for accessing marine sand from the continental shelf for use in beach nourishment (for emergency purposes or to maintain beach amenity when permanent structural protection is in place) or to fill large geotextile bags. There are currently no approvals for exploration or use of this sand source.

Council will follow the policy lead of the NSW Government in relation to offshore sand supplies. It is unlikely that approval will be granted for access to offshore sand for beach nourishment or any other purpose for at least ten years, and potentially much longer.

The current situation therefore, is that any resident or group of residents who proposes to use sand for emergency protection works must obtain the sand from an existing approved sand quarry and must demonstrate that it is of a suitable grain size and colour for application

at the specific location. This sand should be stockpiled at a location approved by Council. Preparation and planning for all of these works should be carried out outside of a coastal emergency.

6.3 Training

Council has decided not to pursue the option of authorising Council officers under the *Coastal Protection Act 1979* to certify and regulate emergency coastal protection works. Council officers will not be trained in this regard. However, Council will provide appropriate training for relevant officers in relation to other aspects of coastal emergency response.

Council will work with OEH and SES in shared training of responses in a variety of coastal emergency scenarios.

Council will ensure that relevant officers are fully aware of the best available climate change science and NSW and Commonwealth government policy responses, as they affect the Wyong Coastline.

6.4 Liaison and Communication

As noted in **Section 6.4**, Council officers will train with OEH and SES officers to ensure there is a clear shared understanding of the scope of coastal emergencies, the responsibilities of the various agencies and how those responsibilities will be given effect during a coastal emergency event.

Council, SES and OEH will continue to be represented on the Tuggerah Lakes Estuary, Coastline and Floodplain Management Committee.

Council, SES and OEH will work together through membership of a local emergency management committee.

After any coastal emergency event, relevant Council, OEH and SES officers will meet and review the implementation of emergency actions by each responsible organisation. The review process is intended to lead to continual improvement of emergency response for coastal emergencies.

6.5 Community Preparedness

Sections 6.2.1 and **6.2.2** describe some aspects of community preparedness for coastal emergencies. In addition to these planning and on ground works, Council will assist residents to prepare for coastal emergency events by providing clear information about:

- the nature of coastal emergencies and the storms that drive coastal emergencies;
- the immediate coastal erosion hazard zone for each beach along the Wyong coastline;
- relevant State and Commonwealth government sources of information, such as Bureau of Meteorology and OEH;
- emergency contact numbers for assistance during a coastal emergency;

- where information can be found to update the situation in the lead up to and during a coastal emergency. In the first instance, updates will be available via local ABC radio. Council is also considering a web based coastal emergency information service which can be accessed during coastal storms.

As part of the implementation of the WSCZMP, Council will develop a range of styles of community information, so that all residents have access to at least two sources of information about the exposure of their property to coastal emergencies and how to reduce risks during coastal emergencies. Potential community information styles include:

- brochures sent to property owners with rate notices;
- Section 149 certificates;
- brochures delivered to all affected properties (rented or owner occupied);
- media releases and features in local newspapers and radio;
- Council newsletters;
- signage at beaches and surf clubs;
- community meetings, including briefings for surf clubs, precinct committees, progress associations and other community groups; and
- static information on Council's web site.

Council is considering an interactive coastal risk management page on its web site; for instance, where affected residents can test scenarios for storms of varying intensity, see potential access and egress routes for coastal emergencies, and see stockpile sites.

6.5.1 Preparing for monitoring

Council proposes to monitor a selection of sites along the coast after coastal emergency events. Preparation for monitoring includes:

- installation of control points on the dunes, at locations which will not be eroded by storm bite;
- developing survey protocols and record keeping systems, linked to Council's GIS system; and
- training of survey teams in the level of survey that is required, in accordance with survey protocols).

7.0 Actions during Coastal Erosion Emergencies

During a coastal emergency, SES has primary control of responses. SES, OEH and Council will implement the communication action plan that has been jointly developed.

During a storm, emergency works will be carried out by the response agencies. This is different to the emergency preparation works, which will often be carried out and paid for by landholders. Emergency works by Council during a storm will be implemented where temporary protection legally installed by land holders is failing and property is at risk.

Council is responsible for implementation of previously planned emergency protection works, when human safety has been secured and when it is safe to carry out emergency protection works. Council has adopted a risk based hierarchy of actions during storm conditions, using the criteria in **Table 7.1**. To apply these criteria, Council will assess the severity of the storm, in conjunction with SES, OEH and BoM. The severity of the storm is the primary driver of the risk level.

