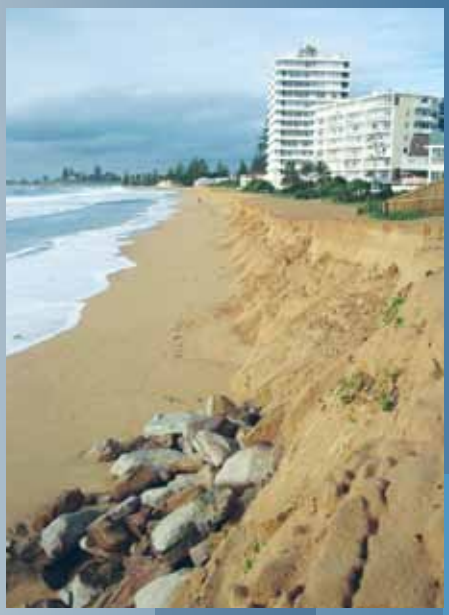
NSW GOVERNMENT | Planning

NSW COASTAL PLANNING GUIDELINE: ADAPTING TO SEA LEVEL RISE

AUGUST 2010



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1 INTRODUCTION

1.1 SCOPE AND AIMS OF THE GUIDELINE

The most recent climate change projections indicate increased temperature and evaporation rates for coastal NSW, along with changes to seasonal rainfall and runoff and subsequent impacts on bushfire regimes, biodiversity, soils, erosion and flooding. The primary impacts in coastal areas are likely to result from sea level rise which, coupled with storms, may lead to increased coastal erosion, tidal inundation and flooding.

The NSW Coastal Planning Guideline: Adapting to Sea Level Rise (this Guideline) has been prepared to provide guidance on how sea level rise is to be considered in land use planning and development assessment in coastal NSW. Other climate parameters affecting coastal processes may be considered when preparing coastal and flood risk studies.

This Guideline applies to all coastal areas of NSW[1]. The term 'coastal areas' is used broadly in this Guideline to be all land fronting tidal waters including the coastline, beaches, coastal lakes, bays and estuaries and tidal sections of coastal rivers. It also includes other low lying land surrounding these areas that may be subject to coastal processes in the future as a consequence of sea level rise.

In this Guideline 'coastal risks' are taken to include risks from coastal erosion, tidal inundation and coastal flooding, including impacts of sea level rise.

Of note, coastal flooding in lowland areas will be of particular concern in the future as a consequence of sea level rise, including increased likely frequency, duration and height of flooding and consequent emergency evacuations and likely property and infrastructure damage. Areas where tidal water flows back up the stormwater drains in king tides under current climatic conditions will be subjected to more frequent tidal inundations.

The aim of this Guideline is to promote ecologically sustainable development (ESD), and in particular to encourage a precautionary approach to land use planning and development assessment in light of potential sea level rise impacts in coastal areas. This Guideline therefore adopts a risk-based approach to planning and development assessment in coastal areas.

1.2 POLICY CONTEXT OF THE GUIDELINE

Land use planning and development assessment processes require a balance between social, economic and environmental considerations. As a consequence of climate change, councils and the State Government face additional challenges in decision-making, particularly in coastal areas of NSW.

The NSW Government has made a concerted effort to incorporate climate change into relevant planning policies, manuals, plans, strategies and directions including the following documents:

- ***NSW Sea Level Rise Policy Statement*** (2009) – specifies sea level rise planning benchmarks of an increase above 1990 mean sea levels of 40cm by 2050 and 90cm by 2100 and outlines that responsibility for coastal protection works rests with landowners, both public and private.
- ***NSW Coastal Policy*** (1997) – requires that climate change be considered in planning and development assessment matters.
- ***Coastal Regional Strategies*** – strategic plans at a regional scale that:
  - seek to ensure future urban development is not located in areas of high risk from natural hazards including sea level rise, coastal recession, rising water tables and flooding;
  - state that in order to manage the risks associated with climate change, councils will undertake investigations of lands with the potential to be affected by sea level rise and inundation to ensure that risks to public and private assets are minimised; and
  - specify that local environmental plans (LEP) will make provision for adequate setbacks in areas at risk from coastal erosion and/or ocean-based inundation in accordance with coastal management plans.
- ***Sydney Metropolitan Strategy*** (2005) and ***draft Sub-Regional Strategies*** – contain a variety of actions factoring climate change into metropolitan planning frameworks.

[1] Coastal areas of NSW include the NSW Coastal Zone, as well as Sydney Harbour, Botany Bay, the Hawkesbury River and their tidal tributaries.

- ***Coastline Management Manual*** (1990) and ***Floodplain Development Manual*** (2005) – require consideration of climate change in the preparation of coastal hazard and flood studies and management plans.
- ***State Environmental Planning Policy 71: Coastal Protection*** – requires that councils consider the impact of coastal processes and coastal hazards when preparing LEPs and assessing development in the NSW Coastal Zone.
- ***Section 117 Direction 2.2 – Coastal Protection*** – directs that a draft LEP shall include provisions that give effect to and are consistent with the *NSW Coastal Policy*, the *Coastal Design Guidelines for NSW* and the *Coastline Management Manual*.
- ***Section 117 Direction 4.3 – Flood Prone Land*** – requires that a draft LEP shall include provisions that give effect to and are consistent with the *Floodplain Development Manual* and the *NSW Flood Prone Land Policy*.
- ***Standard Instrument: Principal Local Environmental Plan*** – contains *clause 5.5: development within the coastal zone* which requires that all development consent authorities within the NSW Coastal Zone consider the effect of coastal processes and coastal hazards and potential impacts, including sea level rise on the proposed development, and arising from the proposed development.

This Guideline builds on these initiatives to encourage more consistent consideration of potential sea level rise impacts in coastal areas, including incorporation of the NSW sea level rise planning benchmarks.

Implementation of this Guideline will ensure more effective application of these existing policies and directions in light of greater understanding and scientific certainty with respect to sea level rise.

This Guideline supports NSW Government policy, and as such, councils, state agencies, planners and development proponents are to have regard to it when addressing sea level rise matters in land use planning and development assessment in coastal areas.

1.3 GUIDELINE PRINCIPLES

This Guideline adopts six coastal planning principles for sea level rise adaptation. The principles should be applied in decision-making processes for land use planning and development assessment in coastal areas.

Coastal planning principles: adapting to sea level rise

Principle 1 – Assess and evaluate coastal risks taking into account the NSW sea level rise planning benchmarks.

Principle 2 – Advise the public of coastal risks to ensure that informed land use planning and development decision-making can occur.

Principle 3 – Avoid intensifying land use in coastal risk areas through appropriate strategic and land use planning.

Principle 4 – Consider options to reduce land use intensity in coastal risk areas where feasible.

Principle 5 – Minimise the exposure of development to coastal risks.

Principle 6 – Implement appropriate management responses and adaptation strategies, with consideration for the environmental, social and economic impacts of each option.

Note: In this Guideline, 'coastal risks' refer to coastal erosion, tidal inundation and coastal flooding. That means that coastal risk areas are those currently at risk and those additional areas that are likely to be at risk in the future as sea level continues to rise unless the impacts of sea level rise can be effectively mitigated (**Figures 1** and **2**).

Umina – DECCW

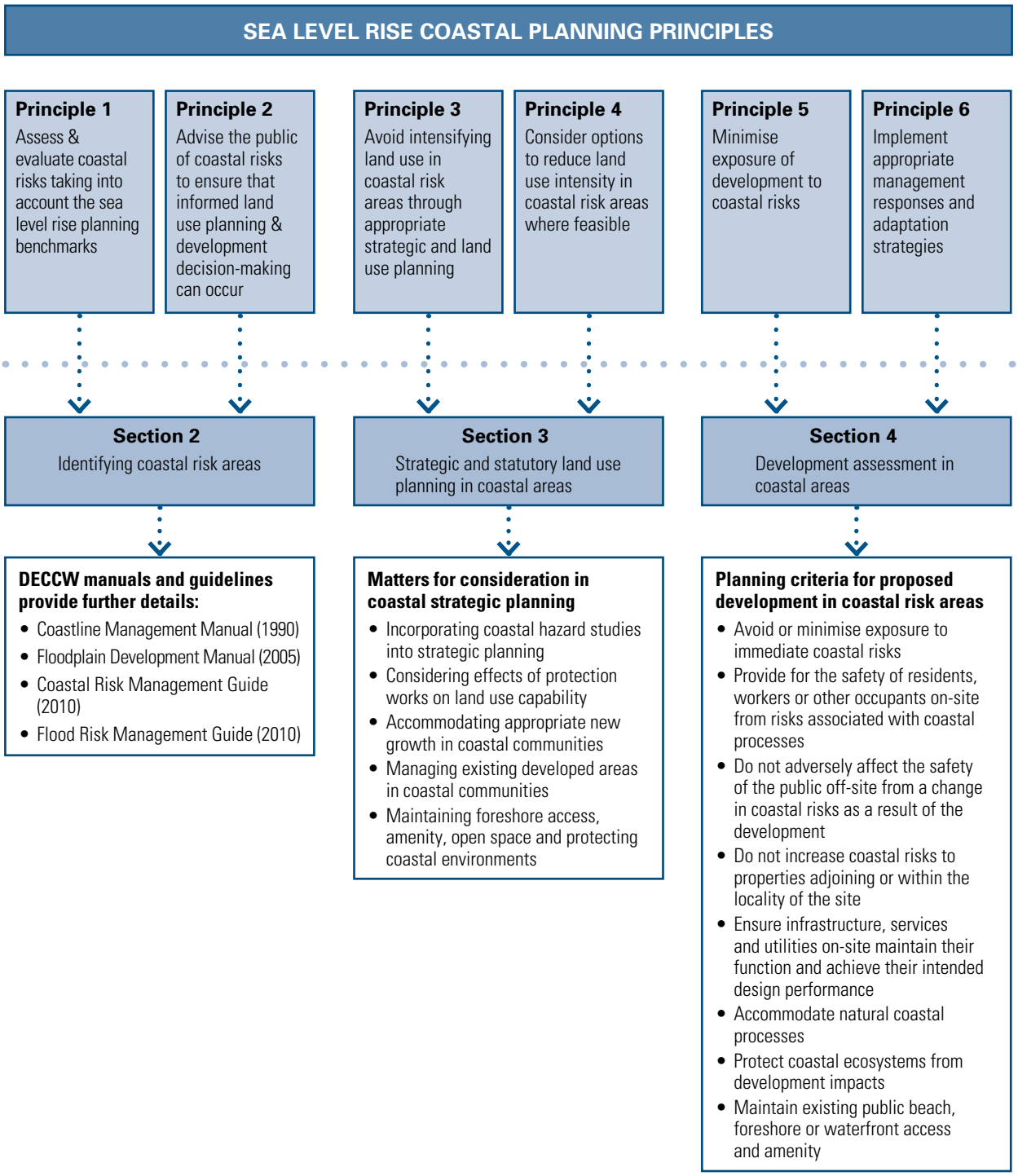
1.4 STRUCTURE OF THE GUIDELINE

This Guideline is structured around the implementation of six coastal planning principles for the consideration of sea level rise. The following diagram illustrates the relationship between these principles and the structure of this Guideline.

SECTION 2 – IDENTIFYING COASTAL RISK AREAS outlines how sea level rise should be incorporated into coastal risk assessment.

SECTION 3 – STRATEGIC AND STATUTORY LAND USE PLANNING provides information on how sea level rise impacts can be factored into strategic and statutory land use planning.

SECTION 4 – DEVELOPMENT ASSESSMENT outlines the process for considering sea level rise in the preparation and assessment of development applications in coastal areas.



2 IDENTIFYING CURRENT AND FUTURE COASTAL RISK AREAS

PRINCIPLE 1 – Assess and evaluate coastal risks taking into account the NSW sea level rise planning benchmarks.

PRINCIPLE 2 – Advise the public of coastal risks to ensure that informed land use planning and development decision-making can occur.

2.1 SEA LEVEL RISE PLANNING BENCHMARKS

This Guideline adopts the NSW sea level rise planning benchmarks in the *NSW Sea Level Rise Policy Statement* (2009).

The NSW sea level rise planning benchmarks are an increase above 1990 mean sea levels of **40cm by 2050 and 90cm by 2100**. These benchmark figures were established by considering the most credible national and international projections of sea level rise for the NSW coast and take into consideration the uncertainty associated with sea level rise projections.

These benchmark figures are to be used in NSW when planning for sea level rise.[2]

The adoption of the sea level rise planning benchmarks will ensure consistent consideration of the influence of sea level rise in coastal areas of NSW. The sea level rise planning benchmarks will be updated in light of any changes to accepted science, such as may be in the next Intergovernmental Panel on Climate Change assessment report expected in 2014.

The sea level rise planning benchmarks are not intended to be used as a blanket prohibition on development of land projected to be affected by sea level rise. New LEPs and development applications will continue to be assessed on their merits using a risk-based approach to determine whether the impacts of sea level rise and other coastal processes can be mitigated and managed over time.

2 For the year 2100, the Federal Government adopted a sea level rise figure of 1.1m coupled with Highest Astronomical Tide levels to illustrate potential impacts across the nation in its recently completed *First Pass National Assessment – Climate Change Risks to the Australian Coast* (2009). The NSW sea level rise planning benchmarks are specific to the NSW coast and will not be changed in light of the first pass assessment.

Coastal planning **Principle 1** emphasises the need to undertake coastal risk assessments incorporating the sea level rise planning benchmarks so that both current and future hazards can be determined.

2.2 IDENTIFIED COASTAL RISK AREAS

There are two primary documents currently used in NSW that guide the identification of coastal erosion and coastal flood risk areas:

- *Coastline Management Manual* (1990) outlines the methodology for assessing and managing coastal hazards including beach erosion, shoreline recession, coastal entrance instability, vegetation degradation and sand drift, coastal inundation, slope and cliff instability and stormwater erosion; and
- *Floodplain Development Manual* (2005) outlines the methodology for assessing and managing flood hazards.

The sea level rise planning benchmarks are to be used in coastal hazard and coastal flood studies. Existing coastal hazard and coastal flood studies that have not incorporated the sea level rise planning benchmarks will need to be updated over time.

Two additional guides have been developed to assist councils in preparing coastal hazard and flood risk studies to incorporate the sea level rise planning benchmarks:

- *Coastal Risk Management Guide: Incorporating sea level rise benchmarks in coastal risk assessments* (2010); and
- *Flood Risk Management Guide: Incorporating sea level rise benchmarks in flood risk assessments* (2010).

The information in these guides updates the guidance in the Coastline Management and Floodplain Development Manuals related to sea level rise.

Some coastal councils have prepared coastal hazard studies that define coastal hazard zones in areas most at risk from coastal erosion and recession. *The Coastal Risk Management Guide* provides guidance on how the sea level rise planning benchmarks can be factored into the identification of additional areas projected to be at risk in the future from coastal erosion.

Flood studies have also been prepared for some coastal rivers and creeks likely to be affected by sea level rise. *The Flood Risk Management Guide* provides guidance on how the sea level rise planning benchmarks can be factored into the identification of additional areas projected to be at risk in the future from flooding.

As new studies incorporating the sea level rise planning benchmarks are completed, additional 'at risk' areas of coastline, foreshore and floodplain, that previously were of lower risk, will be identified. These coastal erosion and coastal flood risk areas will need to be taken into consideration when undertaking strategic land use planning and development assessment.

2.3 SEA LEVEL RISE INVESTIGATION AREAS FOR STRATEGIC PLANNING

Preparing new and updating existing coastal erosion and coastal flood studies will take some time. Prior to the completion of new or revised studies, councils may adopt sea level rise investigation areas (potential coastal risk areas) for the purpose of informing **strategic** land use planning.

For example, consideration should be given to not increasing the zoning intensity in sea level rise investigation areas without more detailed information. Councils could also use sea level rise investigation areas to help prioritise adaptation strategies, including asset management, in existing developed areas. Consideration should also be given to appropriate community based information about the specification and use of sea level rise investigation areas. Sea level rise investigation areas should not be included in environmental planning instruments or DCPs or used in development assessment.