Table 7.1 – Risk based hierarchy of actions

Risk level	Action during storm events
Low	Inspect affected sites, photograph, repair any damage post storm
Moderate	Inspect affected sites, photograph, assess damage implications, restrict access, consult and notify other organisations, implement repairs such as beach scraping, rationalised access reconstruction.
Major	Trigger DISPLAN response, inspect, photograph, assess damage implications, restrict access, consult and notify other organisations, implement higher level repair works such as protection installation, beach scraping, sand nourishment, rationalised access reconstruction.
Catastrophic	Trigger DISPLAN response, inspect affected sites, photograph, assess damage implications, restrict access, consult and notify relevant organisations, undertake emergency repairs to services, collaborative planning to determine response, review WSCZMP.

Where Council believes that emergency physical works may be necessary, to protect assets which are threatened by storm bite erosion (whether or not temporary protection works are in place) it will do the following:

- maintain close liaison with BoM about storm intensity and tracking;
- commence short term monitoring of key (high risk) sites, and activate a community phone-in service to report severe erosion threats;
- Council's emergency response coordinator will maintain contact with the SES controller and with the OEH ESFAC during the high alert period (to coordinate staff movements, maintain clear understanding of access issues, etc.);
- with SES, advise local radio stations and relevant land owners and community organisations;
- discuss any proposed beach nourishment or sand bagging activity with SES and keep SES fully informed at all times;

- with SES ensure that the works can be safely conducted – for instance, by managing onlookers;
- maintain communication with affected property owners. Some property owners may have relocatable assets. They will need adequate lead time to move these assets out of the potential storm bite area;
- discuss the issues and proposed physical works with the OEH ESFAC;
- discuss options with Central Coast Water Corporation if water or sewer assets are threatened. Close public access to any unsafe area (affected by biological pollution); and
- alert operators of relevant sand supplies (if additional sand, beyond what is already in stockpiles near affected locations is needed). Alert earthmoving equipment contractors etc as necessary.

7.1 Other Types of Coastal Emergency Events

As noted in **Section 1.0**, there is a possibility that the Wyong coastline could be affected by a tsunami. Australia has a national tsunami warning system (part of the Pacific Tsunami Warning Centre, with warnings issued by the Bureau of Meteorology) and a national and NSW response process.

SES is the nominated Combat Agency for tsunami in NSW.

Information about the risk (hazard magnitude) of tsunami impact on the NSW coast is limited. NSW SES and OEH, with Geoscience Australia are preparing a tsunami assessment scoping study for the east coast. The results of this study will facilitate a more detailed and accurate hazard assessment which can then be used to identify vulnerable areas and to develop more targeted risk abatement strategies. For instance, the assessment will provide more information on the coastal erosion and inundation impacts of tsunami (using high resolution terrain data), which are currently poorly understood.

The NSW Tsunami Emergency Subplan follows the format of other NSW DISPLAN documents, with procedures for preparedness, response and recovery. NSW SES prepared the Plan in consultation with relevant State agencies and subsequently conducted regional briefings for some 800 emergency managers.

Should a large tsunami occur, its potential impacts on low lying coastal land are much greater than coastal storms (affecting both land based and marine elements) and multi agency coordination of a wide range of services would be essential.

Given the scale of potential impact, a wide ranging and effective warning system is necessary. This is managed by SES.

Council has a number of roles in the recovery process from a future large tsunami. In relation to erosion management, however, the currently available hazard information makes it difficult to specify exactly what would be required. In this context, Council's management response to tsunami comprises its measures to address severe coastal storm erosion, supplemented by a precautionary, watching brief, maintaining liaison with SES and DECCW, so that its erosion control response can be refined.

Council will do the following:

- WSC will liaise with SES and OEH about the outcomes of new studies into tsunami risks along the NSW coast, especially as they relate to the Wyong coastline.

- WSC will develop local scale risk assessments and ensure that its coastal and emergency management personnel have an up to date awareness of the NSW Tsunami Emergency Subplan.
- As new information about tsunami hazards, particularly in relation to coastal erosion, becomes available, WSC will update its emergency management plans in consultation with SES, OEH and local at-risk communities.
- WSC will include information about currently understood tsunami risks on the coastal page of its website.

8.0 Monitoring and Review

8.1 Post Storm Follow Up

As shown in **Table 1.2**, the emergency response actions do not cease when the storm abates. After each storm, there are remediation and review actions which must be completed.

These actions are designed to enhance stabilisation and recovery of the beach environment and to encourage reflection on the emergency operation so that:

- any clean up of environmental hazards is completed efficiently. This would include any clean up required after overflows or other discharges from the sewerage system;
- erosion around stormwater outlets is repaired and revegetated;
- dune escarpments are stable and unlikely to collapse;
- stairs and ramps to the beach needing repair are identified and prioritised for remedial action. Access via these structures will be closed until repairs are carried out to make the access way safe;
- other infrastructure is safe and ready for use (e.g. equipment for beach patrol);
- hazard lines can be reviewed if necessary;
- operational processes can be refined if necessary; and
- stakeholder and collaborator communication processes are as effective as possible.