A sea level rise investigation area can be used by a council as an interim guide to indicate land potentially subject to coastal risks now or in the future as a consequence of sea level rise. The sea level rise planning benchmarks should be incorporated into council's calculation of the sea level rise investigation areas.

Examples of possible measures that can be used in the identification of sea level rise investigation areas include:

- projected coastal erosion and recession distances along relatively long and straight sandy coastlines – 90cm sea level rise may result in coastal recession of 45 to 90 metres landward;
- projected tidal inundation in the lower reaches of a coastal waterway – additional 40cm by 2050 and 90cm by 2100;
- projected extension of flood prone land in tidal river reaches – additional freeboard added to the mapped flood planning area; and
- coastal areas below a set elevation in metres (AHD).

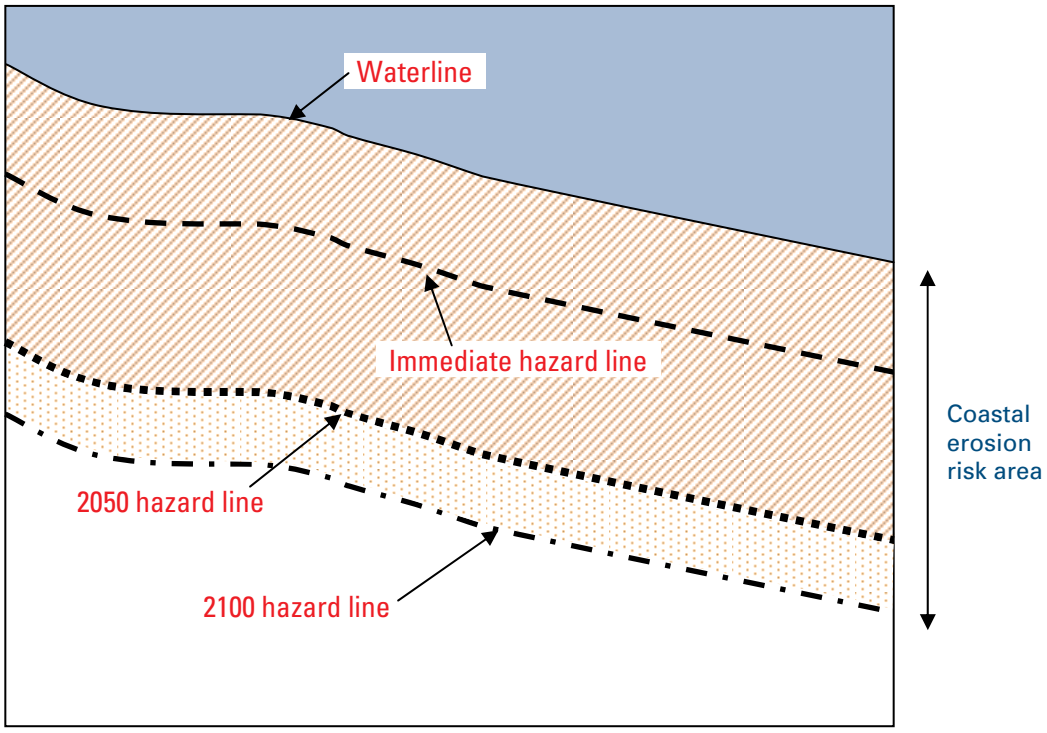
Sea level rise investigation areas should not be included in environmental planning instruments such as LEPs, or in DCPs until they can be confirmed by relevant local studies at which point they should be identified as coastal risk areas in maps within an LEP, regardless of the underlying zone.

2.4 CHANGES IN COASTAL RISKS OVER TIME

Coastal erosion hazards are often depicted on relevant LEP, DCP or risk maps as immediate, 50 year and 100 year lines, showing areas of potential impact. With consideration of the sea level rise planning benchmarks, revised coastal risk studies for open sandy coastlines, estuaries and coastal lakes should identify immediate hazard lines, as well as future hazard lines based on sea level rise to 2050 and 2100 (**Figure 1**).

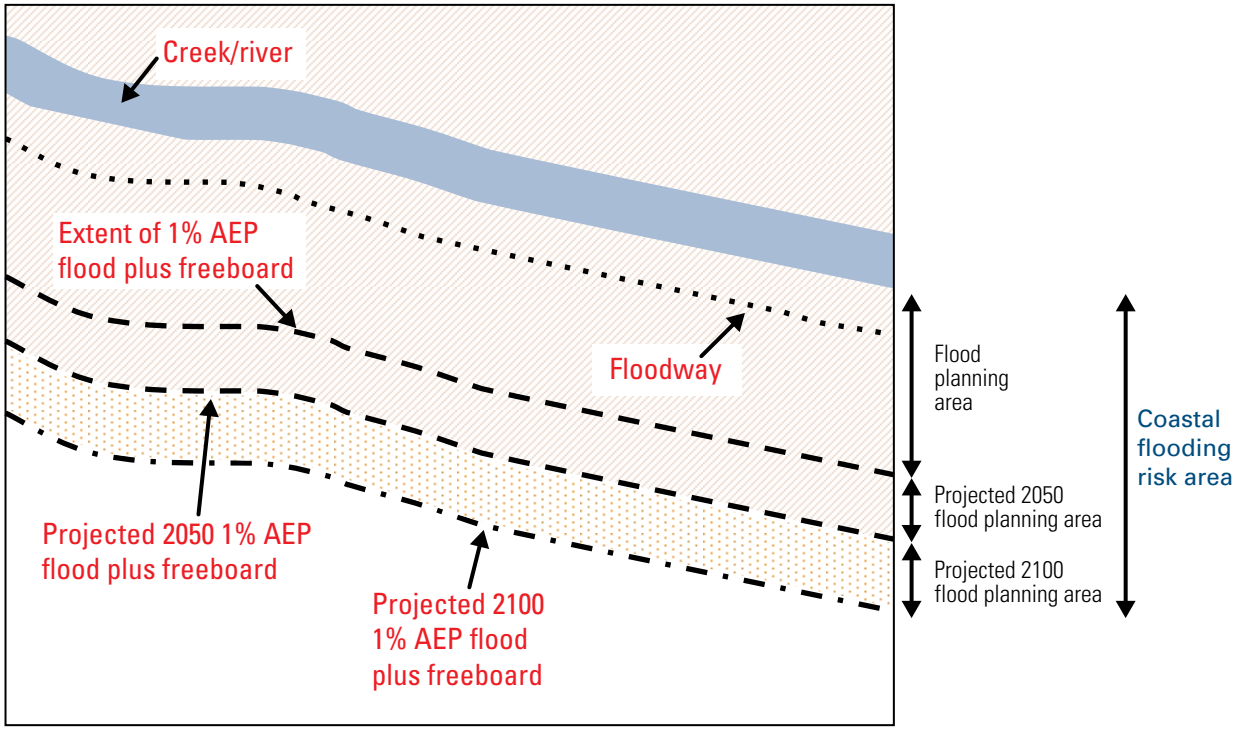
Old Bar – 7 July 2007

Figure 1 – Coastal erosion risk areas



Nb: Coastal erosion risk areas are identified in studies undertaken in accordance with the *Coastline Management Manual* complemented by the *Coastal Risk Management Guide*. The latter shows how the sea level rise planning benchmarks should be included in the modelling of the 2050 and 2100 hazard lines.

Figure 2 – Coastal flood risk areas



Nb: Coastal flood risk areas are identified in studies undertaken in accordance with the *Floodplain Development Manual* complemented by the *Flood Risk Management Guide*. The latter shows how the sea level rise planning benchmarks should be included in the modelling of the projected 2050 and 2100 1% AEP flood lines.

Flood studies, which generally depict the 1 in 100 year average recurrence interval (ARI) and the probable maximum flood (PMF) lines on maps, should also include modelling of the impact of sea level rise to 2050 and 2100 where relevant (**Figure 2**). The 100 year ARI is equivalent to the 1% annual exceedance probability (AEP), which represents a 1% chance of such a flood occurring in any given year.

While current climate change projections extend to the year 2100 this does not mean that sea level rise is projected to cease after that time or that other climate change parameters will be static. It is also important to note that climate change impacts are not occurring in a linear pattern, with future acceleration possible (IPCC, 2007).

2.5 MAKING INFORMATION AVAILABLE TO THE PUBLIC

Coastal planning **Principle 2** emphasises the importance of providing the public with timely advice on coastal risks so that informed land use planning and development decision making occurs.

The current process for the development of coastal hazard and floodplain risk management plans includes community consultation and involvement. Councils' coastal hazard and flood studies should be made available to the public when completed.

Advice provided or action undertaken by councils relating to coastal risks does not incur liability if it is done in good faith, which includes, but is not limited to, acting substantially in accordance with the principles in the *Coastline Management Manual* or *Floodplain Development Manual* (section 733 of the *Local Government Act* 1993).

Planning certificates issued under section 149(2) of the *Environmental Planning & Assessment Act* 1979 must include reference to coastal risks where council or a public authority has adopted a policy that imposes development restrictions on the specified parcel of land. These restrictions must be listed in a LEP, DCP or other council policy (including policies adopted by other public authorities).

Section 149 certificates are generally issued at the time of property purchase. Therefore other mechanisms should be considered in addition to Section 149 certificates to inform and keep landowners and the broader coastal community up to date on issues relating to coastal risks. Brochures, maps and other information could be distributed including via the internet, with rate notices or council newsletters, in targeted or ongoing programs.

Tuggerah Lake – DECCW

3 STRATEGIC & STATUTORY LAND USE PLANNING IN COASTAL AREAS

PRINCIPLE 3 – Avoid intensifying land use in coastal risk areas through appropriate strategic and land use planning.

PRINCIPLE 4 – Consider options to reduce land use intensity in coastal risk areas where feasible.

3.1 STRATEGIC PLANNING

Strategic planning includes land use planning activities at the regional, sub-regional and local level, including the preparation of Regional Strategies, LEPs, as well as local studies that inform the preparation of statutory plans such as LEPs and DCPs.

Land use intensification refers to processes that increase intensity or density of land use. For example, changing from low density residential to high density residential or from a rural zoning to a residential zoning would result in intensification. LEP and DCP controls can also be used to affect intensity. For example, principal development standards within an LEP relating to minimum lot size, height or floor space ratio can be used to change land use intensity.

In order to implement coastal planning **Principle 3** and **Principle 4** above, the following matters should be considered as part of the strategic planning process:

- Incorporating coastal risk studies into strategic planning
- Considering the effects of protection works on land use capability
- Accommodating appropriate new growth in coastal communities
- Managing existing developed areas in coastal communities
- Maintaining foreshore access, amenity and open space and protecting coastal environments.

Incorporating coastal risk studies into strategic planning

Councils are to assess and map risks in accordance with the NSW Government's *Floodplain Development Manual* (2005) and *Coastline Management Manual* (1990) together with the *Coastal Risk Management Guide: Incorporating sea level rise benchmarks in coastal risk assessments* (2010); and the *Flood Risk Management Guide: Incorporating sea level rise benchmarks in flood risk assessments* (2010) which DECCW has prepared to complement these manuals.

As new coastal risk studies incorporating the sea level rise planning benchmarks are completed, coastal risk areas may include new areas of coastline, foreshore and floodplain that previously were considered to be of lower risk. Once identified, these extended areas of risk will need to be taken into consideration when undertaking strategic and statutory planning.

In the interim, councils may adopt *sea level rise investigation areas* to inform their strategic planning, as described in Section 2.3 of this Guideline.

Considering the effects of protection works on land use capability

The decision to construct comprehensive coastal, foreshore or river protection works is an important strategic planning consideration, as it may influence the viability and appropriateness of different land uses.

Structural protection works may be important adaptation strategies, whether they are comprehensive works by the local planning authority or by individual landholders, provided they do not adversely affect coastal processes or the environment.

Where feasible, 'soft engineering' options are preferred to hard engineering works if protection of both assets and coastal habitats are to be achieved. For instance, options such as beach nourishment or re-establishing barrier dune systems may have the advantage of allowing ecological communities to persist, while still protecting landward development from coastal processes.

Structural works to minimize coastal erosion can include seawalls, revetments, gabion walls, artificial reefs and groynes as well as temporary protection works such as sand bags.

Structural protection works can protect immediate areas from coastal erosion but may divert or deflect erosive forces elsewhere if designed incorrectly or sited inappropriately.

To minimise such risks, the installation of structural protection works should be consistent with any approved management plan, such as the relevant coastline or floodplain management plan or related emergency action plan.

The long term maintenance and management of any such works, including the need for long term beach nourishment, are important considerations in the application of these measures.

While structural protection works have generally been undertaken by or on behalf of public authorities in the past, they may be proposed on private foreshore land or public land on a site-by-site basis by landowners, subject to development approval and specified conditions.

Private structural protection works, as with public works, should be based on sound engineering and environmental principles.

In late 2009, the NSW Government released a suite of measures to address coastal erosion, including legislative amendments. These measures provide further guidance relating to coastal protection works.

Structural works to manage coastal flooding can include levees, filling, retarding basins, flood mitigation dams, bypass floodways, channel modifications and floodgates. Such works should be permitted only where they do not adversely affect flood processes, other parts of the floodplain or the environment.

Accommodating appropriate new growth in coastal communities

Strategic planning plays an important role in accommodating future urban growth in a sustainable manner. It can assist in addressing the challenges faced by coastal communities that are affected by both development pressure and the impacts of climate change.

The *Coastal Design Guidelines for NSW* (2003) provide advice on the design of coastal urban settlements. Those Guidelines include advice on retaining foreshores and headlands in public ownership and protecting buildings and properties from storm events and sea level rise.

Coastal planning **Principle 3** of this Guideline discourages the intensification of development in coastal risk areas, particularly in 'greenfield' sites where the potential impacts of sea level rise cannot be effectively mitigated. For example, changing land use from rural to urban, or increasing the density of housing from low to medium or high density is strongly discouraged in high risk areas due to the potential future risk to life, property and the environment.

New urban centres should be sited away from coastal risk areas, where the potential impacts of sea level rise cannot be effectively mitigated, with consideration for other strategic planning issues that affect where new centres are located, such as adequate transport networks, proximity to populations and urban services, and the commercial viability of locations.

Sydney, Meadowbank – 12 Jan 2009 king tide – Peter Stuart

Managing existing developed areas in coastal communities

Coastal planning **Principle 4** of this Guideline encourages the reduction of land use intensity in coastal risk areas *where feasible* and where potential impacts of sea level rise cannot be effectively mitigated. Reducing land use intensity may however be difficult to achieve in areas that have already undergone significant urban development, such as, established residential zones and town centres.

Similarly, changing land use zoning from medium density housing to low density or prohibiting new urban development in general would affect the future development potential of a given area. This may be unnecessary, particularly if the coastal risks are only minor and the future development potential of the land is not otherwise restricted by other environmental, social or economic constraints.

In other areas, management responses and adaptation strategies may be limited and thus projected sea level rise may significantly affect the development potential. Appropriate planning now is needed to minimise the social and economic impacts of development in the long term.

In addition to coastal risks, when councils consider reducing land use intensity, the following factors must be considered:

- land tenure – public or private ownership;
- current land uses and existing use rights;
- the availability, effectiveness and feasibility of impact mitigation options;
- existing environmental constraints on development, such as, bushfire and coastal erosion hazards, flood risks, slope stability constraints, vegetation, threatened species and acid sulfate soils;
- other planning constraints on development, such as, distance to community services, access to transport, sewage, water and utilities and aboriginal cultural heritage; and
- the potential for requiring land acquisition.

Examples of Zoning Options in Coastal Risk Areas

For rural or undeveloped land in coastal risk areas, particularly seaward of the immediate hazard line, the E3 Environmental Management Zone may be appropriate in certain instances to manage land subject to environmental hazards or processes that may require careful management.

Other rural or undeveloped land in coastal risk areas may be zoned E2 Environmental Conservation Zone which provides the highest level of protection, management and restoration for such lands, while allowing uses compatible with those values. It must be noted that the range of permitted uses should not be drawn too restrictively as they may, depending on circumstances, invoke the *Land Acquisition* (*Just Terms Compensation*) *Act 1991* and the need for the Minister to designate a relevant acquiring authority.