SES will lead these processes as set out in its standard emergency protocols and procedures. Council is responsible for the following specific actions:

Council will conduct post storm land survey and photographic records of the beach face and eroded scarps at designated monitoring points (as discussed in **Section 6.5.1**).

As well as refining the emergency management processes as necessary after each emergency event, Council will include monitoring information from coastal emergencies in its full review of the WSCZMP, each three to five years.

9.0 Implementation Summary

Table 9.1 summarises the actions that WSC proposes to take to manage coastal emergency risks.

Table 9.1 - Action Summary

Action	Details
Finalise Emergency Management subplans for Authorised Locations on the Wyong Coast (Hargraves Beach and North Entrance Beach)	Draft Plans are in Section 4.0 of this draft emergency response management plan and in Section 8.0 of the WSCZMP. Council will finalise these plans in consultation with OEH and affected residents. The Subplans will also be reviewed regularly.
Extend the locations where emergency protection works are permitted to include all locations along the Wyong coastline where private property is within the immediate coastal erosion hazard zone. Conditions will apply in relation to how and when works may be carried out.	This is an action from the WSCZMP and will enable other residents affected by immediate hazards to protect their property in the short term. Details will require approval by OEH.
Introduce land use planning measures in Wyong LEP and DCP to control new development in coastal risk areas.	These are set out in the WSCZMP.
Investigate suitable and accessible sources of sand for beach nourishment, both for emergency or temporary protection purposes and for long term mitigation of recession impacts.	There are very few suitable sources of sand for beach nourishment in Wyong Shire. This is an action from the WSCZMP.
Confirm locations along the Wyong coastline where sea wall protection (either shorter term protection with large geotextile bags or longer term engineered rock wall protection) will be permitted. With NSW Government and land owners, resolve funding arrangements for coastal protection works for public and private assets.	This is an action from the WSCZMP. The draft plan identifies options for beaches with critical short term and medium term erosion hazards.
Investigate potential changes to sediment dynamics in The Entrance and North Entrance Beach, as sea level rises. Identify optimal dressing strategy for The Entrance in current conditions, to enhance sand on North Entrance Beach, without destabilising The Entrance channel.	This is an action from the WSCZMP.
Continue training Council officers in emergency response activities, with SES and DECCW	This continues Council's existing liaison with SES and OEH for managing a range of emergencies associated with natural hazards.
Continue the function of the Tuggerah Lakes Estuary, Coastline and Floodplain Management Committee as a forum attended by Council, SES, OEH, L&PMA and community representatives. Central Coast Water Corporation should also attend.	This is an action from the WSCZMP. The Committee will have a range of ongoing communication and review roles.
Prepare and distribute a range of community information about coastal hazards and coastal emergencies	This is an action from the WSCZMP. With regard to emergency response, the focus is on communication about immediate coastal erosion hazards and how land holders and residents can prepare for and act during storm events.
Identify representative coastal monitoring locations	This action will provide ongoing data about how

Action	Details
whose condition can be tracked before and after major coastal storm events. Conduct beach and dune profile monitoring as required.	the coast responds in various storm conditions. It is additional on ground data to supplement the regular LiDAR and LADS data collection that is recommended in the WSCZMP.
Identify potential sand stockpile sites close to beaches likely to be affected by storm bite erosion threatening private property and public assets and prepare detailed site plans for the management of these locations.	This is an action from the emergency subplans and also applies to other beaches with immediate coastal erosion hazards.
Create a spatial data base of all council assets in the immediate coastal erosion hazard zone. Prepare protocols for the priority of repair works for Council assets affected by coastal storm damage.	This is an action from the WSCZMP.
When beach access ways are damaged by coastal storms, place emergency signage at affected locations. Close unsafe access ways until repair work is complete.	Council already has a responsibility to do this.
Report on emergency response activities to the TLEC&FMC and in Council annual reports.	This is an ongoing role for the TLEC&FMC
Review the effectiveness of the Coastal emergency response plan with the Wyong Coastal Zone Management Plan at intervals of not more than 5 years.	This is an action from the WSCZMP

10.0 References

DECCW, 2010. Guidelines for Preparing Coastal Zone Management Plans

DECCW, 2011a. Code of Practice Under the *Coastal Protection Act 1979*

DECCW, 2011b Guide to the Statutory Requirements for Emergency Coastal Protection Works

Emergency Management Australia 2004. Emergency Planning.

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Hanslow D and Howard M 2006. Emergency Management of Coastal Erosion in NSW. (SES website)

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