For risk areas on coastal floodplains that have not yet been zoned for urban uses, retaining low intensity rural zones with large lot sizes may be more appropriate than intensifying land use by allowing residential, industrial or business uses – particularly if the land is projected to be flood prone in the future.

Where coastal risk areas are identified in a National Park or Nature Reserve, the E1 National Parks and Nature Reserves Zone will apply.

For other public land subject to coastal risks, councils may consider applying other zones with low intensity land uses permitted. For instance, in areas currently subject to coastal erosion such as beach and foreshore areas, it may be appropriate to zone the land RE1 Public Recreation Zone. In other circumstances, E2 Environmental Conservation Zone or E3 Environmental Management Zone may be more appropriate.

Coffs Creek penetrating back up stormwater system, 12 Jan 2009 king tide – Mel Bradbury

Rather than prohibiting infill or redevelopment in existing areas, councils could consider measures that would allow ongoing sustainable occupation of coastal areas, until such times as coastal risks threaten life and property. This may include the use of time and/or trigger limited development consent conditions, as discussed in Section 4.7.

As well as appropriate consent conditions, in existing developed areas, councils and/or landowners could consider the use of long term coastal protection works.

Structural protection works to reduce flood exposure to existing development can include flood levees which exclude flooding of the protected area for a particular design event. Sea level rise is likely to reduce the protection provided by levees in lower coastal waterways. Strategic planning for these areas needs to consider plans for future flood risk management. Options could include maintaining current protection levels by upgrading current or constructing new protection works or changing development controls.

Maintaining foreshore access and amenity, open space and protecting coastal environments

Strategic planning should address and accommodate the effects of sea level rise on public foreshore access and coastal assets such as reserves, recreation areas or natural areas.

This also includes addressing the implications on the long term protection of coastal and estuarine ecology and the importance of landward migration of wetlands, mangroves and salt marsh communities.

Coastal public reserves in particular provide important public open space and the loss of these assets may place additional pressure on other open space areas.

3.2 STATUTORY PLANNING

The coastal risk strategic planning considerations discussed in Section 3.1 should directly inform the preparation of planning proposals, LEPs and DCPs.

Strategic planning mechanisms, that is, Regional Strategies and local studies, in general provide broad guidance on suitable locations for large-scale coastal developments to meet future housing and employment needs.

The Regional Strategies also require councils to manage risk in accordance with flood management studies and coastal hazard studies, including sea level rise. In areas where studies have not been completed, councils are not to zone land or approve development or re-development in potential hazard areas unless assessed within a risk assessment framework.

Where possible, new urban developments and coastal subdivisions should be located outside coastal risk areas (for the 2100 sea level rise projection) to avoid increasing the community's exposure to coastal hazards unless the potential impacts of sea level rise can be effectively mitigated. In particular, developments such as hospitals, schools, child care or aged care facilities should not be located in existing or potential coastal risk areas where risks are high or where evacuation may be difficult.

Developments that are of a hazardous or potentially hazardous nature, for example manufacture or storage of hazardous or dangerous materials, or waste disposal, should also be sited outside coastal risk areas.

The following sections outline how an LEP can be used to implement coastal planning **Principle 3** and **Principle 4** to avoid intensifying land use or reduce land use intensity in coastal risk areas.

Land use zones and zoning objectives

Land use zones in the Standard Instrument for LEPs provide an important mechanism for regulating land use in coastal risk areas.

The appropriateness of using a particular land use zone will depend on the level of coastal risk, as well as other environmental and planning considerations, such as existing and permitted land uses on site.

Additional objectives must be consistent with the mandated objectives for development in the zone.

Where zones are identified as being subject to coastal risks it may be appropriate to include an additional objective for that zone requiring the accommodation of the projected impacts of sea level rise.

Principal development standards

The principal development standards provided in the Standard Instrument are the main tools for controlling the bulk, scale and intensity of permissible land uses and include minimum lot size, building height and floor space ratio.

Councils can vary the principal development standards across zones so that they reflect the underlying land capability.

Additional LEP provisions

The Standard Instrument contains *clause 5.5 – development within the coastal zone*. This clause addresses environmental and amenity issues and also requires that, when assessing development within the NSW Coastal Zone, the consent authority considers the effect of coastal processes and coastal hazards and potential impacts, including sea level rise, on the proposed development, and arising from the proposed development.

Wamberal Beach – 9 June 2007 – Phil Watson

Additional LEP clauses can be added to apply local provisions to the whole local government area or specifically mapped areas, regardless of the underlying zone. These types of clauses may contain controls for development including mitigation requirements, provided the local provisions are consistent with the intent and objectives of the underlying land use zone and compulsory provisions of the Standard Instrument.

Inclusion of *clause 6.5 – foreshore building lines* in LEPs may also be appropriate in some instances. That model clause prohibits certain development in foreshore areas, primarily in inner harbour/protected water locations. Foreshore building lines do not constitute a blanket prohibition of development.

Coastal risk areas could be identified in an LEP by a foreshore building line or a flood planning area, with development controls specified in the LEP including mitigation requirements, and performance criteria specified in a related DCP.

Model Local Provisions

Whilst *clause 5.5* of the Standard Instrument applies to the NSW Coastal Zone, Section 1.1 of this Guideline explains that consideration of sea level rise is applicable to areas beyond the NSW Coastal Zone.

Two additional model local provisions have therefore been developed for use with mapped coastal erosion risk areas and coastal flood risk areas shown within LEPs. Both provisions are available from the Department of Planning.

3.3 DEVELOPMENT CONTROL PLANS

DCPs include controls and standards that are part of a consent authority's statutory considerations when assessing a development application. Development controls in a DCP must be consistent with the relevant LEP. For example, DCPs cannot control the permissibility of development. DCPs can relate to issues over a whole LEP or local government area, or can relate to a specifically *mapped area*, such as a coastal risk area.

Where an LEP outlines principal development standards, such as height of buildings, minimum subdivision lot size and floor space ratio, a DCP can make more detailed provision with respect to development. These provisions can take the form of text, maps and diagrams, and usually contain further development standards, performance criteria, matters for consideration or procedural matters associated with controlling development.

For example, coastal risk areas could be mapped, separately as coastal erosion or coastal flooding areas, in both the LEP and the associated DCP. Performance criteria for development assessment could be applied to that coastal risk area through the LEP. More detailed development controls can then be applied to the whole or sections of the coastal risk area, such as the immediate hazard line, the projected 2050 hazard line and the projected 2100 hazard line in the DCP.

Such development controls could cover required mitigation works, construction methods or materials, size of the development, building design, the need for development to be relocatable or temporary and the location of utilities or services within the site. The DCP could also specify the use of time and/or trigger limited conditions within a development consent to allow sustainable accommodation of the coast until such time as the impacts of sea level rise compromise life and property.

Figures 4 and **5** illustrate these matters.

Relevant components of Section 4 – Development Assessment in Coastal Areas, of this Guideline, such as the planning criteria, management responses and adaptation strategies, information requirements and assessment process could all be included in a council's DCP.

Old Bar – September 2009 – Santina Camroux

4 DEVELOPMENT ASSESSMENT IN COASTAL AREAS

PRINCIPLE 5 – Minimise the exposure of development to coastal risks.

PRINCIPLE 6 – Implement appropriate management responses and adaptation strategies, with consideration for the environmental, social and economic impacts of each option.

4.1 DEVELOPMENT IN COASTAL AREAS

This section is intended to assist proponents in preparing coastal development applications and consent authorities assessing these development applications under the *Environmental Planning and Assessment Act* 1979.

The strategic and statutory land use planning mechanisms outlined in Section 3 will assist councils in long term planning by avoiding intensifying land use in areas subject to coastal risks where the impacts of sea level rise cannot be effectively mitigated. The development assessment process provides a further opportunity to ensure that future coastal development does not increase exposure to coastal risks.

Coastal planning **Principle 5** of this Guideline indicates that proposed developments should seek to minimise exposure to coastal risks.

For development sites that are located *within* coastal risk areas, pre-DA consultation with the consent authorities and relevant State agencies will be an important component of the development assessment process.

4.2 SITE SELECTION

The planning criteria below should be considered by applicants when selecting coastal development sites and designing development proposals. These criteria will then be considered by consent authorities when assessing coastal development proposals.

4.3 PREPARATION OF DEVELOPMENT APPLICATION (DA)

Figure 3 outlines the process for development assessment in coastal areas.

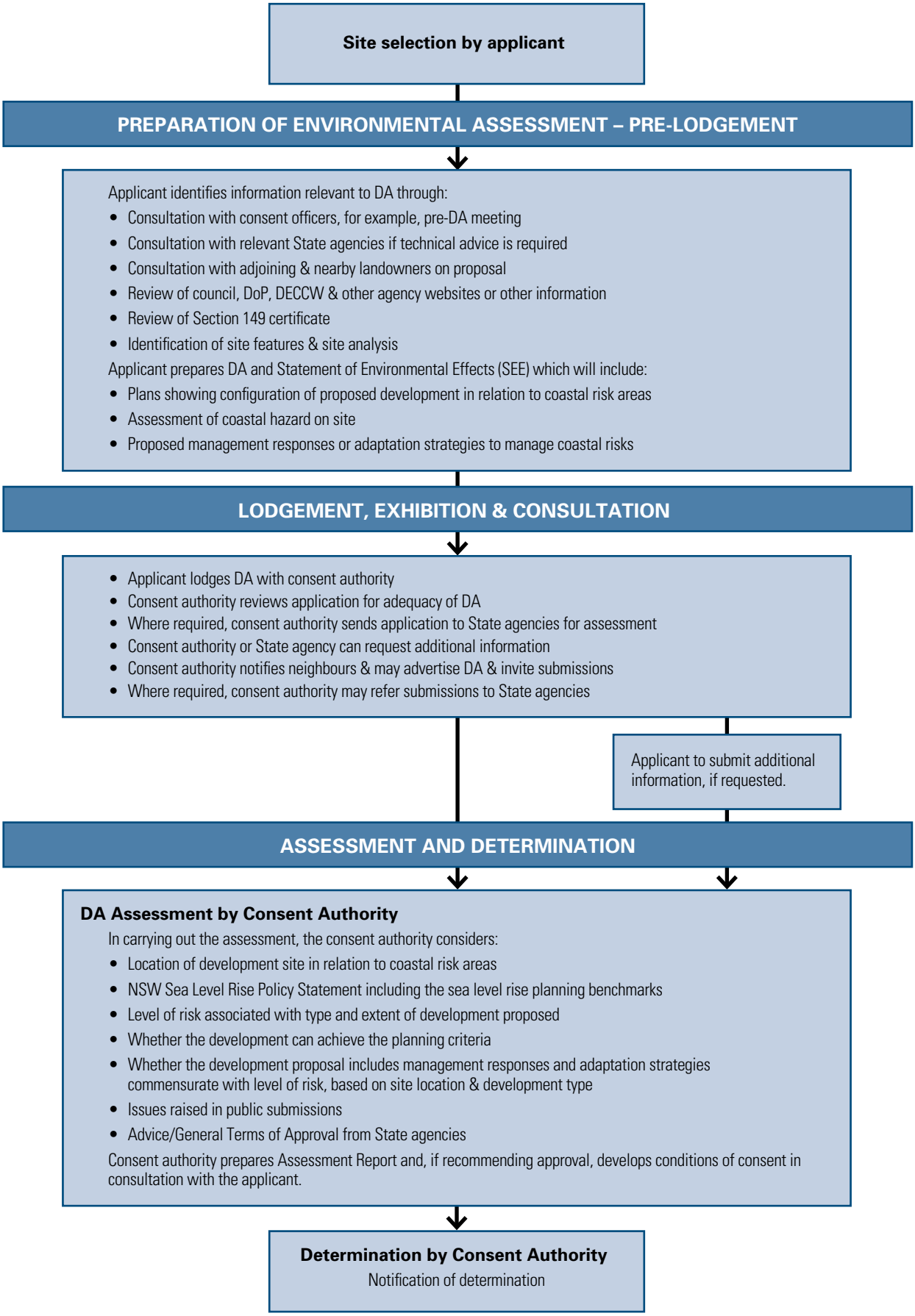
Pre-DA consultation

Proponents who intend to submit development applications in coastal risk areas should seek early advice from the consent authority on the nature and extent of the coastal risks that may affect the development site. Proponents should consult with relevant State agencies where required under legislation. Proponents should also review relevant guidelines, technical documents and reports including the NSW sea level rise planning benchmarks.

PLANNING CRITERIA FOR PROPOSED DEVELOPMENT IN COASTAL RISK AREAS

1. Development avoids or minimises exposure to immediate coastal risks (within the immediate hazard area or floodway).
2. Development provides for the safety of residents, workers or other occupants on-site from risks associated with coastal processes.
3. Development does not adversely affect the safety of the public off-site from a change in coastal risks as a result of the development.
4. Development does not increase coastal risks to properties adjoining or within the locality of the site.
5. Infrastructure, services and utilities on-site maintain their function and achieve their intended design performance.
6. Development accommodates natural coastal processes including those associated with projected sea level rise.
7. Coastal ecosystems are protected from development impacts.
8. Existing public beach, foreshore or waterfront access and amenity is maintained.

Figure 3 – Assessment process for development applications (DAs) in coastal areas



Councils may have DCPs, management plans or other council policies or strategies which apply to the land or the type of development being proposed which may assist proponents in siting and designing developments in coastal risk areas.

Early discussions with councils could also assist in identifying how the proposed development could contribute to any initiatives proposed by the council to manage or avoid coastal hazard risks.

It is also important to consult with adjoining and nearby landowners to discuss both the proposed development and any actions proposed to manage or mitigate offsite coastal risks associated with the proposed development.

Site design and layout

For proposed developments located in coastal risk areas, the assessment criteria will need to be addressed through site design and layout.

The council may also be able to provide advice on appropriate site design and layout for developments in coastal areas.

Management responses and adaptation strategies

Coastal planning **Principle 6** indicates that implementation of appropriate management responses and adaptation strategies will be an important component of any new development in coastal areas.

Applications for coastal development should outline any management responses or adaptation strategies that will be adopted to address the planning criteria such as:

- configuring the development site layout to minimise exposure to coastal risks, such as, ensuring that buildings and infrastructure are placed in low risk areas on site and provide open space and landscaping between buildings and areas of higher hazard risk (illustrated in **Figure 4** and **Figure 5**);
- installing and maintaining protection works;
- constructing buildings or structures that are easily decommissioned, dis-assembled or relocatable either on-site or off-site as required;
- providing for safe evacuation routes during storm and flood events;
- designing buildings with all habitable floors above flood planning levels; and
- designing buildings to be structurally sound in the planning flood.

The appropriateness of these management responses and adaptation strategies will differ on a case-by-case basis.

DA information requirements

Applicants submitting DAs for development in coastal risk areas must demonstrate that the proposal satisfies the planning criteria in Section 4.2. In order to do so, the following information is to be submitted with the DA, as part of the Statement of Environmental Effects (SEE), as appropriate to the scale and location of the proposal.

- Information outlining the type of proposed development including:
  - nature, bulk, scale and location of proposed development; and
  - proposed use and occupation of buildings, and those on adjoining land.
- Plans illustrating the position and configuration of the proposed development in relation to coastal risks including:
  - position of the existing and proposed buildings;
  - existing ground levels in AHD around the perimeter of the building;
  - existing or proposed floor levels in AHD;
  - foundation type; and
  - topographic levels of the site to an accuracy of 0.1m, and structures to an accuracy of 0.01m, showing relative levels in AHD.
- A report addressing the following issues relating to sea level rise as they relate to the development site, where relevant:
  - increase in sea level and increased tidal range;
  - soft coast erosion – beach and foredune loss and/or migration, shoreline recession, beach realignment;
  - coastal flooding;
  - coastal entrance behaviour;
  - reconfiguration of intermittently open and closed lakes and lagoons;
  - cliff and slope instability;

Belongil Beach – Richard Hagley

  - wetland migration; and
  - groundwater elevation and/or salinisation.
- Information that demonstrates whether the development proposal:
  - is consistent with the relevant coastline or flood risk management plan;
  - is consistent with any relevant DCP that relates to coastal or flood issues;
  - meets the coastal protection and flood risk management requirements of the LEP; and
  - incorporates appropriate management responses and adaptation strategies.

4.4 CONSULTATION

The consultation process informs the community of a development application and enables input from the community as well as other agencies that may have an interest in the development assessment process.

The consultation process for a development application within a coastal risk area is the same as for other developments. The consultation process and procedures is often outlined in a council's DCP.

4.5 ASSESSMENT OF DEVELOPMENT APPLICATION

When assessing a development application in a coastal area the consent authority should assess the level of risk of the proposal. Risk is a function of proximity and exposure to coastal hazards and the likely severity of the impacts of the event on the particular type of development.

Risk = Probability of an event occurring x
Likely severity of the impacts

If the proposed development is not located within a coastal risk area, additional assessment under this Guideline is not required.

Assess risk related to location of proposed development

The *probability of an event occurring* will be dependent on the location and nature of the development site. The consent authority should determine whether any part of the development site is located in a coastal risk area (illustrated in **Figure 4** and **Figure 5**).

The proponent must provide the consent authority with the appropriate information to determine whether the development is sited within a coastal risk area. In some cases, this information will be available in council plans or studies, in other cases, the applicant will need to undertake their own studies.

Assess risk related to type of proposed development

The *impact of an event*, being the effects of coastal hazard events on a development site, will be a function of the type and siting of development.

As a guide, the following types of development proposals in coastal risk areas would require further detailed assessment of risks to life, property and/or the environment:

- construction of new residential, commercial, retail or industrial buildings or structures or substantially increasing the floor space ratio of existing buildings or structures;
- subdivision, with consideration for proposed building envelopes, access and service easements;
- institutional developments, especially where evacuating people may be particularly difficult, such as, hospitals, schools, child care or aged care facilities;
- material change of use that substantially increases the number of people living or working on site;
- manufacture or storage of hazardous or dangerous materials or waste disposal; or
- sewage treatment works, substations and other key infrastructure essential in emergency response and recovery.

If these types of development are proposed in a coastal risk area, the consent authority should determine whether the type of development proposed, that is, its nature, bulk or scale and its use is likely to have implications for:

- exposure to immediate coastal risks, that is, within the immediate hazard area;
- maintenance of flow conveyance; that is, within the floodway;
- safety of residents, workers or other occupants on-site;
- safety of public off-site from a change in coastal hazards as a result of the development;
- safety of properties adjoining or within the locality of the development site;

Wooli, River Street – 12 Jan 2009 king tide – Wayne Jubb

- performance of infrastructure, services and utilities on-site including emergency response requirements during and in the aftermath of an extreme coastal and/or flood event;
- changes to natural coastal processes as a result of the design of the development;
- coastal ecosystems on or adjoining the site; or
- existing public beach, foreshore or waterfront access and amenity.

If the consent authority considers the proposed development to be *minor development*, applications need not be assessed against the above criteria.

The following types of development could generally be considered *minor*, however the consent authority should consider each application on a case-by-case basis:

- internal fitouts, minor alterations, additions or extensions to existing buildings or structures that are landward of the seaward alignment of the existing buildings or structures;
- waterway-based structures including jetties, slipways, wharves, boat sheds and pontoons;
- exempt development; or
- temporary or minor relocatable structures.

Assess proposed development against criteria

Based on the risk assessment process identified above, applications for development, other than minor development, in coastal risk areas will need to demonstrate how the proposed development will be designed and managed to achieve safety, planning and environmental performance outcomes.

This assessment approach promotes appropriate development in coastal risk areas through the merit assessment of proposals based on social, economic and environmental factors, rather than strict compliance with a set of prescriptive development controls.

The planning criteria will need to be considered by a consent authority before determining development applications in coastal risk areas.

4.6 DETERMINATION OF DEVELOPMENT APPLICATION

When assessing development applications in coastal areas, consent authorities must have regard to the coastal planning **Principle 5** and **Principle 6** of this Guideline.

In addition, consent authorities should take into consideration:

- location of the development site in relation to coastal risk areas (**Figures 4** and **5**);
- *NSW Sea Level Rise Policy Statement* including the sea level rise planning benchmarks;
- level of risk associated with the type and extent of development proposed;
- whether the development can achieve the planning criteria, including for a defined period of time;
- whether the development incorporates appropriate management responses and adaptation strategies commensurate with the level of risk associated with the site location and the type of development being proposed;
- issues raised in public submissions; and
- advice/general terms of approval from State agencies.

In addition to this Guideline, consent authorities should have regard to other relevant policies and development controls that apply to the development and the subject site.

4.7 CONDITIONS OF CONSENT

The development consent can include conditions relating to the management responses and adaptation actions necessary for the development to meet the planning criteria. This may include site layout and design, construction type and materials, protection works, as well as trigger and/or time limited consents.

A trigger point could be defined as the erosion escarpment receeding to a specified distance from the lot boundary. The distance should be defined consistently with NSW Government policies relating to coastal protection.

Time limited consents could provide a renewal option in the event that conditions at that time still provide for safe occupation.

Such conditions may be particularly appropriate for areas of existing development. They may allow sustainable occupation of coastal land until such time as coastal risks compromise the safety of life and property.

4.8 OTHER DEVELOPMENT ASSESSMENT PROCESSES

Complying development under the General Housing Code of the *State Environmental Planning Policy (Exempt and Complying Development Codes) 2008* cannot be undertaken on flood control lots (see glossary for definition) or land identified in an environmental planning instrument as a coastal erosion hazard.

Figure 4 – Coastal erosion consideration in DA assessment

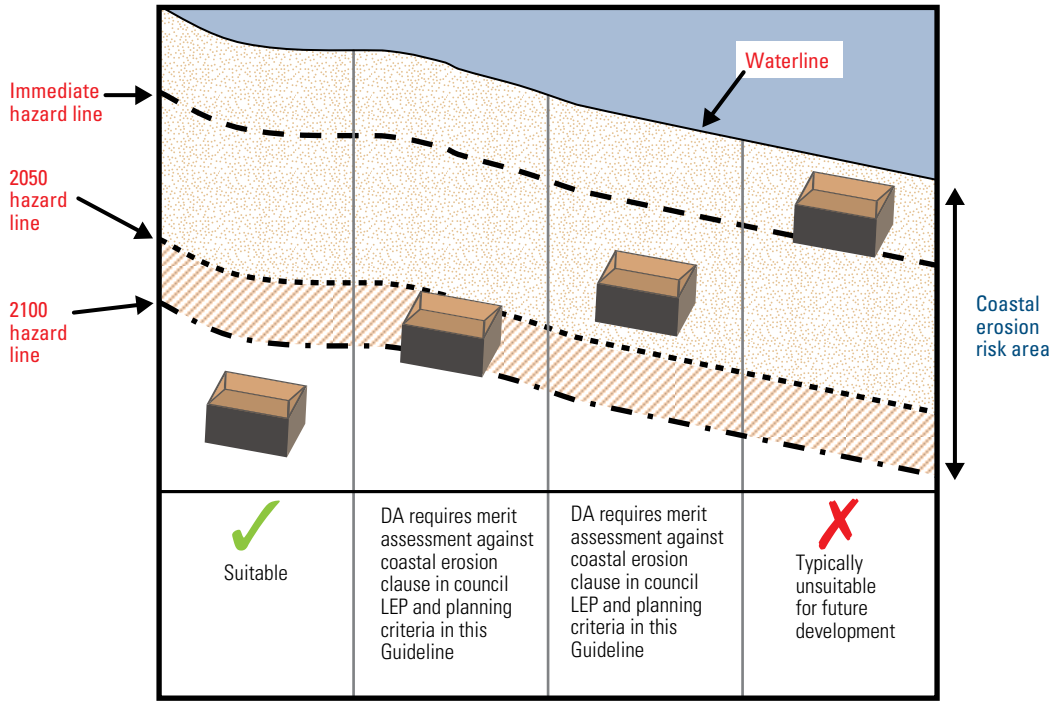
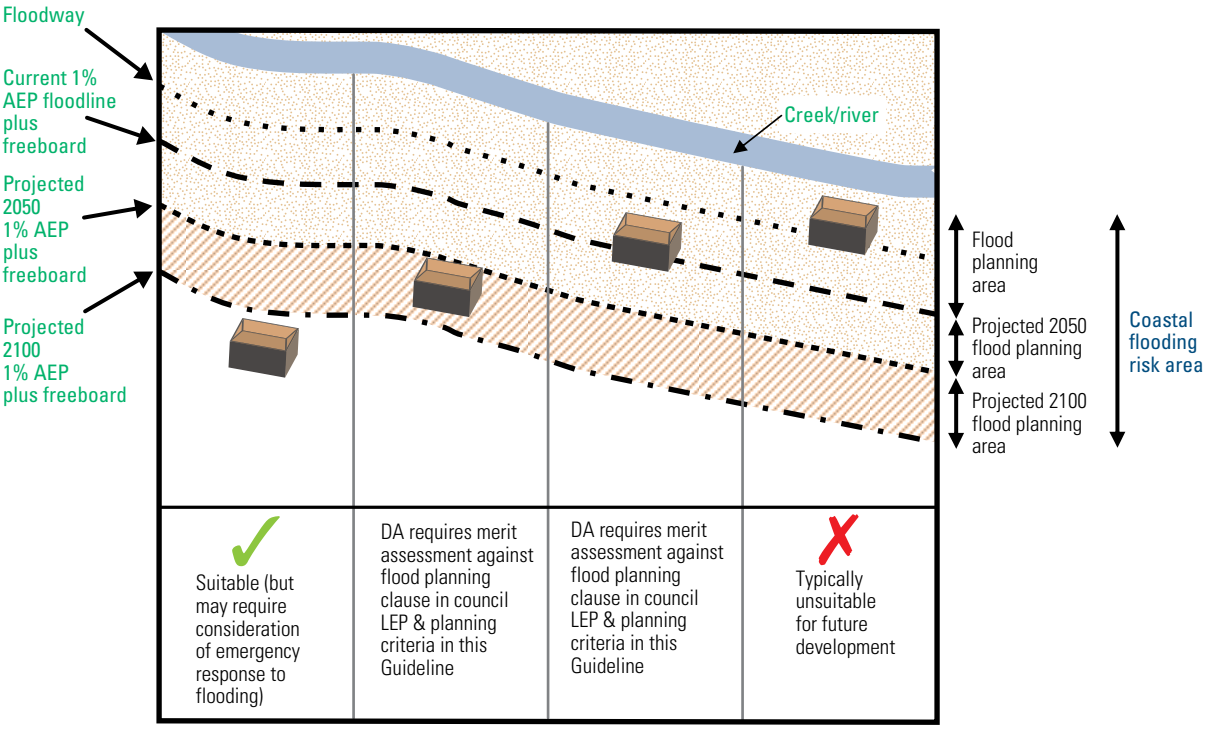


Figure 5 – Coastal flooding consideration in DA assessment



Part 3A of the *Environmental Planning and Assessment Act* 1979 specifies a process-based approach to assessment of major projects. This includes Director General Requirements that specify all issues of relevance to a proposal that need to be assessed. Environmental, social and economic considerations are factored into this assessment, commensurate with their relevance to the proposal and site in question. Where relevant to a particular proposal, the sea level rise planning benchmarks and principles in this Guideline would inform the Director General's requirements.

Whilst this Guideline is not specifically focused on public assets and infrastructure, the planning criteria outlined in Section 4.2 are equally relevant to the consideration of such developments.

North Coast – Greg Yeates

FURTHER INFORMATION AND REFERENCES

Coastal Council of NSW (2003) *Coastal Design Guidelines for NSW. http://www.planning.nsw.gov.au/PlansforAction/Coastalprotection/CoastalDesignGuidelines/tabid/174/Default.aspx*

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DECCW (2009) *Derivation of the NSW Government's sea level rise planning benchmarks.*

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NSW Government (1997) *NSW Coastal Policy. http://www.planning.nsw.gov.au/plansforaction/pdf/CPPARTA.PDF http://www.planning.nsw.gov.au/plansforaction/pdf/CPPARTB.PDF*

NSW Government (2009) *NSW Sea Level Rise Policy Statement.*

Section 117 Direction 2.2 – Coastal Protection. http://www.planning.nsw.gov.au/planningsystem/pdf/s117s_issued_01jul09.pdf

Section 117 Direction 4.3 – Flood Prone Land. http://www.planning.nsw.gov.au/planningsystem/pdf/s117s_issued_01jul09.pdf

Standard Instrument – Principal Local Environmental Plan. http://www.planning.nsw.gov.au/LocalEnvironmentalPlans/StandardInstrument/tabid/247/Default.aspx

State Environmental Planning Policy 71 – Coastal Protection. http://www.legislation.nsw.gov.au/maintop/view/inforce/epi+816+2002+cd+0+N

GLOSSARY

annual exceedance probability (AEP) – the chance of a flood of a given or larger size occurring in any one year, usually expressed as a percentage.

Australian Height Datum (AHD) – a common national surface level datum approximately corresponding to mean sea level in 1968.

average recurrence interval (ARI) – the long term average number of years between the occurrence of a flood as big as or larger than the selected event. ARI is a way of expressing the likelihood of occurrence of a flood event.

coastal area – is used broadly in this Guideline to be all land fronting tidal waters including the coastline, beaches, coastal lakes, bays and estuary sections or tidal sections of coastal rivers. It also includes other low lying land surrounding these areas that may be subject to coastal processes in the future as a consequence of sea level rise.

coastal erosion risk area – refers to the extent of calculated shoreline recession plus any allowance for reduced foundation capacity.

coastal flooding – refers to catchment-related flooding of coastal areas.

coastal risk area – the term used in this Guideline to identify the land covered by both the coastal erosion risk area (Figure 1), as well as the coastal flooding risk area (Figure 2).

coastal risk – in the context of this Guideline means coastal erosion, tidal inundation and coastal flooding, including impacts of sea level rise.

DA – Development Application

DCP – Development Control Plan

DECCW – NSW Department of Environment, Climate Change and Water

DoP – NSW Department of Planning

flood control lot – means a lot to which flood related development controls apply in respect of development for the purposes of dwelling houses, dual occupancies, multi-dwelling houses or residential flat buildings (other than development for the purposes of group homes or seniors housing).

flood planning area – the area of land below the flood planning level and thus subject to flood-related development controls. Commonly, the flood planning area covers the extent of a design flood, for example, 100 year ARI or 1% AEP, plus an appropriate freeboard, for example, 0.5m.

flood planning levels (FPLs) – are the combinations of flood levels, derived from significant historical flood events or floods of specific AEPs, and freeboards selected for floodplain risk management purposes, as determined in management studies and incorporated in management plans.

floodway – those areas of the floodplain where a significant discharge of water occurs during floods. They are often aligned with naturally defined channels. Floodways are areas that, even if only partially blocked, would cause a significant redistribution of flood flow, or a significant increase in flood levels.

identified coastal risk area – as new coastal hazard and flood studies incorporating the NSW sea level rise planning benchmarks are completed, identified coastal risk areas may include new areas of coastline, foreshore and floodplain that previously were of lower risk.

immediate hazard line – mapped line representing the estimated extent of beach erosion from an extreme oceanic storm event plus any allowance for reduced foundation capacity.

LEP – Local Environmental Plan

NSW Coastal Zone – identified in the series of gazetted maps under the *Coastal Protection Act 1979*.

NSW sea level rise planning benchmarks – are specified in the *NSW Sea Level Rise Policy Statement* as an increase above 1990 mean sea levels of 40 cm by 2050 and 90cm by 2100.

planning criteria – eight criteria to be considered by consent authorities when assessing development applications in coastal risk areas (detailed in section 4.2).

risk – is assessed on the basis of the probability of an event occurring multiplied by the impact of the event.

sea level rise investigation areas – potential coastal risk areas adopted by council prior to preparing new and updating existing coastal hazard and flood studies. The sea level rise planning benchmarks should be incorporated into the calculation of sea level rise investigation areas.

SEE – Statement of Environmental Effects

tidal inundation – refers to flooding of land by tidal waters